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DigiWorld

English for Electronics, Electrotechnology,
Automation and ICT

Teacher's Book



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Real-Life skills

Authentic videos

Case studies

Mapping your mind

2030 Agenda

Citizenship

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English for:

- Electronics, Electrotechnology and Automation
- Information and Communication Technology

Teacher's Book

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*DIGI*WORLD • Teacher's Book

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INTRODUZIONE

DigiWorld è un corso di inglese specialistico che promuove lo sviluppo di competenze specifiche, linguistiche e professionali richieste dal mondo dell'impresa. L'acquisizione progressiva e flessibile di tali competenze contribuisce significativamente alla costruzione delle competenze generali richiamate nelle indicazioni nazionali per la programmazione del secondo biennio e del monoennio e nel profilo professionale del diplomato di **Istituto Tecnico - Settore Tecnologico - Indirizzo "Elettronico, Elettrotecnica e Automazione"** e **"Informatica e Telecomunicazioni"**. A questo proposito deve anche essere sottolineato il fatto che le stesse competenze costituiscono elemento selezionante per la partecipazione a progetti UE (Erasmus+) e risultano essere un bagaglio utile per la partecipazione attiva alle attività di PCTO, obbligatorie dal terzo anno.

OBIETTIVI DEL TESTO

La finalità educativa generale del testo è quella di fornire una sintesi che integri al suo interno competenze di carattere comunicativo e pratico-operativo con elementi culturali. **DigiWorld** pone l'accento sull'apprendimento autonomo fornendo materiali di facile consultazione e utilizzo finalizzati all'acquisizione non solo di contenuti, ma anche di strategie di apprendimento. Nello specifico, gli obiettivi che ci si propone di raggiungere sono i seguenti:

- formare un tecnico che possa lavorare nel settore elettronico, elettrotecnico, informatico e delle telecomunicazioni;
- offrire un percorso sistematico, ma allo stesso tempo flessibile e personalizzabile, in grado di soddisfare i diversi bisogni di docenti e studenti del settore;
- sviluppare la consapevolezza di un sapere unico, le competenze culturali trasversali, soprattutto nel settore pertinente all'indirizzo di studio;
- favorire l'acquisizione di specifiche abilità orali e scritte di comprensione e produzione;
- proporre un lessico specifico ampio e moderno che tenga anche conto della lingua del web;
- favorire l'autonomia linguistica e operativa;
- sviluppare strategie per il lavoro in team e stimolare la soluzione di problemi;
- offrire spunti per moduli e percorsi trasversali;
- proporre materiali fruibili anche da allievi BES.

STRUTTURA DEL TESTO

DigiWorld è fruibile secondo due percorsi, identificabili tramite due riquadri colorati sul bordo della pagina di destra. Il percorso **verde** segue la programmazione di elettronica, elettrotecnica ed automazione, il percorso **blu** quello di informatica e telecomunicazioni. Il doppio riquadro colorato identifica le aree trasversali di interesse comune.

DigiWorld è diviso in sei Moduli, ognuno dei quali è ripartito in un numero variabile di Unità. Ogni Unità è suddivisa in brevi Capitoli su due pagine – teoria ed esercizi – per favorire non solo uno studio più parcellizzato, ma anche la scelta dei contenuti antologica da parte dell'insegnante. I contenuti dei Capitoli sono divisi in paragrafi titolati per renderne la comprensione più agevole. I testi vengono affrontati in modo graduale, attraverso esercizi di esplorazione del lessico specifico, comprensione scritta e orale, globale e specifica, reimpiego dei termini tecnici e produzione scritta e orale. Brevi link arricchiscono i brani per consentire una maggiore interattività con l'allievo. Si tratta di curiosità, ampliamenti, rimandi, attività o mini-approfondimenti che hanno l'intenzione di favorire una lettura più interessante ed offrire spunti di riflessione o interazione. Sono cromaticamente differenziati: verdi per i link con attività, arancioni per quelli informativi. Alcune rubriche di approfondimento o curiosità, inoltre, corredano la pagina degli esercizi. Un ricco apparato iconografico correda i brani di lettura, per ognuno dei quali è previsto un esauriente glossario.

Ogni Unità termina con la sezione:

- **Vocabulary:** pagina di esercizi di revisione e consolidamento del lessico introdotto nell'Unità;
- **Mapping your Mind:** mappa concettuale che rappresenta la rete di relazioni tra i vari argomenti dell'Unità e utile strumento per riassumere i concetti chiave e ripassare.

Al termine di ognuno dei sei Moduli, il testo propone delle ulteriori attività, suddivise nelle seguenti parti:

- **Real-life skills:** in questa parte gli studenti sono chiamati a mettere in pratica quanto studiato attraverso attività varie, compiti di realtà e collaborativi, lavori di gruppo e a coppie, che, sempre avendo l'apprendimento linguistico come obiettivo principale, hanno un taglio di tipo pratico calato nella realtà;
- **Case study:** presentazione di un argomento di attualità collegato ai contenuti introdotti, tratto da fonti autentiche e corredato di esercizi mirati anche all'approfondimento e alla discussione tra gli studenti dell'argomento presentato;
- **Clip:** Attività relative a una breve clip tratta da film o documentari le cui tematiche sono attinenti ai contenuti presentati nel Modulo;
- **Citizenship:** pagina di attività che prende spunto dai contenuti del modulo per agganciarsi a tematiche legate all'educazione civica e alla cittadinanza.

MATERIALE DEL TESTO

Audio e Video

Per le tracce audio viene proposto un elevato numero di attività di ascolto in tutte le Unità; il contesto è collegato agli argomenti trattati nel Modulo; la lunghezza e la complessità sono graduate. Dal punto di vista lessicale gli ascolti riprendono i vocaboli chiave dell'unità inseriti in contesti reali e di vita professionale con l'utilizzo di registri linguistici diversi, da informale e familiare a più formale. I video sono tutti reali, tratti dalla rete e quindi materiale esclusivamente autentico e non creato ad hoc. La trascrizione dei testi è fornita nel *Teacher's Book*.

Digitale

Un'ampia sezione di risorse online è collegata al testo. I vari materiali proposti possono essere utilizzati in modo flessibile: possono offrire spunti per altre attività, anche di gruppo, e offrono la possibilità di impostare percorsi personalizzati e in armonia con il livello di competenza raggiunto da ogni singolo allievo.

Disponibili sul sito www.edisco.it:

- file audio formato MP3 con la registrazione delle attività di ascolto;
- film clip e video;
- approfondimenti relativi ai vari moduli;
- piccolo compendio di grammatica con esercizi calati nel contesto della microlingua;
- esempio di prova INVALSI;
- civiltà: compendio schematico e comparativo tra UK e US delle loro principali caratteristiche geografiche, storiche, politiche e culturali con anche riferimenti all'Unione Europea e alle organizzazioni internazionali;
- test doppio per ogni Unità e Modulo, in formato editabile.

Esame di Stato

Essendo la lingua straniera coinvolta solo in forma orale nell'attuale Esame di Stato, vengono fornite delle proposte di possibili spunti per il lancio della discussione che affronti i nodi disciplinari come richiesto dalla normativa. Si tratta di immagini, citazioni o affermazioni ispirate a ogni Modulo che possano agganciarsi alle discipline studiate nel corso dell'ultimo anno e consentire lo sviluppo di un'analisi da parte degli studenti.

Test

Il *Teacher's Book* contiene test formativi (due per ogni singola Unità) e test sommativi (due per ogni singolo Modulo). Ciascun test propone diverse tipologie di esercizi e può essere adattato alle diverse esigenze dei docenti

a seconda degli studenti con cui si trovano a lavorare. Ogni test è anche disponibile in formato editabile – ed è quindi possibile adattarlo per ogni studente, anche BES – per poter garantire al docente la scelta della lunghezza della verifica, l'eventuale ulteriore riduzione del numero degli item/esercizi e la scelta della tipologia di esercizi da proporre. Le chiavi di ogni test sono disponibili all'interno del *Teacher's Book*.

Recupero, obiettivi minimi e BES

DigiWorld è corredato da materiali che rendono il testo fruibile anche da studenti in difficoltà. Gli strumenti che facilitano la comprensione, semplificano i contenuti e agevolano il lavoro e lo studio individuale sono i seguenti:

- la grafica del testo tende a tener conto delle difficoltà di lettura di alcuni DSA e le pagine chiuse che caratterizzano il libro possono anch'esse rappresentare una risorsa perché facilmente consultabili per lo studio e nei momenti di verifica;
- il libro di testo in formato digitale può favorire il lavoro in classe e a casa;
- le mappe ed il glossario possono rientrare nelle misure compensative suggerite nella maggior parte dei casi per lo svolgimento delle prove in classe;
- le tipologie di attività, sia del testo che dei test, sono molto spesso adatte a studenti con problematiche di dislessia o difficoltà di apprendimento: DigiWorld è molto ricco di esercizi a risposta chiusa, quali vero/falso, abbinamento, scelta multipla e riconoscimento – attività generalmente suggerite per le prove scritte;
- i test per il docente sono forniti in formato editabile per facilitarne la personalizzazione a seconda delle esigenze particolari di ciascun studente, in conformità con le misure dispensative o compensative individuate.

Per ulteriori informazioni si può consultare la normativa di riferimento composta dalla Legge n. 170/2010 e dai Decreti Attuativi n. 5669 del 12 luglio 2011 con le relative Linee Guida.

Educazione Civica

Diversi sono i materiali proposti che possono offrire spunti e collegamenti con i temi trattati in Educazione Civica. In particolare, si veda la sezione dedicata al fondo di ogni Modulo e le parti del testo segnalate con il logo dell'Agenda 2030.

Didattica Orientativa e PCTO

Secondo le Linee Guida del D.M. 22 dicembre 2022 n. 328, l'orientamento è un processo volto a facilitare la conoscenza di sé, del contesto formativo, occupazionale, sociale culturale ed economico di riferimento, delle strategie messe in atto per relazionarsi ed interagire in tali realtà. Obiettivo di tale processo è favorire la maturazione e lo sviluppo delle competenze necessarie

per poter definire o ridefinire autonomamente obiettivi personali e professionali aderenti al contesto, elaborare o rielaborare un progetto di vita e sostenere le scelte relative.

Le scuole secondarie di secondo grado attivano a partire dall'anno scolastico 2023-2024 moduli curriculari di orientamento formativo degli studenti del triennio di almeno 30 ore per anno scolastico. Tali moduli rappresentano uno strumento essenziale per aiutare gli studenti a fare sintesi riflessiva e interdisciplinare della loro esperienza scolastica e formativa, in vista della costruzione in itinere del personale progetto di vita culturale e professionale. In quest'ottica, il testo **DigiWorld** propone attività mirate di *real-life skills* atte a sviluppare abilità di auto-orientamento e *problem solving*. Queste attività di tipo per lo più progettuale sono intese a sviluppare, nell'ottica dell'utilizzo della lingua straniera per reali scopi comunicativi, quelle abilità trasversali e di *team working* che saranno richieste all'ingresso nel mondo del lavoro.

■ GLI ISTITUTI TECNICI

L'identità degli Istituti Tecnici

I nuovi ordinamenti del secondo ciclo del sistema educativo di istruzione e formazione di cui al decreto legislativo n. 226/05 e che ebbero attuazione dall'anno scolastico 2010/11, sono fondati sul principio dell'equivalenza formativa di tutti i percorsi con il fine di valorizzare i diversi stili di apprendimento degli studenti e dare una risposta articolata alle domande del mondo del lavoro e delle professioni. La diversificazione dei percorsi di istruzione e formazione ha proprio lo scopo di valorizzare le diverse intelligenze e vocazioni dei giovani, anche per prevenire i fenomeni di disaffezione allo studio e la dispersione scolastica, ferma restando l'esigenza di garantire a ciascuno la possibilità di acquisire una solida ed unitaria cultura generale per divenire cittadini consapevoli, attivi e responsabili.

Nel quadro sopra delineato, il rilancio dell'istruzione tecnica si fonda sulla consapevolezza del ruolo decisivo della scuola e della cultura nella nostra società non solo per lo sviluppo della persona, ma anche per il progresso economico e sociale; richiede perciò il superamento di concezioni culturali fondate su un rapporto sequenziale tra teoria/pratica e sul primato dei saperi teorici.

Agli istituti tecnici è affidato il compito di far acquisire agli studenti non solo le competenze necessarie al mondo del lavoro e delle professioni, ma anche le capacità di comprensione e applicazione delle innovazioni che lo sviluppo della scienza e della tecnica continuamente produce. Per diventare vere "scuole dell'innovazione", gli istituti tecnici sono chiamati ad operare scelte orientate permanentemente al cambiamento e, allo stesso tempo, a favorire attitudini all'autoapprendimento, al lavoro di gruppo e alla formazione continua.

In questo quadro, orientato al raggiungimento delle competenze richieste

dal mondo del lavoro e delle professioni, le discipline mantengono la loro specificità, ma è molto importante che i docenti scelgano metodologie didattiche coerenti con l'impostazione culturale dell'istruzione tecnica che siano capaci di realizzare il coinvolgimento e la motivazione all'apprendimento degli studenti. Sono necessari, quindi, l'utilizzo di metodi induttivi, di metodologie partecipative, una intensa e diffusa didattica di laboratorio, da estendere anche alle discipline dell'area di istruzione generale, con l'utilizzo, in particolare, delle tecnologie dell'informazione e della comunicazione, di attività progettuali e di PCTO per sviluppare il rapporto col territorio e le sue risorse formative in ambito aziendale e sociale.

La scuola e il mondo del lavoro

Soprattutto negli istituti tecnici, che offrono un'ampia possibilità, dopo il diploma, di intraprendere subito un percorso professionale, è auspicabile che gli studenti imparino il prima possibile ad elaborare le acquisizioni che la scuola propone loro attraverso lo studio delle discipline, arricchendole e integrandole con esperienze che li mettano in grado di confrontarsi con crescente autonomia con le richieste dal mondo del lavoro e delle professioni, per mettere in relazione questi dati con gli interessi e le aspirazioni personali. Nel rispetto dell'autonomia organizzativa e didattica di ciascuna istituzione scolastica, è auspicabile infine che l'impegno della scuola si concentri prevalentemente su principi che sviluppino gli aspetti educativi più intimamente connessi con la dimensione della progettualità personale, in funzione di una facilitazione oggettiva delle scelte degli studenti. Si tratta di valorizzare le potenzialità di ciascun allievo, soddisfare le aspettative di crescita e di miglioramento e individuare percorsi rispondenti ai bisogni degli studenti. In altre parole, promuovere un orientamento che sostenga l'esplorazione delle possibilità di sviluppo personale e professionale, che valorizzi la dimensione orientativa delle discipline, che favorisca il collegamento e l'interazione della scuola con il territorio e il mondo produttivo, e che proponga agli studenti attività coinvolgenti, utilizzando diffusamente metodologie attive e contesti applicativi. Per svolgere questo delicato compito, gli istituti tecnici possono contare su alleanze consolidate, a livello locale, regionale e nazionale, con le istituzioni e le associazioni professionali e imprenditoriali.

L'apertura della scuola al mondo del lavoro e delle professioni è, tra l'altro, un'opportunità, unanimemente riconosciuta, per prevenire e contrastare la dispersione scolastica, oltre che per favorire l'occupabilità. Per mantenere elevati i livelli di occupazione occorre puntare su livelli di istruzione più elevati, ma anche sull'apertura a esperienze e linguaggi diversi: contenuti specialistici e suddivisioni disciplinari tendono ad una crescente interdipendenza e contaminazione tra i saperi. Per far fronte alle nuove sfide dell'educazione, l'Unione Europea raccomanda ai paesi membri di rinnovare i sistemi educativi nazionali in modo da superare la contrapposizione tra cultura generale e cultura tecnica e professionale, creare nuovi ponti tra scuola, società e impresa,

considerando quest'ultima anche come ambiente formativo, per garantire ai cittadini e ai lavoratori un apprendimento lungo l'intero corso della vita. In questo contesto sono sempre più necessari l'interazione e il dialogo, in forme non episodiche, tra le imprese, che per sopravvivere e svilupparsi devono divenire "fabbriche di conoscenza", e le scuole, tradizionali "fabbriche della conoscenza e della cittadinanza".

L'impianto del nuovo ordinamento accentua la rilevanza dell'istruzione tecnica come canale formativo dotato di una propria identità culturale e pedagogica, fondata sulla filiera scientifica e sulle tecnologie che caratterizzano gli indirizzi di studio.

■ LE ABILITÀ LINGUISTICHE

Le quattro abilità linguistiche fondamentali (lettura, ascolto, scrittura e parlato) possono essere divise in due gruppi:

1. abilità ricettive o di input (lettura e ascolto) vs. abilità produttive o di output (scrittura e parlato);
2. abilità orali (ascolto e parlato) vs. abilità scritte (scrittura e lettura).

La prima distinzione nasce dalla consapevolezza che nella comunicazione sono coinvolte due distinte sfere (e quindi capacità) che, pur influenzandosi a vicenda, si sviluppano secondo meccanismi differenti.

Quando si studia una lingua, infatti, è frequente trovare studenti che possono mostrare più difficoltà in entrambe le abilità linguistiche dello stesso gruppo. È probabile che uno studente che non riesce ad esprimersi compiutamente quando cerca di comunicare nella lingua straniera abbia problemi anche quando scrive in quella lingua oppure quando deve capire che cosa ha detto un parlante madrelingua, mentre è meno probabile che riscontri tali problemi quando legge. Ciò può naturalmente variare da individuo a individuo e/o con il passaggio da un livello linguistico all'altro; potenziando le abilità più carenti o facendo leva sulla *language skill* più sviluppata all'interno dello stesso gruppo, è infatti possibile equilibrare il livello delle varie abilità.

Ascolto (*Listening*)

È la prima *language skill* che mettiamo in pratica nella vita. Implica l'identificazione di suoni, accenti, inflessioni, intonazioni, ecc. e la comprensione di parole e frasi a livello orale per recepire un messaggio. Di solito ci sono due tipi di situazioni in cui possiamo ritrovarci a utilizzare questa abilità linguistica: situazioni interattive e situazioni non-interattive. Le prime sono rappresentate da conversazioni faccia a faccia o al telefono e comportano un'interazione con un altro parlante, a cui possiamo chiedere spiegazioni, chiarimenti o semplicemente di ripetere e parlare più lentamente. Le seconde, invece, sono costituite da tutte quelle situazioni in cui l'ascolto è "passivo": radio, televisione, registrazioni, conferenze, ecc. In questi casi non abbiamo l'opportunità di interagire con il

parlante e pertanto esse richiedono solitamente uno sforzo maggiore. È importante che lo studente non si scoraggi e pertanto è importante che capisca che il raffinamento di questa abilità richiede esercizio costante, che l'insegnante provvederà a fornire. Si deve insistere sulla concentrazione, nel caso di ascolto di test registrati, poiché gli stimoli non uditi possono distrarre dal *task*. Inoltre, l'insegnante provvederà ad incoraggiare gli studenti a riconoscere parole/segmenti chiave della registrazione e li inviterà a non preoccuparsi eccessivamente di stringhe linguistiche non funzionali alla comprensione in oggetto.

Parlato (*Speaking*)

È strettamente legato alla capacità di ascolto, in quanto insieme rappresentano il fulcro primario della comunicazione. Parlare, così come scrivere, implica tante altre micro-abilità che permettono di veicolare al meglio un messaggio: ad esempio, il tono, il registro, la pronuncia, il ritmo, l'intonazione, ecc. Tutte queste caratteristiche sono parte integrante di questa abilità linguistica e, di conseguenza, la mancanza di anche una sola di tali caratteristiche può compromettere l'efficacia comunicativa del messaggio che vogliamo veicolare. Anche in questo caso, l'insegnante offrirà uno stimolo/pretesto per la comunicazione, preferibilmente basato sugli interessi personali o le curiosità disciplinari degli studenti. L'insegnante, inoltre, incoraggerà gli studenti al raggiungimento della comunicazione orale attraverso frasi non complesse ed alla ricerca di equivalenti comunicativi per veicolare concetti troppo complessi o al ricorso ad esempi per raggiungere lo scopo comunicativo.

Letture (*Reading*)

È una delle *skills* che, anche nella propria lingua madre, richiede formazione e pratica. Oltre al riconoscimento dei caratteri, la lettura necessita anche la comprensione del significato delle varie parole codificate in quei caratteri e delle frasi che a loro volta queste formano. È importante incoraggiare gli studenti ad acquisire metodi di lettura selettiva come lo *skimming* (leggere velocemente un testo per estrapolarne un'idea generale – *general gist*) o lo *scanning* (andare alla ricerca selettiva dell'informazione richiesta dalla consegna) attraverso un esercizio alternato e costante di entrambi. Un'ottima attività introduttiva alla lettura di testi tecnici e quindi piuttosto specializzati linguisticamente, consiste in un'attività introduttiva di *brainstorming* su parole/concetti chiave che si incontreranno nel testo. Questo consente agli studenti di affrontare la lettura dotati di un minimo di pre-conoscenze.

Scrittura (*Writing*)

Pur sottostando a quasi tutte le norme che regolano il parlato, l'ascolto e la lettura, ha peculiarità proprie, specialmente in L2 poiché le regole stilistiche e la strutturazione della frase non sono sovrapponibili a quelle della lingua madre. È importante innanzitutto che gli studenti siano consapevoli dei diversi tipi di testo scritto (lettera, riassunto, relazione, messaggio, email, ecc.) e dei relativi registri (formale/informale) che si realizzano attraverso l'impiego di

strutture linguistiche e lessico diversificati. Pertanto sarà cura dell'insegnante offrire esempi e modelli di tali testi ed evidenziarne le peculiarità. I testi scritti dovranno preferibilmente aderire ad una traccia, inizialmente più dettagliata e via via più generica. È importante anche determinare la lunghezza del testo richiesto, segnalando le parole, da un minimo ad un massimo. Cura particolare nella correzione degli elaborati andrà nel tentativo di distinguere il tipo di errore (*vocabulary, word order, punctuation, grammar, appropriacy, ecc.*)

■ CLIL

Content and Language Integrated Learning (CLIL), o Apprendimento Integrato di Lingua e Contenuto, è un approccio educativo centrato su due obiettivi in cui una seconda lingua viene usata per insegnare ed imparare sia lingua che contenuti.

Fu introdotto da David Marsh e Anne Maljers nel 1994. Il CLIL è una metodologia di insegnamento che si è sviluppata in diversi Paesi Europei a partire dalla metà degli anni '90; in questo periodo, anche in Italia, grazie allo sviluppo di progetti europei organizzati da varie istituzioni e Università, alcune scuole hanno attivato sperimentazioni di insegnamenti di contenuti disciplinari in lingua straniera.

Il CLIL è diventato un'innovazione che implica la costruzione di competenza linguistica e comunicativa contestualmente allo sviluppo ed acquisizione di conoscenze ed abilità disciplinari; non è apprendimento di lingua ma nemmeno di una materia, bensì una fusione di entrambe. L'approccio CLIL comprende sempre un duplice obiettivo in quanto in una lezione CLIL si presta contemporaneamente attenzione sia alla disciplina insegnata sia alla lingua straniera veicolare.

Grazie al suo approccio a doppia focalizzazione, il CLIL offre un contesto più naturale per lo sviluppo della lingua che porta immediatezza, rilevanza e valore aggiunto al processo di apprendimento della stessa, sviluppando competenze sia nella disciplina non linguistica sia nella lingua straniera in cui questa è insegnata. Conseguire questo duplice obiettivo richiede lo sviluppo di uno speciale approccio integrato sia all'insegnamento sia all'apprendimento e richiede che gli insegnanti dedichino attenzione speciale non solo a come insegnare la lingua, ma anche al processo educativo più in generale. Il CLIL si dimostra efficace in tutti i settori dell'istruzione, dalla scuola primaria fino all'istruzione degli adulti ed istruzione accademica.

Gli insegnanti che lavorano con il CLIL normalmente parlano fluentemente la lingua obiettivo, oppure sono bilingui o madrelingua. In molte istituzioni gli insegnanti di lingua lavorano in collaborazione con altri dipartimenti che offrono il CLIL in diverse materie. Il fattore chiave è che il discente acquisisce nuove conoscenze su una materia che non implica di per sé l'insegnamento della lingua, ma in realtà usa ed impara una lingua straniera. Le metodologie e le strategie usate sono spesso legate all'area della materia di riferimento, in cui sono i contenuti che guidano le attività. Inoltre, il CLIL permette alle lingue di essere insegnate in modo relativamente intenso senza richiedere una eccessiva parte dell'orario scolastico.

Il profilo del docente CLIL

Il profilo del docente CLIL della scuola secondaria di secondo grado è caratterizzato da:

- competenze linguistico-comunicative nella lingua straniera veicolare di livello C1 del Quadro Comune Europeo di Riferimento per le lingue (QCER);
- competenze metodologico-didattiche acquisite al termine di un corso di perfezionamento universitario del valore di 60 CFU (Credito Formativo Universitario) per i docenti in formazione iniziale e di 20 CFU per i docenti in servizio.

Iniziative dell'Unione Europea per supportare l'apprendimento attraverso le lingue

Data la sua efficacia e l'abilità di motivare i discenti, il CLIL è indicato come un'area prioritaria nel *Piano d'Azione per l'Apprendimento delle Lingue e la Diversità Linguistica* (Sezione 1 1.2). Il Simposio Europeo su “La classe europea che cambia – il Potenziale dell'Istruzione Plurilinguistica”, che si tenne nel marzo 2005, ribadì il bisogno di assicurare che alunni e studenti partecipino al CLIL a differenti livelli dell'istruzione scolastica. Fu anche enfatizzato il fatto che gli insegnanti dovrebbero ricevere una speciale formazione per il CLIL. In quello stesso anno, l'Unione Europea pubblicò uno studio approfondito su come il CLIL si stava svolgendo nelle scuole in tutta Europa. L'Unione Europea ha anche supportato molti progetti CLIL insieme allo sviluppo di un network europeo per Classi di Contenuto e Apprendimento Integrato.

Il percorso normativo in Italia

La Legge 53 del 2003 ha riorganizzato la Scuola Secondaria di Secondo Grado e i Regolamenti Attuativi del 2010 hanno introdotto l'insegnamento di una disciplina non linguistica (DNL) in una lingua straniera nell'ultimo anno dei Licei e degli Istituti Tecnici e di due discipline non linguistiche in lingua straniera nei Licei Linguistici a partire dal terzo e quarto anno.

La Legge 107 del 2015, all'articolo 7, definisce come obiettivi formativi prioritari “la valorizzazione e il potenziamento delle competenze linguistiche, con particolare riferimento all'italiano nonché alla lingua inglese e ad altre lingue dell'Unione Europea, anche mediante l'utilizzo della metodologia CLIL”. Il Piano per la Formazione dei docenti 2016-2019, nel punto 4.4 Competenze di lingua straniera, evidenzia che i percorsi di metodologia CLIL sono fondamentali per:

- attuare pienamente quanto prescritto dai Regolamenti del 2010;
- ampliare l'offerta formativa attraverso contenuti veicolati in lingua straniera in tutte le classi delle scuole primarie e delle scuole secondarie di primo e secondo grado.

Il nostro è il primo paese dell'Unione Europea a introdurre il CLIL in modo ordinamentale nella Scuola Secondaria di Secondo Grado.

PROGETTARE PER COMPETENZE

I saperi e le competenze, articolati in conoscenze e abilità, con l'indicazione degli assi culturali di riferimento, sono descritti nel documento tecnico allegato al regolamento emanato con decreto del Ministro della Pubblica Istruzione n. 139 del 22 agosto 2007. La certificazione dei saperi e delle competenze acquisite dagli studenti nell'assolvimento dell'obbligo di istruzione è prevista all'art. 4, comma 3, del citato regolamento, in linea con le indicazioni dell'Unione europea, con particolare riferimento al Quadro Europeo dei titoli e delle qualifiche EQF.

“COMPETENZA: comprovata capacità di usare conoscenze, abilità e capacità personali, sociali e/o metodologiche, in situazioni di lavoro o di studio e nello sviluppo professionale e/o personale”.

(European Qualifications Framework - Quadro europeo delle Qualifiche e dei Titoli)

La certificazione delle competenze è uno strumento utile per sostenere e orientare gli studenti nel loro percorso di apprendimento sino al conseguimento di un titolo di studio o, almeno, di una qualifica professionale di durata triennale entro il diciottesimo anno di età e si configura come “espressione dell'autonomia professionale propria della funzione docente, nella sua dimensione sia individuale che collegiale, nonché dell'autonomia didattica delle istituzioni scolastiche” (articolo 1, comma 2, del D.P.R. 22 giugno 2009, n. 122). I consigli di classe utilizzano le valutazioni effettuate nel percorso di istruzione di ogni studente in modo che la certificazione descriva compiutamente l'avvenuta acquisizione delle competenze di base, che si traduce nella capacità dello studente di utilizzare conoscenze e abilità personali e sociali in contesti reali, con riferimento alle discipline/ambiti disciplinari che caratterizzano ciascun asse culturale. Questo significa che l'insegnamento si deve slegare progressivamente dal nozionismo e far sì che l'allievo sappia utilizzare in modo autonomo, originale e consapevole quanto appreso in ambito scolastico. Quindi, è possibile apprezzare precise competenze solo in azione per affrontare e risolvere situazioni problematiche in cui occorre mobilitare conoscenze, abilità e disponibilità all'agire. Secondo le Linee Guida, la competenza si può “accertare facendo ricorso a *compiti di realtà*” che devono essere autentici e rispettare alcuni parametri:

- proporre tematiche che possono essere affrontate nel mondo reale, personale o professionale;
- offrire l'occasione di esaminare i problemi da diverse prospettive teoriche e pratiche;
- permettere più soluzioni alternative;
- fornire l'occasione di collaborare;
- estendere i loro risultati al di là di specifiche discipline;
- essere strettamente integrati con la valutazione;
- sfociare in un prodotto finale completo autosufficiente.

■ THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

The UN's 2030 Agenda for Sustainable Development is a comprehensive plan that outlines how we can transform the world into a peaceful and sustainable environment for all.

It was launched at the UN Sustainable Development Summit held in New York on 25-27 September 2015 and is aimed at ending poverty in all its forms. The UN 2030 Agenda envisages “*a world of universal respect for human rights and human dignity, the rule of law, justice, equality and non-discrimination*”. This historic document lays out the 17 Sustainable Development Goals which aim to mobilize global efforts to end poverty, foster peace, safeguard the rights and dignity of all people, and protect the planet.

It is grounded in the Universal Declaration on Human Rights (1948) and international human rights treaties and emphasises the responsibilities of all states to respect, protect and promote human rights. There is a strong emphasis on the empowerment of women and of vulnerable groups such as children, young people, persons with disabilities, older persons, refugees, internally displaced persons and migrants.

A Plan of Action to Change the World

The 2030 Agenda was endorsed by 193 member states that pledged to work towards social inclusion, environmental protection and sustainable economic growth. By committing to this agreement, the UN and its member countries across the globe are ensuring they build just and peaceful societies and work towards sustainability.

The Agenda has a ultimate goal that is to change the world; it is the most complete guide ever created pointing out strategies for:

- ending extreme poverty;
- helping the environment;
- diminishing inequality.

Before the 2030 Agenda

Before the Agenda are decades of debate and dialogue focused on how to face global challenges affecting the environment, society and economy. Talks started in 1972 with the UN Conference on Human Environment up to the 2015 UN Sustainable Development Summit.

The United Nations Millennium Development Goals (MDGs) signed in 2000 and set to expire at the end of 2015, acted as a springboard for the goals of the 2030 Agenda. All 191 United nations member states committed to help achieve by 2015 the following eight Millennium Development Goals:

1. to eradicate extreme poverty and hunger;
2. to achieve universal primary education;

3. to promote gender equality and empower women;
4. to reduce child mortality;
5. to improve maternal health;
6. to combat HIV/AIDS, malaria and other diseases;
7. to ensure environmental sustainability;
8. to develop a global partnership for development.

They represented a framework for the world's governments to tackle global issues like disease and hunger. In the 2030 Agenda a feedback about the MDGs is provided: *“the progress has been uneven ... and some of the Millennium Development Goals remain offtrack, in particular those related to maternal, newborn and child health and to reproductive health... The new Agenda builds on the Millennium Development Goals and seeks to complete what they did not achieve, particularly in reaching the most vulnerable.”*

Adapted from: <https://www.coe.int/en/web/programmes/un-2030-agenda>
<https://www.ie.edu/school-global-public-affairs/about/news/what-is-the-2030-agenda/>
<https://www.un.org/millenniumgoals/>
<https://www.unfpa.org/resources/transforming-our-world-2030-agenda-sustainable-development>

Structure of the document

The UN General Assembly adopted the document entitled “Transforming our world: the 2030 Agenda for Sustainable Development” within the 70/1 Resolution on 25 September 2015.

The document is organised into sections, the most significant are:

- the **Preamble** – definition of the Agenda and of the purposes of the 17 Sustainable Development Goals; identification of the areas of critical importance for humanity and the planet (the five Ps);
- the **Declaration** – declaration of intent; vision; shared principles and commitments; our world today (main challenges to sustainable development and progress in meeting many development challenges); the new Agenda (introduction to the 17 Sustainable Development Goals; reaffirmation of the importance of the Universal Declaration of Human Rights; flexibility in achieving a sustainable development; pressure on States to refrain from promulgating unilateral economic measures; the importance of peace and security);
- **Sustainable Development Goals and Targets** – list and detailed description of the 17 Sustainable Development Goals with their 169 associated targets;
- **Means of implementation and the Global Partnership** – reaffirmation of the commitment to the full implementation of the Agenda; revitalization of the Global Partnership.

Testo originale in inglese: https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (disponibile nello stesso sito anche in cinese, francese, spagnolo e russo per moduli CLIL o Uda di Educazione Civica)

Fundamental Principles of the 2030 Agenda

The 2030 Agenda consists of a few core principles:

- **Universality:** The Agenda applies to all countries, so it is expected that every country will work towards sustainable development despite economic and development issues.
- **Leaving no one behind:** All people must be considered, proper aid and assistance should be provided to the poorest and most vulnerable countries and categories of people.
- **Interconnectedness and indivisibility:** The 17 Sustainable Development Goals are interconnected and indivisible. World leaders who are asked to implement the goals must consider them as a whole.
- **Inclusiveness:** Everyone should take action so as to achieve the goals of the Agenda, no matter their race, age, gender, geographic regions, ethnicity, political, religious and cultural identity.
- **Partnerships:** Multi-stakeholder partnerships should represent an efficient tool spread knowledge, technology and financial resources.

Adapted from: <https://www.ie.edu/school-global-public-affairs/about/news/what-is-the-2030-agenda/>

The 17 Sustainable Development Goals (SDGs) to transform our world

The 17 Sustainable Development Goals devised by the United Nations are the crucial part of the 2030 Agenda. The goals bring together nations around the world to solve global challenges, promote growth, and create a sustainable future.

The SDGs should be seen as a way to fulfil the fundamental principles of the Agenda, their 169 associated targets help to convert them into concrete actions with definite results, which can be measured and evaluated. The number of targets for each Goal can vary a lot.

GOAL 1: No Poverty	GOAL 10: Reduced Inequality
GOAL 2: Zero Hunger	GOAL 11: Sustainable Cities and Communities
GOAL 3: Good Health and Well-being	GOAL 12: Responsible Consumption and Production
GOAL 4: Quality Education	GOAL 13: Climate Action
GOAL 5: Gender Equality	GOAL 14: Life Below Water
GOAL 6: Clean Water and Sanitation	GOAL 15: Life on Land
GOAL 7: Affordable and Clean Energy	GOAL 16: Peace and Justice Strong Institutions
GOAL 8: Decent Work and Economic Growth	GOAL 17: Partnerships to achieve the Goal
GOAL 9: Industry, Innovation and Infrastructure	

Adapted from: <https://www.un.org/sustainabledevelopment/>
<https://www.un.org/development/desa/disabilities/envision2030.html>

The five Ps

In addition to the fundamental principles and the 17 SDGs, there are five dimensions that are vital to the 2030 Agenda: the so called five Ps (people, planet, prosperity, peace and partnership). These represent the large-scale topics which the Goals must refer to.

- **People:** *“Determination to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment”.*

Goals 1, 2, 3, 4 and 5 can be combined into the category for people. The first five goals of the sustainable development goals are designed to provide appropriate target for meeting the fundamental needs of all people around the world.

- **Planet:** *“Determination to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations”.*

Goals 6, 12, 13,14 and 15 present the challenges that our planet is facing around the world. The global community must become aware of the importance of saving our planet and of how our future depends on transforming our approaches to tackle the climate crisis.

- **Prosperity:** *“Guarantee that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature”.*

Goal 7 provides targets for the international community to be able to attenuate the negative impact from energy over-utilization and eventually achieving the appropriate and sustainable balance of its utilization. Goals 8, 9, 10, 11 involve fair and justice systems both in public and private communities and national entities. These goals assert sustainable economic successes must be achieved in manners that promote and attain fair justice system.

- **Peace:** *“Determination to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development”.*

Goal 16 shows how the international community must come together to promote and protect peace around the world, not with military actions but with strong institutions of justice.

- **Partnership:** *“Determination to mobilize the means required to implement this Agenda through a revitalised Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focused in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people”.*

Goal 17 shows how partnership is crucial in achieving the SDGs for the goals. Partnerships can involve any entities in the international community, public and private.

Adapted from: https://www.unescwa.org/sites/default/files/inlinefiles/the_5ps_of_the_sustainable_development_goals.pdf

EU contribution to the United Nations Agenda 2030

The EU made a positive and constructive contribution to the development of the 2030 Agenda, nowadays Europe is committed to implement the SDGs in all its policies and is encouraging EU countries in doing the same.

Due to the close connection between the Europe's objectives and the SDGs, the Agenda has also been highly relevant for the Council of Europe, which has, from the outset, been contributing to the process which led to its adoption.

Considering its global and overarching political approach it has not been necessary to set up new European objectives, instruments or activities, but rather to align existing ones with relevant SDGs. Most, if not all, of Europe's activities contribute to the implementation of Agenda 2030 which is particularly important for the European development and co-operation programmes. For example to achieve SDG1 (No poverty) Europe is focused on projects aiming at leaving no one behind in the Sub-Saharan Africa, a particularly poor and instable region of the world. To achieve this, actions should necessarily involve partnerships involving humanitarian, civil and governmental actors.

The main responsibility for the implementation of Agenda 2030 lies with member States, Europe's role is to assist and facilitate member States in their contribution to SDGs implementation.

In these years Europe proved to be able to represent an added-value in the achievement of the Agenda Goals, this comes from a combination of:

- its members: 47 member States covering a large multicultural territory;
- its standards: a comprehensive measurable normative framework which can be used as indicators/benchmarks;
- its multi-stakeholder dimension: in addition to its intergovernmental bodies, the Council of Europe's structure includes the Parliamentary Assembly, the Congress of Local and Regional Authorities, the Commissioner for Human Rights the Conference of International NGOs, as well as the European Court of Human Rights. These various bodies and instruments are precious to support States in their efforts to translate the global agenda into action at both national and local levels;
- its monitoring/follow-up bodies and processes: essential to gather data, assess progress and provide further guidance;
- its technical support provided to individual countries for capacity-building and removing obstacles to implementation;
- its global outreach: most of the organisation's legally-binding conventions and activities are open to participation by non-member States.

Adapted from: https://ec.europa.eu/international-partnerships/sustainable-development-goals_en
<https://www.coe.int/en/web/un-agenda-2030/home?desktop=true>



DIDATTICA INCLUSIVA E BES

Suggerimenti per la programmazione e la valutazione

di Nadia Sanità

1. Normativa e inquadramento scolastico
2. Dislessia, didattica e inglese
3. Didattica inclusiva e resilienza
4. Altri tipi di Bisogni Educativi Speciali
5. Suggerimenti e modelli per la valutazione

■ 1. NORMATIVA E INQUADRAMENTO SCOLASTICO

1.1 Introduzione

La presente sezione non ambisce a fornire un'illusoria ricetta di didattica miracolosa ai docenti, ma, nella pletora dei testi sul medesimo argomento, si impegna a chiarire alcuni punti e a fornire suggerimenti orientativi a quegli insegnanti di lingua inglese che sempre più intendono riuscire ad “includere” tutti gli studenti nelle proprie lezioni. La prima parte sarà dedicata alla normativa quadro che ci consente di categorizzare e definire il fenomeno – normativa intesa dunque come risorsa e non come qualcosa di noioso e astratto; si cercherà poi di inquadrare meglio il fenomeno della dislessia, poiché la lingua inglese, non essendo trasparente fonologicamente (cioè non avendo corrispondenza tra scritto e parlato come in larga misura sono l'italiano e il tedesco), causa notevoli problemi di decodifica agli studenti affetti da tale disturbo; infine, scopo ambizioso di tale pubblicazione sarà anche quello di tentare di contribuire a superare lo schema “misure compensative e dispensative”, provando a suggerire una didattica qualitativamente diversa da inserire in un Piano Didattico Personalizzato che recepisca pienamente la CM n. 8 del 6/3/2013 e che diventi davvero adatta a tutta la classe: «Il piano Didattico Personalizzato non può più essere inteso come mera esplicitazione di strumenti compensativi e dispensativi per gli alunni con DSA».

1.2 La normativa inclusiva italiana: breve excursus

La normativa inclusiva italiana ha visto i propri albori negli anni Settanta, con l'inserimento degli alunni con disabilità nelle scuole statali e si è ampliata con la **legge 62/2000** che sancì il diritto all'integrazione degli alunni con disabilità anche nelle scuole paritarie. Precedentemente, l'obbligo scolastico era esteso solo ai ciechi e ai sordi (**Riforma Gentile del 1923**). In seguito, l'istruzione speciale prevedeva classi differenziali per gli allievi con lievi ritardi, ospitate nei plessi scolastici ordinari e scuole speciali per sordi, ciechi e “anormali psichici” ospitati in plessi distinti.

I casi più gravi venivano separati dalle famiglie per lunghi periodi e ospitati in istituti speciali. Le classi differenziali, tuttavia, erano destinate anche agli allievi con problemi di condotta o disagio sociale o familiare. Talvolta il disagio familiare consisteva nel parlare esclusivamente un dialetto del sud. Si deve attendere il **1971** con la **legge 118** per superare la logica della separazione in cui il disabile veniva percepito come un malato e come potenziale elemento di disturbo. Tale legge però non accennava minimamente né alla didattica speciale, né allo sviluppo potenziale o alle risorse da impegnare. Con la **legge 104/1992** si giunge, invece, ad una legge quadro che non si concentra solo sull'assistenza, ma anche sull'integrazione e sui diritti dei disabili al fine di promuoverne la massima autonomia individuale, specificando che l'integrazione deve avvenire in ogni ciclo, università compresa, nelle classi comuni.

Negli altri paesi europei, invece, si era diffusa una normativa inclusiva che riguardava alunni con difficoltà di apprendimento non dovute a cause sanitarie ma a svantaggi socioculturali, ambientali, familiari e/o personali. Tali alunni venivano considerati alunni con SEN (*Special Educational Needs*), di cui l'acronimo italiano BES è la traduzione. L'apertura a questo nuovo approccio è stata la traduzione italiana degli ICF¹ (*International Classification of Functioning, Disability and Health*) dell'Organizzazione Mondiale della Sanità. Il modello diagnostico degli ICF considera la persona in modo olistico, in una prospettiva globale – dunque biologica, psicologica e anche sociale – prendendo quindi in considerazione la totalità e la complessità dei funzionamenti delle persone e non solo gli aspetti bio-strutturali. La **direttiva ministeriale 27 del dicembre del 2012** basa, quindi, il concetto di bisogno educativo speciale proprio sugli ICF:

«Gli alunni con disabilità si trovano inseriti all'interno di un contesto sempre più variegato, dove la discriminante tradizionale – alunni con disabilità/alunni senza disabilità – non rispecchia pienamente la complessa realtà delle nostre classi. Anzi, è opportuno assumere un approccio decisamente educativo, per il quale l'identificazione degli alunni con disabilità non avviene sulla base della eventuale certificazione, che certamente mantiene utilità per una serie di benefici e di garanzie, ma allo stesso tempo rischia di chiuderli in una cornice ristretta. A questo riguardo è rilevante l'apporto, anche sul piano culturale, del modello diagnostico ICF (*International Classification of Functioning*) dell'OMS, che considera la persona nella sua totalità, in una prospettiva bio-psico-sociale. Fondandosi sul profilo di funzionamento e sull'analisi del contesto, il modello ICF consente di individuare i Bisogni Educativi Speciali (BES) dell'alunno prescindendo da preclusive tipizzazioni. In questo senso, ogni alunno, con continuità o per determinati periodi, può presentare Bisogni Educativi Speciali: o per motivi fisici, biologici, fisiologici o anche per motivi psicologici, sociali, rispetto ai quali è necessario che le scuole offrano adeguata e personalizzata risposta».

Nel 2007, quindi diversi anni prima della direttiva ministeriale di cui sopra, la Regione Piemonte emise una delibera in cui si parlava di EES (Esigenze Educative Speciali). Successivamente, alcuni confusero i due acronimi, immaginando che fossero la stessa cosa. In realtà i BES (Bisogni Educativi Speciali) non devono essere intesi come una nuova categoria, ma come una macro-categoria, un termine-ombrello che comprende al suo interno tre sottocategorie:

- la **prima fascia**, corrispondente alla disabilità
- la **seconda fascia**, riguardante i disturbi evolutivi specifici e a sua volta divisa in DSA (Disturbi Specifici di Apprendimento) e EES (per la Regione Piemonte)
- la **terza fascia**, comprendente le difficoltà che nascono da uno svantaggio socio/economico, linguistico e culturale.

Di seguito, una tabella riepilogativa aiuterà a comprendere il quadro normativo di riferimento.

1. https://www.reteclassificazioni.it/portal_main.php?portal_view=public_custom_page&id=25

FASCIA	NORMATIVA	OGGETTO	PUNTI CHIAVE
Prima	L. 104/92	Legge quadro per l'assistenza, l'integrazione sociale e i diritti delle persone handicappate	Tratta della certificazione di disabilità e invita a una lettura equa dei bisogni. Il <i>Profilo Dinamico Funzionale</i> e il <i>Piano Educativo</i> sono, per tale legge quadro fondamentale, i momenti concreti in cui si esercita il diritto all'istruzione e all'educazione dell'alunno con disabilità.
	L. 17/1999	Integrazione e modifica della legge quadro 104/1992	Garantisce agli studenti handicappati iscritti all'università sussidi tecnici e didattici specifici.
	L. 62/2000	Norme per la parità scolastica e disposizioni sul diritto allo studio e all'istruzione	Stabilisce che le scuole paritarie, svolgendo un servizio pubblico, devono accogliere chiunque, compresi gli alunni e gli studenti con handicap.
	DM 185 del 23/02/2006	Regolamento recante modalità e criteri per l'individuazione dell'alunno come soggetto in situazione di handicap	Prevede che ai fini della individuazione dell'alunno come soggetto in situazione di handicap, le Aziende Sanitarie dispongano, su richiesta documentata dei genitori o degli esercenti la potestà parentale o la tutela dell'alunno, appositi accertamenti collegiali, documentati attraverso la redazione di un verbale che rechi l'indicazione della patologia accertata con riferimento alle classificazioni internazionali dell'OMS.
	Nota MIUR del 4/08/2009	Linee guida sull'integrazione degli alunni con disabilità	Le direttive mirano ad innalzare il livello qualitativo degli interventi formativi ed educativi sugli alunni portatori di disabilità fisiche, psichiche e sensoriali, a garanzia di una più piena conformità ai principi dell'integrazione da parte di tutti gli operatori nel mondo della scuola. La prima parte consta di una panoramica sui principi generali (norma costituzionale del diritto allo studio, DPR 275/1999, Convenzione ONU per i diritti delle persone con disabilità, L. 18/2009) ribadendo il modello sociale della disabilità. La seconda parte entra nelle pratiche scolastiche, riconoscendo la responsabilità educativa di tutto il personale della scuola e ribadendo la necessità della corretta e puntuale progettazione individualizzata per l'alunno con disabilità, in accordo con gli Enti Locali, l'ASL e le famiglie. La terza parte prende in considerazione la dimensione inclusiva della scuola: il POF è inclusivo quando prevede nella quotidianità azioni da compiere per dare risposte precise ad esigenze educative individuali e non concepisce nella pratica scolastica la presenza dei disabili come un "incidente di percorso" da affidare al docente di sostegno.
	D. L.ivo 66 del 13/04/2017	Norme per la promozione dell'inclusione scolastica degli studenti con disabilità	Il decreto aggiorna, riorganizza e razionalizza i provvedimenti vigenti in materia, tenendo conto della nuova prospettiva nazionale ed internazionale dell'inclusione scolastica, riconosciuta quale identità culturale, educativa e progettuale del sistema di istruzione e formazione in Italia.
Seconda	L. 170/2010	Norme in materia di Disturbi Specifici di Apprendimento in ambito scolastico	Tratta della diagnosi del disturbo, della personalizzazione e relativa necessità di flessibilità. Riconosce la dislessia, la disgrafia, la disortografia e la discalculia quali disturbi specifici dell'apprendimento, "che si manifestano in presenza di capacità cognitive adeguate, in assenza di patologie neurologiche e di deficit sensoriali, ma [che] possono costituire una limitazione importante per alcune attività della vita quotidiana". Stabilisce inoltre misure educative e didattiche di supporto (strumenti compensativi e dispensativi). ➤

FASCIA	NORMATIVA	OGGETTO	PUNTI CHIAVE
Seconda	DM 5669/2011	Linee guida per il diritto allo studio degli alunni e degli studenti con Disturbi Specifici di Apprendimento	Fornisce precisazioni sulle lingue straniere, invitando le istituzioni scolastiche ad attuare ogni strategia didattica per consentire agli studenti con DSA l'apprendimento delle lingue straniere (valorizzazione delle modalità attraverso cui il discente meglio può esprimere le sue competenze e dell'espressione orale, strumenti compensativi e misure dispensative). "In sede di esami di Stato, conclusivi del primo e del secondo ciclo di istruzione, modalità e contenuti delle prove orali – sostitutive delle prove scritte – sono stabiliti dalle Commissioni, sulla base della documentazione fornita dai consigli di classe. I candidati con DSA che superano l'esame di Stato conseguono il titolo valido per l'iscrizione alla scuola secondaria di secondo grado ovvero all'università. [...] Solo in casi di particolari gravità del disturbo di apprendimento, anche in co-morbilità con altri disturbi o patologie, risultanti dal certificato diagnostico, l'alunno o lo studente possono – su richiesta delle famiglie e conseguente approvazione del consiglio di classe – essere esonerati dall'insegnamento delle lingue straniere e seguire un percorso didattico differenziato. In sede di esami di Stato, i candidati con DSA che hanno seguito un percorso didattico differenziato e sono stati valutati dal consiglio di classe con l'attribuzione di voti e di un credito scolastico relativi unicamente allo svolgimento di tale piano, possono sostenere prove differenziate, coerenti con il percorso svolto, finalizzate solo al rilascio dell'attestazione di cui all'art. 13 del DPR n. 323/1998."
	Nota MIUR 3573 del 26/05/2011	Diagnosi alunni con DSA precedente all'entrata in vigore della L. 170/2010	Stabilisce che gli alunni e gli studenti con diagnosi di DSA redatta anteriormente all'entrata in vigore della Legge 8 ottobre 2010 n. 170 potranno regolarmente usufruire degli strumenti compensativi e delle misure dispensative previsti, sia nella normale attività didattica sia nell'ambito degli Esami di Stato.
	Dir. Min. 27/2012	Strumenti di intervento per alunni con Bisogni Educativi Speciali e organizzazione territoriale per l'inclusione scolastica	Delinea e precisa la strategia inclusiva della scuola italiana. Estende il campo di intervento e di responsabilità di tutta la comunità educante all'intera area dei Bisogni Educativi Speciali, comprendente: "svantaggio sociale e culturale, disturbi specifici di apprendimento e/o disturbi evolutivi specifici, difficoltà derivanti dalla non conoscenza della cultura e della lingua italiana perché appartenenti a culture diverse". Stabilisce la redazione del <i>Piano Didattico Personalizzato</i> , strumento in cui si potranno includere "progettazioni didattico-educative calibrate sui livelli minimi attesi per le competenze in uscita, e strumenti programmatici utili in maggior misura rispetto a compensazioni o dispense".

FASCIA	NORMATIVA	OGGETTO	PUNTI CHIAVE
Seconda	CM 8/2013 (esplicativa della DM 27/2012)	Indicazioni operative alunni con BES	Ribadisce il nucleo fondante della Direttiva, aggiungendo che per gli alunni in possesso di una diagnosi di DSA rilasciata da una struttura privata, si devono adottare le misure della 170 nelle more del rilascio della certificazione da parte di strutture sanitarie pubbliche o accreditate. Richiama inoltre l'attenzione sul fatto che ogni alunno può manifestare Bisogni Educativi Speciali anche in modo temporaneo e che essi devono essere suffragati da elementi oggettivi. Per gli alunni stranieri è possibile attivare percorsi individualizzati e personalizzati, nonché strumenti compensativi e dispensativi. Rammenta infine che le due ore di insegnamento della seconda lingua comunitaria nella secondaria di primo grado possono essere utilizzate per potenziare l'insegnamento della lingua italiana.
	Nota MIUR 2563 del 22/11/2013	Strumenti di intervento per alunni con Bisogni Educativi Speciali. Chiarimenti	Richiama l'attenzione sulla distinzione tra ordinarie difficoltà di apprendimento, gravi difficoltà e disturbi di apprendimento che hanno carattere permanente e base neurobiologica. La scuola può intervenire nella personalizzazione in tanti modi diversi, informali o strutturati, secondo i bisogni e la convenienza; pertanto la rilevazione di una mera difficoltà di apprendimento non dovrebbe indurre all'attivazione di un percorso specifico con la conseguente compilazione di un <i>Piano Didattico Personalizzato</i> .
Terza	Dir. Min. 27/2012	Strumenti di intervento per alunni con Bisogni Educativi Speciali e organizzazione territoriale per l'inclusione scolastica	Identifica l'area dello svantaggio, e chiarisce la responsabilità pedagogico-didattica versus delega biomedica: "[o]ve non sia presente certificazione clinica o diagnosi, il consiglio di classe o il team dei docenti motiveranno opportunamente, verbalizzandole, le decisioni assunte sulla base di ben fondate considerazioni pedagogiche e didattiche; ciò al fine di evitare contenzioso." (CM 6/03/13). Vedi sopra.
	CM 8/2013	Indicazioni operative alunni con BES	Vedi sopra.
	Nota MIUR 2563 del 22/11/2013	Strumenti di intervento per alunni con Bisogni Educativi Speciali. Chiarimenti	Vedi sopra.

1.3 Bisogni Educativi Speciali: inquadramento scolastico

Per cercare di semplificare quanto attiene ai Bisogni Educativi Speciali, seguono un paio di tabelle riepilogative circa le varie tipologie, i vari gruppi/organismi interessati e gli adempimenti didattico-burocratici che vedono il coinvolgimento del consiglio di classe a tutela del diritto allo studio e all'inclusione di tutti gli studenti.

BISOGNI EDUCATIVI SPECIALI (BES)			
FASCIA	Prima	Seconda	Terza
DEFINIZIONE	Disabilità	Disturbi evolutivi specifici	Svantaggio socio-economico, linguistico, culturale
CERTIFICAZIONE	Sì	No	No
DIAGNOSI ²	Sì	Sì	No
TIPOLOGIE	<ul style="list-style-type: none"> • Minorati psicofisici • Minorati vista • Minorati udito 	<p>EES Esigenze Educative Speciali</p> <ul style="list-style-type: none"> • Disturbi del linguaggio • Disturbi delle abilità non verbali (disturbo visuospatiale) • Disturbi della coordinazione motoria/ disprassia • Disturbi da deficit di attenzione/iperattività (ADHD)³ • Disturbo da comportamento dirompente • Disturbi d'ansia, disturbi dell'umore • Disturbo evolutivo specifico misto⁴ • Funzionamento cognitivo limite (o borderline) 	<ul style="list-style-type: none"> • Difficoltà derivanti da elementi oggettivi (segnalazione servizi sociali, per esempio) <p>oppure</p> <ul style="list-style-type: none"> • Fondatte considerazioni psico-pedagogiche e didattiche rilevate dal Consiglio di Classe



2. La diagnosi deve essere a cura delle ASL (o dalle Aziende Ospedaliere e Universitarie e dalle IRCSS, ossia Istituti di Ricovero e Cura a Carattere Scientifico) o di un medico privato in attesa di quella dell'ente pubblico.

3. Nel caso di alunni con iperattività all'interno di un quadro clinico grave, anche per co-morbilità con altre patologie, può venire assegnato il docente di sostegno.

4. Qualora sia lieve e non rientri nelle previsioni della L. 104/1992.

		DSA Disturbi Specifici dell'Apprendimento <ul style="list-style-type: none"> • Dislessia (disturbo che impedisce la decodificazione del testo scritto) • Disortografia (disturbo specifico della scrittura che riguarda l'ortografia) • Discalculia (disturbo che riguarda il sistema numerico e i calcoli) • Disgrafia (disturbo specifico della scrittura che riguarda il tratto grafico) 	
DIRITTI	<ul style="list-style-type: none"> • Insegnante di sostegno • PEI 	<ul style="list-style-type: none"> • Personalizzazione del percorso di studio 	<ul style="list-style-type: none"> • Personalizzazione del percorso di studio
DOCUMENTAZIONE DA PRODURRE DA PARTE DEL CONSIGLIO DI CLASSE	PEI (<i>Piano Educativo Individualizzato</i>): documento obbligatorio (redatto congiuntamente dalla scuola e dai servizi socio-sanitari che hanno in carico l'alunno in collaborazione con la famiglia) e parte integrante della programmazione educativo-didattica di classe. Le azioni definite nel PEI sono coerenti con le indicazioni espresse nella Diagnosi Funzionale e nel Profilo Educativo Funzionale (documenti predisposti dalla Neuro-psichiatria Infantile) e descrivono annualmente: <ul style="list-style-type: none"> - obiettivi educativi e didattici - metodi e criteri di valutazione. 	PDP (<i>Piano Didattico Personalizzato</i>): documento obbligatorio redatto dal consiglio di classe entro tre mesi dalla ricezione della diagnosi da parte dell'istituto. Include: <ul style="list-style-type: none"> - la tipologia del disturbo - le attività didattiche personalizzate - gli strumenti compensativi - le misure dispensative - le modalità di verifica e valutazione personalizzate e comprende tutti i supporti e le strategie che possono portare al successo formativo dell'alunno. Le azioni in esso definite devono essere coerenti con le indicazioni espresse nella diagnosi consegnata alla scuola.	PDP (<i>Piano Didattico Personalizzato</i>): documento non obbligatorio ma consigliato redatto dal consiglio di classe entro tre mesi dalla ricezione di eventuali relazioni di esperti da parte dell'istituto o dalla rilevazione dell'area di svantaggio. Include: <ul style="list-style-type: none"> - la problematica rilevata - le attività didattiche personalizzate - gli strumenti compensativi - le misure dispensative - le modalità di verifica e valutazione personalizzate e comprende tutti i supporti e le strategie che possono portare al successo formativo dell'alunno. Deve tenere conto di eventuali relazioni cliniche, di esperti o educatori consegnate alla scuola.
TITOLI DI STUDIO CONSEGUIBILI AL TERMINE DELLA SCUOLA SECONDARIA SUPERIORE	<ul style="list-style-type: none"> • Attestato di credito formativo, nel caso di allievo con percorso didattico differenziato (art. 13, DPR 323/98) • Diploma, nel caso di allievo con programma ad obiettivi differenziati (DPR 323/98) 	<ul style="list-style-type: none"> • Diploma • Attestazione, nel caso di studenti DSA con esonero totale delle lingue straniere⁵ 	<ul style="list-style-type: none"> • Diploma

5. Vedi tabella normativa, DM 5669/2011.

ACRONIMO	SIGNIFICATO	NORMA	FUNZIONE
CTS	Centri Territoriali di Supporto	CM 6/03/13	Interfaccia fra l'Amministrazione e le scuole, e tra le scuole stesse e rete di supporto al processo di integrazione, allo sviluppo professionale dei docenti e alla diffusione delle migliori pratiche.
CTI	Centri Territoriali per l'Inclusione	L. 35/2012	Definire, per ciascuna istituzione scolastica, "un organico per l'autonomia, funzionale all'ordinaria attività didattica, educativa, amministrativa, tecnica e ausiliaria, alle esigenze di sviluppo delle eccellenze, di recupero, di integrazione e sostegno agli alunni con bisogni speciali e di programmazione dei fabbisogni di personale". Si occupano anche della costituzione di reti di scuole, della prevenzione dell'abbandono scolastico e di contrasto alla dispersione scolastica e formativa e al bullismo.
GLI	Gruppo di Lavoro per l'Inclusione	Istituito dalla L. 104/92 e ripreso nella CM 8/2013	Rilevazione dei BES presenti nella scuola, raccolta e documentazione degli interventi didattico-educativi posti in essere; focus/confronto sui casi, consulenza e supporto ai colleghi sulle strategie e metodologie di gestione delle classi; rilevazione, monitoraggio e valutazione del livello di inclusività della scuola; raccolta e coordinamento delle proposte formulate dai singoli GLHI.
GLIP o GLH	Gruppo di Lavoro Interistituzionale e Provinciale	Istituito dalla L. 104/92 e definito nel DM 216/1992	Il GLIP è composto da operatori della scuola e delle altre Istituzioni che operano sul territorio. Svolge funzioni di consulenza alle scuole per quanto riguarda l'integrazione e promuove la piena attuazione del diritto allo studio.
GLHI o GLIS	Gruppo di Lavoro e di Studio d'Istituto	L. 104/92, art. 15	Consulenza e proposta al Dirigente scolastico regionale e alle singole scuole, collaborazione con enti locali e unità sanitarie locali per la conclusione e la verifica dell'esecuzione degli accordi di programma per l'impostazione e l'attuazione dei piani educativi individualizzati, nonché per qualsiasi altra attività inerente all'integrazione degli alunni in difficoltà di apprendimento.
GLHO	Gruppo di Lavoro per l'Handicap Operativo	L. 104/92	Per ogni alunno con disabilità certificata, in genere, viene costituita un'equipe di lavoro, composta dal Dirigente scolastico, da almeno un rappresentante degli insegnanti di classe, dall'insegnante specializzato sul sostegno, dall'assistente educatore eventualmente presente, dagli operatori della ASL o ente privato convenzionato che si occupano del caso, dai genitori o dai facenti funzione e da qualunque altra figura significativa che operi nei confronti dell'alunno. Per esercitare le sue funzioni di competenza, il gruppo elabora il <i>Profilo Dinamico Funzionale</i> e formula il <i>Piano Educativo Individualizzato</i> .
PAI	Piano Annuale per l'Inclusività	Istituito dalla L. 122/2010	Formulare, da parte del GLI, un'ipotesi globale di utilizzo funzionale delle risorse specifiche, istituzionali e non, per incrementare il livello di inclusività generale della scuola. È riferito a tutti gli alunni con BES e si deve redigere al termine di ogni anno scolastico.

■ 2. DISLESSIA, DIDATTICA E INGLESE

2.1 Dislessia: una breve analisi

La dislessia non è una malattia, ma una neuro-diversità, cioè uno sviluppo neurologico atipico che è espressione della varianza della popolazione. Lo sviluppo atipico interessa i processi di apprendimento impliciti che non sono facilmente identificabili in maniera isolata e che partecipano alla costruzione dei macro-apprendimenti, tra cui quelli scolastici.

La Classificazione internazionale ICD10¹ (International Statistical Classification of Diseases and Related Health Problems) dell'Organizzazione Mondiale della Sanità registra i disturbi specifici di apprendimento nell'asse F81. Si tratta di disturbi evolutivi specifici delle abilità scolastiche, disordini in cui le normali modalità di acquisizione delle competenze sono disturbate fin dai primi stadi di sviluppo. Ciò, però, non in diretta conseguenza di una mancata opportunità di apprendimento, non come risultato di un ritardo mentale e non in conseguenza di alcuna forma di trauma cerebrale o di deficit.

Tali disturbi, che possono occorrere tutti insieme perché vi è spesso comorbidità, sono:

F81.0 – Disturbo specifico della lettura

F81.1 – Disturbo specifico della computazione

F81.2 – Disturbo specifico delle abilità aritmetiche

F81.3 – Disturbi misti delle abilità scolastiche

F81.8 – Altri disturbi evolutivi delle abilità scolastiche

F81.9 – Disordine evolutivo di abilità scolastiche non meglio specificato.

Leggere vuol dire decodificare, ossia dover fare continue traduzioni, ma se la corrispondenza tra grafemi e fonemi non è stabilizzata, come nel caso della dislessia, le lettere vengono invertite, le desinenze dimenticate, la frase “Whatyouthinkdyslexialookslike” diventa “whatewtinhkdyxlesiaklooske”. La metafora che si usa più frequentemente è quella delle lettere che galleggiano².

Lo sviluppo delle tecniche di *neuroimaging* ha dato un contributo notevole alla ricerca sulla dislessia, arrivando a identificare un'elaborazione fonologica disfunzionale dei soggetti nella regione perisilviana, ossia tutta l'area intorno alla scissura laterale fra il lobo temporale e il lobo parietale. Sulla base dei risultati delle ricerche condotte sui task di discriminazione visiva, i sostenitori di tale ipotesi ritengono che le difficoltà correlate alla dislessia si manifestino a causa di una impossibilità di filtrare contemporaneamente i vari input e, pertanto, a categorizzare le informazioni in modo da distinguere i dati sensoriali importanti da quelli meno rilevanti.

Alternativa a tale ipotesi è quella del deficit fonologico, la *Rapid auditory processing theory*, in base alla quale il deficit principale risiede nella percezione di brevi e rapidi suoni

1. Cfr. <http://www.who.int/classifications/apps/icd/icd10online/>

2. Si consiglia la visione del seguente filmato: <http://indy100.independent.co.uk/article/this-website-shows-what-its-like-to-read-when-you-have-dyslexia—bkvKwiQJW>

e nella valutazione dell'ordine temporale, fenomeno che spiegherebbe la difficoltà nel percepire, decodificare o riprodurre i suoni nella giusta posizione.

Per quanto concerne l'apprendimento della lingua inglese, si è sviluppato un filone di ricerche su studenti di nazionalità diverse che ha messo in luce come, nelle lingue in cui la dimensione grafica e quella fonetica è "trasparente"³, l'incidenza delle difficoltà fonologiche derivanti dalla dislessia sia inferiore.

Secondo tali ricerche, tre fattori principali concorrono allo sviluppo delle attività di lettura. Il primo è costituito dalla disponibilità di diverse unità fonologiche pre-esistenti alla lettura; il secondo è rappresentato dalla coerenza nelle associazioni tra dimensione fonetica e dimensione grafica; il terzo è la *granularity*, per cui il numero di unità ortografiche da imparare è maggiore del numero di unità fonologiche utilizzate. Un sistema viene considerato completamente trasparente quando a ogni suono corrisponde un segno, cioè, nei sistemi cosiddetti alfabetici, quando a ogni fonema corrisponde una lettera (rapporto 1:1). Il grado di trasparenza si riduce quando la trascrizione ortografica di un fonema richiede più di una lettera e il rapporto fra fonemi e lettere non è più 1:1, ma diventa 1:2, come, per esempio, per il fonema che si riproduce con 2 lettere (il digramma GN in italiano, per esempio). Questa differenza di "granularità" dipende dalla difformità fra il numero di fonemi di una lingua e il numero di lettere di ciascun alfabeto. Per esempio, per l'italiano ci sono circa 30 fonemi, che devono essere trascritti con 21 lettere, anche se nella pratica sono utilizzate altre 5 lettere di origine non-latina (j, k, w, x, y). Il grado di trasparenza non può quindi essere perfetto perché il numero di lettere dovrebbe essere uguale a quello dei fonemi, tuttavia non c'è paragone con la lingua inglese: la regolarità dell'italiano è notevolmente maggiore di quella della lingua inglese, che ha circa 44 fonemi, ma solo 26 lettere a disposizione per la loro trascrizione.

Sulla base di questo criterio, è stata costruita la teoria della dimensione della granularità in base alla quale:

- nei sistemi ortografici ad alta regolarità la scrittura viene acquisita in tempi più rapidi;
- nei sistemi regolari la didattica di insegnamento della lettura e della scrittura più consona è quella sillabico/alfabetica, in quanto la segmentazione e la fusione fonemica risultano molto facili e si prestano a una transcodifica assemblativa (il metodo fonico-sillabico);
- nei sistemi regolari sia la lettura sia la scrittura vengono acquisite in tempi più rapidi che nei sistemi meno regolari;
- i bambini che imparano con i sistemi regolari commettono meno errori ortografici e di lettura di quelli che apprendono un sistema ortografico irregolare come quello inglese.

Secondo tale approccio, la lettura dipenderebbe quindi dall'astrazione di mappe ottimali tra unità grafiche e fonologiche della lingua e l'organizzazione lessicale, così come le strategie che servono a processare le parole al fine di leggere sarebbero fortemente influenzate dai limiti imposti dai diversi sistemi di scrittura. L'apprendimento di una lingua seconda, inoltre, non è inconscio come quello della lingua madre quindi non vi è solo la difficoltà dell'aspetto decifrativo, ma anche quello della fatica cosciente richiesta che è

3. V. Introduzione, p. 25.

necessaria per apprendere una seconda lingua, come l'inglese, con divergenze notevoli ma non omogenee e regolari tra pronuncia e resa grafica.

La letteratura scientifica attesta che le abilità di codifica (produzione in forma scritta e orale) e decodifica (comprensione di forme scritte e orali) richieste e quelle necessarie per processare l'aspetto fonologico-ortografico hanno bisogno di una motivazione molto forte che, nel caso dei dislessici, può essere pregiudicata dal basso livello di successo percepito e che quindi deve essere accresciuta con stimoli che rendano piacevole un apprendimento così ostico.

2.2 Dislessia: le difficoltà principali

Si elencano ora una serie di difficoltà che possono presentare gli studenti dislessici, con l'avvertenza, tuttavia, che esse potrebbero essere presenti solo in parte o solo in alcuni, o che, ancora, potrebbero essere già state compensate nell'età che qui si prende in considerazione (ossia quella degli alunni della scuola secondaria di primo e secondo grado), poiché gli alunni dislessici non rappresentano una popolazione scolastica omogenea – li accomuna la difficoltà di lettura, ma le differenze soggettive possono essere decisamente consistenti:

- lentezza nell'apprendere e nello stabilizzare la corrispondenza tra le lettere e i suoni nella lingua straniera
- difficoltà con parole funzionali (preposizioni, congiunzioni, ecc.)
- tendenza a non ricordare le elencazioni (nomi, cose, numeri, ecc.), specie se in sequenza
- la comprensione in lettura potrebbe essere compromessa per via della poca accuratezza, velocità e scorrevolezza di lettura
- difficoltà nell'indicare destra o sinistra, l'ordine dei giorni della settimana, dei mesi, ecc.
- difficoltà nella sintassi e nella punteggiatura
- difficoltà a riassumere e a sintetizzare
- difficoltà a prendere appunti o a copiare dalla lavagna
- difficoltà nell'uso del dizionario
- lentezza nel rispondere alle domande, soprattutto quelle aperte che richiedono una risposta articolata
- lentezza nel memorizzare.

In particolare, in inglese, i problemi di decodifica più frequenti sono:

- il cosiddetto *spoonerism*, ossia lo scambio di iniziali di due termini, ad esempio: *fips and chish* per *fish and chips*
- d per b, ad esempio *dog* al posto di *bog*
- confusione tra m e w
- parole lette al contrario (*tip* per *pit*)
- parole scambiate (*home* per *house*)
- confusione tra sequenze di lettere (ad esempio *soiled* per *solid*; *left* per *felt*)
- spelling incoerente: *dolls/dols*, *thanks/thinks*, *natulal/natural*
- conversione fonema/grafema: *ajsrink* (*icerink*), *distroyd* (*destroyed*)
- addizione/sottrazione di lettere: *ekspresioning* (*expressing*), *stoy* (*story*)
- scelte non interpretabili: *witol* (*vehicle*), *endangires* (*endangered*).

2.3 Qualche suggerimento operativo di facile attuazione

STRUMENTI COMPENSATIVI

- Uso di organizzatori anticipati per gli argomenti complessi, ossia schemi o mappe
- Possibilità di registrare le lezioni per uso personale
- Possibilità di usare il computer o il tablet
- Uso dei programmi di sintesi vocale
- Uso di dizionari elettronici
- Uso di calcolatrice, formulari e tabelle
- Uso di programmi di videoscrittura con correttori automatici

MISURE DISPENSATIVE

- Dispensa dalla lettura ad alta voce
- Dispensa dallo scrivere sotto dettatura
- Dispensa dal prendere appunti
- Dispensa dal copiare dalla lavagna
- Dispensa dalla scrittura alla lavagna
- Dispensa dallo studio mnemonico (es. poesie, forme verbali, sequenze...)
- Dispensa di un eccessivo carico di compiti con riadattamento e riduzione delle pagine da studiare mantenendo gli stessi obiettivi

VERIFICHE E VALUTAZIONI

- Interrogazioni programmate e/o concordate
- Dispensa dalle prove scritte in lingua straniera
- Prove orali equipollenti in sostituzione delle prove scritte
- Utilizzo di schemi/mappe/formulari durante le verifiche scritte
- Utilizzo di schemi/mappe/formulari durante le verifiche orali
- Valutazione attenta più ai contenuti che alla forma
- Diminuzione del numero di item per esercizio
- Tempi più lunghi nelle verifiche scritte
- Verifiche su porzioni ridotte di programma
- Utilizzo prevalente di domanda a risposta chiusa
- Lettura delle consegne degli esercizi
- Fornitura delle prove su supporto digitalizzato
- Consegne in italiano delle verifiche di lingua straniera
- Peso maggiore delle verifiche orali rispetto alle prove scritte di lingua straniera
- Tempi più lunghi ai fini del recupero
- Possibilità di utilizzare il dizionario bilingue cartaceo o su supporto informatico

LEZIONI

- Chiarire esplicitamente il piano della lezione e, a ogni passaggio a fase successiva, ricordare il piano
- Se si usa la LIM o un proiettore, fornire alla fine della lezione i file allo studente
- Prevedere esercizi di discriminazione fonologica (ad esempio distinzione tra fonemi dell'inglese che in italiano non hanno valore distintivo /n/ e /ŋ/)
- Ricordarsi di spiegare agli studenti che per motivi storici la lingua inglese è molto “opaca” e quindi...
 - **Una lettera, diversi fonemi: that's the problem!**
 - O → 17 fonemi
 - A → 10 fonemi
 - E → 9 fonemi
 - **Una lettera → nessun fonema**
gave, castle, subtle
 - **Un grafema multi-lettera → diversi fonemi**
EA → *lead, meadow, sea*
 - **Grafemi diversi → uno stesso fonema**
Be, chief, key
 - **Omografi non omofoni**
Pear/pair
 - **Omofoni non omografi**
Right, rite, wright, write

Quest'ultimo è un problema per tutti gli apprendenti, non solo per i dislessici. Sottolineare le difficoltà dovute alla scarsa “trasparenza” della lingua è molto importante, così come far conoscere agli studenti le seguenti percentuali di errori nella decifrazione delle parole al termine del primo anno di scolarità nel Regno Unito rispetto agli altri paesi europei la cui lingua è più “trasparente”:

Regno Unito: 67% - Germania: 7% - Spagna: 6% - Italia: 5%

2.4 Qualche accorgimento nella didattica quotidiana

Spesso, purtroppo, nonostante i numerosi corsi di aggiornamento e le pubblicazioni su questo argomento – per tacere dell'ottimo e corposo materiale pubblicato online e dell'impegno dell'Associazione Italiana Dislessia – l'associazione tra dislessia e pigritia è ancora molto frequente.

Gli studenti affetti da tale disturbo, talvolta, oltre a essere visti come problematici e trattati con malcelata insofferenza, vengono anche definiti svogliati, a riprova del fatto che il misoneismo – ossia il timore di ciò che è nuovo e scardina, o anche solo intacca, abitudini e stili di insegnamento, convincimenti e mode didattiche – è ancora molto diffuso.

Limitarsi infatti ad applicare misure compensative e dispensative in modo meccanico, senza invece pensare a una didattica inclusiva ad ampio raggio, per poi concludere che sono gli studenti DSA a non voler vedere applicate le misure o le strategie suggerite, non è forse la strada migliore da intraprendere per chi ha a cuore i propri studenti.

Sapere di dover svolgere la verifica in modo diverso dagli altri, per esempio, molte volte spinge gli adolescenti a non avvalersi delle misure compensative e dispensative proposte perché vengono intese come marcatori di differenza. Usare il tablet o un notebook quando i compagni usano il foglio protocollo, non è concepito come una strategia strumentale equiparabile a mettersi gli occhiali se non si vede la lavagna. E queste differenze, seppur minime, possono avere conseguenze serie per gli apprendenti.

Come osserva Giacomo Stella⁴: “Alla scuola superiore il problema viene accentuato dal rifiuto da parte degli studenti di utilizzare strumenti compensativi e misure dispensative per non essere identificati come ‘diversi’”. Quindi, oltre ai fattori di rischio di insuccesso, ci sono anche fattori di rischio psicosociale e psicopatologico. “Ci vorrebbe”, sempre secondo Stella, “una scuola completamente diversa, basata sull’apprendimento e non sull’insegnamento. Questo significa non valutare unicamente le risposte alle nozioni, ma far crescere gli studenti agendo sulle loro potenzialità, senza diversificare chi necessita di computer o di tavola pitagorica da chi non ne ha la necessità. Inoltre, è necessario un nuovo contratto educativo in cui ciascuno viene riconosciuto per quello che può dare e superare, almeno alla primaria, l’attuale modello classificatorio. È importante una scuola senza compiti, ma con attività di potenziamento e di allenamento diversificate condotte all’interno della scuola, anche se affidate ad agenzie diverse. Insomma, una scuola amica che consideri l’apprendimento un’opportunità per tutti e non una punizione per alcuni.”

Chi vive quotidianamente la realtà scolastica, che si sa essere fatta non solo di didattica ma anche di burocrazia, edilizia, sicurezza, arredi e programmazioni talvolta eccessivi e/o inadeguati, potrà considerare quanto sopra utopico, se non la solita aria fritta, ma, come si spera di poter dimostrare con alcuni esempi, basta estendere alcuni accorgimenti a tutta la classe per creare un ambiente inclusivo a costo zero.

La dislessia, da “problema” che affatica la vita dei docenti e la riempie di ulteriori e lunghi documenti e doppi lavori, che stigmatizza gli studenti in “diversi” e “difficili”, può trasformarsi in “opportunità”, occasione di dare una svolta al proprio metodo di insegnamento, riuscendo finalmente a trasformare la propria didattica, talvolta cattedratica, monodiscendente e frontale, in una didattica più personalizzata, ricca e coinvolgente, a misura di ogni studente.

Gli accorgimenti che seguono tengono anche conto delle differenze tra le difficoltà di apprendimento nella scuola primaria e in adolescenza, momento nel quale il problema è

4. Professore ordinario di Psicologia clinica all’Università di Modena e Reggio Emilia, fondatore dell’Associazione Italiana Dislessia, membro del comitato tecnico-scientifico per l’attuazione della legge 170 e del comitato promotore per il panel di aggiornamento e revisione della Consensus conference sui DSA, direttore scientifico della rete di centri clinici S.O.S. Dislessia per diagnosi e rieducazione dei DSA e di I.RI.DE, Istituto di Ricerca sulla dislessia evolutiva. Citazione tratta da <http://www.sardegnamecicina.it/content/dislessia-e-dsa-sotto-la-lente-di-giacomo-stella>.

più della memoria di lavoro che non nelle difficoltà di letto-scrittura, ossia la capacità di mantenere in mente e manipolare le informazioni per un breve periodo di tempo. Essa è implicata in molteplici attività della vita quotidiana, come farsi la cartella e capire informazioni stradali, ma anche nell'attività scolastica, come ripetere una parola in una lingua straniera e memorizzare consegne complesse. Infatti, il recupero delle informazioni a lungo termine che opera quando l'insegnante spiega e lo studente ascolta oppure legge e prende appunti, interviene nell'organizzazione del discorso e nella comprensione del testo. Se si producono enunciati troppo complessi, si sollecita in modo eccessivo la memoria di lavoro, perché non si riesce a mantenere il collegamento tra l'inizio dell'enunciato e la fine, il che è necessario al fine dell'apprendimento.

Un esempio molto facile da capire è quello delle indicazioni stradali: "Svolta alla prima a destra e poi di nuovo a sinistra in corrispondenza del semaforo di fronte alla farmacia, poi procedi sempre dritto e, dopo aver oltrepassato alla tua destra il tabaccaio, svolta a destra e in corrispondenza della rotonda...". Questo tipo di informazione, nella vita reale, sarebbe interrotta dall'interlocutore con DSA che deciderebbe di chiedere la ripetizione della sequenza già dalla prima svolta oppure di affidarsi a un navigatore. In classe ciò non è possibile, ecco quindi che una modalità diversa di trasmettere i contenuti può essere risolutiva, poiché è il sovraccarico di informazione nella memoria che porta lo studente DSA a distrarsi e a cancellare anche le poche informazioni trattenute.

Nella scuola, spesso, il problema della memoria di lavoro non viene identificato, ma attribuito a scarsa attenzione⁵. Una capacità di memoria di lavoro inefficiente impedisce di manipolare le informazioni. Una semplice verifica per rendersi conto del problema potrebbe essere quella di far ripetere in ordine inverso sequenze di numeri o parole. A sviluppo di memoria terminato, ossia a 15 anni, si dovrebbe essere in grado di ricordare tra le 5 e le 6 parole dette in sequenza.

Accorgimento 1: abbassare il filtro affettivo

Secondo il celebre linguista statunitense Stephen Krashen, per acquisire una nozione è necessario che non sia inserito il filtro affettivo, altrimenti ciò che si comprende viene collocato nella memoria a breve termine e non diventa acquisizione stabile e definitiva.

Nelle situazioni di sfida piacevole, nella convinzione di poter riuscire, l'organismo rilascia neurotrasmettitori (come la noradrenalina) necessari per fissare la "traccia mnestica", ossia per fare proprio l'input che viene recepito, mentre in stato di paura e stress si produce uno steroide che blocca la noradrenalina e fa andare in conflitto l'amigdala – la ghiandola "emotiva" che vuole difendere la mente da eventi spiacevoli – e l'ippocampo – la ghiandola che invece ha un ruolo attivo nell'attivare i lobi frontali e iniziare la memorizzazione.

Il filtro affettivo è dunque un preciso meccanismo di autodifesa che viene attivato da stati di ansia e condiziona negativamente il passaggio dei dati. In sostanza, lo stato

5. G. Stella, *La dislessia in adolescenza*, in <https://www.youtube.com/watch?v=iiGNykzaAPI>

emozionale del soggetto, causato dall'ansia di fronte al compito, può favorire o impedire l'elaborazione mentale di ciò che sente: in presenza di un filtro affettivo attivato non si può avere acquisizione, ma solo apprendimento.

Le modalità e l'intensità attraverso le quali il filtro agisce sull'apprendimento del soggetto dipendono dalle sue caratteristiche personali, ma anche e, in alcuni casi soprattutto, da come l'ambiente è in grado di "leggere" e di soddisfare le sue motivazioni profonde in relazione ai contenuti da apprendere, e di come questo possa procurare al soggetto benessere emozionale, in quanto "lo stato mentale rilassato dello studente [...] aumenta la recettività verso la nuova materia"⁶.

La soluzione dunque è quella di non far innescare tale filtro affettivo, solitamente attivato da:

- stati di ansia: ad esempio, un dettato autocorretto non è ansiogeno, ma solo una sfida con se stessi, mentre un dettato che poi viene corretto dall'insegnante crea ansia;
- attività che pongono a rischio l'immagine di sé che lo studente vuole offrire al resto della classe: ad esempio, chiedere a uno studente di parlare o dialogare in lingua straniera prima che egli si senta sicuro di riuscirci;
- attività che minano l'autostima: per esempio, la procedura *cloze* (tecniche di incastro), gli esercizi in cui occorre rimettere in ordine le parole e gli esercizi in cui si deve trovare un sinonimo sono attività che pongono lo studente di fronte alla propria capacità di *problem solving*, che può parere inadeguata;
- attività che provocano la sensazione di non essere in grado di apprendere: ad esempio, le attività di comprensione che aprono un'unità d'apprendimento devono facilitare al massimo il primo contatto con un nuovo testo in lingua straniera, evitando l'inserimento del filtro affettivo⁷. Un accorgimento quindi potrebbe essere quello di scegliere testi di questo tipo in modo da alzare il livello di autostima.

Quanto elencato non si riferisce esclusivamente a studenti con BES, si può dunque facilmente cogliere come la dislessia possa concorrere a moltiplicare gli stati d'ansia di fronte a una qualsiasi attività di apprendimento.

La chiave è, forse, aiutare chi la dislessia non ce l'ha, ossia rendere i docenti consapevoli che la didattica trasmissiva e gli esercizi di cui sopra escludono e non includono, e spingerli a chiedersi se abbassare il filtro affettivo non giovi a tutta la classe e non solo ai dislessici.

Accorgimento 2: multisensorialità

Come già accennato, occorre puntare sulla motivazione e su strategie didattiche appropriate, come l'approccio multisensoriale, per esempio, il cui principio fondante è che "gli studenti percepiscono l'input linguistico mediante il ricorso a più di un canale

6. Cfr. P. E. Balboni, *Le sfide di Babele. Insegnare le lingue nelle società complesse*, UTET, 2012, p. 39.

7. *Ibidem*, p. 40.

sensoriale, facendo sì che si realizzi simultaneamente un'elaborazione visiva, uditiva, e tattile-cinestetica dell'informazione"⁸.

Scrivere e pronunciare le nuove parole sollecitando l'associazione a un simbolo visivo, compitare le parole ad alta voce, far percepire che quando si pronuncia la lettera "h" in inglese si emette dell'aria (espirazione) che ad esempio sposta una pallina di carta che l'insegnante tiene in mano, aiuta ad associare struttura grafica, pronuncia e significato della parole.

Trasformare la classe in un laboratorio multisensoriale o poter disporre di un laboratorio linguistico sarebbe l'optimum, ma, partendo da ipotesi più realistiche e cioè che non sia possibile accedere ad un siffatto laboratorio, che non vi sia una LIM in classe, né un proiettore collegato a un computer, si può chiedere agli studenti di portare i loro apparecchi in base alla nota strategia BYOD (*Bring Your Own Device*) oppure almeno reperire delle casse per il PC d'aula.

Accorgimento 3: flessibilità e clima relazionale positivo

Un'altra parola chiave è flessibilità, perché non esiste un alunno dislessico standard e spesso vi è un disturbo misto: si tratta quindi di trovare insieme allo studente strategie diverse che vanno adattate di volta in volta.

Ogni insegnante di lingua inglese conosce molto bene quale sia il ciclo di apprendimento delle lingue straniere: *comprehension-assimilation-production*. Tuttavia, talvolta non attribuiamo abbastanza valore all'aspetto della ricezione-comprensione, tendendo a darlo quasi per scontato. Ciò capita soprattutto con l'inglese, sia perché è la più romanza tra le lingue germaniche, sia perché nel registro formale annovera molti termini di derivazione greca o latina che la maggior parte degli studenti italiani non ha eccessiva difficoltà a comprendere. Valorizzare la comprensione del testo e non sottovalutarla potrebbe aiutare gli studenti ad elevare il livello di autostima e a rafforzare la fiducia nelle proprie abilità di comprensione, anche se si tratta di testi puramente referenziali, in questo modo affronterebbero con meno timore testi in cui abbondano verbi fraseologici, figure retoriche, polirematiche e proverbi.

Flessibilità significa anche non procedere per tappe forzate, ma privilegiare le attività in cui gli studenti riescono meglio in modo da trarre gratificazione da ciò che fanno.

Alcuni suggerimenti potrebbero essere:

- contestualizzare sempre i vocaboli anche rispetto a campi semantici vicini agli interessi dei ragazzi, come la musica, il calcio, la danza, per esempio, e rinunciare a un paragrafo del libro su una corrente letteraria o su un autore
- parlare di un autore raccontando aneddoti sulla sua vita privata che attirino l'attenzione degli studenti
- dire che Shakespeare non sapeva scrivere il proprio cognome e lo scriveva in modi sempre diversi

8. P. Aiello et alii, "Dislessia e complessità didattica della lingua inglese nei contesti scolastici italiani: proposta di un approccio multisensoriale ed interattivo" in *Italian Journal of Special Education for Inclusion*, anno 1, n. 2, 2013, p. 113.

- raccontare le difficoltà che avevano a scuola letterati di primo piano, e, soprattutto, raccontare le proprie difficoltà di quando eravate voi gli studenti
- non aver paura di usare l'italiano per attirare l'attenzione: se gli studenti non capiscono, si distraggono, pensano che l'inglese sia troppo difficile e assumono atteggiamenti rinunciatari
- usare colori per le parole chiave
- usare lo stampatello e chiedere se capiscono, o scusarsi per la propria brutta grafia sono strategie che non costano niente e migliorano la relazione tra docenti e studenti, permettendo agli alunni dislessici di capire le parole meglio senza rivolgersi al compagno di banco
- sorridere, chiedere agli studenti come stanno, come si sentono, soprattutto se ci si rende conto che è successo qualcosa che li ha rattristati o agitati nell'ora precedente e rinunciare a spiegare quello che ci si era prefissi o a interrogare o a svolgere la verifica scritta è un esempio di flessibilità che influisce molto positivamente sull'aspetto emotivo-motivazionale, perché gli studenti associano inevitabilmente il docente alla materia e se il docente li considera persone e non secchi da riempire – per citare la celebre metafora di Yeats⁹ – la fiamma prima o poi si accenderà
- lodarli: gli insegnanti madrelingua dicono continuamente “good” o “excellent”: è una buona tecnica motivazionale
- mimate: mettetevi sotto la cattedra se dovete spiegare “under” o fate cadere una biro per spiegare “to drop”: oltre a catturare la loro attenzione innescherete un altro canale di riconoscimento del nuovo vocabolo.

Liberate la vostra fantasia: in fondo le indicazioni nazionali stesse sottolineano l'importanza di programmare un'azione educativa che tenga in considerazione principalmente le risorse dell'individuo, puntando su un'accoglienza educativa che gli permetta di affrontare con serenità le attività richieste.

Accorgimento 4: lavori di gruppo o di coppia e cooperative learning

Lavorare in coppia o in gruppo è più delicato perché una cosa è doversi esporre di fronte all'insegnante e alla classe, altra cosa è, invece, relazionarsi tra pari, in un'intervista, in un *role play* o in un'attività di *work in pairs*.

Il confronto ridotto consente anche di lavorare sulle dinamiche relazionali della classe: gli studenti imparano a confrontarsi anche con i compagni meno simpatici o meno conosciuti e non solo con il compagno di banco; se il clima è positivo, si possono creare dei gruppi basandosi sulle date di nascita e associando tutti coloro che sono nati nello stesso mese o tutti coloro che sono nati in primavera o in estate in modo da evitare che qualcuno si senta escluso. Associare studenti che ottengono risultati molto positivi ad altri che non li ottengono, non è sempre una buona idea, perché talvolta il criterio è troppo ovvio e finirebbe per umiliare questi ultimi, se non si sa mediare e far accettare un messaggio di aiuto tra pari.

9. “Education is not the filling of a pail, but the lighting of a fire”, W.B. Yeats.

L'importante è sempre chiarire perché si deve svolgere un determinato esercizio e che cosa si impara facendolo: se l'insegnante sa dove deve andare, gli alunni lo seguono, ma in coppia o in gruppo è più divertente.

Il metodo principe per quanto riguarda l'apprendimento cooperativo formale e strutturato, molto differente quindi dall'approccio grammatico-traduttivo, è il *cooperative learning*, ispirato alle teorie costruttiviste e alla teoria della valutazione autentica. Per quanto riguarda la didattica delle lingue straniere, l'approccio di Spencer Kagan¹⁰ ha il vantaggio di essere di facile implementazione e di non richiedere una lunga progettazione preparatoria.

Nell'interazione "a stella", tipica della lezione frontale, al centro vi è sempre l'insegnante, mentre nelle attività di apprendimento cooperativo l'interazione è reticolare e coinvolge tutti gli allievi in modo olistico senza essere mediata dal docente.

Nell'interazione "a stella" gli alunni considerano importante solo il parlato di quest'ultimo e si sentono esonerati dall'ascoltare i compagni¹¹. L'attività didattica suddivisa in momenti di spiegazione e interrogazione instaura un rapporto solitario, a due, tra alunni e insegnante, che alza il livello del filtro affettivo. L'interrogazione, tipico esempio di conversazione diseguale, è un *unicum* italiano che causa noia e distrazione, soprattutto nel caso delle interrogazioni cosiddette "programmate", negative soprattutto nell'apprendimento di una lingua straniera, in particolare nel caso di alunni dislessici che necessitano di sistematicità e non possono affrontare molte pagine di contenuti tutte insieme, anche se, ovviamente, devono sapere quando e su che cosa saranno interrogati.

Accorgimento 5: schemi/tabelle/quaderno compensativo/mappe

L'utilizzo di poster didattici, la realizzazione di schemi con la reiterazione di forme linguistiche di difficile memorizzazione, un formulario di rielaborazioni sintetiche da realizzare insieme, sono strategie che funzionano sempre. Tali attività sono socializzanti e favoriscono l'integrazione piuttosto che la differenziazione. Difficilmente gli studenti le rifiuteranno o le troveranno banali, soprattutto se si dirà loro che possono utilizzare tali materiali anche durante le verifiche scritte o orali (le neuroscienze hanno dimostrato che scrivendo si memorizza, tanto più se lo si fa con colori diversi). Gli studenti dislessici potrebbero disegnare i mediatori iconici oppure si occuperanno di reperire mappe e sintesi sul loro apparecchio elettronico in base alle loro preferenze.

In alcune facoltà universitarie si permette agli studenti di tenere aperto il libro di testo durante gli esami, perché se l'argomento non è stato compreso e non si è acquisito un metodo di studio adeguato, non si riesce comunque a svolgere il compito assegnato in maniera adeguata; quindi, perché puntare sulla memorizzazione non contestualizzata delle preposizioni dei *phrasal verbs*, per esempio, quando si apprendono in modo più proficuo utilizzandoli e magari disegnando delle vignette che li illustrino? Anche le *flash card* sono efficaci e divertenti. Si possono coinvolgere gli studenti nella loro creazione e

10. S. Kagan, *L'apprendimento cooperativo: l'approccio strutturale*, Edizioni Lavoro, 2000, Roma.

11. C. Lavinio, *Comunicazione e Linguaggi disciplinari*, Carocci, Milano, 2006, p. 190.

sono utili per ripassare il lessico e alcune regole grammaticali. O, ancora, si possono realizzare dei poster... per esempio dal titolo “Attenti a quei due” per elementi grammaticali o lessicali a confronto e soggetti a interferenze o “Usare solo in caso di necessità” (ma la creatività degli studenti sarà certamente più accattivante), oppure conseguenze temporali con traduzione a fianco per ricordare la differenza di uso tra L1 e L2...

<i>Mangio</i> una mela ogni giorno.	I eat an apple every day.
Oggi a pranzo <i>mangio</i> una mela.	I'm going to eat an apple at lunch.
Adesso <i>mangio</i> una mela.	I'm eating an apple now.
Ho fame: <i>mangio</i> una mela.	I'm hungry. I'll eat an apple.
<i>Mangio</i> solo una mela a pranzo da una settimana.	I've been eating just an apple at lunch for a week.

Agli studenti si può chiedere di osservare l'economicità dell'italiano rispetto all'inglese, una volta tanto, oppure semplicemente che in inglese cambia sempre il tempo e in italiano si usa sempre il presente indicativo per indicare azioni che si svolgono in tempi diversi, oppure si può parlare dell'aspetto del verbo, delle funzioni linguistiche, ecc., ma è importante che ce l'abbiano sempre davanti quando svolgono un esercizio di produzione scritta.

È fondamentale chiarire che questa differenza causa errori di interferenza e che ci sbagliavamo anche noi quando avevamo la loro età perché tutti traducono dalla lingua madre. È inutile ipotizzare situazioni di “bagno linguistico” e di metodo comunicativo puro che difficilmente sono praticabili in una classe con 24 studenti per tre sole ore alla settimana in cui si deve anche spiegare, correggere e valutare e che, comunque, funzionano solo con i bambini piccoli: l'adolescente vuole sapere perché e fa confronti con la lingua italiana. Rispondiamogli o, meglio ancora, anticipiamolo.

Lo studente dislessico potrebbe utilizzare un quaderno compensativo in cui inserire gli ostacoli alla memoria sia durante le verifiche scritte sia durante quelle orali. Ciò ovvierebbe al problema di confondere una parola con un'altra e consentirebbe di testare più la sua comprensione che la sua memoria.

La mappa concettuale è un altro strumento utile. Si tratta della rappresentazione grafica di un concetto, un'informazione o una conoscenza. L'utilizzo delle mappe concettuali nella didattica permette non solo un apprendimento significativo, ma anche lo sviluppo della meta-cognizione, intesa come la consapevolezza che un soggetto ha della propria capacità cognitiva. Non è da dimenticare, inoltre, che le mappe concettuali disegnano l'articolazione della rete cognitiva in cui un dato sapere è collocato e collegato ad altre conoscenze, pertanto la sua rappresentazione grafica obbliga ad una lettura di tipo ipertestuale e abitua chi le utilizza ad abbandonare il pensiero lineare/sequenziale e ad utilizzare il cosiddetto pensiero reticolare.

Imparare ad usare ed insegnare ad usare software specifici può essere una buona strategia. Tali software infatti solitamente utilizzano due strategie peculiari affinché una

mappa sia effettivamente utile: la riduzione del numero di informazioni e della complessità visiva e l'aumento del valore informativo del singolo nodo. Alcuni esempi sono: 'IperMAPPE' (studiato appositamente per gli apprendenti dislessici), 'cmap', 'XMind', e 'Mindomo' (quest'ultima applicazione presenta anche la possibilità di collaborazione in tempo reale poiché più utenti possono lavorare contemporaneamente sulla stessa mappa). Tali mappe possono anche essere integrate da altre applicazioni o piattaforme eLearning (*Moodle, Blackboard, Desire2Learn, Clever, itslearning*).

In ogni caso, le mappe non si devono improvvisare e bisogna imparare a costruirle e a farle costruire, altrimenti si rischia di ottenere esiti opposti che confondono gli studenti. Le mappe non devono essere ricche, ma essenziali e con chiare relazioni. I ragazzi con DSA tendono a perdersi quando devono preparare un'argomentazione, sia scritta sia orale, a causa delle difficoltà che hanno nei processi di automatizzazione delle informazioni. La mappa aiuta a minimizzare i punti deboli dello studente, compensando la lentezza nella lettura, la stanchezza nella lezione, la disorganizzazione e la struttura sintattica esclusivamente paratattica, a patto che:

- si eviti la prima progettazione a mano libera da parte dello studente: la dislessia severa rende arduo individuare nel testo le parole grafiche, la memoria a breve termine fa dimenticare i collegamenti, la disgrafia rende incomprensibile la rilettura
- si faccia utilizzare il PC con sintesi vocale guidandoli nell'uso, non delegando al PC ciò che è peculiare del docente
- si forniscano le mappe nel caso di contenuti complessi di genere storico-letterario ricordandosi di individuare i nodi e i concetti associati, assegnando loro etichette significative (parole-concetto)
- si individuino i collegamenti (anche quelli che al docente paiono scontati) e si assegnino le parole-collegamento
- si facciano svolgere attività di preparazione alla costruzione delle mappe come, per esempio, imparare a scegliere il significato in base al contesto o saper ricavare informazioni dagli espedienti grafici dei libri di testo, dai mediatori iconici, dalle fotografie e dai titoli dei paragrafi.

Accorgimento 6: provare la *flipped classroom*

Anche la *flipped classroom* può essere una strategia per abbassare il filtro affettivo. L'idea è quella di fornire agli studenti dei materiali didattici appositamente selezionati o predisposti dall'insegnante prima di affrontarne il contenuto insieme in classe.

La prima cosa che gli studenti fanno diventa quindi quella di studiare guardando video, consultando i materiali ed adoperandoli più volte fino a quando i concetti non sono sufficientemente chiari. Visto che lo studente dislessico non può permettersi lo stesso metodo di studio dei normolettori – ossia leggere più volte il materiale di studio – dato che la difficoltà di lettura rallenta i tempi e affatica in modo eccessivo rendendo precari i processi di comprensione e elaborazione del testo, occorre spiegare quali siano le strategie per ottimizzare il metodo di studio. In questo caso il concetto di classe capovolta funziona solo se il docente conosce e fornisce prima il materiale da preparare

a casa e lo correda di una traccia per creare aspettative e focalizzare l'attenzione su determinati argomenti. L'insegnante potrebbe quindi, per esempio, dare come consegna di leggere il titolo e individuare l'argomento centrale del titolo e i sotto-argomenti; fornire un glossario evidenziando prima le parole più difficili che si troveranno nel testo; suggerire di gerarchizzare le informazioni utilizzando le congiunzioni, dopo aver fornito una tabella con i *linking signals*; o ancora usare colori diversi per far ricordare meglio le informazioni più importanti e le parole chiave.

La seconda parte del lavoro avviene invece in classe dove l'insegnante si troverà (almeno dal punto di vista teorico) un gruppo di studenti già preparato e, a detta dei sostenitori, finalmente omogeneo ed "allineato"¹². Nella terza parte c'è un momento di recupero e sistematizzazione delle informazioni e una simulazione di verifica.

In sintesi:

SÌ	NO
Ridondanza (riutilizzo in vari contesti dei medesimi vocaboli)	Uso di sinonimi
Multisensorialità (vari linguaggi: paraverbali, iconici, uditivi)	Metodo <i>'talk and chalk'</i>
Input segmentato (tempi più lunghi e compiti scorporati in più fasi)	Assegnazione di contenuti da studiare "da pagina a pagina"
Input sistematico (schemi di riferimento e ricapitolazioni)	Scarso rinforzo, digressioni, pianificazione disordinata della lezione
Input ludico	Assegnazione di elenchi di vocaboli o verbi da sapere a memoria
Usare organizzatori anticipati: schemi, tabelle, mappe con uso di colori diversi per gerarchizzare le informazioni, le desinenze, l'ordine delle parole che devono imparare e controllare l'aggiornamento sistematico del quaderno compensativo	Non dare come consegna la riletture di argomenti nuovi o poco chiari

¹². In realtà non è proprio così, perché dipende dall'ambiente di apprendimento domestico e dalla possibilità di consultare il materiale o di farsi aiutare, ma è un tentativo che val la pena fare.

■ 3. DIDATTICA INCLUSIVA E RESILIENZA

3.1 Superare la logica compensativa

In considerazione di una visione pedagogica che si proponga come ponte e non come muro e che non deleghi alle tecnologie il lavoro dell'insegnante, fatto di relazione e accompagnamento, si propone in questa sezione un approccio didattico orientato a superare la logica compensativa e a sviluppare le potenzialità individuali. Le misure compensative previste dalla normativa vigente sono già state accennate e sono in genere ormai note a tutti i docenti, ciò che forse è più opportuno ricordare è la differenza tra didattica individualizzata e didattica personalizzata¹.

Mentre "individualizzato" è l'intervento didattico misurato su ogni singolo individuo, tale intervento diventa "personalizzato" quando è ideato ad hoc per ogni studente, calibrato sulle sue necessità.

L'azione formativa individualizzata si prefigge obiettivi comuni per tutti gli studenti della classe, ma è concepita modellando le metodologie in funzione delle caratteristiche individuali dei singoli studenti. La didattica individualizzata si caratterizza per l'assegnazione di determinate attività individuali che può svolgere il singolo discente per potenziare specifiche competenze: ad esempio nella classe terminale della secondaria di secondo grado scrivere una mail all'Ufficio Relazioni con il Pubblico per lamentarsi della qualità del servizio, gerarchizzare le informazioni di un testo storico o in una biografia, individuare le informazioni referenziali e inferenziali in un dato testo, scrivere un testo argomentativo, svolgere un esercizio di scrittura documentata, individuare le figure retoriche di un testo poetico, scrivere un testo utilizzando solo termini denotativi e non connotativi e viceversa, o ancora distinguere il registro formale da quello informale in un articolo di giornale.

La didattica personalizzata, invece, gestisce l'offerta didattica e le modalità relazionali sulla specificità e univocità a livello personale dei bisogni educativi considerando le differenze individuali sotto il profilo qualitativo, accrescendo i punti di forza di ciascun allievo. Gli individui apprendono in maniera diversa l'uno dall'altro secondo le modalità e le strategie con cui ciascuno elabora le informazioni e quindi la didattica inclusiva deve tener conto degli stili di apprendimento che differiscono da studente a studente. Quando si usano mappe concettuali, organizzatori anticipati, mediatori iconici calibrati sul singolo studente e adeguati al suo particolare stile di apprendimento, si usa la didattica personalizzata. La sinergia tra didattica individualizzata e personalizzata crea le condizioni più favorevoli per l'apprendimento.

Non si tratta più dunque di far fare a ciascuno la stessa cosa nello stesso modo, ma di adattare a necessità e stili diversi attività che rimangano simili negli obiettivi ma diverse nella modalità di somministrazione, gestione e valutazione.

1. Cfr. AA. VV., *Dislessia e altri DSA a scuola. Strategie efficaci per insegnanti*, Erickson, Trento 2013, p. 79.

Il primo passo per diventare un docente inclusivo è l'analisi dei prerequisiti degli studenti. Dando per scontato che il docente debba credere egli stesso nell'inclusione perché possa riuscire a realizzarla, per quanto riguarda i discenti occorre conoscere il retroterra scolastico di ogni alunno dislessico per capire se vi sia stata una presa in carico tempestiva o meno e capire le specifiche difficoltà di ciascuno. Le differenze soggettive, come già chiarito, sono infatti essenziali per la scelta adeguata degli strumenti compensativi da adottare.

Alcuni studenti incontrano difficoltà nella comprensione del testo e quindi la sintesi vocale o l'uso di programmi di video-scrittura con correttore ortografico bastano da un punto di vista legale, ma potrebbero non essere sufficienti da un punto di vista didattico. Il computer funziona solo se l'alunno lo sa usare bene, sapendolo adattare alle proprie esigenze di studio, tuttavia difficilmente gli studenti dislessici sono dattilografi provetti che conoscono perfettamente i programmi di video-scrittura, pur essendo molto veloci nello scaricare film e musica o interagire sui social network. Inoltre, raramente gli studenti sanno filtrare le fonti, se non glielo si insegna a scuola, per cui le teorie sconclusionate di un blogger qualsiasi spesso sono considerate alla pari di quelle di accademici di fama. Occorre dunque insegnare loro la differenza, così come è necessario spiegare il divario culturale e di affidabilità che corre tra l'enciclopedia Treccani online, ad esempio, e Wikipedia, nonché informarli sull'esistenza di Google Scholar e scoraggiarli, invece, dall'utilizzare Google traduttore, dato che traduce "tu sei" con "you six"²!

Più che affidarsi unicamente a strumenti digitali, è invece essenziale potenziare le capacità di ascolto degli alunni dislessici e rafforzare le loro relazioni sociali, così come la competenza sociale di saper chiedere aiuto è una competenza che molti studenti devono ancora apprendere: un progetto di autonomia non significa infatti imparare a fare a meno degli altri, ma significa imparare a chiedere aiuto e a ringraziare per averlo ricevuto³.

Il PC non basta se il modello di lezione è quello trasmissivo in cui il docente parla e scrive date e nomi alla lavagna in corsivo! Forse adottare strategie è più opportuno che adottare tecnologie, come suggerito dalla seguente tabella⁴:

2. Un sistema infallibile è, per esempio, quello di prendere un testo autentico, letterario o giornalistico, che loro conoscono e farlo tradurre da Google traduttore, mettendo a fronte la traduzione di un anglista.

3. Cfr. F. Fogarolo, "Tecnologie per compensare la dislessia: che cosa fare perché siano efficaci" e E. Ghidoni, D. Angelini, "La dislessia negli adolescenti e negli adulti", in *La Dislessia e i Disturbi specifici dell'Apprendimento*, in *Annali della Pubblica Istruzione* 2/2010.

4. Vedi F. Fogarolo, *op. cit.*, p. 111.

STRATEGIE COMPENSATIVE	TECNOLOGIE COMPENSATIVE
Vengono spesso acquisite, e anche individuate, autonomamente dagli alunni.	Almeno all’inizio, l’intervento degli adulti è indispensabile.
Raramente hanno controindicazioni. Possono essere più o meno efficaci ma è molto raro che possano essere considerate dannose.	Le tecnologie mal somministrate possono essere seriamente controproducenti: calo di motivazione e autostima, netta diversificazione dalla classe, complicazione operativa, allungamento dei tempi...
Spesso le strategie sono utili a tutti i ragazzi e quindi possono essere proposte a tutta la classe. Non hanno alcuna caratteristica stigmatizzante e vengono accettate molto più facilmente dagli alunni con problemi di vario tipo.	L’uso delle tecnologie usate in funzione compensativa è davvero conveniente solo in presenza di un serio disturbo; per gli altri alunni sarebbero un’inutile complicazione in più. Problemi di rifiuto e/o accettazione sono molto frequenti.
Le strategie, almeno quelle di base, non hanno costi e possono essere usate con tutti gli alunni senza problemi. Questo facilita l’accettazione e la condivisione.	Molte tecnologie richiedono prodotti software distribuiti con licenza unica e che non possono pertanto essere usati da tutti i compagni.
Possono essere introdotte o suggerite anche in modo strutturato o informale, in base ai più svariati stimoli o suggerimenti educativi.	È necessario un percorso di formazione e addestramento, almeno in certi momenti più significativi, per acquisire alcune abilità per una efficace competenza.

Diventare un insegnante inclusivo è molto difficile perché richiede molto tempo e la messa in discussione della propria routine didattica, ma è anche una sfida emozionante che si può vincere se si riesce a sviluppare resilienza e ad accettare che è un percorso ad ostacoli con poche gratificazioni a breve termine. Non bisogna stancarsi di provare e cambiare strategia quando questa non funziona, evitando sia i conflitti che a volte si creano, ma anche il pietismo, per cui “la sufficienza è scontata dato che l’alunno è dislessico”. Cerchiamo di ricordarci ogni giorno le parole di Thomas Jefferson: “There is nothing more unequal than the equal treatment of unequal people”.

3.2 Come sviluppare la resilienza e l’autoefficacia nell’ora di inglese

La resilienza è definita come un processo di adattamento funzionale per affrontare le avversità, le situazioni stressanti e traumatiche della vita (Masten, 1994), o come la capacità di “rimbalzare” (*rebound*) o far fronte con successo alle avversità, o, secondo la definizione di Froma Walsh (2003), come l’abilità di resistere e affrontare senza soccombere alle sfide che la vita impone, come un processo che coinvolge aspetti dinamici che sostengono, incoraggiano e promuovono l’abilità di contrastare e opporsi. Essere resilienti implica lo sviluppo di quelle competenze emotive, sociali, e cognitive necessarie al superamento delle difficoltà nonostante l’individuo sia esposto a notevole fonte di stress⁵. Tuttavia, le definizioni proposte dagli esperti sono ben più numerose di quelle sopra citate.

5. Cfr. V. Cavioni, M. Lupica Spagnolo, G. Beddia, M. A. Zanetti, “Promuovere la resilienza a scuola. Un curriculum europeo per docenti e studenti”, in *Psicologia e Scuola*, maggio-giugno 2015.

In ambito anglofono, associato alla resilienza si trova il concetto di *empowerment*, termine di difficile traduzione perché sintetizza in una parola la capacità di padroneggiare una situazione e la consapevolezza di avere il potere di influire sull'ambiente grazie alle proprie competenze in quel determinato ambito. Secondo questo approccio, gli indicatori dell'*empowerment* personale sono principalmente fondati sulla capacità di controllo personale e di autonomia e rimandano ai concetti di auto-apprezzamento/valutazione delle competenze e alla stima di sé. Per questo concetto, i ricercatori canadesi francofoni usano il termine *habilitation* (accrescimento dell'abilità)⁶. Al di là della questione terminologica, a scuola interessano gli aspetti operativi delle componenti dell'*empowerment*, identificate dagli studiosi Zimmerman, Bandura e Mechanic⁷:

1. attribuzione di causalità interna
2. percezione di auto-efficacia
3. speranza appresa (traduzione di *learned hopefulness*)
4. pensiero positivo operativo.

Si potrebbe obiettare, ironicamente, "Vasto programma!". In classe, però, gli studenti trascorrono parecchie ore e quindi ci sarebbe il tempo per tentare di far sviluppare tali atteggiamenti nei confronti delle difficoltà scolastiche.

Nel caso del fattore uno – ossia l'attribuzione di causalità interna –, è tipico di alcuni adolescenti attribuire i risultati delle proprie azioni e dei propri risultati scolastici negativi all'insegnante del momento, al sistema scolastico, al libro di testo, agli insegnanti degli ordini di scuola precedenti, ossia a forze esterne e indipendenti dai propri comportamenti. Nei confronti dell'inglese, l'atteggiamento di alcuni studenti dislessici è rinunciatario perché esso è da sempre fonte di frustrazione e diminuzione del livello di auto-stima. Altri adolescenti, invece, come meccanismo di difesa, per non riconoscere che c'è qualcosa che non va, si attribuiscono tutte le responsabilità: "non lo imparo perché non ho voglia di studiarlo", "mi annoia", "non mi va". Anche questo è un modo per reagire allo stress causato dall'insuccesso scolastico, è una strategia di *coping*, ossia un processo di adattamento, uno sforzo cognitivo e comportamentale per far fronte a una difficoltà, al fine di ridurre la minaccia che stressa l'individuo. Meglio dire di non aver voglia di studiare, meglio convincersi che il problema è la mancanza di volontà, piuttosto che chiedere aiuto e riconoscere che c'è un problema. Questo atteggiamento è anche influenzato dall'egocentrismo dell'adolescente oppure dal meccanismo psicologico della profezia che si auto-avvera (*self-fulfilling prophecy*) per cui l'individuo mette in atto comportamenti atti a provocare ciò che egli teme.

Per rispondere a ciò in modo positivo, si può cominciare con il chiedere agli studenti dislessici due parole che associano all'inglese: purtroppo, si sentiranno risposte molto negative, sempre collegate alla materia scolastica e mai alla lingua in cui sono cantate la maggior parte delle canzoni che ascoltano o in cui sono scritte quasi tutte le frasi delle magliette che indossano. Partire da questa considerazione e insegnare loro ad associare

6. Cfr. E. Malaguti, "Articolazioni teoriche della resilienza", in B. Cyrulnik, E. Malaguti, *Costruire la resilienza*, Erickson, Trento 2015.

7. *Ibidem*.

immagini positive all'inglese può essere un modo per farli riflettere sul fatto che l'atteggiamento negativo condiziona i risultati.

Per quanto riguarda il punto due, ossia la percezione di auto-efficacia, occorre far riflettere questi studenti su che cosa intendano per imparare l'inglese e far loro capire che sanno già fare molte cose con questa lingua, ma che le sottovalutano, perché hanno deciso di concentrarsi su altre materie, dato che l'inglese “tanto è troppo difficile”, “si scrive in un modo e si legge in un altro”, “non ci sono regole fisse”, ecc. Una strategia vincente per l'auto-efficacia è spiegare perché l'inglese è così, fare esercizi di consapevolezza fonologia e scoprire che una logica c'è, suddividendo ad esempio le parole in gruppi fonologici, evidenziandoli con colori diversi per ricordarsi che tutte corrispondono a un suono preciso:

- *cat, sat, bat...*
- *but, duck, mug...*
- *see, bee, teen...*
- *food, soon, moon...*

Il concetto di “speranza attesa” e di “pensiero positivo operativo” sono collegati. Il primo è definibile come la tendenza a ritenere che determinati eventi siano gestibili e controllabili, anche la grammatica inglese con le sue deviazioni dalla norma così ampie rispetto alle lingue romanze! Vi sono insegnanti di inglese italiani dislessici, si tratta quindi di sviluppare abilità e conoscenze per influire sul proprio apprendimento perché nulla può avvenire di default. A volte gli studenti hanno dei falsi miti sull'apprendimento della lingua inglese: “l'inglese si impara solo andando sul posto, non sui libri, non a scuola”, “così non serve a niente”, ma tale mito si sfata facilmente anche semplicemente citando i tanti immigrati italiani del passato che non lo parlavano neanche dopo molti anni di permanenza, perché non l'avevano studiato e frequentavano solo italiani in quartieri abitati da italiani, mentre i figli che lo hanno studiato a scuola l'hanno imparato molto bene. Un altro esempio sono gli studenti dei paesi ex-membri del Patto di Varsavia che, pur non potendo soggiornare in Paesi anglofoni, conoscevano ugualmente la lingua molto bene. È necessario affaticarsi per imparare l'inglese, così come per qualsiasi altra materia, e l'impegno dura tutta la vita. Gli alunni dislessici si stancano prima degli altri ed è per questo che hanno diritto a più tempo.

Un modo efficace per creare un pensiero operativo positivo collegato alla materia è, per esempio, usare attività inconsuete o che scatenino ilarità e collaborazione, come per esempio insegnare l'aspetto continuo del verbo chiedendo agli studenti di disegnare delle vignette illustrando frasi assurde o comiche per presentare, sdrammatizzare e interiorizzare la spesso ostica *duration form*. Un altro esempio potrebbe essere cercare di coinvolgerli maggiormente attraverso le canzoni, ottimo spunto con cui affrontare i tempi verbali⁸. Anche YouTube può essere fonte di ispirazione, ma se non si dispone di LIM o di PC collegato a un proiettore, si può usare comunque il metodo BYOD. Perché non chiedere poi agli studenti di preparare una verifica sul tempo verbale affrontato utilizzando le canzoni e

8. Al link <http://www.tefltunes.com/grammarsongs.aspx> si può trovare una tabella indicante, per ogni testo verbale, quale canzone potrebbe essere utile e il link relativo al testo.

inventando esercizi collegati ad esse? Qualsiasi occasione di protagonismo (spesso anche proposta dagli stessi studenti) non può che motivare e lavorare nella giusta direzione.

Per concludere: l'alunno dislessico non può diventare resiliente da solo, la comunità educante tutta, le associazioni, le istituzioni sul territorio devono interagire per aiutarlo, ma anche la didattica spicciola e il singolo docente possono fare molto e ciò migliorerà l'ambiente di apprendimento e avrà risultati positivi su tutti gli studenti. Val la pena quindi di pensare a una rilettura in chiave di *empowerment* delle misure compensative e dispensative per un Piano Glottodidattico Resiliente:

1. Sviluppare il pensiero positivo per incoraggiare l'ottimismo e l'umorismo nell'affrontare la dislessia
2. Potenziare i punti di forza degli studenti deboli, diagnosticati e non, per aiutarli nell'utilizzo delle proprie abilità e potenzialità per il successo scolastico e sociale aumentandone l'autoefficacia e l'autostima
3. Sviluppare l'autodeterminazione per stimolare l'impegno, l'autonomia e la tenacia degli studenti dislessici mediante attività di *problem solving* e *decision making*
4. Potenziare le capacità di *listening* e *speaking* che non sono condizionate dalla dislessia
5. Potenziare l'assertività e la capacità di chiedere aiuto
6. Incoraggiare la costruzione di relazioni amicali sviluppando le capacità di cooperazione, di imparare a studiare insieme ai compagni e l'empatia. Le schede, le mappe e le sintesi servono a tutti e trasformare la propria difficoltà nell'opportunità di aiutare gli altri, insegnando loro un metodo di studio efficace, è una arma potentissima
7. Promuovere processi metacognitivi fa riflettere sulle proprie difficoltà e trovare il modo di aggirarle
8. Evitare verifiche a sorpresa per tutti, non solo per gli studenti con DSA. Anche all'università gli studenti sanno con largo anticipo quando vi sarà l'esame e su cosa verterà. Inoltre, far sempre fare a tutta la classe una simulazione di verifica è utile a tutti
9. Consentire l'uso del dizionario a tutti, ma non prima di aver insegnato come utilizzarlo. La traduzione è un esercizio di *problem solving* di elevata difficoltà, dunque esercitarla è un ottimo sistema per stimolare i giusti processi di apprendimento
10. Usare gradualità nell'affidarsi agli strumenti compensativi e adattarli in base a ciò che si deve valutare di volta in volta, personalizzandoli
11. Stare attenti ai prerequisiti: se l'alunno dislessico non ha mai usato programmi di videoscrittura con correttore ortografico e non vuole cominciare a 16 anni, non si deve insistere, ci si limiterà a non tener conto dei tipici errori di *spelling* che vengono compiuti. Anche per quanto riguarda il tempo a disposizione, che può essere più ampio, è meglio lasciare allo studente la facoltà di scegliere questo tipo di misura oppure di avvalersi della possibilità di svolgere un esercizio in meno

12. Insegnare a tutti a tenere un diario di bordo è fondamentale. Lo studente migliore non è mai il più intelligente o il più creativo, bensì il meglio organizzato. Alcuni, anche se non sono dislessici, non riescono a scrivere i compiti e le date delle verifiche sul diario perché i docenti le dettano troppo velocemente. Scrivere sempre sulla lavagna la data e l'argomento della lezione, suddividendola nelle varie sezioni è, per esempio, uno dei modi per aiutare a compilare un diario di bordo
13. Suddividere spiegazioni e verifiche in porzioni idonee. Non serve rispettare sempre e comunque la scansione del libro di testo, è più efficace adattare il testo alle esigenze della propria classe. Un'unità di apprendimento si suddivide in unità didattiche, ma non è detto che le varie sezioni strutturate per uno studente immaginario funzionino a livello pratico. In fondo, il programma non esiste più: esistono gli studenti e le loro esigenze formative che non sono mai omogenee
14. Coinvolgere lo studente dislessico nella redazione del PDP, di cui è il protagonista, in questo modo diventerà sempre più consapevole delle proprie modalità di "funzionamento" e si sentirà parte attiva del processo.

4. ALTRI TIPI DI BISOGNI EDUCATIVI

4.1 Quando il Bisogno Educativo è raro e superspeciale

All'interno degli alunni con Bisogni Educativi Speciali devono anche essere inclusi i cosiddetti "gifted", ossia gli studenti plusdotati definiti anche "ad altissimo potenziale intellettuale". Si tratta di studenti con un QI più alto di 25/30 punti rispetto al 100, che è il punteggio standard per un'intelligenza media. A causa della rapidità di pensiero¹, questi studenti svolgono le attività assegnate prima degli altri e si annoiano nell'attesa che gli altri terminino. Nel 2014 l'Organizzazione Mondiale della Sanità ha segnalato che questi alunni sono a rischio di insuccesso formativo se non riescono a realizzare i propri talenti cognitivi.

Tuttavia, non solo coloro che hanno un QI al di sopra della media possono essere considerati superdotati. Infatti, una seconda linea teorica sostiene che si debbano tenere in considerazione anche altri indici. Non si tratta quindi di alunni geniali, non ci si riferisce agli *enfants prodiges*, a novelli Mozart, ma ad alunni che hanno qualcosa in più da un punto di vista qualitativo, più che un QI superiore alla media, anche perché nella maggior parte dei casi gli insegnanti ignorano il QI dei loro studenti. La Regione Veneto, all'avanguardia su questo aspetto, ha pubblicato un documento con le linee guida sui "gifted", al quale si rimanda², in cui vengono prese in considerazione caratteristiche quali creatività, pensiero divergente, autoregolazione e intelligenza emotiva.

Pertanto non si tratta neanche delle "eccellenze", non sono gli alunni con tutti 9 e 10 in pagella, anche perché come è noto, spesso gli studenti che ottengono voti migliori a scuola coincidono con gli studenti meglio organizzati e con un migliore metodo di studio, ma non sempre questi ultimi sono anche i più intelligenti o i più creativi. Infatti, fattori come l'istruzione ricevuta nel ciclo precedente, la famiglia di origine e la motivazione contribuiscono notevolmente ad avere una media di voti molto alta.

Si tratta quindi, nel complesso, qualsiasi sia il loro talento in più, di studenti che occorre non demotivare e, soprattutto, scoprire. A volte, infatti, soprattutto nella secondaria di secondo grado, essi tendono a nascondersi, perché gli adolescenti sono molto conformisti, non vogliono differenziarsi dal gruppo dei pari ed essere considerati "secchioni". Una volta "scoperti" tali alunni, gli errori da non compiere sono i seguenti: non considerarli assistenti dei docenti, non chiedere loro di spiegare qualcosa che gli altri non hanno capito, non considerarli adulti da un punto di vista emotivo e affettivo – le loro intelligenze infatti si sono sviluppate in modo asincrono e potrebbero avere dei problemi relazionali, non assegnare loro un numero di esercizi superiore a quello assegnato ai compagni o approfondimenti personali non supervisionati dal docente. Anche aspettarsi che siano eccellenti in tutte le materie è sbagliato.

1. Cfr. <http://gcq.sagepub.com/content/51/4/342.refs> VanTassel-Baska & Brown, "Toward Best Practice: An Analysis of the Efficacy of Curriculum Models in Gifted Education", in *Gifted Child Quarterly*, Fall 2007 51: 342-358, 2007.

2. <http://www.istruzioneveneto.it/wpusr/wp-content/uploads/2015/05>.

Come fare dunque a identificarli? In genere tali alunni condividono alcune o tutte le seguenti caratteristiche:

- sono lettori avidi
- hanno senso dell'umorismo
- dimostrano curiosità intellettuale prolungata nel tempo su alcuni argomenti
- si esprimono con notevole proprietà di linguaggio
- operano collegamenti originali
- amano le attività di *problem solving* e i giochi enigmistici
- hanno un'immaginazione particolarmente vivida
- sono interessati all'equità e alla giustizia
- si annoiano facilmente
- preferiscono la compagnia di persone adulte
- tendono a mettere in discussione l'autorità
- sono abili con i numeri
- sono molto creativi
- sono molto sensibili e dimostrano empatia per chi ha subito un torto o è in difficoltà
- sono particolarmente vulnerabili a livello emotivo
- hanno acquisito le abilità di letto-scrittura precocemente.

Che cosa fare quindi, quando si ha la fortuna di avere alunni con queste caratteristiche intellettive? Coltivare il talento di ciascuno. Sembra uno slogan, difficilmente applicabile nella prassi, ma, soprattutto nell'insegnamento della lingua straniera, sperimentare e individualizzare è facile e possibile.

Supponiamo di dover affrontare un'unità didattica su *Il mercante di Venezia* nell'ambito di un'unità di apprendimento su Shakespeare. Si potrebbe ipotizzare di partire dal monologo di Shylock e chiedere agli studenti di cercare su YouTube i vari contributi presenti. A ciascuno poi si potrebbero assegnare compiti differenziati: distinguere tra le rappresentazioni degli attori professionisti e quelle dei dilettanti, classificare le sequenze tratte dalle riduzioni cinematografiche, chiedersi come mai tale monologo è così famoso e così rappresentato anche a livello di recite scolastiche e provare a dare più risposte. Agli alunni "gifted" si potrebbe chiedere, invece, di capire come mai il monologo di Shylock è allo stesso tempo sublime e pericoloso, qual è il rapporto con il denaro dei veneziani così ben rappresentato da Shakespeare, di spiegare perché i critici hanno accostato quest'opera a *Il Timone d'Atene* e sostenuto che Shakespeare ha anticipato Marx, in che modo nella Germania nazista è stato rappresentato *Il Mercante di Venezia*, oppure di individuare gli errori di traduzione nel doppiaggio e nei sottotitoli in italiano nella riduzione cinematografica più famosa, quella del 2004 in cui Shylock è interpretato da Al Pacino diretto da Michael Radford. Gli studenti in cui il pensiero divergente è meno sviluppato, ma che possiedono buona memoria, potrebbero imparare a memoria il monologo e recitarlo.

In generale, quando si assegnano attività di *problem solving*, vi è una fase che riguarda la produzione delle idee che si chiama "fase divergente", in cui alcuni allievi sono più versati, e una "fase convergente", in cui si selezionano le idee. Gli alunni "gifted" hanno bisogno di compiti sfidanti, che stimolino la loro curiosità intellettuale e mettano in gioco il

pensiero divergente. Si può chiedere loro di confrontare due traduzioni di due brani di narrativa tratti da un classico della letteratura o due poesie, oppure di rispondere a domande aperte che richiedano capacità argomentative e di ricerca delle informazioni particolarmente impegnative.

Ad esempio, se si propone l'analisi di una recensione cinematografica oltre alle solite domande di comprensione del testo e a quelle sulle caratteristiche testuali della recensione, sul contenuto, sull'opinione del critico, e su quale tipo di film preferiscano gli studenti, si può chiedere, a livello facoltativo, di scoprire se vi siano tycoon donne, in quale romanzo Fitzgerald tratta dei magnati hollywoodiani, di approfondire la storia della censura a Hollywood. A questo punto si potrebbero ulteriormente differenziare i compiti: ad alcuni si chiede di scoprire perché nei film degli anni Cinquanta anche le coppie sposate venivano rappresentate sempre in stanze con letti gemelli, ai "gifted" di scrivere una relazione sulla censura a Hollywood durante il Maccartismo; ad altri di scoprire esempi di *product placement* (pubblicità indiretta) nei film di James Bond; ai "gifted" di studiare la questione dal punto di vista giuridico. Esistono contratti in cui una casa di produzione "vende" un certo numero di inquadrature dell'acqua minerale San Pellegrino? Quali termini del linguaggio settoriale giuridico vengono usati in questi contesti?

Se si affronta una lettura tratta da un qualsiasi *quality paper* britannico, si potrebbe assegnare loro il compito di esaminare molto attentamente il paratesto e poi di confrontarlo con un'altra testata britannica e, successivamente, con una testata statunitense e italiana, oltre alle usuali domande di comprensione del testo.

Per quanto riguarda l'aspetto grammaticale, quando si spiega *used to*, per esempio, si può chiedere loro di scoprire che cos'è il *would* iterativo e di scrivere degli esempi. Oppure quando si trattano i verbi fraseologici chiedere di analizzare e tradurre in italiano frasi come *He drank himself into the hospital*, *In 1931 England was forced off the gold standard*, o *The rain washed out the match*.

In conclusione, la creatività, il senso critico e l'empatia sono doti con cui si nasce, sta all'insegnante cercare di farle venire fuori e, ciò che più conta, è che spesso esse non sono così limitate. Compito dei docenti è quindi insegnare a chi le possiede a mettersi in relazione in modo positivo con gli altri, a conoscere i propri punti di forza ma anche quelli deboli, a gestire lo stress e le emozioni, creando un ambiente di apprendimento in cui tutti si impegnano per risolvere un problema contribuendo con le proprie capacità e collaborando. L'importante è far capire che tutti contano e sono utili: chi riesce a trovare soluzioni originali ma magari è disordinato sarà aiutato da chi è meno creativo ma più sistematico. Poiché ormai è scientificamente accertato che le intelligenze sono multiple e gli stili di apprendimento sono diversi, un insegnante inclusivo dovrebbe cercare di far star bene in classe sia il timido insicuro di sé, sia l'estroverso creativo che si spazientisce se ci sono esercizi ripetitivi.

■ 5. SUGGERIMENTI E MODELLI PER LA VALUTAZIONE

5.1 Suggerimenti di formattazione per documenti *dyslexic-friendly*

Le tipologie di esercizi da utilizzarsi nelle verifiche qui di seguito proposte si basano sui seguenti criteri di accessibilità suggeriti dagli esperti:

- usare font ‘bastoni’ come Arial o Verdana a grandezza 14, con interlinea almeno 1,5 (i font graziati, infatti, ossia quelli con allungamenti ortogonali alle estremità delle lettere detti appunto ‘grazie’, sono di più difficile leggibilità) oppure usare font creati ad hoc e scaricabili gratuitamente: 1. *Open Dyslexic*, le cui lettere hanno una forma particolare; 2. *TestMe*, i cui caratteri sono senza grazie, con spaziatura abbondante e lettere ascendenti e discendenti lunghe; 3. *Bianconero* che rende molto più leggibili le lettere che più spesso vengono confuse: p-b, p-q, a-e
- usare carta opaca, color bianco avorio: lo sfondo non bianco stanca meno la vista
- non spezzare la parola per andare a capo
- utilizzo del colore quando possibile
- giustificazione a sinistra
- sottolineamento delle frasi per evitare errori dovuti alla confusione tra la riga di sopra e quella di sotto
- adoperare molte tabelle e numerare gli elenchi
- non usare più di 60-70 caratteri per rigo
- aumentare i margini della pagina
- consentire la verticalizzazione del testo con un leggio
- predisporre due cartoncini colorati tagliati a L per inquadrare il paragrafo da leggere
- evitare testi fotocopiati.

5.2 Suggerimenti per la predisposizione di verifiche

Di seguito, un insieme di buone pratiche per impostare nella maniera corretta i testi necessari a valutare gli studenti:

- ridotta quantità di produzione scritta con esercizi non strutturati
- esercizi strutturati costituiti per lo più da attività di abbinamento e T/F o scelta multipla limitate a 2 o 3 sole opzioni
- assenza di esercizi che richiedono una riflessione astratta sulla lingua
- assenza di esercizi che si focalizzano sullo spelling
- evitare esercizi del tutto decontestualizzati tipo riordinamento di frasi, esercizi con verbi all’infinito tra parentesi da coniugare nella forma corretta
- fornire un glossario riferito alla tematica da trattare e un elenco di *linking signals* con a fronte la traduzione in italiano. Infatti, anche se viene concesso l’uso del bilingue

cartaceo nella ricerca del lemma e del traduttore corretto, lo studente può perdere tempo sia per problemi nell'individuare il corretto ordine alfabetico sia nell'individuare il contesto corretto al quale si riferisce il traduttore, anche a causa dei caratteri molto ridotti dei traduttori e delle glosse esplicative dei dizionari in commercio. Qualora, invece, sia possibile far utilizzare un dizionario on line, il problema non si pone e si può fornire solo un elenco di *linking signals*, tipo quello suggerito.

ADDITION	SIMILARITY	LIMITATION	CONTRADICTION	RESULT	CONDITION
not only... but also non solo... ma anche	as well as così come	although sebbene	however tuttavia	accordingly in base a	as long as purché
as well as oltre a	likewise allo stesso modo	despite (+ nome) malgrado	instead invece	hence quindi	provided that a patto che
moreover/furthermore inoltre	together with insieme con/a	even though anche se	conversely viceversa	therefore perciò	unless a meno che non
in addition to this inoltre		in spite of (+ verbo) nonostante	nevertheless ciò nonostante	thus dunque	due to a causa di
			on the one hand, ... on the other hand da un lato... dall'altro		
			while/whereas mentre		

5.3 Modelli di verifica per studenti dislessici

Nelle domande aperte, gli esercizi non possono differire per contenuto da quelli del resto degli studenti. Sono possibili solo accorgimenti grafici, l'uso del dizionario bilingue, nonché la possibilità di rispondere a un quesito in meno, oppure più tempo a disposizione. Il tutto, ovviamente, deve essere specificato nel PDP ed essere stato applicato nelle simulazioni.

Al fondo della sezione, dopo alcuni modelli di verifica che hanno il semplice scopo di mostrare alcune tipologie di esercizi impostati nella maniera corretta e formattati secondo i suggerimenti consigliati, sarà possibile anche trovare un paio di esempi di griglie valutative che valorizzano la comprensione globale del testo o la capacità di esprimere la propria opinione in modo efficace, non penalizzando gli errori che non inficiano la comunicazione, in particolare gli errori ortografici, la punteggiatura, la non differenziazione tra minuscole e maiuscole, gli errori dovuti a distrazione o stanchezza. Per gli esercizi puramente grammaticali si consiglia di trascurare gli errori ortografici, valutando quindi maggiormente il contenuto rispetto alla forma.

Prima di valutare, comunque, ricordiamo sempre che la legge 170 (art. 5, c. 4) parla di “adeguate forme di verifica e di valutazione”, e pertanto i ragazzi con DSA devono essere valutati in rapporto alle loro capacità e alle loro difficoltà, senza paura di discostarsi da come in genere si valuta in classe, ma secondo il principio della personalizzazione. Si deve tenere conto delle caratteristiche personali del disturbo dell’allievo, del punto di partenza e dei risultati conseguiti, premiando i progressi e gli sforzi: è importante che l’insegnante ricordi che la valutazione è un processo di natura psicologica, perché tocca il giudizio che ciascuno ha di sé, pertanto dovrebbe essere pensata e progettata come un processo per migliorare i risultati degli studenti e non solo per verificarli.

Ricapitolando, un docente, per una attenta e accurata valutazione, deve:

- valutare più il contenuto e meno la forma
- considerare le conoscenze e non le carenze
- applicare una valutazione formativa e non sommativa dei processi di apprendimento
- fornire copia delle verifiche per una riflessione consapevole
- dimostrarsi ottimista sulle capacità di recupero.

Livello A2 – Reading comprehension

1. Read the information about a school theatre trip.

Complete Andrea's notes.

**LEGGI LE INFORMAZIONI SU UN'USCITA DIDATTICA A TEATRO.
COMPLETA GLI APPUNTI DI ANDREA.**

Join us in a school trip to Stratford-on-Avon on Saturday 3rd July!
You can spend the morning shopping.
For lunch we will have a picnic near the river.
In the afternoon we will see William Shakespeare's play
Romeo and Juliet.
Price: £15
Meet at River Road car park: 8.30 a.m.
Return: 6.30 p.m.

Dear Students,

Our Stratford-on-Avon trip is very popular. Unfortunately we cannot get enough tickets to see *Romeo and Juliet*.
So we have tickets for *A Midsummer Night's Dream* instead.

The tickets are a little more expensive, so the trip will now cost £18 per person.

Arrival and departure times are the same.

Mrs Pendleton
English Teacher

Andrea's notes: School Trip

Name of town: _____

Name of play: _____

Cost: _____

Meeting place: _____

Return time: _____

2. Which notice (A-D) says this?

QUALE CARTELLO DICE QUESTO?

1. **You don't have to pay to get the bus from here.**

A

Please give this seat to an old, sick or pregnant person
if they need it.

B

There are no bus services from this stop on Sundays
and public holidays.

C

The bus service is changing, please take a timetable.

D

We offer a free bus service from this car park to the airport.

1. Read the web page on the screen and find out information about Nelson Mandela on the web and complete the fact-file.

LEGGI LA PAGINA WEB SULLO SCHERMO, SCOPRI LE INFORMAZIONI SU NELSON MANDELA E COMPLETA LA SCHEDA¹.

Name: _____

Born: _____

Died: _____

Famous Saying: “The struggle is _____”

Family background: Mandela is one of ____ (how many?) children. His _____ was a Thembu king and his father was a _____ .

Ethnic Group: The _____, his tribal clan, is part of the _____ people.

Education: BA, University of South Africa, 1942: Student, University of the Witwatersrand. Mandela has honorary degrees from more than 50 international universities and is chancellor of the University of the North in South Africa.

Occupation: _____

Historical Notes:

- In 1964

- In 1990

- In 1993

- In 1994

- From 1994 to 1999 he was

¹ Nel caso non si disponga di schermo o LIM si fornirà testo autentico.

1. Circle the right answer.

CERCHIA LA RISPOSTA CORRETTA.

1. Which word is a correct past simple verb?

- a. made
- b. taked
- c. stooded

2. What is the comparative form of *great*?

- a. more great
- b. very great
- c. greater

3. What is the past participle of *to be*?

- a. was
- b. been
- c. were

4. Which preposition can be used before *home*?

- a. to
- b. at
- c. in

2. Find the odd one out.

TROVA L'INTRUSO.

- 1. sauce, orange juice, water, bread: _____
- 2. steak, egg, cheese, wine: _____
- 3. glasses, dress, skirt, blouse: _____
- 4. eye, heart, mouth, beach, ear: _____
- 5. flowers, forests, rivers, horses: _____
- 6. hockey, soccer, ballet, waterpolo: _____

3. Tick (✓) if these sentences are correct. Put a cross (X) if they're wrong.

**METTI UN TICK (✓) SE LE FRASI SONO CORRETTE.
UNA CROCETTA (X) SE SONO SBAGLIATE.**

1. You do like ham sandwiches. _____
2. Do they play tennis on Sunday afternoons? _____
3. He is got two dogs. _____
4. She isn't a nice girl. _____
5. Does he work in a factory? _____

4. Subject personal pronoun or possessive adjective?

**INSERISCI IL GIUSTO PRONOME PERSONALE SOGGETTO
O AGGETTIVO POSSESSIVO.**

I – YOU – HE – SHE – IT – WE – YOU – THEY
MY – YOUR – HIS – HER – ITS – OUR – YOUR – THEIR

1. Jack and Linda are with _____ parents today.
_____ are very nice people.
2. Katie is only 12, but _____ often goes out with
_____ friends in the evening.
3. Lucas is going out with _____ friends tonight.
Are _____ going out too?

5. Tick (✓) if these sentences with the Saxon Genitive are correct. Put a cross (X) if they're wrong.

**METTI UN ✓ SE LA FRASE RISCRIITA CON IL GENITIVO
SASSONE È CORRETTA, O UNA X SE È SBAGLIATA.**

1. The windows of the house are green. → The house's windows are green. _____
2. The car of Luke and Michelle is a Fiat. → Luke's and Michelle's car is a Fiat. _____
3. The bicycles of those men are very expensive. → Those men's bicycles are very expensive. _____

6. Choose the correct question for the underlined part of the answer.

SCEGLI LA DOMANDA GIUSTA PER LA PARTE SOTTOLINEATA DELLA RISPOSTA.

1. Who is Mary's teacher? – Whose is Mary's teacher? –
Who is Mary's teacher's name?
Mary's teacher is Mr Reds.

2. With who is Margaret? – Who is Margaret with? –
Who with is Margaret's father?
Margaret is with her father in this moment.

3. When is your school? – Where is her school? –
Where is your school?
My school is in the city centre, opposite the church.

7. Choose the correct option.

SCEGLI L'ALTERNATIVA CORRETTA.

Greg and Sarah are married and have got two **daughters / childrens / son**. They live in a big house **next to / under / between** a supermarket. Upstairs (*al piano di sopra*) there **are / is / have got** the bathroom, two bedrooms, and **an / – / a** store room, downstairs (*al piano di sotto*) there is the kitchen, the toilet and the living room.

Greg and Sarah's / Greg's and Sarah / Greg's and Sarah's favourite room is their living room. It is quite big and **his / its / it's** walls are orange. **From / In / On** the middle of the room **their / they're / there** is a big circular table with six chairs. Opposite the fireplace (*caminetto*) there is a grey sofa with **a / any / some** white cushions (*cuscini*). Their cat usually sleeps there. Would you like to meet **they / their / them**?

1. Complete the chart with the right words.

Will, Could, Perfect (3), Past continuous, Past simple

DIRECT SPEECH	REPORTED SPEECH
Present simple	...
Present continuous	...
Past simple	Past...
Present ...	Past...
Can	...
...	Would

2. Tick (✓) the right option.

1. If you ... practise, you won't pass.

- a. don't b. won't c. will

2. They will be scolded if they... arrive late.

- a. will b. / c. do

3. Paula's daughters ... fail their exams if they don't study harder.

- a. will b. won't c. don't

4. If she doesn't apologise, I ... talk to her again.

- a. don't b. won't c. will

5. My phone plays a Leonard Cohen song when someone ... me.

- a. will call b. calls c. won't call

3. Complete with the participle adjectives of these verbs.

ADJECTIVE + -ED / -ING

0. **INTEREST:** She's INTERESTED in old books, she's just bought one.
1. **TIRE:** The journey was _____, it lasted nearly ten hours.
2. **EXCITE:** I like windsurfing, it's so _____.
3. **FRIGHTEN:** He was so _____ he couldn't speak.
4. **AMUSE:** He's an _____ person. He always tells jokes and stories.

4. Match the two parts of the sentences and add the correct relative pronoun to complete them.

THAT – WHAT – WHICH – WHO – WHOSE

1. The film _____
 2. I'd never met a person _____
 3. My country house, _____
 4. Carl, _____
 5. This is _____
-
- a. I would like to receive for my anniversary.
 - b. speaks so badly before.
 - c. we saw yesterday won two Oscars.
 - d. wife you met last Christmas, has just left for India for two months.
 - e. is in Lake District, is very old but I've renovated it.

1. Read the text.

THE DISTANCES TOURISTS TRAVEL AND THE SEASONABILITY¹ OF THEIR TRIPS

Efficient and cheaper travel allows people to travel all over the world as tourists. The numbers travelling tend to decrease with distance. In the UK, Europe remains the most popular destination, while in the USA, California and Florida are popular. Some people enjoy returning to familiar places and following the same routine year after year. Others search for new experiences in unfamiliar locations. These people travel increasing distances. The mountains of South America, the foothills² of the Himalayas and Antarctica have become tourists goals.

Tourism can be a very seasonal activity with people looking for sunshine and coasts in the summer. In winter a significant number of tourists seek out snow for winter sports. This seasonability can cause problems for destination areas. People managing resorts attempt to extend their season, for example:

- seaside resorts use elaborate illuminations and put on carnival events to attract visitors out of the season
- ski resorts have summer walking routes
- Mediterranean resorts offer long breaks for the over-60s during cooler autumn and spring periods
- extensive indoor facilities provide resorts that are not dependent on the weather.

Adapted from J. Hancock and Alan Bilham-Boult, *Revise GCSE*, Letts 2009, p. 176

Glossary

1. SEASONABILITY = stagionalità
2. FOOTHILLS = colline pedemontane

2. Now, say whether these statements are true (T) or false (F).

1. Both busy and quiet seasons pose problems for holiday resorts. _____
2. Tourism develops everywhere. _____
3. Most people like unfamiliar locations. _____
4. Italy, France and Spain are popular destinations in Britain. _____
5. The numbers travelling tend to increase with distance. _____
6. People managing resorts try to attract tourists out of season. _____
7. Few people like returning to familiar places. _____
8. In winter tourists stay at home. _____
9. People over 50 do not travel abroad. _____
10. Very few people enjoy skiing. _____

3. Match the first part of the sentence to the final one.

1. This e-mail message is intended...	a. that any use of this message is unauthorized and may be unlawful.
2. If you are not the intended recipient, ...	b. delete this message from your system.
3. ... by replying to this message and then...	c. please, notify us immediately...
4. You are hereby notified...	d. only for the use of the individual or entity to which it is addressed.

1. _____; 2. _____; 3. _____; 4. _____

1. Prepare the pre-call checklist to call a supplier for your firm.

Here are some prompts:

**PREPARA UNA LISTA DI CONTROLLO PRE-TELEFONATA
PER CHIAMARE UN FORNITORE PER LA TUA DITTA.
ECCO ALCUNI SPUNTI:**

a. Who do I need to speak to?

b. What time zone is the receiver in?

c. _____

d. _____

e. _____

f. _____

2. Now try to write the phone call. Complete the dialogue.

**ADESSO PROVA A SCRIVERE LA TELEFONATA,
COMPLETANDO IL DIALOGO.**

The supplier's secretary: ABC Ltd., how can I help you?

You: I'd like to _____

The supplier's secretary: Who's calling, please?

You: This is _____. It's about _____

The supplier's secretary: Hold the line. I _____ put you
_____ .

You: _____

The supplier: _____

You: _____

1. Match the sentences to the tenses.

1. This issue is dealt with in the second chapter.	c	a. Past simple active
2. Our hamster is being examined by the vet.		b. Past perfect passive
3. Paul looked into Miriam's eyes.		c. Present simple passive
4. My car was being fixed by the mechanic.		d. Present continuous passive
5. She's been given a telling off.		e. Past continuous passive
6. Their flat had been broken into.		f. Present perfect passive

2. Tick (✓) the right option.

1. He... stealing my silver fountain pen.
 a. denied b. refused c. said he didn't
2. The twins... why they couldn't come.
 a. warned b. explained c. told
3. Susan's niece... cheating at the maths test.
 a. admitted b. agreed c. disagreed
4. I... my parents not to ground me.
 a. promised b. begged c. prayed
5. The teacher... his students not to cram before the exam.
 a. promised b. advised c. suggested

HEALTH AND SAFETY CONCERNS ARE RESTRICTING CHILDREN'S SCHOOL PLAYTIME

Survey shows children brought up 'in cotton wool' when they need boisterous play, say experts

A generation of “cotton wool” children are growing up without being exposed to risky play, experts have warned, as new research finds that parents are increasingly concerned about the health and safety culture in schools.

In a survey of more than 2,000 parents of primary school children commissioned by Play England and the British Toy and Hobby Association, almost three-quarters said they felt schools were too concerned with health and safety during playtime. The survey found the average child got just 37 minutes of time to play in the school day.

Two-thirds of parents told researchers they felt this was not enough. Dr Amanda Gummer, a psychologist who advises the association, said: “‘Cotton wool’ children are growing up without having been given the opportunity to learn how to assess risks. Children have to have bumps and scrapes to teach them what’s safe and what’s not; children who have all elements of danger removed from their lives grow up to think they are invincible. This doesn’t just affect the accidents they might have when riding a bike or exploring a river, but it has a knock-on effect in terms of drug culture and gang violence.”

Taken from <https://www.theguardian.com/education/2010/sep/07/health-and-safety-children-school-play>

1. After reading this article, circle the best answer for each item.

1. “Cotton wool” children could be translated in Italian as:
 - a. bambini di bambagia
 - b. bambini di cotone
 - c. bambini fragili

2. Experts think... .
 - a. children should never be exposed to risky play
 - b. risky play is an opportunity to take risk and make mistakes
 - c. rough play should be forbidden
3. According to Dr Gummer... .
 - a. children shouldn't get hurt while playing
 - b. children should not engage in any play involving physical contact
 - c. children should be allowed to fall and get bruises
4. Children grow up to think they are invincible if... .
 - a. they never play outdoors
 - b. both parents and teachers protect them from any possible accident
 - c. they are allowed to engage in physical play

2. Complete the following dialogue between a very anxious mother complaining about her very lively little girl with her pediatrician, using the information in the article.

Mother: Susan is my second eldest, so I only had her older sister to compare with her. Since she was a toddler, she liked running and fighting with boys.

Doctor: Why don't you let her free to play and fight, children have to _____

Mother: But she _____ be able to sit still at least at dinner, I always have to scold her.

Doctor: How long does the school break last?

Mother: It _____

Doctor: It's not _____. You should take her to a playground after school.

Mother: But what if she _____ hurt?

Doctor: Children should be allowed to _____

Mother: But she could end up all black and blue!

Doctor: _____

Griglia – Domande aperte

Parametri	Descrittori	Punti	Quesiti		
			Primo	Secondo	Terzo
Aderenza alla traccia	Non coerente	0			
	Coerente	1			
Conoscenza dei contenuti	Gravemente insufficiente	1			
	Insufficiente	2			
	Sufficiente	3			
	Discreta	4			
	Buona	5			
	Ottima	6			
Complessità della struttura linguistica e del lessico	Minima	1			
	Sufficiente	2			
	Buona	3			
	Totale	10			

VALUTAZIONE COMPLESSIVA DELLA PROVA

...../10

Griglia – Essay

Parametri	Descrittori	Punteggio
Capacità argomentativa	Insufficiente	1
	Sufficiente	2
	Buona	3
	Ottima	4
Organizzazione dei contenuti	Scarsa	1
	Sufficiente	2
	Buona	3
Complessità della struttura linguistica e del lessico	Minima	1
	Sufficiente	2
	Buona	3
	Totale	10

VALUTAZIONE COMPLESSIVA DELLA PROVA

...../10



PROGRAMMAZIONE DIDATTICA

The following didactic planning aims to work as a guide and support to teachers in the writing of their ‘piani di lavoro’ and the ‘programmazioni di dipartimento’. It can easily be adapted and modified from the editable file published on the publishing house website: www.edisco.it.

UNIT 1.1 • THE BASICS OF ELECTRICITY

Teoria	Lessico
<ul style="list-style-type: none"> • La carica elettrica • La corrente elettrica • Corrente, tensione, resistenza e relative unità di misura • Conduttori, isolanti e superconduttori • Vari tipi di circuiti elettrici • Vari tipi di lampadine elettriche 	Termini riguardanti: <ul style="list-style-type: none"> • l'elettricità come fenomeno fisico e chimico • le grandezze legate all'elettricità e loro unità di misura • materiali e componenti dei circuiti elettrici e dispositivi per l'illuminazione

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Abbinare termini e definizioni • Scrivere parole corrispondenti alle definizioni • Completare frasi con parole mancanti • Correggere frasi false 	<ul style="list-style-type: none"> • Vero/Falso • Completare frasi con parole mancanti • Domande aperte 	<ul style="list-style-type: none"> • Parlare di un argomento utilizzando domande come traccia • Confrontare dati partendo da una tabella e argomentare i risultati 	<ul style="list-style-type: none"> • Tradurre vocaboli e frasi • Produrre frasi contenenti vocaboli dati • Produrre brevi testi descrittivi o argomentativi partendo da mappe concettuali o tabelle di dati

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'elettricità • Comprendere e descrivere la struttura dell'atomo e i fenomeni legati all'elettricità • Definire le grandezze relative all'elettricità e conoscerne le unità di misura • Comprendere e descrivere la struttura e il funzionamento di conduttori, isolanti e semiconduttori • Descrivere il funzionamento di circuiti elettrici e dispositivi per l'illuminazione • Analizzare e confrontare le caratteristiche di materiali e dispositivi elettrici
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RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Elettricità statica • Come si misura la corrente elettrica • Tesla e la guerra delle correnti • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 1.2 • THE PRODUCTION OF ELECTRICITY

Teoria	Lessico
<ul style="list-style-type: none"> • Batterie • Generatori • Vari metodi per produrre energia elettrica: combustibili fossili, biomassa, energia idroelettrica, eolica, solare, geotermica, nucleare e fotovoltaico 	Termini riguardanti: <ul style="list-style-type: none"> • tipi di batterie e il loro funzionamento • componenti dei generatori e il loro funzionamento • componenti e funzionamento dei vari tipi di centrali elettriche • i sistemi fotovoltaici

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Abbinare termini e definizioni • Scrivere parole corrispondenti a definizioni • Completare tabella con dati mancanti • Rispondere a domande aperte • Abbinare le due metà di frasi 	<ul style="list-style-type: none"> • Vero/Falso • Completare frasi con parole mancanti • Domande aperte con risposte brevi 	<ul style="list-style-type: none"> • Confrontare dati partendo da una tabella e argomentare i risultati 	<ul style="list-style-type: none"> • Tradurre vocaboli e frasi • Produrre frasi contenenti vocaboli dati • Scrivere definizioni

COMPETENZE

- Utilizzare terminologia specifica legata alla produzione di energia elettrica
- Descrivere e confrontare i vari tipi di batterie, mettendoli in relazione al loro uso
- Descrivere il funzionamento di un generatore
- Comprendere e descrivere il funzionamento dei vari tipi di centrali elettriche

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Energia cinetica e potenziale • La cella carburante • Tecnologia Air-Gen • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 1.3 • THE DISTRIBUTION OF ELECTRICITY

Teoria	Lessico
<ul style="list-style-type: none"> • La rete elettrica di distribuzione • Gli impianti di produzione • I trasformatori • La gestione della rete • La rete intelligente • Lo stoccaggio di energia sulla rete 	Termini riguardanti: <ul style="list-style-type: none"> • componenti della rete elettrica di distribuzione e il suo funzionamento • componenti della rete intelligente e il suo funzionamento • dispositivi e metodi per lo stoccaggio di energia elettrica sulla rete

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Riordinare frasi per ricostruire azioni in sequenza • Scrivere parole corrispondenti a definizioni • Domande aperte • Abbinare due metà di frasi 	<ul style="list-style-type: none"> • Vero/Falso • Completare frasi con parole mancanti 	<ul style="list-style-type: none"> • Descrivere un processo partendo da uno schema 	<ul style="list-style-type: none"> • Tradurre vocaboli e frasi • Descrivere un processo partendo da uno schema

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata alla distribuzione di energia elettrica • Descrivere e confrontare i vari tipi di impianti di produzione di energia elettrica • Descrivere i trasformatori e il loro funzionamento • Comprendere e descrivere il funzionamento delle reti di distribuzione tradizionali e intelligenti • Descrivere i problemi di gestione delle reti di distribuzione e le loro soluzioni • Descrivere e confrontare i vari metodi di stoccaggio di energia elettrica sulla rete

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • L'impatto ambientale della produzione e distribuzione di energia • Michael Faraday • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 1.4 • ELECTRICITY, MAGNETISM AND MOTORS

Teoria	Lessico
<ul style="list-style-type: none"> • L'elettromagnetismo • I motori elettrici • Vari tipi di motori elettrici • Altre applicazioni dell'elettromagnetismo • I veicoli elettrici 	Termini riguardanti: <ul style="list-style-type: none"> • il fenomeno dell'elettromagnetismo • componenti e funzionamento dei motori elettrici • caratteristiche e funzionamento dei diversi tipi di motori elettrici • dispositivi funzionanti con l'elettromagnetismo • componenti e funzionamento dei veicoli elettrici

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Scrivere parole corrispondenti a definizioni • Completare testo con frasi mancanti • Abbinare due metà di frasi 	<ul style="list-style-type: none"> • Vero/Falso • Completare frasi con parole mancanti 	<ul style="list-style-type: none"> • Dare definizioni 	<ul style="list-style-type: none"> • Tradurre frasi • Scrivere definizioni

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata al fenomeno dell'elettromagnetismo • Descrivere il funzionamento del motore elettrico • Descrivere caratteristiche e funzionamento dei vari tipi di motore elettrico • Descrivere il funzionamento dei dispositivi che utilizzano l'elettromagnetismo • Descrivere le caratteristiche e il funzionamento dei vari tipi di veicoli elettrici
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RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Le onde elettromagnetiche • Automobili alimentate ad aria compressa • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 2.1 • THE BASICS OF ELECTRONICS

Teoria	Lessico
<ul style="list-style-type: none"> • Origini e applicazioni dell'elettronica • I semiconduttori • I transistor • Altri componenti elettronici • I codici colore dei componenti elettronici 	Termini riguardanti: <ul style="list-style-type: none"> • la storia dell'elettronica e i suoi ambiti di impiego • vari tipi di semiconduttori e il loro utilizzo • i transistor e le loro caratteristiche • le caratteristiche degli altri componenti elettronici • i codici colore dei componenti elettronici • grandezze usate in elettronica e loro unità di misura

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Abbinare parole a definizioni • Completare schemi con dati mancanti • Rispondere a domande aperte 	<ul style="list-style-type: none"> • Vero/Falso • Abbinare due metà di frasi 	<ul style="list-style-type: none"> • Descrivere processi 	<ul style="list-style-type: none"> • Tradurre frasi • Scrivere definizioni

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'elettronica e ai suoi componenti • Descrivere le caratteristiche dei vari tipi di semiconduttori • Descrivere caratteristiche e funzionamento dei transistor e degli altri componenti elettronici • Descrivere il significato del codice colore dei componenti elettronici • Conoscere le grandezze usate in elettronica e le loro unità di misura

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Gordon Moore e la sua legge • Jack Kilby e Robert Noyce • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 2.2 • DIGITAL ELECTRONICS

Teoria	Lessico
<ul style="list-style-type: none"> • Differenze fra analogico e digitale • Vari tipi di circuiti elettronici • Il sistema binario • Operatori logici • Amplificatori e oscillatori • Sensori e attuatori 	Termini riguardanti: <ul style="list-style-type: none"> • gli ambiti analogico e digitale dell'elettronica • vari tipi di circuiti elettronici • gli elementi del sistema binario • gli operatori logici • amplificazione e produzione di segnali nei circuiti elettronici • sensori e attuatori e il loro utilizzo

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Rispondere a domande aperte • Vero/Falso • Abbinare parole a definizioni • Completare testi con frasi mancanti • Completare tabelle • Scrivere parole corrispondenti a definizioni 	<ul style="list-style-type: none"> • Vero/Falso • Completare testi • Rispondere a domande 	<ul style="list-style-type: none"> • Descrivere il funzionamento di dispositivi 	<ul style="list-style-type: none"> • Descrivere il funzionamento di circuiti elettronici

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'elettronica analogica e digitale • Descrivere le caratteristiche dei vari tipi di circuiti elettronici • Descrivere caratteristiche e funzionamento del sistema binario e degli operatori logici • Conoscere e descrivere i dispositivi e le tecniche per l'amplificazione e la produzione di segnali nei circuiti elettronici • Conoscere e descrivere il funzionamento di sensori e attuatori
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RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Amplificatori operazionali • Steve Jobs e Bill Gates • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 2.3 • MICROPROCESSORS

Teoria	Lessico
<ul style="list-style-type: none"> • Il microprocessore • Come funziona il microprocessore • Microcontrollori • I microchip • La fabbricazione dei microchip 	Termini riguardanti: <ul style="list-style-type: none"> • la struttura dei microprocessori e il loro funzionamento • i microcontrollori e il loro funzionamento • gli elementi del sistema binario • la struttura dei microchip e la loro fabbricazione

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Scrivere parole corrispondenti a definizioni • Completare frasi • Riordinare frasi per descrivere un processo • Abbinare parole a definizioni 	<ul style="list-style-type: none"> • Completare frasi • Vero/Falso 	<ul style="list-style-type: none"> • Descrivere un processo 	<ul style="list-style-type: none"> • Scrivere definizioni • Tradurre frasi

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata ai microprocessori e ai microcontrollori • Descrivere le caratteristiche dei microprocessori e dei microcontrollori e il loro funzionamento • Descrivere caratteristiche e funzionamento dei microchip • Conoscere e descrivere il processo di produzione dei microchip

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • I microchip negli animali domestici • La Silicon Valley • L'intelligenza artificiale • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 3.1 • THE BASICS OF COMPUTERS

Teoria	Lessico
<ul style="list-style-type: none"> • La struttura del computer • La CPU e il ciclo macchina • Periferiche: input • Periferiche: output • Input device automatici e device di controllo • Memoria • Porte e connessioni 	Termini riguardanti: <ul style="list-style-type: none"> • i componenti del computer • la funzione dei vari componenti del computer • i device collegati al computer • la memoria del computer • i nomi delle porte

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Scrivere parole corrispondenti alle definizioni • Completare testi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Scegliere l'opzione corretta • Domande aperte 	<ul style="list-style-type: none"> • Domande e risposte in coppia • Parlare di device informatici di uso quotidiano 	<ul style="list-style-type: none"> • Tradurre vocaboli • Riassumere partendo da una traccia • Correggere frasi false

COMPETENZE

- Utilizzare terminologia specifica legata all'informatica
- Comprendere e descrivere la struttura del computer
- Comprendere e descrivere il funzionamento del computer
- Descrivere e comprendere la differenza tra input e output device
- Descrivere e comprendere i tipi di memoria del computer
- Riconoscere le diverse porte di connessione

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • I campi del computing • CPU • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 3.2 • THE FUNCTIONING OF COMPUTERS

Teoria	Lessico
<ul style="list-style-type: none"> • Scrivere un programma • I linguaggi informatici • Le generazioni dei linguaggi • I principali tipi di linguaggi • Il sistema operativo • I principali sistemi operativi 	Termini riguardanti: <ul style="list-style-type: none"> • i diversi tipi di linguaggi informatici • la terminologia relativa alla programmazione informatica • i tipi di sistemi operativi

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Completare frasi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Scegliere la definizione corretta • Domande aperte 	<ul style="list-style-type: none"> • Domande e risposte in coppia 	<ul style="list-style-type: none"> • Tradurre vocaboli • Riassumere partendo da una traccia • Correggere frasi false • Scrivere definizioni • Scrivere brevi testi argomentativi

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata alla programmazione informatica • Comprendere e descrivere i vari tipi di linguaggi informatici • Descrivere le diverse fasi dello sviluppo dei linguaggi informatici • Descrivere e comprendere la funzione del sistema operativo • Descrivere i principali sistemi operativi e le loro caratteristiche

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Il sistema binario • PHP • L'interfaccia utente • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 3.3 • THE USES OF COMPUTERS

Teoria	Lessico
<ul style="list-style-type: none"> • I principali software office • I principali software grafici • Altri tipi di software 	Termini riguardanti: <ul style="list-style-type: none"> • i software office • i software grafici • realtà virtuale e aumentata • le piattaforme

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Completare testi con parole mancanti • Associare termini e definizioni • Vero/Falso 	<ul style="list-style-type: none"> • Associare termini e definizioni • Domande aperte 	<ul style="list-style-type: none"> • Descrivere una tabella 	<ul style="list-style-type: none"> • Tradurre vocaboli • Riassumere partendo da una traccia • Tabelle da completare

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'uso del computer • Comprendere e descrivere i vari tipi di software • Descrivere i diversi usi dei software • Descrivere e comprendere la differenza fra realtà virtuale e aumentata • Descrivere i campi d'uso della realtà virtuale e aumentata

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Gli effetti speciali digitali nel cinema • Tipi di CAD • Piattaforme e-learning • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 4.1 • THE BASICS OF TELECOMMUNICATIONS

Teoria	Lessico
<ul style="list-style-type: none"> • Le telecomunicazioni • Le onde elettromagnetiche • Metodi di trasmissione via cavo • Metodi di trasmissione wireless 	Termini riguardanti: <ul style="list-style-type: none"> • i componenti delle telecomunicazioni • i sistemi di telecomunicazione • l'elettromagnetismo • i vari tipi di onde magnetiche • i vari tipi di cavi usati nelle telecomunicazioni • la trasmissione wireless

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Unire termini e definizioni • Completare testi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Unire termini e definizioni • Completare una tabella • Domande aperte 	<ul style="list-style-type: none"> • Domande e risposte in coppia 	<ul style="list-style-type: none"> • Tradurre vocaboli • Correggere frasi false

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'elettromagnetismo • Comprendere e descrivere i diversi tipi di trasmissione • Comprendere e descrivere le caratteristiche dei diversi tipi di cavi usati nelle telecomunicazioni • Descrivere e comprendere i diversi tipi di trasmissione wireless

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Antenne e satelliti • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 4.2 • THE BASICS OF NETWORKS

Teoria	Lessico
<ul style="list-style-type: none"> • I componenti dei network • Tipi di network • Internet • I servizi di Internet • Come navigare in rete • Dal web 1.0 al web 4.0 	Termini riguardanti: <ul style="list-style-type: none"> • i componenti hardware e software dei network • i diversi tipi di network • il funzionamento e i servizi di internet • la world wide web • le generazioni del web

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Tabelle da completare • Completare frasi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Domande aperte • Completare le frasi con le parole mancanti 	<ul style="list-style-type: none"> • Descrivere i dati riportati in una tabella 	<ul style="list-style-type: none"> • Tradurre vocaboli • Correggere frasi false • Creazione di un'infografica

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata ai tipi e componenti dei network • Comprendere e descrivere le differenze fra i vari tipi di network • Comprendere e descrivere il funzionamento di Internet e dei suoi servizi • Descrivere e comprendere la differenza tra Internet e www • Descrivere le generazioni del web
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RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • I protocolli di comunicazione: il modello ISO/OSU • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 4.3 • THE APPLICATIONS OF THE WEB

Teoria	Lessico
<ul style="list-style-type: none"> • Cloud computing • Blog, forum, instant messaging e social media • E-commerce, big data, customer profiling e aggregators • Gaming, smart TV e streaming • Audio, video, image e documents sharing (videoconferenze, VoIP) • Applicazioni e widgets 	Termini riguardanti: <ul style="list-style-type: none"> • i tipi e i servizi del cloud computing • gli strumenti di socializzazione e comunicazione su Internet • le raccolte di dati • internet per il lavoro • gli aggregators • i servizi di condivisione • le applicazioni

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Unire termini e definizioni • Completare testi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Scegliere l'opzione corretta • Domande aperte 	<ul style="list-style-type: none"> • Descrivere un'infografica 	<ul style="list-style-type: none"> • Tradurre vocaboli • Riassumere partendo da una traccia • Correggere frasi false • Creare un'infografica

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata al cloud computing • Comprendere e descrivere i diversi tipi e servizi di cloud • Comprendere e descrivere gli strumenti di comunicazione offerti da Internet • Descrivere e comprendere gli strumenti di lavoro, svago e condivisione offerti da Internet • Descrivere e comprendere la differenza tra applicazioni e widgets

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Lo smartwork • Audio, video e image sharing • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 4.4 • THE PROTECTION OF COMPUTERS

Teoria	Lessico
<ul style="list-style-type: none"> • Le minacce • Buone pratiche di protezione • Hardware e software per proteggere il computer • La crittografia 	Termini riguardanti: <ul style="list-style-type: none"> • i tipi di minacce a computer e network • i diversi tipi di protezione • la crittografia

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Unire termini e definizioni • Completare frasi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Scegliere l'opzione corretta • Domande aperte • Completare una tabella 		<ul style="list-style-type: none"> • Tradurre vocaboli • Correggere frasi false

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata alle minacce a computer e network • Comprendere e descrivere i diversi tipi minaccia • Comprendere e descrivere gli strumenti di protezione • Descrivere e comprendere l'uso e la funzione della crittografia

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Il malware sui device mobili • Sicurezza di rete, copyright e copyleft • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 5.1 • AUTOMATION

Teoria	Lessico
<ul style="list-style-type: none"> • Meccanizzazione vs. automazione • I processi di automazione • L'autoregolazione dei sistemi automatici • Vantaggi e svantaggi dell'automazione • Applicazioni dell'automazione • Il PLC e il suo funzionamento • Internet delle Cose • Domotica • Sistemi automatici di riscaldamento e illuminazione 	Termini riguardanti: <ul style="list-style-type: none"> • sistemi automatici e processi di automazione • sistemi di autoregolazione • dispositivi regolati da sistemi automatici • struttura e funzionamento del PLC • applicazioni che utilizzano l'Internet delle Cose • sistemi domestici automatizzati

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Scrivere parole corrispondenti a definizioni • Completare tabelle • Completare testi con frasi mancanti • Abbinare le due metà di frasi • Riordinare frasi per descrivere un processo • Abbinare parole a definizioni 	<ul style="list-style-type: none"> • Abbinare interlocutori ai loro enunciati • Vero/Falso • Rispondere a domande aperte • Completare tabelle 	<ul style="list-style-type: none"> • Descrivere un processo • Descrivere il funzionamento di dispositivi • Spiegare il significato di espressioni date 	<ul style="list-style-type: none"> • Tradurre frasi • Descrivere caratteristiche

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'automazione • Descrivere le caratteristiche dei sistemi automatici, i loro componenti e funzionamento • Descrivere le caratteristiche e gli ambiti di applicazione dei sistemi automatici in ambito industriale e domestico • Conoscere l'Internet delle Cose e le sue applicazioni

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Storia dell'automazione • Sophia • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 5.2 • THE BASICS OF ROBOTICS

Teoria	Lessico
<ul style="list-style-type: none"> • I tipi di robot • I robot industriali • Come funziona un robot • I robot nell'industria • Altre applicazioni dei robot 	Termini riguardanti: <ul style="list-style-type: none"> • le basi della robotica • i tipi di robot • le parti che compongono il braccio robotico • i campi di impiego dei robot nell'industria • altri utilizzi dei robot

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Unire termini e definizioni • Completare tabelle • Vero/Falso 	<ul style="list-style-type: none"> • Scegliere l'opzione corretta 	<ul style="list-style-type: none"> • Leggere i dati di una tabella 	<ul style="list-style-type: none"> • Tradurre vocaboli • Correggere frasi false

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata alla robotica • Comprendere e descrivere i diversi tipi di robot e il loro utilizzo • Comprendere e descrivere i componenti del braccio robotico • Descrivere e comprendere l'impiego dei robot nei diversi settori

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Storia dell'automazione • I robot nell'automotive • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 5.3 • THE FUTURE OF DIGITAL TECHNOLOGY

Teoria	Lessico
<ul style="list-style-type: none"> • L'industria 4.0 • CIM • Realtà virtuale e aumentata • Laser e Li-Fi • I droni • La stampa in 3D • L'intelligenza artificiale 	Termini riguardanti: <ul style="list-style-type: none"> • l'industria 4.0 • la smart factory • l'automazione e il sistema CIM • il funzionamento dei laser e Li-Fi • i tipi di droni • i componenti della stampante 3D • l'intelligenza artificiale

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Unire termini e definizioni • Completare frasi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Scegliere l'opzione corretta • Completare una tabella • Riassumere un brano ascoltato 	<ul style="list-style-type: none"> • Rispondere a domande aperte 	<ul style="list-style-type: none"> • Tradurre vocaboli • Correggere frasi false o sbagliate • Riassumere un brano ascoltato

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata all'industria 4.0 • Comprendere e descrivere una smart factory • Comprendere e descrivere il processo CIM • Comprendere, distinguere e descrivere i tipi di realtà virtuale / aumentata • Comprendere e descrivere il funzionamento di laser e Li-Fi e il loro impiego • Descrivere e comprendere i tipi di droni e il loro impiego • Descrivere e comprendere la struttura e l'utilizzo della stampante 3D • Descrivere e comprendere l'utilizzo dell'intelligenza artificiale

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • L'intelligenza artificiale • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 6.1 • FINDING A JOB

Teoria	Lessico
<ul style="list-style-type: none"> • Dove e come cercare impiego • Competenze tecniche e competenze trasversali • Il CV • Il colloquio di lavoro 	Termini riguardanti: <ul style="list-style-type: none"> • luoghi fisici e virtuali dove cercare lavoro • competenze e requisiti nei vari tipi di impiego • elementi e contenuti del CV e della lettera d'accompagnamento • vari tipi di colloquio

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Domande aperte • Abbinare parole a definizioni • Abbinare titoli a paragrafi • Completare tabelle • Completare testi con frasi mancanti 	<ul style="list-style-type: none"> • Vero/Falso • Analizzare situazioni 	<ul style="list-style-type: none"> • Descrivere e discutere situazioni 	<ul style="list-style-type: none"> • Produrre CV • Tradurre lettere di accompagnamento

COMPETENZE

<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata alle procedure di ricerca di lavoro • Descrivere i vari stadi della ricerca di occupazione • Parlare di competenze tecniche e trasversali • Scrivere CV e lettere di accompagnamento • Sostenere un colloquio di lavoro
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RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Il formato europeo del CV • Un futuro radioso per gli elettricisti • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 6.2 • AT WORK

Teoria	Lessico
<ul style="list-style-type: none">• Le diverse tipologie di contratto di lavoro, stage e apprendistato• La struttura organizzativa sul posto di lavoro• Etica del lavoro	Termini riguardanti: <ul style="list-style-type: none">• le diverse tipologie e forme di contratto di lavoro• i ruoli organizzativi e le diverse forme di retribuzione• comportamenti etici sul posto di lavoro

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none">• Abbinare parole a definizioni• Correggere frasi false• Completare frasi		<ul style="list-style-type: none">• Mostrare e illustrare presentazioni	<ul style="list-style-type: none">• Preparare presentazioni

COMPETENZE

<ul style="list-style-type: none">• Utilizzare terminologia specifica legata al lavoro• Conoscere i vari tipi di contratto e le varie forme di occupazione• Conoscere e descrivere l'organizzazione strutturale delle aziende e le varie forme di retribuzione• Conoscere e descrivere comportamenti etici sul posto di lavoro

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none">• I tirocini Erasmus +• Come avviare un'officina meccanica • Mappa di unità	<ul style="list-style-type: none">• Test di unità• Test di modulo

UNIT 6.3 • SAFETY AND SECURITY

Teoria	Lessico
<ul style="list-style-type: none"> • Sicurezza sul lavoro: regole e segnali • Comportamenti da tenere in caso di emergenza • I rischi del lavoro negli uffici e negli impianti industriali • Privacy e protezione dei dati online 	Termini riguardanti: <ul style="list-style-type: none"> • segnali di sicurezza • dispositivi di protezione individuale • dispositivi e procedure di emergenza • rischi connessi ai vari ambienti di lavoro • protezione e violazione della privacy e dei dati online

ABILITÀ LINGUISTICHE

Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Abbinare immagini al loro significato • Completare frasi • Abbinare titoli a paragrafi • Scrivere parole corrispondenti a definizioni • Rispondere a domande 	<ul style="list-style-type: none"> • Completare frasi • Identificare frasi • Vero/Falso 	<ul style="list-style-type: none"> • Parlare di regole di sicurezza 	<ul style="list-style-type: none"> • Scrivere regole di sicurezza

COMPETENZE

- Utilizzare terminologia specifica legata alla sicurezza sul lavoro
- Saper descrivere i rischi derivanti dai vari ambienti di lavoro
- Saper descrivere le procedure di sicurezza in ambiente di lavoro e online
- Saper descrivere le procedure di intervento in caso di emergenza

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • L'origine della Festa della Donna • TikTok e la questione privacy • Modi stupidi per morire • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo

UNIT 6.4 • WORKING ESSENTIALS

Teoria	Lessico
<ul style="list-style-type: none"> • Come rispondere al telefono • Come scrivere un'email commerciale • Come scrivere una lettera commerciale • Come fare una presentazione • Come gestire i problemi • Come leggere numeri e grafici 	Termini riguardanti: <ul style="list-style-type: none"> • le conversazioni telefoniche in ambito commerciale • le comunicazioni scritte (email e lettere) in ambito commerciale • le presentazioni in ambito commerciale • problem solving in ambito commerciale • grafici e dati

ABILITÀ LINGUISTICHE			
Reading	Listening	Speaking	Writing
<ul style="list-style-type: none"> • Mappa da completare • Domande di comprensione • Completare frasi con parole mancanti • Vero/Falso 	<ul style="list-style-type: none"> • Rispondere a domande aperte • Completare frasi con parole mancanti 	<ul style="list-style-type: none"> • Descrivere un grafico 	<ul style="list-style-type: none"> • Tradurre vocaboli • Correggere frasi false • Scrivere un'email commerciale • Scrivere una lettera commerciale • Fare una presentazione

COMPETENZE
<ul style="list-style-type: none"> • Utilizzare terminologia specifica legata al business • Gestire una telefonata commerciale • Leggere e scrivere una lettera / email commerciale • Preparare una presentazione • Gestire una situazione di problem solving in ambito commerciale • Leggere e comprendere dati e grafici

RISORSE EXTRA	VALUTAZIONE
<ul style="list-style-type: none"> • Presentazioni • Mappa di unità 	<ul style="list-style-type: none"> • Test di unità • Test di modulo



ESAME DI STATO

The following materials aim to support teachers in the preparation of the oral discussion of the “Esame di Stato”, providing suggestions that prompt and facilitate cross-curricular analyses. Check the publishing house website: www.edisco.it.

■ IL COLLOQUIO ORALE

Il colloquio si svolgerà in chiave multi- e inter-disciplinare al fine di valutare la capacità dello studente di cogliere i nessi tra i diversi saperi collegandoli opportunamente tra loro e sarà finalizzato ad accertare il conseguimento del profilo culturale, educativo e professionale, secondo quanto richiamato dal D. Lgs. 62/2017.

“Il colloquio ha la finalità di accertare il conseguimento del profilo culturale, educativo e professionale della studentessa o dello studente. A tal fine la commissione, tenendo conto anche di quanto previsto dall’articolo 1, comma 30, della legge 13 luglio 2015, n. 107, propone al candidato di analizzare testi, documenti, esperienze, progetti, problemi per verificare l’acquisizione dei contenuti e dei metodi propri delle singole discipline, la capacità di utilizzare le conoscenze acquisite e di collegarle per argomentare in maniera critica e personale anche utilizzando la lingua straniera. Nell’ambito del colloquio il candidato espone, mediante una breve relazione e/o un elaborato multimediale, l’esperienza di PCTO svolta nel percorso di studi”.

Si tratterà in sostanza di verificare la capacità del candidato di collegare le conoscenze acquisite in una prospettiva pluridisciplinare. Pertanto, in questa sezione verrà fornita una serie di documenti, organizzati per moduli, da sottoporre ai candidati per l’analisi pluridisciplinare. Tali documenti potranno riguardare immagini, specifiche o evocative, con didascalia o senza, citazioni di personaggi famosi e/o brevi testi.

MODULE 1 • ELECTRICITY AND ITS APPLICATIONS

1. Look at the picture and think of possible connections between subjects.

- *Inglese*: The transformer
- *TPSEE*: La cabina elettrica di trasformazione
- *Matematica*: Le funzioni derivate
- *Storia*: La Belle Époque
- *Scienze Motorie*: Gli scambi energetici del e nel corpo umano



2. Look at the picture and think of possible connections between subjects.

- *TPSEE*: Sistemi di trasmissione e distribuzione dell'energia elettrica
- *Inglese*: The distribution of electricity
- *Storia*: Il boom economico
- *Letteratura italiana*: Italo Calvino
- *Matematica*: Le funzioni integrali
- *Scienze Motorie*: Il metabolismo



3. Look at the picture and think of possible connections between subjects.

- *Inglese*: AC motors
- *Elettronica ed Elettrotecnica*: Il motore asincrono trifase
- *Storia*: Gli anni '20 / La crisi del 1929
- *Letteratura italiana*: Il Futurismo



4. Look at the picture and think of possible connections between subjects.

- *Inglese*: Wind power
- *TPSEE*: La generazione di energia eolica
- *Letteratura italiana*: Eugenio Montale
- *Storia*: La Seconda Guerra Mondiale



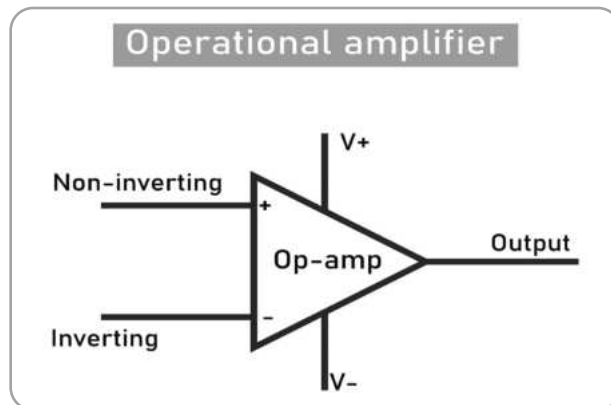
5. Look at the picture and think of possible connections between subjects.

- *Inglese*: Nuclear power
- *Storia*: Hiroshima and Nagasaki/la fine della II Guerra Mondiale
- *Italiano*: Elsa Morante: *Pro e Contro la Bomba Atomica* / Primo Levi
- *TPSEE*: Impianti di produzione dell'energia elettrica
- *Elettronica ed Elettrotecnica*: L'alternatore

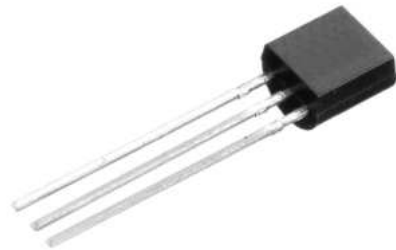


MODULE 2 • ELECTRONICS

1. Look at the picture and think of possible connections between subjects.
 - *Elettronica ed elettrotecnica*: amplificatori di potenza nei circuiti elettronici – amplificatori operazionali
 - *Inglese*: Amplifiers
 - *Storia*: Il Secondo dopoguerra
 - *Lingua e letteratura italiana*: Il Neorealismo
 - *Storia*: La Guerra Fredda



2. Look at the picture and think of possible connections between subjects.
 - *Inglese*: Transistors
 - *Elettronica ed elettrotecnica*: Il transistor BJT
 - *Storia*: La Guerra Fredda
 - *Letteratura italiana*: Eugenio Montale

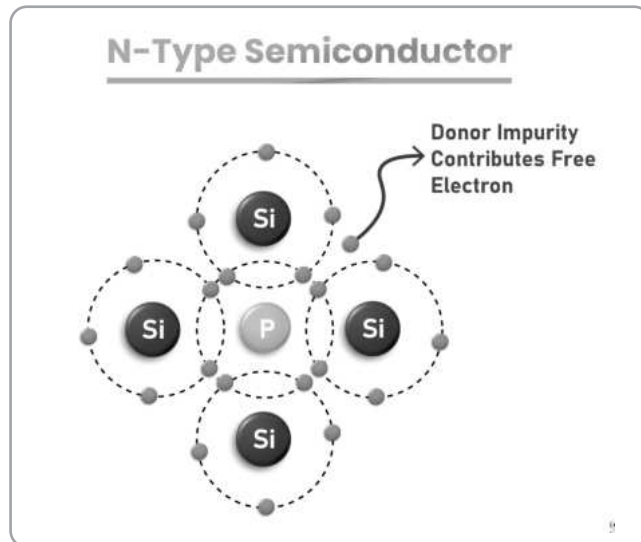


3. Look at the picture and think of possible connections between subjects.
 - *Elettronica ed elettrotecnica*: Il diodo zener
 - *Inglese*: Diodes
 - *Storia*: L'Italia del Boom Economico
 - *Letteratura Italiana*: Pierpaolo Pasolini/ Leonardo Sciascia



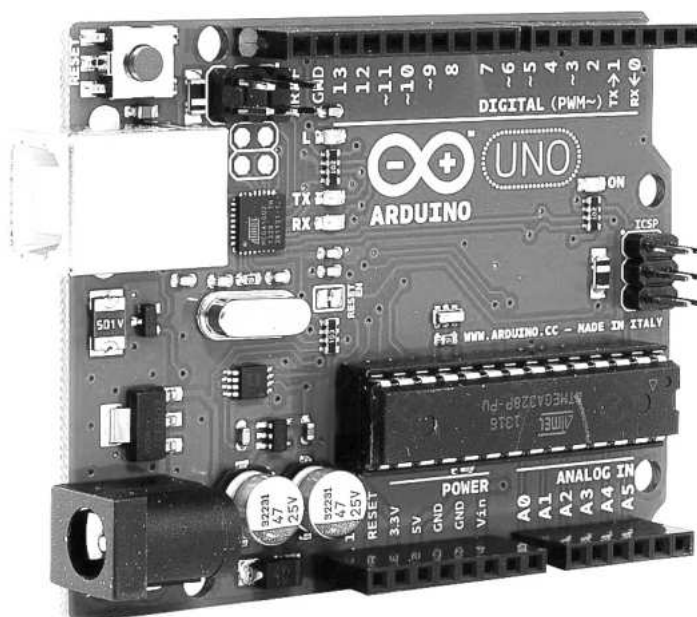
4. Look at the picture and think of possible connections between subjects.

- *Inglese*: Semiconductors
- *TPSEE*: La cella fotovoltaica
- *Storia*: La Seconda Rivoluzione Industriale
- *Letteratura italiana*: Positivismo e Realismo in letteratura



5. Look at the picture and think of possible connections between subjects.

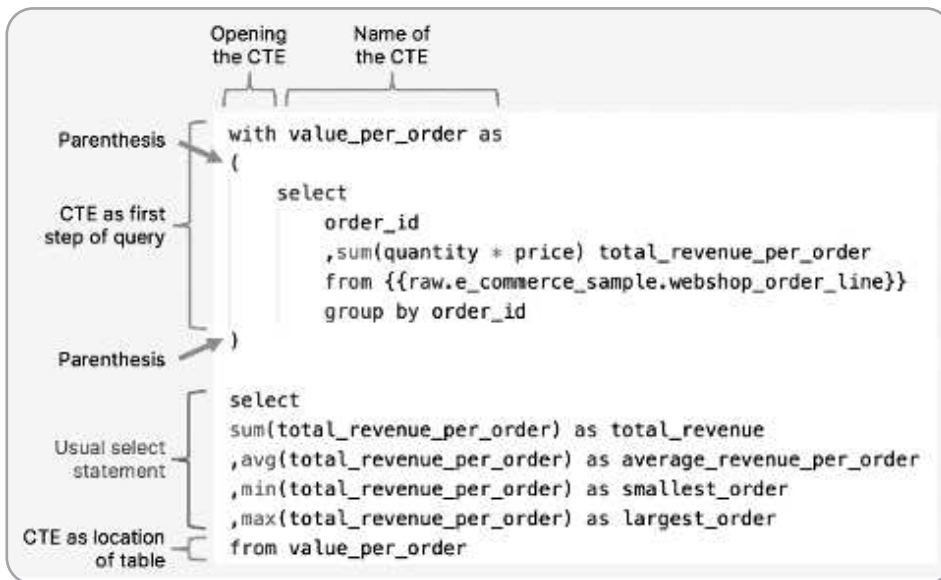
- *Sistemi Automatici*: Arduino
- *Inglese*: Microcontrollers
- *Storia*: Il Giappone dopo la Seconda Guerra Mondiale
- *Letteratura italiana*: Primo Levi



MODULE 3 • INFORMATION TECHNOLOGY

1. Look at the picture and think of possible connections between subjects.

- *Informatica*: SQL – i sotto-linguaggi di un DBMS relazionale
- *TPSIT*: Linguaggio XML
- *Inglese*: Programming languages
- *Storia*: L'uso della tecnologia nella Seconda guerra mondiale
- *Letteratura italiana*: Il futurismo
- *Matematica*: Le funzioni integrali



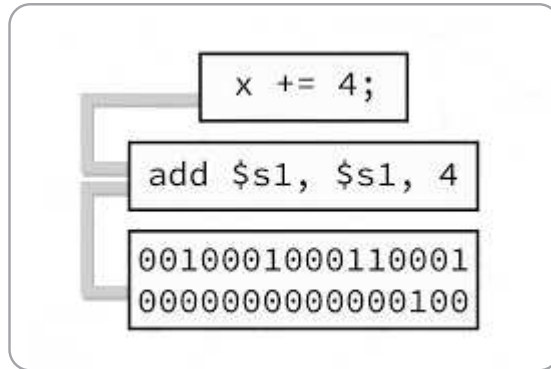
2. Look at the picture and think of possible connections between subjects.

- *Inglese*: Hardware and software
- *Informatica*: CPU
- *Storia*: La macchina Enigma e gli U-boot
- *Italiano*: Ungaretti
- *Matematica*: Le derivate



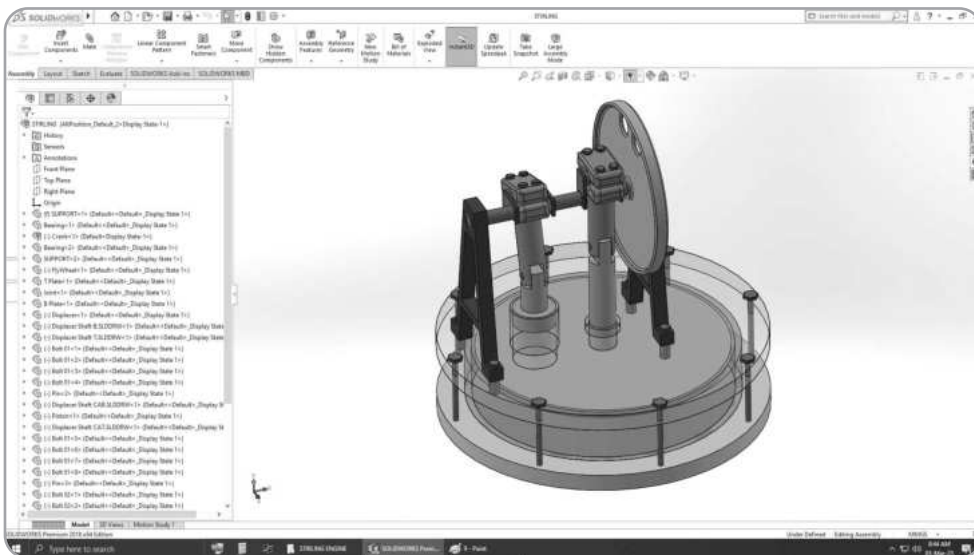
3. Look at the picture and think of possible connections between subjects.

- *Inglese*: Machine and assembly language
- *TPSIT*: Uso di linguaggi per applicazioni lato server
- *Informatica*: Data query language
- *Matematica*: Gli integrali definiti e indefiniti
- *Italiano*: Marinetti



4. Look at the picture and think of possible connections between subjects.

- *Informatica*: CAD
- *TPSIT*: I sistemi distribuiti
- *Inglese*: Graphic software
- *Storia*: La Belle Epoque



MODULE 4 • TELECOMMUNICATIONS AND NETWORKS

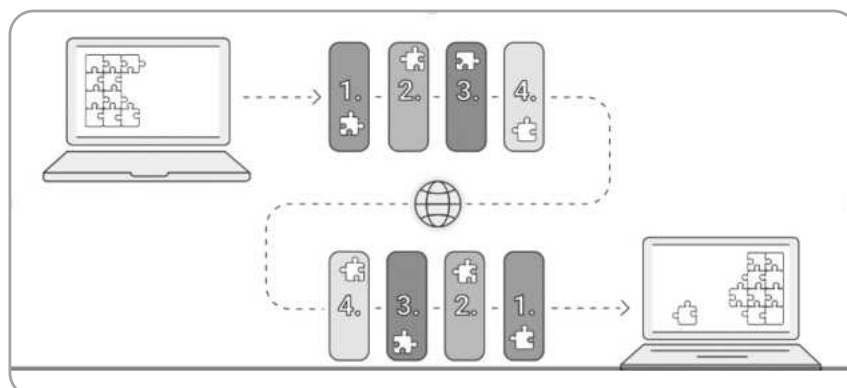
1. Look at the picture and think of possible connections between subjects.

- *Inglese*: Telecommunications and methods of transmission
- *TPSIT*: I sistemi distribuiti
- *Sistemi e reti*: VLAN-Virtual local area network
- *Storia*: La Guerra Fredda
- *Italiano*: Pirandello



2. Look at the picture and think of possible connections between subjects.

- *TPSIT*: WWW, indirizzi statici e dinamici
- *Inglese*: The internet and how it works
- *Sistemi e reti*: Il protocollo TCP
- *Matematica*: Le derivate
- *Storia*: La propaganda nelle guerre mondiali
- *Italiano*: Il positivismo



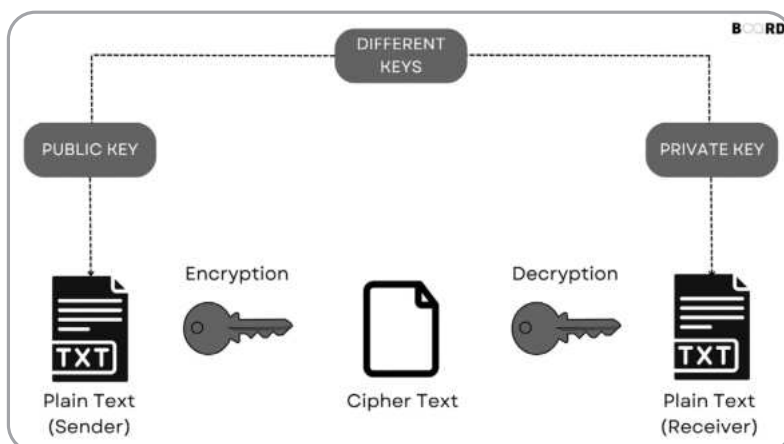
3. Look at the picture and think of possible connections between subjects.

- *Inglese*: Cloud computing
- *Informatica*: Client/server databases
- *Matematica*: I limiti
- *Storia*: Il boom economico



4. Look at the picture and think of possible connections between subjects.

- *Inglese*: Cryptography
- *TPSIT*: Tecniche crittografiche per la protezione dei dati
- *Matematica*: La macchina Enigma
- *Storia*: La Seconda guerra mondiale
- *Italiano*: Ungaretti



MODULE 5 • AUTOMATION AND ROBOTICS

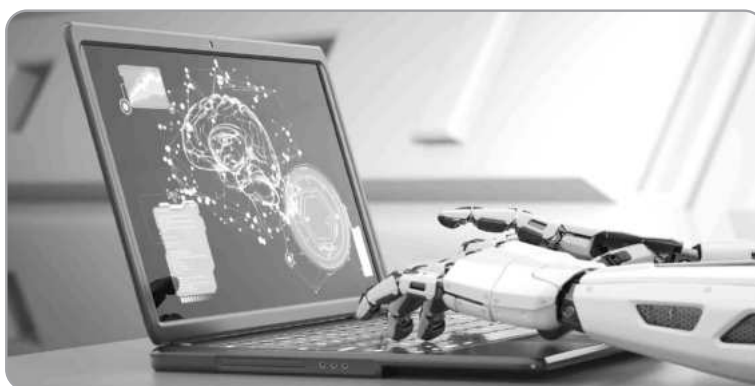
1. Look at the picture and think of possible connections between subjects.

- *Sistemi Automatici*: Il PLC
- *Inglese*: Mechanisation vs. automation
- *Elettronica ed Elettrotecnica*: Le macchine a corrente continua
- *Letteratura italiana*: Il Futurismo
- *Storia*: Il Fordismo



2. Look at the picture and think of possible connections between subjects.

- *Inglese*: Automation and its advantages
- *Letteratura italiana*: Il Futurismo
- *Sistemi automatici*: Il PLC
- *TPSEE*: I trasduttori
- *Storia*: La Seconda rivoluzione industriale



3. Look at the picture and think of possible connections between subjects.

- *Inglese*: Types of robots
- *Gestione progetto*: Enti di normazione e norme ISO 9000
- *Storia*: La seconda Rivoluzione Industriale
- *Italiano*: Il Futurismo



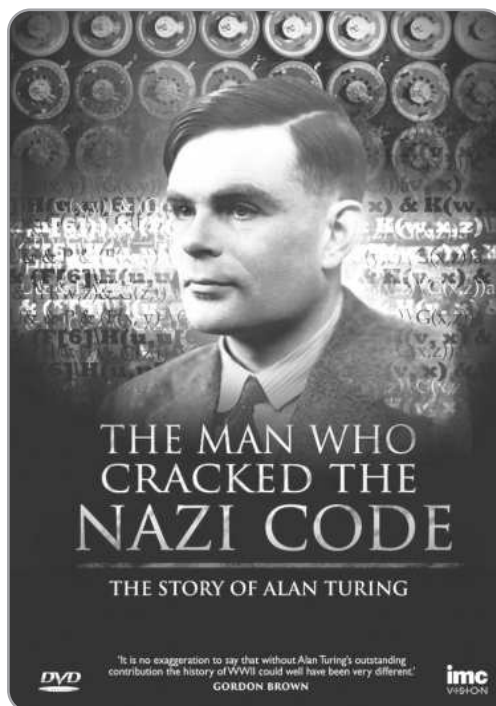
4. Look at the picture and think of possible connections between subjects.

- *Inglese*: Industry 4.0
- *Gestione progetto*: La programmazione e il controllo dei costi e la gestione delle aree di rischio
- *Informatica*: Modellazione logica
- *Storia*: Il Fordismo
- *Italiano*: Svevo



MODULE 6 • AT WORK

1. Look at the picture and think of possible connections between subjects.
 - *Inglese*: Data protection and data breach
 - *Storia*: La Seconda Guerra Mondiale
 - *Letteratura Italiana*: Eugenio Montale
 - *Elettronica ed Elettrotecnica*: L'alternatore



2. Look at the picture and think of possible connections between subjects.
 - *TPSEE*: Dichiarazione di conformità degli impianti elettrici
 - *Inglese*: Working conditions and safety risks/Work ethics
 - *Storia*: La Seconda Rivoluzione Industriale
 - *Letteratura Italiana*: Il Positivismo e il Realismo in letteratura



3. Look at the picture and think of possible connections between subjects.

- *Inglese*: Electric shock
- *TPSEE*: Dispositivi di protezione negli impianti elettrici
- *Storia*: L'Italia agli inizi del '900
- *Letteratura Italiana*: Il Futurismo
- *Matematica*: Le funzioni integrali



4. Look at the picture and think of possible connections between subjects.

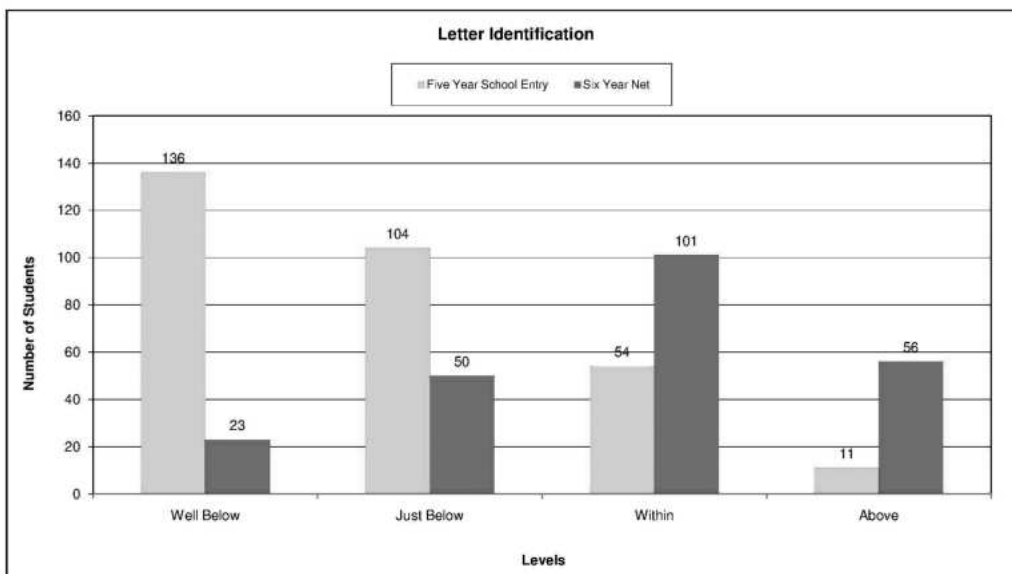
- *Storia*: La crisi del '29
- *Inglese*: Where and how to look for a job
- *Letteratura italiana*: Primo Levi, *La chiave a stella*
- *Elettronica ed Elettrotecnica*: Il motore asincrono trifase



5. Look at the picture and think of possible connections between subjects.

- *Inglese*: How to read a graph
- *Matematica*: Le funzioni derivate
- *Letteratura italiana*: Il Neorealismo
- *Storia*: Il Secondo Dopoguerra

Bar Graph Template





UNIT TESTS

The following tests aim at verifying the knowledge, abilities, and competences of students for each unit of the text. Each test is available in two versions and is about 50 minutes long. The material is editable so that each teacher can adapt it easily to each of their classes and also each of their SEN students. Visit the publishing house website: www.edisco.it.

Name

Class Date



READING COMPREHENSION

1. Read the text and complete it with the correct phrases. There are two extra phrases you do not need to use.

- a. inexpensive electric light
- b. was a disadvantage for him
- c. incandescent lighting system
- d. carbon filament which glowed
- e. electrical telegraph signals into letters.
- f. Edison developed the carbon transmitter,
- g. Edison's mother was interested in chemistry

Thomas Edison, the Man of Inventions

Thomas Alva Edison, born in Ohio in 1847, was one of the most famous inventors of all time. He had become almost deaf in both ears at an early age. He left school early, in 1859, to begin working on the railroad between Detroit and Port Huron, where his family lived, selling food and newspapers to train passengers.

During the Civil War, Edison learned about the new technology of telegraphy, and travelled around the country working as a telegrapher. However, the development of auditory signals for the telegraph **1.** and for all deaf people. For this reason, Edison began to work on inventing devices that would help make things possible for him and other deaf people, including a printer that would convert **2.**

From 1870 to 1875, Edison opened his own laboratory in Menlo Park, New Jersey, where he developed products related to the telegraph for the Western Union Telegraph Company, which was the industry leader at that time, and for its rivals, too.

In 1877, **3.** a device that improved the audibility of the telephone by making it possible to transmit voices at higher volume and with more clarity. That same year, he invented the phonograph, which recorded sound on a sheet of paper covered with paraffin and could reproduce them.

In 1878, Edison concentrated on the invention of an **4.** to replace the gaslight.

Edison's early **5.** was used in the Paris Lighting Exhibition in 1881 and the Crystal Palace in London in 1882.

Edison continued to work at his inventions until he was more than 80 years old. He died in 1931, after having patented up to 1,093 inventions.

Adapted from: <https://www.history.com/topics/inventions/thomas-edison>



VOCABULARY

2. Match each word with the correct definition.

coating • conductivity • device • electric current • energy-saving • incandescent • mercury
 • negative ion • rubber • switch

1. A piece of mechanical or electronic equipment.
2. An atom with more electrons than protons.
3. The movement of electric charges produced by a source.
4. The degree at which a material allows the flow of current.
5. A material used to make wire coatings.
6. It loses all its resistance at -269°C
7. It is used to open or close an electric circuit.
8. The first type of electrical bulb invented.
9. An appliance or light consuming less electricity than usual.
10. A layer of protective material that covers a surface.

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. In a neutral atom, the number of protons and neutrons is the same. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Charged bodies create an electric field around themselves. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. A conducting material contains a large quantity of free electrons. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Potential difference is measured in ampères. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Water and lemon juice are good conductors. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Silver is a metal largely used to produce electric wires. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The first superconductor was discovered in the late 1800s. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. A voltmeter measures voltage in one point of a circuit. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. CFL bulbs are generally cheaper than incandescent bulbs. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Incandescent bulbs are highly energy-consuming devices. | <input type="checkbox"/> | <input type="checkbox"/> |

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SENTENCE COMPLETION

4. Complete the sentences with the correct word.

1. Two bodies with charges attract each other.
2. A, a generator, fuel or solar cells can be sources of electric current.
3. The flow of electrons in a is similar to the flow of water in a pipe.
4. In DC, the direction of current and are always constant.
5. Most metals are better conductors at temperatures.
6. compound materials become superconductors at -238°C .
7. Superconductors are used in transport, for example in trains.
8. A in a circuit is a device that uses current to work.
9. Christmas light strings were examples of circuits.
10. bulbs contain a mixture of gases.

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SHORT OPEN QUESTIONS

5. Answer the questions.

1. When and how was electricity discovered for the first time?
2. Describe how direct current works and its applications.
3. What are the main applications of conductors and insulators?
4. What is the difference between a closed and an open circuit?
5. How does a CFL bulb produce light?

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Total score/50



READING COMPREHENSION

1. Read the text and complete it with the correct phrases. There are two extra phrases you do not need to use.

- a. effective filament for an electric light bulb.
- b. produced light bulbs on a large scale
- c. up to 1,000 light bulbs per day.
- d. lit by electricity rather than by gas lamps.
- e. yellow light and burnt out more quickly.
- f. be the first inventor of the light bulb
- g. the Italian father of the light bulb,

Cruto, the Italian Pioneer of Light Bulbs

The inventor Alessandro Cruto, who is considered **1.** was born in 1847 in Piosasco, a village near Turin. Cruto started studying architecture at the University of Turin, but was more interested in attending physics and chemistry lectures; after one of these lectures, he had the idea of producing artificial diamonds using carbon.

In 1872, he opened a small workshop in his home village. His experiments led him to create a dense carbon material that was hard enough to scratch glass, even if it was not at all similar to a diamond.

Cruto had the idea for his bulb after attending a conference by Galileo Ferraris, the pioneer of alternating current, who said that American inventor Thomas Edison was trying to find a suitable filament for incandescent light bulbs; then, he realised the material he had created might be an **2.**

In 1882, he attended the Electricity Expo at Munich, Germany, where his filaments, which produced a strong, white light, were more suitable for electric bulbs than Edison's one, which produced a less effective **3.**

The following year, Cruto's bulbs illuminated the centre of Piosasco, which was the first village in Italy to be **4.**

After exhibiting at the Turin Expo in 1884, his invention generated so much interest that he decided to produce bulbs on a commercial scale; for this reason, a year later, he opened a factory that made **5.**

However, Cruto's company had a very big competitor, the Italian Edison Company, that made it impossible for them to survive. Cruto remained at the head of until 1889, but in 1893, after disagreements with some of the managers, he left the company and returned to his first love, inventions.

The factory was sold many times and finally acquired by a big German company in 1927. Alessandro Cruto died in 1908; unfortunately, his important contribution to the development of artificial light seems to be almost forgotten.

Adapted from: <https://www.italyontheday.com/2022/05/alessandro-cruto-inventor.html>

Glossary:

to attend: *frequentare*

to scratch: *graffiare*

suitable: *adatto*



VOCABULARY

2. Match each word with the correct definition.

appliance · consumption · copper · fuse · insulators · positive ion · series circuit ·
superconductivity · to glow · voltage

1. An electrical device designed to perform specific tasks.
2. An atom with more protons than electrons.
3. The force that pushes electrons in a wire.
4. A metal widely used to make electric wires.
5. Materials that block the flow of current.
6. The total absence of resistance to the passage of current.
7. It protects the circuit from an excess of current.
8. A circuit with one only path for the current to flow.
9. To give out light.
10. The amount of energy used to run electrical devices.

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Atoms are the smallest particles that compose matter. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Static electricity was studied by Coulomb. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Current is measured in ohms. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. In an insulating material, electrons are strongly attached to their atoms. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Fiberglass and porcelain are good insulators. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Copper is considered the best conductor at room temperature. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The first superconductor was discovered by an American engineer. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Mercury was the first room-temperature semiconductor ever discovered. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. An ammeter measures current flowing in a circuit. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. LED bulbs are among the most energy-saving devices in commerce. | <input type="checkbox"/> | <input type="checkbox"/> |

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SENTENCE COMPLETION

4. Complete the sentences with the correct word.

- 1. Two bodies with the same charge each other.
- 2. A generator is a of electric current.
- 3. Electrons in a wire like water in pipes.
- 4. Alternating current continuously the direction of its flow.
- 5. A shorter piece of material offers resistance to the passage of current.
- 6. At the moment, the highest temperature for a superconductor is °C.
- 7. Superconductors are used in medicine, for example in machines.
- 8. A in a circuit regulates the flow of current.
- 9. circuits are used to connect household appliances to the power supply.
- 10. OLED bulbs contain films of material.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. How is an atom structured?
- 2. Describe how alternating current works and its applications.
- 3. What is conductivity affected by? Give examples.
- 4. What can cause a short circuit?
- 5. How does an LED bulb produce light?

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Total score/50



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

How to Make a Battery from a Lemon

To make a lemon battery you will need a copper penny, a nail covered with zinc, a lemon, a knife and a voltmeter. Wash the penny to make sure you are working with a clean surface. Aluminium foil can substitute the nail if you don't have one. A lemon with a thin skin is the most suitable for this experiment.

1. Squeeze the lemon, without breaking its skin, to release the juice inside the lemon, needed for the battery to work. The acidity of the juice in a lemon makes it ideal for this sort of chemical reaction, as it contains the solution of molecules necessary to carry electric current between the two metal terminals of the battery.
2. Make a small cut through the skin of the lemon to insert the copper penny into it.
3. Insert the penny and the nail into the lemon. These items will serve as the positive and negative terminals of your battery. Be careful to avoid the nail and the penny touching inside the lemon. If they touch, the battery will short circuit and you won't get any voltage. Make sure the penny and the nail are in contact with the juice of the lemon.
4. Attach the voltmeter terminals, one to the nail and the other to the penny. You should see a small increase in voltage on the voltmeter; if the voltage is very low, try moving the nail closer to the penny.

Adapted from: <https://www.wikihow.com/Create-a-Battery-from-a-Lemon>

Glossary:

nail: *chiodo*

- | | T | F |
|--|--------------------------|--------------------------|
| 1. To make a lemon battery you need both a copper object and a zinc one. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. If you do not have a nail, you cannot make the battery. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. What makes it possible to make a lemon battery is its skin. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The battery works when electrical current travels from one terminal to the other. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The penny and the nail are the positive and negative poles of the battery. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. The penny and the nail must touch each other in the middle of the lemon. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The penny and the nail must be immersed in the lemon juice. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. To measure the electricity produced, a voltmeter is needed. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. The two terminals of the voltmeter must be put inside the lemon. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. If the voltage is low, you must use a bigger nail for the battery. | <input type="checkbox"/> | <input type="checkbox"/> |

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VOCABULARY

2. Write the English equivalent of the following words.

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|--------------------------|---------------------------------|
| 1. Catodo | 6. Carbone |
| 2. Cella | 7. Suolo |
| 3. Piombo | 8. Invaso (n.) |
| 4. Asse | 9. Cinetico |
| 5. Centrale eolica | 10. Barra di combustibile |

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MULTIPLE MATCHING

3. Match the beginnings and endings.

- | | | |
|---|--------------------------|---|
| 1. Electricity is produced in power stations... | <input type="checkbox"/> | a. are considered renewable sources of energy. |
| 2. Water, wind and the sun... | <input type="checkbox"/> | b. from corn and sugarcane. |
| 3. Fossil fuels... | <input type="checkbox"/> | c. are installed in nuclear reactors to ensure safety. |
| 4. Wave power plants... | <input type="checkbox"/> | d. is considered an environmentally-friendly facility. |
| 5. A dam... | <input type="checkbox"/> | e. are highly energy-efficient. |
| 6. Wind turbines... | <input type="checkbox"/> | f. is placed behind the rotor of a turbine. |
| 7. A gearbox... | <input type="checkbox"/> | g. can be built on land or offshore. |
| 8. A photovoltaic panel... | <input type="checkbox"/> | h. is formed by two different types of semiconductors. |
| 9. Ethanol is produced... | <input type="checkbox"/> | i. converting mechanical energy into electrical energy. |
| 10. Cooling systems... | <input type="checkbox"/> | j. harness the movement of water in the oceans. |

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MULTIPLE CHOICE

4. Choose the correct answer.

1. Natural gas is...
 - a. a biofuel.
 - b. not renewable.
 - c. transformed in steam to produce electricity.
 - d. radioactive.

2. AC current is produced...
 - a. by a dynamo.
 - b. by an alternator.
 - c. by a battery.
 - d. in laboratories.

- 3.** Which of the following methods for producing electricity does not need a generator?
- a.** Wind power.
 - b.** Water power.
 - c.** Nuclear power.
 - d.** Photovoltaic panels.
- 4.** The quantity of energy produced by tidal power plants...
- a.** can be predicted.
 - b.** is unpredictable.
 - c.** cannot be distributed in cities.
 - d.** is not renewable.
- 5.** Which of the following sentences about generators is incorrect?
- a.** A generator is very useful in a place where the power supply is often interrupted.
 - b.** A generator transforms electrical energy into mechanical energy.
 - c.** Power stations employ a generator to produce electricity to be distributed.
 - d.** A generator transforms mechanical energy into electrical energy.
- 6.** A hydroelectric power station...
- a.** cannot be useful for the environment.
 - b.** has a low building cost.
 - c.** has a high maintenance cost.
 - d.** is usually connected to a dam and a reservoir.
- 7.** A shaft is...
- a.** used to increase the rotation speed of a wind turbine.
 - b.** used to increase safety in nuclear plants.
 - c.** used as a control system.
 - d.** something that is never found in power plants.
- 8.** Heat in the Earth's core...
- a.** cannot be exploited in any way.
 - b.** is too difficult to be employed for practical purposes.
 - c.** is generated by chemical and nuclear reactions underground.
 - d.** is expected to run out in a short time.
- 9.** Biodiesel...
- a.** is produced from palm oil and some kind of vegetables.
 - b.** is produced from sugarcane and corn.
 - c.** is not a renewable source of energy.
 - d.** creates greenhouse gases.
- 10.** Which of the following sentences about nuclear power is correct?
- a.** Nuclear fusion is normally used together with nuclear fission to produce electricity.
 - b.** Every nuclear power plant has control systems to avoid risks in case of emergency.
 - c.** Uranium is a renewable source of energy.
 - d.** Nuclear waste can be disposed of anywhere.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What are the components of a battery and what is their function?
- 2. What is the difference between dynamos and alternators?
- 3. What is biomass?
- 4. How does a CSP system work?
- 5. What happens in a nuclear chain reaction?

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Total score/50



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

How to Make a Battery from a Potato

It is possible to create a battery from a potato because potatoes act as an electrolyte. This means that they provide a place where electrons are able to move to copper and zinc, and back to copper to complete circuits. To have an amount of energy that could be measured by a voltmeter, you will need at least a couple of potatoes. In addition, you will need a knife, a copper penny, a copper wire and a nail covered with zinc for each potato.

1. Cut out a hole as big as a penny coin inside one of the potatoes.
2. Take out the plastic insulating coating from one end of a copper wire.
3. Tie the copper wire around a penny, making sure the non-insulated end is touching the copper of the penny. You should wrap the wire around the penny a few times.
4. Place the penny and copper wire unit in the hole of your potato.
5. Insert the nail into the potato in the opposite side of the potato as the penny.
6. Do the same thing with another potato, penny, copper wire, and nail.
7. Place the two potatoes side by side and wrap the copper wire from one potato around the nail of the other potato.

Now, you can measure the voltage provided by the battery connecting a voltmeter terminal to the nail and penny placed in the battery. You can also use your potato battery to power something small, like an LED bulb.

Adapted from: <https://kids.lovetoknow.com/childrens-education/how-make-potato-battery>

Glossary:

nail: *Chiodo*

- | | T | F |
|---|--------------------------|--------------------------|
| 1. The inner part of a potato can work as the electrolyte in a battery. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. A single potato can provide a good amount of energy. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. To make a potato battery, you need two copper objects to be the battery terminals. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. It is necessary to use a completely insulated wire. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The wire must be wrapped around the penny more than once. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. The part of the wire without insulation must touch the penny. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The penny and the nail must be placed one next to the other inside the potato. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. To increase the voltage, use two potato batteries placed side by side. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A voltmeter must be connected to both terminals of the battery to measure voltage. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. A potato battery can power any kind of appliance. | <input type="checkbox"/> | <input type="checkbox"/> |

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VOCABULARY

2. Write the English equivalent of the following words.

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|------------------------|------------------------------|
| 1. Anodo | 6. Petrolio |
| 2. Carbonio | 7. Serra |
| 3. Ione di litio | 8. Diga |
| 4. Bobina | 9. Carburante |
| 5. Avvolgere | 10. Barra di controllo |

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MULTIPLE MATCHING

3. Match the beginnings and endings.

- | | | |
|---|--------------------------|--|
| 1. Natural gas, oil and coal... | <input type="checkbox"/> | a. but it requires little maintenance. |
| 2. AC and DC current... | <input type="checkbox"/> | b. from rapeseed, soy and palm oil. |
| 3. In power plants, water is transformed into steam... | <input type="checkbox"/> | c. the radioactive element used for nuclear reactions. |
| 4. The quantity of energy produced in tidal power plants... | <input type="checkbox"/> | d. increases the rotation speed of a turbine to produce more energy. |
| 5. In places where the power supply is often interrupted... | <input type="checkbox"/> | e. generators are very useful. |
| 6. The initial building cost of a hydroelectric power station is very high, ... | <input type="checkbox"/> | f. are produced by two different types of generators. |
| 7. A shaft... | <input type="checkbox"/> | g. is generated from continuous chemical reactions. |
| 8. Heat in the Earth's core... | <input type="checkbox"/> | h. can be predicted. |
| 9. Biodiesel is produced... | <input type="checkbox"/> | i. to turn a turbine which activates a generator. |
| 10. Uranium is... | <input type="checkbox"/> | j. are not renewable and are estimated to run out in a short time. |

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MULTIPLE CHOICE

4. Choose the correct answer.

1. Which of the following is a non-renewable source of energy?
 - a. Wind.
 - b. Water.
 - c. Fossil fuels.
 - d. Solar power.

2. A DC generator is the...
 - a. dynamo.
 - b. alternator.
 - c. lithium-ion battery.
 - d. power station.

- 3.** Wave power plants...
- a.** make it possible to predict the quantity of electricity produced.
 - b.** use the movement of oceans to produce electricity.
 - c.** are installed on land.
 - d.** run on both water and wind.
- 4.** Which of the following is not a fossil fuel?
- a.** Coal.
 - b.** Natural gas.
 - c.** Oil.
 - d.** Ethanol.
- 5.** Choose the correct statement.
- a.** Dams can be considered environmentally-friendly facilities.
 - b.** Hydroelectric power is estimated to run out, even if in a long time.
 - c.** Hydroelectric power stations have high maintenance costs.
 - d.** Hydroelectric power stations produce a certain amount of greenhouse gas.
- 6.** Wind turbines...
- a.** are only built on land.
 - b.** can be placed offshore.
 - c.** produce electricity even in the absence of wind.
 - d.** transform electrical energy into mechanical energy.
- 7.** Which of the following is not part of a wind turbine?
- a.** The gearbox.
 - b.** The shaft.
 - c.** The blades.
 - d.** The collector.
- 8.** A photovoltaic panel...
- a.** has to be connected to a generator to produce electricity.
 - b.** can only power small appliances.
 - c.** uses N-type and P-type semiconductors to produce electricity.
 - d.** gets energy from the sun to produce steam.
- 9.** Ethanol...
- a.** is produced from soy and rapeseed.
 - b.** releases great quantities of greenhouse gases.
 - c.** increases the problem of waste disposal.
 - d.** is produced from corn.
- 10.** Which of the following sentences about nuclear power is incorrect?
- a.** It produces very low carbon emissions.
 - b.** Nuclear waste is easy and safe to dispose of.
 - c.** Nuclear fission is a chain reaction.
 - d.** Nuclear fusion is still not in use.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is the difference between primary and secondary batteries? Give an example for each type of battery.
- 2. What are fossil fuels?
- 3. In what ways can geothermal energy be used?
- 4. What is a dam and how does it work to produce electricity?
- 5. How is electricity generated using wind?

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Total score/50

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READING COMPREHENSION

1. Read the text and complete it with the correct missing phrases.

- a. thermal power plants
- b. an industrial facility that generates
- c. and produce electricity
- d. get their energy directly from their respective sources
- e. renewable energy power plants
- f. instead of a turbine
- g. in some countries like Canada
- h. coal or natural gas
- i. convert mechanical energy into electrical energy
- j. are limited in the amount of energy

Types of Power Plants

A power plant is **1.** electricity from primary energy. Most power plants use one or more generators that **2.** in order to supply power to the electrical grid for society's electrical needs. The exception is solar power plants, which use photovoltaic cells **3.** to generate this electricity. Power plants fall into two main categories: **4.**, which use different types of fuel to generate steam, and **5.**

Thermal power plants include: fossil fuel power plants, which burn their fuel, **6.**, in order to create steam; nuclear plants, which use fission processes to create the thermal energy needed to create steam, and solar thermal power plants, using heat from the sun rays to create the steam needed to rotate the turbine.

Renewable energy power plants **7.** in order to generate electricity. These primary energy sources, however, **8.** that is available at any given time or place. Among these, hydroelectric plants use energy from falling water in rivers and reservoirs to spin a generator **9.** Wind turbines get their energy from wind, which upon contact slows down and transfers kinetic energy to the turbine.

Different countries get their electricity from different types of power plants. For example, **10.**, most electricity generation comes from hydroelectric power plants and accounts for about 60% of the total electricity generated.

Adapted from: https://energyeducation.ca/encyclopedia/Power_plant

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VOCABULARY

2. Match each word with the correct definition.

condenser · to dispatch · imbalance · leakage · overload · peak · PMU · power station · step-up transformer · utility company

- 1. An installation where electrical power is generated.
- 2. A device used to increase voltage.
- 3. An excessive amount of current.
- 4. A piece of equipment that transforms steam into water.
- 5. An accidental escape of electricity.
- 6. A business dealing with electricity distribution.
- 7. The highest level of something.
- 8. A device used to monitor fluctuations in voltage or current.
- 9. A lack of equilibrium.
- 10. To send off something.

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Electricity is sent to users through a power grid. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Power stations produce electricity mainly in the form of direct current. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. A pylon is a tall tower carrying cables. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Transmission cables oppose no resistance to the passage of electricity. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Houses usually use current at 120,000 - 240,000 volts. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. To produce electricity, biomass is burned in a boiler. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Cooling towers are parts of thermal power plants. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Transformers are usually made of an iron magnetic core. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A step-down transformer has more turns in the secondary than in the primary winding. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. A power outage is the amount of electricity produced by a power station. | <input type="checkbox"/> | <input type="checkbox"/> |

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SENTENCE COMPLETION

4. Complete the sentences with the correct missing word.

- 1. Transmission occur when cables are old or worn-out.
- 2. A is a part of the transmission grid where transformers are kept.
- 3. The voltage of current is easier to increase or decrease.
- 4. To be transformed into kinetic energy, steam is sent to a steam
- 5. A grid can integrate different power sources.
- 6. Modern grids have digital to protect them from the excess of current.
- 7. It is important to power to feed it into the grid when necessary.
- 8. hydroelectric storage exploits the force of water to store energy.
- 9. Some thermal storage plants employ salt.
- 10. In a container there is no air.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Briefly describe the process of energy transmission.
- 2. How is safety granted along the power grid?
- 3. Describe how a step-down transformer works.
- 4. What are the possible solutions to the problems caused by weather conditions on the grid?
- 5. How do battery storage plants work?

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READING COMPREHENSION

1. Read the text and complete it with the correct missing phrases.

- a. automated for monitoring the electricity consumption
- b. energy consumption and its cost
- c. that resists power outages
- d. by guiding them to use appliances
- e. help to minimise the consumption during high-cost, peak-demand
- f. it encourages consumer participation
- g. to generate its own power at home
- h. by employing two-way communication
- i. A modern smart grid system
- j. energy management software

Smart Grid Technology

Smart grid technology has been introduced for controlling the use of appliances **1.**

A smart grid is equally advantageous for businesses, shops, hospitals, universities and multinational corporations. The entire smart grid system is **2.** everywhere.

Grid architecture is also combined with **3.** for estimating the **4.** for a specific consumer. Generally, electricity prices increase together with demand. By giving consumers information about current consumption and energy prices, smart grid energy management services **5.** times, providing users with an automated way to reduce their electricity bills, **6.** when the cost is lower. Moreover, as it enables communication about consumption between customers and utilities, **7.** in grid operations and allows the electricity markets to grow and make business.

8. can be operated more efficiently, can repair itself and ensures a consistent power supply **9.** A decentralised grid system allows the individual user **10.** by employing any appropriate method such as, for example, photovoltaic or solar panels.

Adapted from: <https://www.techopedia.com/definition/692/smart-grid#:~:text=A%20smart%20grid%20is%20an,via%20two%2Dway%20digital%20communication>

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VOCABULARY

2. Match each word with the correct definition.

cooling tower · core · medium · meter · molten · power outage · pylon · relay · step-down transformer · substation

- 1. A tall tower used for carrying electricity cables high above the ground.
- 2. A device used to decrease voltage.
- 3. The part of the grid where transformers are kept.
- 4. A tall building in a power station where steam is condensed.
- 5. The central part of something.
- 6. An interruption in the supply of electricity.
- 7. An instrument used for measuring energy consumption.
- 8. A device that protects the grid from an excess of current.
- 9. The act of keeping something apart for future use.
- 10. Transformed in liquid by heating it.

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false ones.

- | | | T | F |
|---|--|--------------------------|--------------------------|
| 1. Substations are places where electricity is generated. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The functions of a power grid are energy production, transmission and distribution. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. AC is more suitable than DC for long distance transmission. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Sometimes transmission cables are placed underground. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Long distance transmission cables are covered with insulating material. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. A steam turbine converts kinetic energy into steam. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. In a hydroelectric power plant, water is transformed into steam to turn a turbine. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. The secondary winding of a transformer is connected to the input voltage. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. In a wind power plant, wind spins the blades of a wind turbine connected to a gearbox. | | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Transformers are only employed in power grids to change the voltage. | | <input type="checkbox"/> | <input type="checkbox"/> |

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SENTENCE COMPLETION

4. Complete the sentences with the correct missing word.

- 1. Energy companies deliver electricity to homes and businesses.
- 2. Bad weather conditions can cause a power
- 3. Transmission cables can be placed on pylons or
- 4. A is a place where biomass is burned.
- 5. The highest demand for electricity is during hours.
- 6. are employed to monitor fluctuations in voltage or current on the grid.
- 7. Battery plants mainly employ lithium-ion batteries.
- 8. Compressed is kept in underground reservoirs.
- 9. In thermal storage plants, energy heats the medium to produce energy.
- 10. storage plants employ the energy deriving from motion.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Briefly describe the process of energy distribution.
- 2. How do thermal power plants work?
- 3. What are the possible solutions to transmission losses on the grid?
- 4. List the three main advantages of a smart grid.
- 5. How do pumped hydroelectric storage plants work?

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READING COMPREHENSION

1. Read the text and complete the sentences with one word per gap.

Electric Transport, Past and Present

The invention of the first electric vehicle is attributed to various people. In 1828, the Hungarian priest and physicist Anyos Jedlik invented an early type of electric motor and created a small car powered by his new motor. In 1835, a Dutch professor, Sibrandus Stratingh, and his assistant Christopher Becker from Germany also created a small-scale electric car, powered by non-rechargeable primary cell batteries.

The first known electric locomotive, powered by batteries, was built in 1837 in Scotland by Robert Davidson. Later on, Davidson built a larger locomotive named *Galvani*, which was exhibited at the Royal Scottish Society of Arts Exhibition in 1841.

Interest in motor vehicles increased greatly in the late 1890s and early 1900s. Electric vehicles had a number of advantages over gasoline cars, for example they did not have the vibration, smell, and noise associated with them. These cars were also preferred because they did not require a manual effort to start, as did gasoline cars, which featured a hand **crank** to start the engine.

After enjoying success at the beginning of the 20th century, the electric car began to lose its position in the automobile market. After years, however, the energy crises of the 1970s and 1980s renewed interest in electric cars, as they were seen as independent from the fluctuations of the oil market. In 1990, General Motors announced that they would start building electric cars for sale to the public.

The development of lithium-ion batteries led to the production of electric vehicles that are more and more efficient in terms of range. In the early 2020s, more than one million electric plug-in cars were sold in the world.

Adapted from: https://en.wikipedia.org/wiki/History_of_the_electric_vehicle

Glossary:

crank: *manovella*

1. Jedlik built a first, then he invented a car powered by it.
2. The electric car created in 1835 took its power from
3. In 1837, the first electric was built.
4. A second one was exhibited in Scotland years later.
5. Electric vehicles were much less noisy and smelly than gasoline cars, and had fewer
6. Gasoline cars had to have their started by using a hand crank.
7. Electric cars lost their popularity until the
8. A new interest in electric cars was a consequence of the crisis.
9. The development of ion batteries was very important for the EV market.
10. Sales of cars reached one million items in the early 2020s.

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VOCABULARY

2. Write the English equivalent of the following words.

- | | |
|---------------------------------|--------------------|
| 1. Albero di trasmissione | 6. Polarità |
| 2. Armatura | 7. Rotaia |
| 3. Avvolgimento | 8. Solenoide |
| 4. Campo elettrico | 9. Spazzola |
| 5. Commutatore | 10. Rotore |

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MULTIPLE MATCHING

3. Match the beginnings and endings.

- | | | |
|--|--------------------------|---|
| 1. Electricity is... | <input type="checkbox"/> | a. must have an iron base. |
| 2. In a magnet, N and S poles... | <input type="checkbox"/> | b. a coil of wire wrapped in a loop. |
| 3. A solenoid is... | <input type="checkbox"/> | c. work on electromagnetic induction. |
| 4. Torque can be defined... | <input type="checkbox"/> | d. that determine an EV range. |
| 5. A stator is... | <input type="checkbox"/> | e. the movement of electric charges. |
| 6. Induction and synchronous motors... | <input type="checkbox"/> | f. as the turning force of the motor. |
| 7. Microphones and loudspeakers... | <input type="checkbox"/> | g. run on alternating current. |
| 8. To work properly on an induction cooker, pans... | <input type="checkbox"/> | h. attract each other. |
| 9. Plug-in hybrid vehicles can be... | <input type="checkbox"/> | i. the part of the motor which does not rotate. |
| 10. The capacity of a battery is one of the factors... | <input type="checkbox"/> | j. recharged at charging stations. |

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TRUE/FALSE

4. Decide if the statements are true or false. Correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Electricity and magnetism are strictly related phenomena. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. A stator is a permanent magnet. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. An electric motor converts mechanical energy into electricity. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. A conveyor belt is a pole connected to the armature of a motor. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. AC motors have a commutator whose function is to reverse current. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Induction and synchronous motors are both AC motors. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Motor brushes are made of plastic. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Microphones have a diaphragm connected to an electromagnet. | <input type="checkbox"/> | <input type="checkbox"/> |

- 9. In electric vehicles DC motors are more commonly used than AC ones.
- 10. Regenerative braking is a characteristic of hybrid vehicles.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Briefly explain how current can generate a magnetic field.
- 2. What is a single-phase motor? Give examples of its applications.
- 3. Why have “synchronous motors” got this name? Give examples of their applications.
- 4. Briefly explain how an electric alarm bell works.
- 5. Describe a plug-in hybrid electric vehicle (PHEV).

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READING COMPREHENSION

1. Read the text and complete the sentences with one word for each gap.

How to Prevent Malfunctioning in Electric Motors

As in any other mechanical device, there are a number of reasons that can cause the malfunctioning of an electric motor; here are the most common problems that can affect electric motors, causing faults and shortening their lives.

Electric motors naturally generate heat while working; this can cause damage and deterioration of the components inside the motor itself, for example the rotor. The way to reduce the risk of unexpected motor failure is to check the working of the motor regularly, to be sure it is not **overloaded**.

Contamination is also a common problem for motor maintenance. Contaminants are everywhere in the form of dirt, dust and abrasive substances. When all these contaminants enter the internal parts of the motor, they can cause corrosion and damage the motor wires and contacts over time. To avoid contamination, it is important to keep the work spaces clean and put the motor away from machines that might contribute to air contamination.

Water and humidity can damage the insulation of an electric motor, reducing its life.

Therefore, it is important to look for a warm and dry place to store the motor while not in use. Instruments for monitoring humidity can be useful to check the environmental conditions, while devices for controlling humidity can help keep its levels low, reducing the risk of damage and corrosion caused by it.

As far as DC brushed motors are concerned, it is necessary to check commutators and brushes constantly. Brushes should be perfectly in contact with the commutator and they should not make noise or sparks while the motor is working. If this happens, brushes must be changed.

Adapted from: <https://sloanelectric.com/6-common-malfunctions-in-electric-motors/>

Glossary:

overloaded: *sovraccaricato*

1. The life of an electric motor can be by the malfunctioning of some parts.
2. An excess of can break the internal parts of the motor.
3. The of the motor should be checked continuously to prevent failure.
4. Dust, and abrasive substances are called contaminants.
5. Contaminants mainly damage contacts and of the motor.
6. Motors should be kept away from other to avoid air contamination.
7. It is better to store motors in a, warm place as humidity can damage them.
8. Humidity can be monitored and using different devices.
9. In motors, commutators and brushes must be checked constantly.
10. If brushes produce or noise, they must be substituted.

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VOCABULARY

2. Write the English equivalent of the following words.

- | | |
|--------------------------|-----------------------------|
| 1. Anello | 6. Frenata |
| 2. Campo magnetico | 7. Induzione |
| 3. Carbonio | 8. Molla |
| 4. Coppia | 9. Motore passo passo |
| 5. Elettromagnete | 10. Statore |

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MULTIPLE MATCHING

3. Match the beginnings and endings.

- | | | |
|--|--------------------------|--|
| 1. Electric motors and generators... | <input type="checkbox"/> | a. do not need a commutator. |
| 2. Magnets can attract... | <input type="checkbox"/> | b. objects made of magnetic materials. |
| 3. A changing magnetic field... | <input type="checkbox"/> | c. work on the principle of electromagnetic induction. |
| 4. The rotor is... | <input type="checkbox"/> | d. connects the motor to the wheels. |
| 5. AC motors... | <input type="checkbox"/> | e. that lifts maglev trains. |
| 6. Single and three-phase motors... | <input type="checkbox"/> | f. induces current in a wire. |
| 7. Electromagnets provide the force... | <input type="checkbox"/> | g. do not need a fuel tank. |
| 8. A VCU... | <input type="checkbox"/> | h. controls all the mechanisms of an EV. |
| 9. A transmission unit... | <input type="checkbox"/> | i. are examples of induction motors. |
| 10. Electric vehicles... | <input type="checkbox"/> | j. the turning part of a motor. |

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TRUE/FALSE

4. Decide if the statements are true or false. Correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Adding more windings to a solenoid increases the strength of the magnetic field. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The rotor is a permanent magnet. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. An electric motor converts electricity into mechanical energy. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. A shaft transmits mechanical energy from the motor to the device it runs. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. AC motors may have electronic circuits instead of brushes. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Synchronous motors are powered by DC current. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A stepper motor is a type of brushed motor. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. A loudspeaker has a coil of wire attached to a cone. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. The capacity of batteries in an electric vehicle does not affect its range. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Electric and plug-in hybrid cars use charging stations for battery recharging. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Briefly explain how a magnetic field can generate electricity.
- 2. What is a three-phase motor? Give examples of its applications.
- 3. Why has a “brushed motor” got this name? Give examples of its applications.
- 4. Briefly explain how an induction cooker works.
- 5. Describe a hybrid electric vehicle (HEV).

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READING COMPREHENSION

1. Read the text and complete the sentences.

The Invention of Transistors

In the 1940s, a team of scientists working for Bell Telephone Labs in New Jersey, USA, were trying to discover a device to replace vacuum tube technology. Vacuum tubes were the only technology available at that time to amplify signals or serve as switching devices in electronics. The problem was that they were expensive, consumed a lot of power, produced too much heat, and needed a lot of maintenance. The scientists responsible for the invention of the transistor in 1947 were John Bardeen, Walter Brattain, and William Shockley. Bardeen, a mathematician and physicist from Princeton University, was a specialist in the conducting properties of semiconductors. Brattain was an expert in the nature of the atomic structure of solids at their surface level and solid-state physics. Shockley was the director of transistor research for Bell Labs.

Their original name for the transistor was: 'Semiconductor amplifier; Three-electrode circuit element utilizing semiconductor materials.' Their work was considered so important that in 1956 the group was awarded the Noble Prize for Physics for the invention of the transistor.

Adapted from: <https://www.physlink.com/education/askexperts/ae414.cfm>

1. The inventors of the transistor wanted to
2. Vacuum tubes at the time.
3. Vacuum tubes were used as
4. They needed and
5. They produced a large
6. 1947 is the year in which
7. At Princeton University, Bardeen was a professor of
8. Semiconductors have
9. The transistor research at Bell Labs was
10. The invention was so important that the group

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VOCABULARY

2. Write the Italian or English equivalent of these words.

- | | | | |
|--------------|-------|------------------|-------|
| 1. Household | | 6. Emettitore | |
| 2. Automated | | 7. Amplificatore | |
| 3. Bond | | 8. Carbonio | |
| 4. Rectifier | | 9. Diodo | |
| 5. Value | | 10. Capacitanza | |

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TRUE/FALSE

3. Decide if the statements are true or false.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. The first electronic component was invented in the early 1900s. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The triode was invented by Thomas Edison. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Electronic components use electricity at high voltage. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. 3D systems are applications of electronics. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Transistors are made of semiconductor material. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Diodes can conduct electricity in two opposite directions. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Resistors block current and protect circuits. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. A P-type semiconductor is obtained by doping silicon with phosphorus. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A FET is made of two components: a source and a drain. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The colour code of electronic components is internationally recognised. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

4. Match the beginnings and endings.

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|---|--------------------------|--|
| 1. The first electronic components... | <input type="checkbox"/> | a. to a circuit with a power source. |
| 2. The first computer ever invented... | <input type="checkbox"/> | b. helped reduce the size of integrated circuits. |
| 3. Silicon is largely employed... | <input type="checkbox"/> | c. represent digits from 0 to 9. |
| 4. In a BJT, the base is connected... | <input type="checkbox"/> | d. a layer of metal oxide. |
| 5. MOSFETs are coated with... | <input type="checkbox"/> | e. made amplification of electric signals possible. |
| 6. The invention of transistors... | <input type="checkbox"/> | f. do not provide power gain. |
| 7. Passive electronic components... | <input type="checkbox"/> | g. employed a great number of vacuum tubes. |
| 8. A condenser... | <input type="checkbox"/> | h. that measures inductance. |
| 9. The first two bands of a transistor... | <input type="checkbox"/> | i. can temporarily store electrical energy. |
| 10. The henry is the unit... | <input type="checkbox"/> | j. in the production of electronic components. |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Give a short definition of electronics.
- 2. What are the two functions of a transistor? Briefly describe them.
- 3. What types of semiconductors are made from silicon? Briefly explain how they can be obtained.
- 4. Describe an inductor and its functions.
- 5. What electronic components use colour coding and why?

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Total score/50



READING COMPREHENSION

1. Read the text and complete the sentences.

Light Emitting Diodes

A light emitting diode, or LED, is a semiconductor device that emits light when current flows through it. The colour of the light is determined by the energy released by electrons when moving inside the semiconductor material, and depends on the structure of the semiconductor itself. White light, for example, is obtained by using many different semiconductors or a layer of light-emitting phosphorus on the semiconductor device.

The earliest LEDs, which appeared in 1962, emitted low-intensity infrared light; the first visible-light LEDs were of low intensity and limited to red. Later developments produced LEDs available in visible ultraviolet light.

Until 1968 LEDs were very expensive, as they cost around 200 dollars each, and they could not be widely used. When they became cheaper, LEDs were then commonly used instead of incandescent bulbs as indicator lamps and in displays; later on, they were employed in appliances such as calculators, TVs and radios.

LEDs have many advantages over incandescent light sources: they consume less power, last longer and are generally smaller. However, LEDs have some disadvantages; for example, they must be powered at low voltage and they generally need DC power to work.

Adapted from: https://en.wikipedia.org/wiki/Light-emitting_diode

1. When current flows through an LED,
2. The energy released by electrons
3. Using or, white light is obtained.
4. The earliest LEDs were invented
5. The light emitted by the first LEDs was
6. The colour of the first visible-light LEDs
7. LEDs until the late 1960s.
8. After then, they were initially used and in displays.
9. As light sources, LEDs are more energy efficient than other sources because
10. LEDs generally work

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VOCABULARY

2. Write the Italian or English equivalent of these words.

- | | |
|------------------|-----------------------|
| 1. Vacuum | 6. Ossido |
| 2. Valence | 7. Condensatore |
| 3. Pattern | 8. Guadagno |
| 4. Field | 9. Induttanza |
| 5. Doping | 10. Giunzione |

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false sentences.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Electronics has no practical applications apart from industry. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Electronics deals with electricity at low voltage. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The first electronic components and devices invented were all quite big. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. CT scanners use electronic components. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Transistors work according to the principle of electromagnetic induction. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Inductors conduct electricity in two directions. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Capacitors block current and protect circuits. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Boron and gallium have three valence electrons per atom. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Most electronic components are made of semiconductors. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Colour coding in electronic components is used in the USA only. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

4. Match the beginnings and endings.

- | | | |
|---|--------------------------|--|
| 1. Thomas Edison discovered that electrons... | <input type="checkbox"/> | a. by transistors since 1947. |
| 2. Vacuum tubes have been replaced... | <input type="checkbox"/> | b. have three terminals. |
| 3. The doping process of silicon... | <input type="checkbox"/> | c. made of wire wound in a coil. |
| 4. Semiconductors... | <input type="checkbox"/> | d. could flow between metal conductors in a vacuum. |
| 5. Both BJTs and FETs... | <input type="checkbox"/> | e. of active electronic components. |
| 6. Transistors belong to the category... | <input type="checkbox"/> | f. are printed vertically on it. |
| 7. A transistor can work... | <input type="checkbox"/> | g. have a great importance in electronics. |
| 8. An inductor is a device... | <input type="checkbox"/> | h. as a switch and as an amplifier. |
| 9. The fourth band of a transistor... | <input type="checkbox"/> | i. indicates the tolerance. |
| 10. Coloured value bands in a capacitor... | <input type="checkbox"/> | j. has the result of changing its atomic structure. |

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READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

Boolean Algebra

Boolean algebra is a division of mathematics that deals with operations on logical values and incorporates binary variables.

Boolean algebra was first presented in 1847 by British mathematician George Boole in his book, *The Mathematical Analysis of Logic*; the concepts explained in his first book were then expanded in Boole's second work, *An Investigation of the Laws of Thought*, published in 1854. The factor that distinguishes Boolean algebra from elementary algebra is that Boolean algebra studies binary variables, which are presented with only two possible values: 1 ("true") or 0 ("false"); for this reason, Boolean algebra is also known as binary algebra. Moreover, Boolean algebra does not deal with numerical operations, but with logical operations. Finally, elementary algebra is expressed using basic mathematical functions, such as addition, subtraction, multiplication, and division, whereas Boolean algebra deals with conjunction, disjunction, and negation.

Boolean algebra has several applications: the main one is in computer language programming; however, it is also used in statistics and finance, for modelling market activities, for example.

Adapted from: <https://www.investopedia.com/terms/b/boolean-algebra>

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Boolean algebra is a particular type of mathematics. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Its name comes from the scientist who invented it. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The first book on Boolean algebra was published in 1854. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Elementary algebra deals with two values, 0 and 1. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The value 1 represents the "true" state. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. The "false" state is represented by the value 0. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Boolean algebra deals with numerical operations. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Elementary algebra deals with functions such as conjunction and disjunction. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Negation is one of the functions of Boolean algebra. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The only application of Boolean algebra is computer programming. | <input type="checkbox"/> | <input type="checkbox"/> |

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VOCABULARY

2. Write the Italian or English equivalent of these words.

- | | | | |
|----------------|-------|---------------------|-------|
| 1. Dial | | 6. Discreto | |
| 2. Degradation | | 7. Sintonizzare | |
| 3. Board | | 8. Operatore logico | |
| 4. Pointer | | 9. Ampiezza | |
| 5. Silicon | | 10. Sensore | |

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MULTIPLE MATCHING

3. Match each word with the correct definition.

- | | | |
|---------------|--------------------------|--|
| 1. Byte | <input type="checkbox"/> | a. One of the numbers from 0 to 9. |
| 2. Chip | <input type="checkbox"/> | b. To supply with material or power. |
| 3. Converter | <input type="checkbox"/> | c. A path or track drawn on something. |
| 4. Digit | <input type="checkbox"/> | d. A small piece of material. |
| 5. Distortion | <input type="checkbox"/> | e. A device that can change the form of an electric current or signal. |
| 6. Sensor | <input type="checkbox"/> | f. A group of eight binary digits. |
| 7. To amplify | <input type="checkbox"/> | g. To discover or identify the presence of something. |
| 8. To detect | <input type="checkbox"/> | h. To make a signal bigger. |
| 9. To feed | <input type="checkbox"/> | i. The deformation of a signal from its original form. |
| 10. Trace | <input type="checkbox"/> | j. A device which measures physical quantities in the environment. |

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MULTIPLE CHOICE

4. Choose the correct option.

1. An analogue device...
 - a. shows measurements in digits on a display.
 - b. transforms the physical quantities in electricity.
 - c. shows measurements with a pointer moving on a dial.
 - d. is more precise than a digital one.

2. Which of the following statements is true?
 - a. Analogue signals are converted into digital ones to be processed.
 - b. A digital signal is represented by a continuous waveform.
 - c. A digital measuring instrument shows values on a graduated scale.
 - d. A digital signal is affected by a high level of degradation.

3. What is a bit?
 - a. It is a string of numbers.
 - b. It is one of the two digits 1 and 0 in the binary system.
 - c. It is a number from 0 to 9.
 - d. It is a representation of numbers in the binary system.

4. Which of the following are all “derived” logic gates?
 - a. AND, NAND, OR, NOR.
 - b. AND, OR, NOT.
 - c. AND, NOT, which is also called “inverter”.
 - d. NAND, NOR, XNOR, XOR.

- 5. In an XNOR gate...
 - a. the output is true if both inputs are true.
 - b. the output is true if the inputs are the same.
 - c. the output is true if either input is true.
 - d. the output is true if both inputs are false.

- 6. Which of the following gates are used to run washing machines?
 - a. OR gates.
 - b. AND gates.
 - c. NOR gates.
 - d. XNOR gates.

- 7. What is the gain of an amplifier?
 - a. The amount of amplification it provides.
 - b. The magnitude that voltage or current has.
 - c. The main characteristic of hearing aids.
 - d. The difference between an input and an output signal.

- 8. An oscillator...
 - a. picks up signals and makes them stronger.
 - b. produces an input following precise logic instructions.
 - c. gets signals and transforms them into mechanical action.
 - d. provides current at regular pulses.

- 9. What is the IoT?
 - a. A system of rules contained in the computer memory.
 - b. A mathematical code used to solve complex problems.
 - c. A device used to detect signals from the environment.
 - d. A system of connected digital devices sharing data.

- 10. Choose the correct statement about actuators.
 - a. They transform physical inputs into electrical signals.
 - b. They play an important role in the IoT.
 - c. Their functioning can be compared to that of the human body.
 - d. Theme parks use them to manage and direct visitors' movements.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Describe how analogue and digital circuits deal with signals.
- 2. What is the binary system and what is it used for?
- 3. Describe how a NOT gate works.
- 4. Explain the difference between traditional and integrated electronic circuits.
- 5. Describe how a sensor works.

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Total score/50



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

The Sensors Every Smart Home Needs

In modern and smart houses, smart sensors play an important role in providing the owners' security and well-being. Temperature sensors, for example, constantly measure the temperature inside the house, and make adjustments according to the temperature set in the thermostat, turning the heating up or down.

Light sensors can turn off the light switches automatically. This is very useful to avoid leaving the lights on when going out and helps in saving energy. Moreover, with a smart lighting system, it is also possible to programme the light bulbs to turn on and off at certain times of the day. This can be useful to prevent burglary when the people living in the house are on holiday.

Sensors to alert people for open windows and doors are another example of smart devices which can help in saving energy and preserving heating in the house, as well as keeping people safe. Smart garage door openers, for example, can warn the garage owner if someone has forgotten to shut the door. Front door sensors can also help in saving energy when they are connected to smart lighting, which can turn the lights on and off when someone enters or exits a room.

In conclusion, the future of smart home sensors is constantly developing. As these technologies progress, it is expected that home owners will use them more and more to manage and optimise their energy consumption and increase their security.

Adapted from: <https://www.enercare.ca/blog/smarter-home/9-sensors-every-smart-home-needs>

Glossary:

burglary: *furto in appartamento*

owner: *proprietario*

well-being: *benessere*

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Sensors have become very important in the field of home security. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The use of sensors can help the right temperature to be reached in a house. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Sensors cannot help in saving money on energy. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. It is not possible to programme automatic light switching, even with a smart lighting system. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Automatic light switching can be a good way to provide home security. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Sensors can warn home owners if they leave a window open. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A garage door cannot be connected to sensors. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Front doors connected to smart lighting can help save energy. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Some sensors can detect the movement of people entering a room. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. It can be said that smart technology is not going to advance any further. | <input type="checkbox"/> | <input type="checkbox"/> |

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VOCABULARY

2. Write the Italian or English equivalent of these words.

- | | |
|----------------------|-----------------------|
| 1. String | 6. Degradazione |
| 2. Power | 7. Convertitore |
| 3. To reverse | 8. Distorsione |
| 4. Hearing aid | 9. Pulsazione |
| 5. Magnitude | 10. Sequenza |

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MULTIPLE MATCHING

3. Match each word with the correct definition.

- | | | |
|---------------|--------------------------|--|
| 1. Analogue | <input type="checkbox"/> | a. A face of a measuring instrument that is marked with numbers. |
| 2. To convey | <input type="checkbox"/> | b. A flat piece of hard material. |
| 3. Board | <input type="checkbox"/> | c. The return of a part of the output signal of an amplifier. |
| 4. Dial | <input type="checkbox"/> | d. Something that is similar or comparable to something else. |
| 5. Discrete | <input type="checkbox"/> | e. Information entering a system. |
| 6. Feedback | <input type="checkbox"/> | f. Consisting of distinct or unconnected elements. |
| 7. Gain | <input type="checkbox"/> | g. A device in which electrical signals are converted into sounds. |
| 8. Input | <input type="checkbox"/> | h. To transmit, transport or deliver to another place. |
| 9. Oscillator | <input type="checkbox"/> | i. The increase of current or voltage in an amplifier. |
| 10. Receiver | <input type="checkbox"/> | j. A circuit producing regular pulses of electric current. |

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MULTIPLE CHOICE

4. Choose the correct option.

1. Which of these statements about analogue signals is false?
- They are represented by a continuous waveform.
 - They deal with signals directly without transforming them.
 - They are affected by the risk of degradation.
 - In circuits they vary in a discrete way.

2. A digital thermometer...
 - a. shows the temperature in digits on a display.
 - b. uses a liquid moving on a scale.
 - c. shows the temperature with a pointer moving on a dial.
 - d. is less precise than an analogue one.
3. Which values constitute the binary system?
 - a. All numbers from 1 to 9.
 - b. All real numbers.
 - c. 1 and 0.
 - d. Multiples of 2.
4. Which of the following are all “basic” logic gates?
 - a. NAND, NOR, XNOR, XOR.
 - b. AND, OR, NOT.
 - c. AND, OR, NOR.
 - d. OR, NOR, XOR, XNOR.
5. In a NOR gate...
 - a. the output is false if both inputs are true.
 - b. the output is true if the inputs are the same.
 - c. the output is true if both inputs are false.
 - d. the output is true if both inputs are true.
6. An integrated circuit...
 - a. is printed on a big plastic board.
 - b. has all its components connected by wires.
 - c. has its components formed on a chip.
 - d. is bigger than a traditional circuit.
7. What does PCB stand for?
 - a. Plastic Case Board.
 - b. Printed Closed Board.
 - c. Plastic Copper Brand.
 - d. Printed Circuit Board.
8. Mixed-signal circuits...
 - a. are often used as analogue-digital converters.
 - b. deal with analogue signals only.
 - c. deal with digital signals only.
 - d. are mainly used in TV or radio amplifiers.
9. Which of the following logic gates are used for burglar alarms?
 - a. AND and NAND gates.
 - b. OR and NOR gates.
 - c. NOT and NOR gates
 - d. XOR and XNOR logic gates.
10. What is negative feedback?
 - a. A device used to increase the magnitude of current.
 - b. A technique used to avoid distortion.
 - c. The amount of amplification provided by an amplifier.
 - d. The variation in frequency of the output signal compared to the input one.



SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. List two of the advantages of digital circuits and briefly explain them.
- 2. What are logic gates and what are they used for?
- 3. Describe how a NAND gate works.
- 4. Explain what the IoT is.
- 5. Explain the importance of the binary system in digital electronics.

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Total score/50



READING COMPREHENSION

1. Read the text and complete it with the correct phrases.

- a. were still not known
- b. grain of rice and
- c. removing the microchip
- d. where a local tattoo artist
- e. Fifty out of eighty
- f. logging in in the morning without a badge
- g. being microchipped
- h. there would be no tracking of information
- i. the microchip was inserted using a syringe
- j. to implant tiny microchips

No More Badge Needed!

In 2017, a tech company in Wisconsin, USA, offered its employees **1.** in their hands. **2.** people working in the firm decided to have these chips implanted. Chips were as big as a **3.** they were inserted between the employees' forefinger and thumb. With this microchip, employees were able to do things like buying snacks from machines, **4.** and unlocking doors with just a movement of a hand. The company assured that **5.**, but some of the employees did not agree with **6.**, especially because there was a fear of infections, and other potential dangers **7.** The chip ceremony was held in the company's cafeteria, **8.** did the installation. The entire process took about a minute, and **9.** According to the experts, **10.** in case someone is no more satisfied is quite simple: it may just be pushed out of the hand like a splinter.

Adapted from: <https://eu.usatoday.com/story/tech/talkingtech/2017/08/01/wisconsin-employees-got-embedded-chips/529198001/>

Glossary:

splinter: *scheggia*

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VOCABULARY

2. Match each word with the correct definition.

blueprint • bus • CPU • microcontroller • pattern • photolithography • registers • ROM • silica • wafer

- 1. It functions as the brain of a computer.
- 2. Local areas in a microprocessor where data is accepted, stored and transferred.
- 3. A path connecting the CPU to memory circuits in a computer.
- 4. The permanent memory of a microprocessor.

5. An electronic system like Arduino, designed for specific purposes.
6. One of the main components of sand and rocks.
7. A thin slice of silicon, used as a base for microchip building.
8. A model used for microchip making.
9. The process which uses light to imprint the circuits on a microchip.
10. The initial design of a microchip.

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SENTENCE COMPLETION

3. Complete the sentences with the correct word.

1. Processing Units are microprocessors designed to improve machine vision.
2. The part of the CPU which performs arithmetic and logic operations is called
3. The is a particular type of oscillator employed in a CPU.
4. The cache memory makes it easier and faster to data.
5. Microprocessors are connected to I/O
6.-volatile memory chips store data in a permanent way.
7. Wafers are sliced from ingots.
8. An chip combines chips and circuits with different functions.
9. technology includes devices which can be worn by people.
10. In the final step of microchip making, wafers are cut into

...../10



TRUE/FALSE

4. Decide if the following sentences are true or false. Correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Modern processors operate with 32 or 64-bit words. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Large-scale integration was introduced in the early 1980s. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Circuit density in a microchip is related to the number of its transistors. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Modern microprocessors have thousands of components on a small chip. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The data stored in the RAM is kept after the device is turned off. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. After the processing, an output is released in the form of bits. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Arduino programming codes are secret and cannot be modified. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Developments in microchip technology have helped increase computer power. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Since the 1950s, computing power has increased one trillion times. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The graphic representation of the layers of a microchip is called etching. | <input type="checkbox"/> | <input type="checkbox"/> |

Name

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READING COMPREHENSION

1. Read the text and complete it with the correct phrases.

- a. on electromagnetic waves
- b. to track deliveries
- c. people start asking themselves
- d. what they eat or drink
- e. stop using these devices
- f. more than 3,000 Swedish people
- g. as it is employed in contactless credit cards
- h. started implanting their employees
- i. a small amount of data
- j. security and health

The Swedish Microchip Revolution

In 2018, several Swedish firms **1.** with microchips which can be used to replace keys, credit cards and train tickets; **2.** got this electronic device in under their skin.

The small implants use Near Field Communication (NFC) technology, which is not new, **3.**, mobile payments or electronic bus passes; such chips are also used as tags for pets and by some companies **4.** When activated by a reader a few centimetres away, **5.** flows between the two devices travelling **6.**

As the microchip implanting is **spreading** across the world, **7.** questions about privacy, **8.** The companies say that the chips are biologically safe; however, chips surely show information about the employee's habits: **9.**, what time they come to work and so on. Of course, the same data is generated by company badges or by the employees' smartphones, but, if it is possible to choose to **10.**, people cannot easily **get rid of** implanted chips!

Adapted from: <https://www.dailymail.co.uk/sciencetech/article-5726197/>

Glossary:

to spread: *diffondersi*

to get rid of: *liberarsi di*

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VOCABULARY

2. Match each word with the correct definition.

cache • Control Unit • etching • GPU • ingot • photomask • RAM • shortage • SoC • encase

1. A microprocessor specialised in graphics processing.
2. Circuits in a microprocessor controlling the whole processing system.
3. A type of memory which makes it easier and faster to retrieve data.

4. A situation when something is not available in the quantities needed.
5. The memory in a microprocessor where data is temporarily stored.
6. A new type of chip combining different chips in a single one.
7. A cylindrical piece of silicon.
8. To enclose something in a protective case.
9. The process of cutting a design out of a surface.
10. The representation of a microchip design made using CAD instruments.

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SENTENCE COMPLETION

3. Complete the sentences with the correct words.

1. Large-scale was introduced in the 1970s.
2. Speech recognition systems employ signal processors to work.
3. Microprocessors contain all the which is necessary for processing.
4. are areas in a CPU where data is temporarily stored to be retrieved.
5. Arduino is an open-..... microcontroller.
6. Memory chips are called if they store data temporarily.
7. chips include CPUs, GPUs and NPUs.
8. Single-purpose chips such as the are used for repetitive processing tasks.
9. Silicon is made from silica
10. The of a microchip provides all the wiring necessary to its functioning.

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TRUE/FALSE

4. Decide if the following sentences are true or false. Correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. The maximum word length a microprocessor can deal with is 32 bits. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The speed of a microprocessor depends on the word length it can handle. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The first microprocessor was released in 1971. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. VLSI increased the circuit density of microprocessors in the 1980s. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The ALU controls all the processing system of a microprocessor. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. An input can be given by pressing a key and it is then transformed into bits. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The Arduino microcontroller was created in the USA by American researchers. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. The COVID-19 pandemic increased the need for microchips. | <input type="checkbox"/> | <input type="checkbox"/> |

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- 9. During the pandemic, microchip factories continued to work without interruptions.
- 10. Silicon is expensive and difficult to find.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is a Vision Processing Unit?
- 2. What is a microchip?
- 3. How is data entered and transformed in a microprocessor?
- 4. What is the difference between a microprocessor and a microcontroller?
- 5. Describe how silicon is treated in the microchip manufacturing process.

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Total score/50



MULTIPLE MATCHING

2. Match the terms with the correct definitions.

- | | | |
|-----------------------|--------------------------|--|
| 1. Computer | <input type="checkbox"/> | a. Applications and programs that run on a device and execute specific tasks. |
| 2. Mainframe computer | <input type="checkbox"/> | b. It is a set of four steps that include reading, interpreting the machine language, executing the code, and storing the results. |
| 3. Hardware | <input type="checkbox"/> | c. It uses light-emitting diodes to light the screen's pixels. |
| 4. Software | <input type="checkbox"/> | d. Computer able to support many users and multiple programs simultaneously. |
| 5. CPU | <input type="checkbox"/> | e. Technology that reads characters written in a special ink sensitive to magnetic fields. |
| 6. Machine cycle | <input type="checkbox"/> | f. It connects an analogue computer monitor to other monitors, projectors or televisions. |
| 7. Optical mouse | <input type="checkbox"/> | g. A digital electronic machine that can be programmed to store and process information. |
| 8. LED monitor | <input type="checkbox"/> | h. A handheld pointing device with an electronic sensor to detect movements. |
| 9. MICR | <input type="checkbox"/> | i. The physical components of the computer. |
| 10. VGA port | <input type="checkbox"/> | j. The unit containing all the circuitry needed to process input, store data and output results. |

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MULTIPLE CHOICE

3. Choose the correct option.

1. Which of the following is not a feature of supercomputers?
 - a. They are very big.
 - b. They are very fast.
 - c. They are designed for individual use.
 - d. They are especially used in engineering and scientific applications.
2. What are hybrid computers?
 - a. They are a combination of both analogue and digital computers.
 - b. They are mainframe computers.
 - c. They are computers used only by a single user.
 - d. None of the above.
3. What does Von Neumann architecture refer to?
 - a. To the tasks carried out by software.
 - b. To the relationship between input, CPU, output and memory.
 - c. To the relationship between memory and hardware.
 - d. To the structure of the physical components of a computer.
4. System software includes...
 - a. general application software.
 - b. special purpose application software.
 - c. CPU.
 - d. the operating system.

5. Which of the following is not a step of the machine cycle?
- a. Fetch.
 - b. Insert.
 - c. Decode.
 - d. Execute.
6. Which of the following is a virtual keyboard?
- a. A keyboard that uses icons or images as keys.
 - b. A keyboard that gets its name from the the first row of letters on the upper left hand-side.
 - c. A keyboard that is usually the on-screen keyboard of smartphones and tablets.
 - d. A mechanical keyboard.
7. What image input device lets a user draw or handwrite on a tablet using a special pen?
- a. A graphic tablet.
 - b. A scanner.
 - c. A QWERTY keyboard.
 - d. An OLED monitor.
8. Which of the following is a feature of LCD monitors?
- a. It is large and heavy and requires lots of energy to work.
 - b. It has two polarised layers of glass where the liquid crystals let the light pass or block it.
 - c. It is made up of pixels made from OLEDs.
 - d. It uses light-emitting diodes to light the screen's pixels.
9. What is the main feature of RCA ports?
- a. They transmit and receive high-definition audio and visual signals.
 - b. They are typically used to attach external devices such as keyboards, mice, printers, etc.
 - c. They are used for wired Internet connections.
 - d. They are red, white and yellow to indicate the correct port for audio and video cable insertion.
10. Which of the following is not a magnetic storage device?
- a. Blu-ray discs.
 - b. Pen drives.
 - c. Flash drives.
 - d. Hard disk drives.

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MULTIPLE MATCHING

2. Match the terms with the correct definitions.

- | | | |
|-------------------------|--------------------------|--|
| 1. Minicomputers | <input type="checkbox"/> | a. They are internal or external devices that put information into or get information out of a computer. |
| 2. Software | <input type="checkbox"/> | b. It is the set of programs, instructions and data that make a computer operate. |
| 3. Application software | <input type="checkbox"/> | c. It is the oldest type and it is large, heavy and requires a lot of energy. |
| 4. Control unit | <input type="checkbox"/> | d. It is used for backups and for the storage of programs and data that are not needed immediately. |
| 5. Peripherals | <input type="checkbox"/> | e. It has the function of directing the operations of the processor. |
| 6. Scanner | <input type="checkbox"/> | f. They have two or more processors and support up to 200 users at once. |
| 7. CRT monitor | <input type="checkbox"/> | g. It is used for wired Internet connections. |
| 8. OMR | <input type="checkbox"/> | h. It carries out a specific task for an end user or for another application. |
| 9. Secondary storage | <input type="checkbox"/> | i. They are optical devices able to read information in pre-defined and well-identified areas, for example to read questionnaires. |
| 10. Ethernet port | <input type="checkbox"/> | j. It is an external device that captures images from paper and converts them into digital information. |

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MULTIPLE CHOICE

3. Choose the correct option.

- Which of the following is a feature of mainframe computers?
 - They are able to support many users and multiple programs simultaneously.
 - They are very slow.
 - They are designed for individual use.
 - They are especially used in engineering applications.
- What are analogue computers?
 - They can perform calculations and logical operations at high speed.
 - They are mainframe computers.
 - They are computers used only by a single user.
 - They are computers that can process data that change continuously.
- Which of the following component is not hardware?
 - A motherboard.
 - An operating system.
 - A graphic card.
 - A CPU.
- General application software is designed to...
 - run the hardware.
 - perform a wide range of operations.
 - perform one specific task.
 - run the operating system.

5. Which of the following statements about the CPU is incorrect?
 - a. It interprets instructions.
 - b. It executes programs stored in memory.
 - c. It transfers data between memory and software.
 - d. It controls the movement of data among the various computer components.

6. Which of the following descriptions refers to a graphic tablet?
 - a. It lets the user draw or write by hand using a special pen.
 - b. It records or streams video to a computer or via the internet.
 - c. It captures images from paper and converts them into digital information.
 - d. It takes pictures and stores them as digital data.

7. Which of the following is a feature of LED monitors?
 - a. They are large and heavy and require lots of energy to work.
 - b. They have two polarised layers of glass where the liquid crystals let the light pass or block it.
 - c. They are made up of pixels made from OLEDs.
 - d. They use light-emitting diodes to light the screen's pixels.

8. Which of the following is a control device?
 - a. MICR.
 - b. An actuator.
 - c. A barcode reader.
 - d. An OLED monitor.

9. Which of the following statements refers to cache?
 - a. It is short-term memory where data is temporarily stored while the programs are running.
 - b. It is auxiliary memory that temporarily stores frequently used data to allow the CPU to work faster.
 - c. It contains non-volatile, permanent data and essential programs.
 - d. None of the above.

10. Which of the following are solid state storage devices?
 - a. Pen drives.
 - b. Blu-ray discs.
 - c. DVD-RWs.
 - d. RAM.

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TRUE/FALSE

4. Say if the sentences are true or false, correct the false ones.

1. Mainframe computers are small and can support a single user at a time.
2. Hybrid computers are a combination of analogue and digital ones.
3. There are two types of software: system software and application software.
4. The CPU is the arithmetic logic unit able to solve problems.
5. Ethernet ports are used for wired Internet connections.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is a computer and what are its main functions?
- 2. What is a machine cycle?
- 3. What is a computer mouse and what are the main two types?
- 4. What is secondary storage? Give two examples.
- 5. What is the difference between ports and connectors?

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READING COMPREHENSION

1. Read the text and summarise it using 60-80 words.

Evolution of Programming Languages

Computer programming has become a part of our daily lives and almost every device we use is dependent on a certain algorithm that is developed by writing a program. Humans convey a message by speaking a specific language in the same way machines interact with each other by analysing computer languages. Programming allows us to control machines, software, and other devices. Since the 19th century we have been developing programming languages and now we have mastered them. Many of you don't know that the first-ever programming language was written by British Mathematician Ada Lovelace in 1843.

There are more computer languages in existence than anybody knows, and still more keep getting created every year. There isn't really any great reason to keep creating more languages, because existing languages are adequate to achieve any task we can think of: people just keep creating them, even when they don't really need to. As a matter of fact, some languages are much better suited to certain tasks than others and some of them are also much easier to learn than others.

Adapted from: https://codinghero.ai/evolution-of-computer-languages/

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SENTENCE CORRECTION

2. Each sentence has a mistake. Find it and correct it.

- 1. Low-level languages must always be translated into machine languages to be executed by the computer.
- 2. Object-oriented programming organises software around functions and logic.
- 3. C# is a low-level, general-purpose and object-oriented language designed for the Common Language Infrastructure.
- 4. Most markup languages are machine languages because their annotations are written in a way that distinguishes them from the text itself.
- 5. Apple iOS is a mobile operating system with frequent updates and is Linux-based, so it is open-source.

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**MULTIPLE CHOICE****3. Choose the correct option.**

1. What are algorithms in computer programs?
 - a. Organised collections of information and data stored in the computer system.
 - b. The set of steps to carry out a task.
 - c. The code that checks if a program works.
 - d. The code that fixes any programming mistake.
2. In a flowchart, what does the oval symbol represent?
 - a. It represents input information or output results.
 - b. It represents the process of an operation.
 - c. It represents the beginning / end of the process.
 - d. It represents the relationship between steps.
3. Which of the following programming languages uses only binary code?
 - a. Assembly language.
 - b. High-level language.
 - c. Machine language.
 - d. HTML language.
4. What is the function of a compiler in computer language?
 - a. It converts the program into an object file and translates an entire program at once.
 - b. It translates assembly language into machine code.
 - c. It converts a program into machine code line by line.
 - d. It provides basic computer instructions.
5. Which of the following is a feature of second-generation languages?
 - a. They are high-level language with an easy-to-read syntax.
 - b. They are more programmer-friendly and allow the use of a graphical user interface.
 - c. They are based on problem-solving.
 - d. None of the above.
6. Which of the following is not a feature of Python?
 - a. It is a procedural-oriented language.
 - b. It is widely used by beginners because it is very simple.
 - c. It is dynamic because it is checked at run-time, i.e. during the execution of the program.
 - d. It is often used to build websites, software and for data analysis.
7. Which is the best description for “tags” of HTML language?
 - a. Angle brackets.
 - b. Algorithms.
 - c. Symbols.
 - d. Keywords.
8. In HTML language, what does </h> represent?
 - a. The title of the page.
 - b. The closing of the heading.
 - c. The head that appears at the top of every page.
 - d. The instruction to make a text bold.
9. What is a single-user, single-task OS?
 - a. It is an OS designed to let one user effectively carry out one task at a time.
 - b. It is an OS used to control machinery, industrial systems and scientific instruments.
 - c. It is an OS that manages several computers at the same time.
 - d. It is an OS that lets a single user have several applications in operation at the same time.

- 10.** What does an open-source operating system do?
- a. It can operate on a variety of hardware platforms without the problem of incompatibility.
 - b. It cannot have bugs.
 - c. It can be modified and distributed by anyone.
 - d. It has a very good app market.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- 1. The arrow symbol in a flowchart represents the sequence of a process.
- 2. An assembler translates assembly language into machine code.
- 3. Sixth-generation languages will be human-readable and based on visual development.
- 4. A multiuser OS works by breaking the problem into pieces among many smaller computers.
- 5. Windows Phone is an open-source mobile OS.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What basic steps are required when starting to write a computer program?
- 2. What are the steps to follow when writing a computer program?
- 3. What is a high-level language?
- 4. What are the main features of Java language?
- 5. What is the relationship between an operating system and a user?

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Total score/50

Name

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READING COMPREHENSION

1. Read the text and summarise it using 60-80 words.

Windows 1.0

When people think of Microsoft Windows, they think of the modern versions that are used on desktop and laptop computers today. Windows 1.0 was released on 20th November 1985; it was the first major release of Microsoft Windows, and a milestone in the development of graphical operating systems. Although it was primitive by today's standards, Windows 1.0 laid the foundation for the success of subsequent versions of Windows. It introduced many key features, including the use of a mouse to interact with graphical elements on the screen, windows that could be opened and closed, and icons that represented files and programs. The original Windows 1.0 used a 16-bit interface, with a size of less than 1MB. It came complete with a lot of similar now popular software such as Paint, Calculator, Notepad, and Word Processor. Despite being primitive by today's standards, it represented a major step forward in terms of user-friendliness and functionality.

Adapted from: https://www.tldevtech.com/interesting-facts-about-windows-operating-system/

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SENTENCE CORRECTION

2. Each sentence has a mistake. Find it and correct it.

1. Algorithms are organised collections of information and data stored in the computer system.
2. In programming, a flowchart shows a programming language.
3. A compiler is a type of low-level language.
4. Sixth level languages will have a very low degree of abstraction.
5. One of the main features of Microsoft Windows is the lack of bugs and hackers.

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**MULTIPLE CHOICES****3. Choose the correct option.**

1. What is debugging in program writing?
 - a. A specific step aimed at fixing any program mistake.
 - b. The set of algorithms.
 - c. The code that checks if the program works.
 - d. An organized collection of data and instructions.
2. In a flowchart, what does the rectangular symbol represent?
 - a. It represents the relationship between steps.
 - b. It represents input information or output results.
 - c. It represents the process of an operation.
 - d. It represents the beginning / end of the process.
3. Which of the following statements best describes the assembly language?
 - a. It uses only binary characters.
 - b. It is a high-level language.
 - c. It is designed to be readable by humans.
 - d. It converts the program into an object file.
4. What is the function of an interpreter?
 - a. It converts a program into machine code line by line.
 - b. It provides basic computer instructions.
 - c. It converts the program into an object file and translates an entire program at once.
 - d. It translates assembly language into machine code.
5. Which of the following is not a feature of fourth generation languages?
 - a. They are very high-level languages.
 - b. They are the languages of microprocessors.
 - c. They are non-procedural languages.
 - d. They have mnemonics to represent operation codes.
6. Which of the following is a feature of Java language?
 - a. It is a procedural-oriented language.
 - b. It is a high-level programming language.
 - c. It is dynamic because it is checked at run-time, i.e. during the execution of the program.
 - d. None of the above.
7. What are “operands”?
 - a. Algorithms.
 - b. HTML tags.
 - c. Variables or values of an operation which are relevant to the instruction.
 - d. Keywords.
8. In HTML language, what does <h> represent?
 - a. The head that appears at the top of every page.
 - b. The title of the page.
 - c. The closing of the heading.
 - d. The instruction to put a text into italics.
9. What is a Real Time Operating System (RTOS)?
 - a. It is an OS designed to let one user effectively carry out one task at a time.
 - b. It is an OS that manages several computers at the same time.
 - c. It is an OS that lets a single user have several applications in operation at the same time.
 - d. It is an OS used to control machinery, industrial systems and scientific instruments.

- 10.** What is end-to-end encryption?
- a. It is a feature that lets an OS have frequent updates.
 - b. It is a feature that lets an OS operate on a variety of hardware platforms.
 - c. It is a feature that gives the OS high-level security.
 - d. It is a feature that lets the OS easily configure keyboards into many languages.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- 1. A computer program is a set of instructions written in a specific code that directs computer systems to perform specific tasks.
- 2. A linker is a program related to the compiler which converts the object file into an executable file.
- 3. A typical program of the first-generation is written in a human-like language.
- 4. Java is an object-oriented programming language similar to Python.
- 5. The OS is the way through which a user interacts with applications and websites.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is a flowchart and why is it used in programming?
- 2. What are the main features of fifth-generation languages?
- 3. What is hyper text markup language?
- 4. What is a distributed OS?
- 5. Briefly describe Apple iOS.

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READING COMPREHENSION

1. Read the text and say if the sentences are true or false, correct the false ones.

Virtual Reality in Gaming

Previously, gamers used to play their games on flat screens. But with time, technology and VR hardware made it possible for the players to merge into a personalised environment. This also allows the player to gain a superior level of engagement with the gaming world. With the coming of VR headsets along with other devices, gamers have been able to communicate well with elements in the game. It has helped them to absorb the gaming world in a better manner. And the best thing about VR in gaming is that they give users the possibility to move freely within the artificial world. There are several game genres that have utilised the possibilities offered by virtual reality in the gaming industry. VR adventure games, for example, are completely based on exploration and puzzle-solving and provide great picture quality. Also, VR driving simulation has a huge potential because the experience we get of driving with this technology matches the experience on the road.

Adapted from: <https://www.juegostudio.com/blog/how-vr-is-transforming-the-online-gaming-industry>

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|--|--------------------------|--------------------------|
| 1. Today, VR in gaming lets players play games only on flat screens. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. VR allows gamers to interact with any element of the game. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. VR allows users to be static in the fictional world. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Only adventure games are improved by the use of VR. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Driving simulation has been greatly improved by the use of VR. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|-------------------|--------------------------|--|
| 1. Spreadsheet | <input type="checkbox"/> | a. It is a diagram that illustrates comparisons using rectangular shapes. |
| 2. Bar chart | <input type="checkbox"/> | b. Type of software that combines text, images, and artwork to produce documents for print or visual consumption. |
| 3. Photo editor | <input type="checkbox"/> | c. Software used to alter images digitally. |
| 4. DTP | <input type="checkbox"/> | d. In GPS it is the device which receives the signals. |
| 5. User equipment | <input type="checkbox"/> | e. It is a computer program designed to display, manage, and manipulate numerical data. |

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**MULTIPLE CHOICE****3. Choose the correct option.**

1. Which of the following is not a function of a word processor?
 - a. Footnotes.
 - b. Revision.
 - c. Formulas.
 - d. Formatting.
2. Which of the following is a feature of notebook applications?
 - a. It is system software to create and manage databases.
 - b. It is useful to keep track of appointments and events.
 - c. It is used to make clear data visualisation.
 - d. It can recognise the user's handwriting.
3. In which type of charts is data arranged as segments of a circle?
 - a. Bar charts.
 - b. Pie charts.
 - c. Line charts.
 - d. Databases.
4. What is a PNG?
 - a. A type of bitmap image.
 - b. A type of 3D graphic software.
 - c. A presentation slideshow.
 - d. None of the above.
5. Which of the following is a feature of digital pages in desktop publishing?
 - a. The elements are only three dimensional.
 - b. They are meant to be printed on paper.
 - c. They can zoom on certain elements.
 - d. They can be dynamically re-sized.
6. What is the main purpose of using CAD?
 - a. To build web pages.
 - b. To create 3D models of real-world objects before they are manufactured.
 - c. To draw sketches or add colours to images.
 - d. To add special effects to animated images.
7. What is the function of ground control in GPS system?
 - a. To control activities of the satellites in space and monitor transmissions.
 - b. To send signals from space to users on their geographical position.
 - c. To receive signals.
 - d. To control ground antennas.
8. Which of the following statements best describes augmented reality?
 - a. It is an experience that users can have using special screens.
 - b. It turns the real world into a fictional reality.
 - c. It adds digital elements to a live view.
 - d. It is mainly used in gaming.
9. What are Nuclino and Godot?
 - a. e-Learning platforms.
 - b. Learning Management Systems.
 - c. Video game software.
 - d. Business software.
10. An example of medium size enterprise software is...
 - a. business process management.
 - b. e-commerce.
 - c. home accounting software.
 - d. office suites.



SENTENCE COMPLETION

4. Complete the following sentences with 1-2 words.

- 1. applications are software programs used to search, sort, calculate, report and share information. They can also contain code to perform
- 2. Drawing software is used to create original using a computer mouse or external such as electronic sketchpads.
- 3. In photo editor software, the cropping function is used to select a of the image, while the function is used to cover up imperfections.
- 4. One of the functions of CAD is the possibility to on certain elements of the model just like a camera lens to facilitate inspection and reduce before manufacturing.
- 5. In GPS, satellites are stations that orbit around the earth and send to users on their position and time of the day.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is presentation software?
- 2. What does vector graphic software do?
- 3. Describe two applications of virtual reality in real life.
- 4. Why is coding required to create video games?
- 5. What is business software used for?

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READING COMPREHENSION

1. Read the text and say if the sentences are true or false, correct the false ones.

AR in Education

Augmented reality has its own magic. It can change the way we interact with mobile apps and other visual graphic experiences. Actually, augmented reality is capable of augmenting computer-generated graphics into the real environment on screen. It means that if you move your mobile camera, AR enables you to see a computer-generated object on your screen. Altogether, it happens in real time while you view it from your camera. This technique can enable students to learn in a more interactive environment.

Another aspect of the AR experience is that it includes 25% digital reality and 75% existing reality. It means it doesn't replace the complete environment with a virtual one, but it integrates virtual objects into the real world. With AR, classroom education can be extraordinary and more interactive, as AR can enable teachers to show virtual examples of concepts and add gaming elements to provide textbook material support. This will enable students to learn and memorise information faster.

Adapted from: <https://elearningindustry.com/augmented-reality-in-education-staggering-insight-into-future>

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| 1. Mobile apps have been greatly influenced by AR. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. When you move your mobile camera, AR allows you to see computer-generated elements on your screen. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The AR experience offers users 75% of fictional reality. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. AR integrates some real elements in a completely virtual world. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. In education, AR cannot support textbooks. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

2. Match each term with the correct definition.

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|--------------------|--------------------------|--|
| 1. Text formatting | <input type="checkbox"/> | a. It is a function that allows the user to input and format text in a presentation. |
| 2. Text editor | <input type="checkbox"/> | b. It is a type of bitmap image. |
| 3. Bar chart | <input type="checkbox"/> | c. It is a function that refers to the appearance of the text, including font type and size, bolding and italicising. |
| 4. Gif | <input type="checkbox"/> | d. A function of photo editor programs that allows elements to be added to an existing photo. |
| 5. Layers | <input type="checkbox"/> | e. It is a chart that shows data with rectangular shapes. |

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**MULTIPLE CHOICE****3. Choose the correct option.**

1. What is the function of cell formatting in datasheets?
 - a. To make mathematical operations in a cell.
 - b. To change the way data appears in each cell.
 - c. To add footnotes.
 - d. To arrange data in rows.
2. What does the revision function of a word processor consist in?
 - a. It allows other users to change a text and add notes.
 - b. It presents contents in a sequential order.
 - c. It is used to insert images and videos.
 - d. It is used to keep track of appointments and events.
3. Which type of chart illustrates data as a series of points connected together?
 - a. Line charts.
 - b. Bar charts.
 - c. Slideshow.
 - d. Pie charts.
4. What is a TIFF?
 - a. A type of chart.
 - b. A type of 2D graphic software.
 - c. Presentation software.
 - d. A type of bitmap image.
5. Which of the following is a feature of virtual pages in desktop publishing?
 - a. They can zoom on certain elements.
 - b. The elements are three dimensional.
 - c. They are meant to be printed on paper.
 - d. They can be dynamically re-sized.
6. What is the function of electronic sketchpads?
 - a. To create video games.
 - b. To create 3D models of real-world objects.
 - c. To hand-draw images with a special pen.
 - d. None of the above.
7. What are master control stations in GPS systems?
 - a. They are stations responsible for the management of remote monitoring sites.
 - b. They are orbiting stations.
 - c. They are stations controlling ground antennas.
 - d. They are satellites.
8. Which of the following statements best describes virtual reality?
 - a. It replaces the real world with a fictional reality.
 - b. It is used only in mechanical fields.
 - c. It adds digital elements to a live view.
 - d. It works using a camera.
9. Which of the following is a feature of Learning Management Systems?
 - a. They are not very flexible.
 - b. They are open-source applications.
 - c. They can be accessed only within the organisation network.
 - d. They are business software.

10. Which of the following is not a type of business software?
- a. Enterprise resource planner.
 - b. Office suite.
 - c. Customer relationship management.
 - d. Small business market.

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SENTENCE COMPLETION

4. Complete the following sentences with 1-2 words.

- 1. An is a collection of software used for routine tasks. A typical one includes applications such as a, a spreadsheet, and presentation software.
- 2. A notebook application has the same function of a paper, the only difference is that it is used to take
- 3. software creates images made up of pixels but if the images are scaled, they quality.
- 4. In, a digital page can be as happens with webpages.
- 5. Augmented reality is successfully used in many fields, such as in repair and to suggest potential fixes or in for war simulations.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is a spreadsheet?
- 2. What is calendar software?
- 3. What is CAD used for?
- 4. What is the function of satellites in GPS?
- 5. What are learning platforms?

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READING COMPREHENSION

1. Read the text and complete the sentences with the missing words.

Mobile Communication

Mobile communication is the use of technology that allows us to communicate with others in different locations without the use of any physical connection (wires or cables). A mobile phone (also called mobile cellular network, cell phone or hand phone) is an example of wireless communication. It is an electric device used for full duplex two-way radio telecommunication over a cellular network of base stations known as cell sites. The following are some of the main features of mobile communication.

- **High-capacity load balancing:** when one access point is **overloaded**, the system will actively **shift** users from one access point to another depending on the capacity which is available.
- **Network management system:** today, wireless networks are much more complex and may consist of hundreds or even thousands of access points, firewalls, and various other components; they have a smart way of managing the entire network from a centralised point.
- **Indoor and outdoor coverage options:** it is important that your wireless system has the capability of adding indoor coverage as well as outdoor coverage.
- **Mobile device management:** it allows you to control how you will manage access to programs and applications. You can even remotely **wipe** the device if it is lost or stolen.

Adapted from: <https://www.javatpoint.com/mobile-communication-introduction>**Glossary:**coverage: *copertura*to shift: *spostare*to overload: *sovraccaricare*to wipe: *pulire, cancellare*

1. When you use a mobile phone, no connection is required because it is a communication medium.
2. Mobile communication is a full two-way radio telecommunication that works over a cellular
3. When the access point is, the system can move the user to another access point to balance the
4. Today, mobile phones must have the same level of whether the user is indoors or
5. Mobile device management allows users to access to programs of the even remotely.

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**MULTIPLE MATCHING****2. Match each term with the correct definition.**

- | | | |
|-----------------------------|--------------------------|--|
| 1. Wireless transmission | <input type="checkbox"/> | a. A range of waves that go from very high frequency and short wavelength to very low frequency and long wavelength. |
| 2. Amplitude | <input type="checkbox"/> | b. Radio waves used for short-range applications. |
| 3. Non-ionising waves | <input type="checkbox"/> | c. Cables used for transmitting data in small areas. |
| 4. Electromagnetic spectrum | <input type="checkbox"/> | d. The process of exchanging information through electromagnetic waves. |
| 5. Sky propagation | <input type="checkbox"/> | e. The height of an electromagnetic wave. |
| 6. SHF | <input type="checkbox"/> | f. Technology that enables electronic devices to connect to local networks using radio waves. |
| 7. ELF | <input type="checkbox"/> | g. The lowest radio frequency. |
| 8. Twisted pair cables | <input type="checkbox"/> | h. Technology that allows devices to communicate with each other sending information across a short distance. |
| 9. Wi-Fi | <input type="checkbox"/> | i. Electromagnetic waves with low energy radiation and long wavelength. |
| 10. Bluetooth | <input type="checkbox"/> | j. Reflections of radio waves from the ionosphere back to the Earth. |

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**MULTIPLE CHOICE****3. Choose the correct option.**

- In a telecommunication system, an input transducer...
 - converts sound or light deriving from the information source into a form which can be transmitted.
 - is the intended recipient of the message.
 - encodes message data and transmits the information to one or more receivers.
 - is the medium that carries the message.
- What is the function of an encoder?
 - It increases the power of a signal.
 - It changes a given code into a set of signals.
 - It converts data or signals by using a specific code.
 - It converts a code into data.
- What does “a system with one powerful transmitter and many low-power receivers” refer to?

a. A full duplex system.	c. A multiplex system.
b. A half-duplex system.	d. A broadcast system.
- In electromagnetic waves, what is a trough?
 - The highest point of a wave.
 - The lowest point of a wave.
 - The length of a wave.
 - The frequency of a wave.
- What is the amplitude of an electromagnetic wave?
 - It is the distance from the centre line to the top or to the bottom.
 - It is the number of waves passing a point in a certain time.
 - It is the quantity of energy a wave has.
 - It is the distance from any point on one wave to the same point on the next wave.

6. Which of the following bands includes FM radio?
 - a. The highest frequency.
 - b. Shortwave radio waves.
 - c. Low-medium frequencies.
 - d. High frequencies.

7. Which of the following applications uses SHF and EHF frequencies?
 - a. GPS.
 - b. Bluetooth.
 - c. Atomic clock.
 - d. None of the above.

8. Which of the following is a description of coaxial cables?
 - a. Two copper wires are covered with insulating material.
 - b. An internal metallic shield contains a dielectric insulator.
 - c. No metallic shielding.
 - d. Several layers of protective plastic materials surround a glass core.

9. Infrared transmission is...
 - a. short-region wireless transmission.
 - b. long-range wireless transmission.
 - c. mobile transmission.
 - d. wired transmission.

10. In which type of mobile transmission do frequencies differ from country to country?
 - a. 5G.
 - b. 4G.
 - c. LTE.
 - d. HSPA+.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. In telecommunications, the information source encodes message data and transmits the information to receivers. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. In half-duplex communication both directions are used at the same time. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. A wavelength is the distance between the highest/lowest points of two consecutive waves. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Astronomy uses the entire electromagnetic spectrum. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. ELF VLF, LF and MF radio waves use frequency modulation to encode an audio or data signal. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

- 1. In telecommunications, what is a decoder?
- 2. What is the unit of measurement of the frequency of electromagnetic waves and what does it measure?
- 3. What are radio waves?
- 4. In what applications are the highest frequencies of radio bands generally used?
- 5. How does satellite transmission work?

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Total score/50

Name

Class Date



READING COMPREHENSION

1. Read the text and complete the sentences with the missing words.

The Impact of 5G Technology

The advent of 5G technology will positively impact the environment, transportation systems and human health.

Through connection to a 5G network, each home will become more energy efficient. Reducing energy consumption means a decrease in **harmful** emissions from fossil fuels. By receiving data from sensors connected to home **appliances**, information about each home's energy and temperature usage can be calculated and adjusted according to room occupancy, using energy only when necessary.

5G networks will provide safer and more effective transportation, too. With the ability to communicate wirelessly, smart cars will be able to detect traffic signals or to communicate with other cars on the road as well to know in advance which **lane** is less congested.

Self-driving cars connected to 5G receive information on the movement of ambulances, automatically and safely **pulling over** to allow emergency vehicles to pass.

Revolutionary advances in **healthcare** systems through 5G networks will improve people's health. With robot-assisted technology and high-speed connection, an individual can safely be operated by a **surgeon** located in another part of the world. In addition, remote monitoring devices can send patient's information to the doctors' team in real-time.

Adapted from: <https://www.toeflland.com/post/writing-task-1-practice-5g>

Glossary:

appliance: *elettrodomestico*

healthcare: *assistenza sanitaria*

harmful: *dannoso*

lane: *corsia*

to pull over: *accostare*

surgeon: *chirurgo*

- The advent of 5G technology will reduce the dangerous of fossil fuels so it will be positive for the
- 5G technology will have a positive on our houses because it will be able to reduce energy by receiving information about room occupancy.
- Driving will benefit from 5G because smart will be able to communicate wirelessly with other cars or detect signals.
- will be improved by 5G technology thanks to technology that will let a surgeon operate on a patient even at distance.
- In healthcare, 5G technology allows remote devices to inform the doctors about a patient's health conditions in

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MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|-----------------------|--------------------------|--|
| 1. Information source | <input type="checkbox"/> | a. A component of radio, television, and radar systems that directs incoming and outgoing radio waves. |
| 2. Amplifier | <input type="checkbox"/> | b. The number of waves passing a point in a certain time. |
| 3. Wavelength | <input type="checkbox"/> | c. A device that increases the power of a signal either at the source or at destination. |
| 4. Frequency | <input type="checkbox"/> | d. The distance between the highest/lowest points of two consecutive waves. |
| 5. Radio waves | <input type="checkbox"/> | e. Part or device placed at the end of a cable. |
| 6. Carrier wave | <input type="checkbox"/> | f. A wave that brings signals from one location to another on the surface of the Earth. |
| 7. Connector | <input type="checkbox"/> | g. Several layers of protective plastic materials that surround a glass core. |
| 8. Fibre optic cables | <input type="checkbox"/> | h. A type of electromagnetic radiation used in communication technologies. |
| 9. Coaxial cables | <input type="checkbox"/> | i. Cables containing a dielectric insulator and a copper centre conductor. |
| 10. Antenna | <input type="checkbox"/> | j. A device that encodes message data and transmits the information to receivers. |

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MULTIPLE CHOICE

3. Choose the correct option.

- In a telecommunication system, a transmitter...
 - is the intended recipient of the message.
 - converts sound or light deriving from the information source into a form which can be transmitted.
 - amplifies the signals.
 - sends data received by the transducer.
- What is the function of a decoder?
 - It increases the power of a signal either at the source or at destination.
 - It changes a given code into a set of signals.
 - It converts a code into data.
 - It converts data or signals by using a specific code.
- What does “a one-way communication mode” refer to?
 - A simplex system.
 - A half-duplex system.
 - A multiplex system.
 - A broadcast system.
- In electromagnetic waves, what is a crest?
 - The length of a wave.
 - The highest point of a wave.
 - The frequency of a wave.
 - The lowest point of a wave.

5. What does the Greek letter λ refer to?
 - a. The length of a wave.
 - b. The energy of a wave.
 - c. The crest of a wave.
 - d. The height of a wave.

6. Which of the following is a characteristic of ionising waves?
 - a. Low energy radiation and long wavelength.
 - b. High energy radiation and long wavelength.
 - c. High energy radiation and short wavelength.
 - d. Low energy radiation and short wavelength.

7. Which of the following applications uses LF frequencies?
 - a. GPS.
 - b. An atomic clock.
 - c. Satellites.
 - d. Wi-Fi.

8. Which of the following is a description of UTP cables?
 - a. They contain a dielectric insulator.
 - b. They are enclosed in a metallic shield.
 - c. They transfer data signals in the form of light.
 - d. They do not require any grounding cable for installation.

9. Wi-Fi transmission is a...
 - a. short-region wireless transmission
 - b. mobile transmission.
 - c. long-range wireless transmission.
 - d. None of the above.

10. Which of the following mobile transmissions is a hybrid 3G network?
 - a. 5G.
 - b. HSPA.
 - c. HSPA+.
 - d. LTE.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | | T | F |
|--|--------------------------|---|--------------------------|
| 1. A multiplex system consists of one powerful transmitter and many low-power receivers. | <input type="checkbox"/> | | <input type="checkbox"/> |
| 2. The electromagnetic spectrum comprises all types of electromagnetic radiation that travel through space in the form of waves. | <input type="checkbox"/> | | <input type="checkbox"/> |
| 3. Low and medium frequencies are sometimes considered to be part of the microwave band. | <input type="checkbox"/> | | <input type="checkbox"/> |
| 4. Twisted pair cables are used for transmitting data in small areas. | <input type="checkbox"/> | | <input type="checkbox"/> |
| 5. Fibre optic cables are suitable for areas with electrical interference. | <input type="checkbox"/> | | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. In telecommunications, how can the transmission of signals occur?
- 2. What is the amplitude of an electromagnetic wave?
- 3. What are the main characteristics of shortwave radio waves?
- 4. What are STP cables?
- 5. What are antennas and what type of wireless transmission do they belong to?

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Total score/50

Name

Class Date



READING COMPREHENSION

1. Read the text and answer the questions.

What is an ISP?

An ISP (Internet Service Provider) is a company that provides individuals and organisations with access to the Internet and other related services. An ISP has the equipment and the telecommunication line access required to have a point of presence on the Internet for the geographic area served. ISPs make it possible for customers to access the Internet and it also provides additional services such as email and domain registration. ISPs may also provide different Internet connection types, such as cable, fibre, DSL and satellite since they are connected to one or more high-speed Internet lines. Larger ISPs have their own high-speed lines, so they are less dependent on telecommunication services and can provide better service to their customers. ISPs also keep thousands of servers in data centres – the number of servers depends on their Internet service area. These large data centres manage all customer traffic. Multiple ISPs are also connected to large backbone routing centers. ISPs are divided into three tiers:

Tier 1: These ISPs have the most global reach:

Tier 2: These ISPs have regional or national reach;

Tier 3: These ISPs connect customers to the Internet using another ISP's network.

Adapted from: https://www.techtarget.com/whatis/definition/ISP-Internet-service-provider

Glossary:

tier: livello

- 1. What is the function of an ISP?
2. How are ISPs connected to the Internet?
3. Why can larger ISPs provide a better service to customers?
4. What is the function of ISP data centres?
5. What is the difference between tier 1 and tier 2?

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MULTIPLE MATCHING

2. Match each expression with its definition.

- | | | |
|---------------------|--------------------------|---|
| 1. Computer network | <input type="checkbox"/> | a. A short-distance network that allows multiple devices within a small area to connect to one another. |
| 2. Gateway | <input type="checkbox"/> | b. A service that allows for the establishment of a protected connection. |
| 3. PAN | <input type="checkbox"/> | c. A set of web pages located under a single domain name. |
| 4. Ring topology | <input type="checkbox"/> | d. A set of interconnected computers that can share resources, data and an Internet connection. |
| 5. VPN | <input type="checkbox"/> | e. A software program used to find the required information when the URL is unknown. |
| 6. IP address | <input type="checkbox"/> | f. A server that translates the text-based domain name you have asked for into the correct IP address. |
| 7. Packet switching | <input type="checkbox"/> | g. A mode in which every computer is connected to another one, so each device has two neighbouring devices. |
| 8. Website | <input type="checkbox"/> | h. A type of data transmission in which data is broken into smaller pieces of information sent independently. |
| 9. Search engine | <input type="checkbox"/> | i. A set of four numbers used to send the data to the correct recipient. |
| 10. DNS | <input type="checkbox"/> | j. A device that connects networks belonging to different networking types. |

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MULTIPLE CHOICE

3. Choose the correct option.

- Which of the following is not a feature of peer-to-peer networks?
 - All the computers have equal status.
 - The network is totally dependent on the server.
 - All the computers can share each other's resources.
 - The whole network slows down as more people use the network.
- A router is...
 - a device which works as the central point between computers and wired or wireless networks.
 - a small device used to connect multiple devices in a network.
 - a powerful computer that stores data or applications shared by the users of a network.
 - a set of rules and guidelines for data communication.
- Which of the following networks can extend to any area of the globe?
 - LAN.
 - MAN.
 - PAN.
 - WAN.
- In which of the following network topologies is each node directly connected with all the others?
 - Bus.
 - Ring.
 - Partial mesh.
 - Full mesh.

5. What is a CDN?
 - a. A network of servers that distributes content throughout the world.
 - b. A network of services that offers a high level of security.
 - c. A network in which the devices are positioned along a line.
 - d. A device used to access the servers.

6. What happens in a circuit switching network?
 - a. Data is broken into pieces of information.
 - b. Data is sent only through cables.
 - c. Data is transmitted in sequence.
 - d. Data is reassembled by the server.

7. Which of the following services does video conferencing belong to?
 - a. Information retrieval.
 - b. Communication.
 - c. Education.
 - d. None of the above.

8. What is the function of a search engine?
 - a. Displaying web pages.
 - b. Keeping track of all domain names.
 - c. Finding the required information using keywords.
 - d. Sending a copy of the website to the client.

9. What is a URL?
 - a. A protocol for the transmission of data.
 - b. A search engine.
 - c. A web address.
 - d. A browser.

10. In which web generation did the use of metadata become essential?
 - a. Web 1.0: static.
 - b. Web 3.0: semantic.
 - c. Web 4.0: intelligent.
 - d. Web 2.0: participative.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. A switch is a computer of a network that accesses the servers and shared resources. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. In bus network topology a single cable is used to connect all the nodes. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. TCP protocols are responsible for maintaining the connection for data transmission. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Web browsers are hypertexts formatted in HTML. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. "Phyigital revolution" is an expression belonging to the web generation of e-mails and forum discussions. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

2. Match each expression with its definition.

- | | | |
|---------------------------|--------------------------|---|
| 1. Communication protocol | <input type="checkbox"/> | a. A protocol that allows web browsers and web servers to talk to each other. |
| 2. Switch | <input type="checkbox"/> | b. A network with a central hub that connects all the computers of a network. |
| 3. MAN | <input type="checkbox"/> | c. A company that provides access to the Internet. |
| 4. Star topology | <input type="checkbox"/> | d. A system of rules to transmit data and information over physical or wireless technologies. |
| 5. TCP | <input type="checkbox"/> | e. A network of several LANs throughout a city, town or municipality. |
| 6. E-mail client | <input type="checkbox"/> | f. Hypertexts formatted in HTML, connected by links and accessed mainly via HTTP. |
| 7. ISP | <input type="checkbox"/> | g. A graphical user interface to information stored on computers running web servers. |
| 8. HTTP | <input type="checkbox"/> | h. Software installed on a device used to send, receive, download and store emails through an email server. |
| 9. Web pages | <input type="checkbox"/> | i. Protocols responsible for the connection between the devices and maintaining the connection for data transmission. |
| 10. World Wide Web | <input type="checkbox"/> | j. A device that divides the network into independent segments to reduce the amount of data travelling. |

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MULTIPLE CHOICE

3. Choose the correct option.

1. Which of the following is not a feature of a client-server network?
 - a. All the computers have equal status.
 - b. The network is totally dependent on the server.
 - c. They are the popular choice for networks that need many computers.
 - d. One more powerful computer is used to store the data and programs shared with the whole network.
2. A hub is...
 - a. a device which works as the central point between computers and wired or wireless networks.
 - b. a device that connects a home network to the ISP.
 - c. a device that connects clients and servers to the channel.
 - d. a small device used to connect multiple devices in a network.
3. Which of the following is a short-distance network?
 - a. LAN.
 - b. MAN.
 - c. PAN.
 - d. WAN.
4. In which of the following network topologies is every computer connected to another two?
 - a. Line.
 - b. Ring.
 - c. Partial mesh.
 - d. Star.

5. What is a VPN?
 - a. A device used to access the servers.
 - b. A network of servers that distributes content throughout the world.
 - c. A network in which the devices are positioned along a line.
 - d. A network of services that offers a high level of security.

6. What happens in a packet switching network?
 - a. Data is broken into pieces of information.
 - b. Data is transmitted in sequence.
 - c. Data is sent only through cables.
 - d. None of the above.

7. What is an IP address?
 - a. A set of five numbers which range from 0 to 100.
 - b. A set of four numbers which range from 0 to 255.
 - c. A set of four numbers which range from 0 to 100.
 - d. A set of five numbers which range from 0 to 250.

8. Which of the following definitions refer to the www?
 - a. A set of related web pages located under a single domain name.
 - b. A collection of web pages stored in web servers.
 - c. Software applications used to access and view websites.
 - d. A protocol that allows browsers and servers to communicate.

9. What is the function of DSN?
 - a. Connecting related pieces of information in different documents.
 - b. Sending the website files to the browser in the form of data packets.
 - c. Translating the text-based domain name into the IP address.
 - d. Connecting different types of networks.

10. Which of the following web generations is known as “documentary”?
 - a. Web 1.0.
 - b. Web 2.0.
 - c. Web 3.0.
 - d. Web 4.0.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. The components of a network are grouped into hardware and software components. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. An interface device works as the central point between computers and manages communication traffic. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. In a tree network topology certain nodes are connected to one other node, while others are connected to two or more. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. In a circuit switching network data is transmitted in sequence following a chronological order. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. HTTP is a protocol that keeps track of all domain names. | <input type="checkbox"/> | <input type="checkbox"/> |

Name

Class Date



READING COMPREHENSION

1. Read the text and answer the questions.

Internet Forums

An Internet forum, or message board, is an online discussion site where people can hold conversations in the form of posted messages that are usually temporarily archived. A forum has a tree-like directory structure. The top end is «Categories». A forum can be divided into categories for the relevant discussions. Under the categories are sub-forums, and these sub-forums can have further sub-forums. The topics (commonly called *threads*) come under the lowest level of sub-forums and these are the places in which members of the forum can start their discussions or posts. Internally, forums organise visitors and logged in members into user groups. The moderators are users (or employees) of the forum who are granted access to the posts and threads of all members in order to moderate the discussions and also to keep the forum clean (for example neutralising spam). Moderators also answer users' concerns about the forum, general questions, as well as respond to specific complaints. Each post is a user-submitted message enclosed into a block containing the user's details and the date and time it was submitted. Members are usually allowed to edit or delete their own posts. The posts are contained in the threads, where they appear as blocks one after another.

Adapted from: https://en.wikipedia.org/wiki/Internet_forum

1. What is a forum?
2. What is the tree-like structure of a forum composed of?
3. What is a thread?
4. What is the role of the forum moderator?
5. What is a post?

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MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|---------------------------|--------------------------|--|
| 1. PaaS | <input type="checkbox"/> | a. A form of real-time text-based communication in which people chat in a conversation. |
| 2. Public cloud computing | <input type="checkbox"/> | b. A form of e-commerce in which companies sell to consumers. |
| 3. Blog | <input type="checkbox"/> | c. A server program that allows users to work together with a simplified interface that does not require the use of HTML language. |
| 4. Instant messaging | <input type="checkbox"/> | d. Computing platform including OS, programming language, web server, databases and execution environment. |
| 5. B2C | <input type="checkbox"/> | e. A simple software application that allows users to perform a function or access a service quickly. |
| 6. Aggregator | <input type="checkbox"/> | f. A journal in which users share their opinions and knowledge about different topics. |
| 7. Streaming | <input type="checkbox"/> | g. Software that offers services to customers supporting them in their everyday life. |
| 8. Wiki | <input type="checkbox"/> | h. An entity that collects media content and applications from online sources to reuse or resell. |
| 9. Lifestyle app | <input type="checkbox"/> | i. The continuous transmission of audio or video files from a server to a client in which the media file played on the client device is stored remotely. |
| 10. Widget | <input type="checkbox"/> | j. Multi-tenant cloud environment in which a server shares the same hardware, storage and network devices as other users. |

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MULTIPLE CHOICE

3. Choose the correct option.

- Which of the following features belongs to IaaS?
 - It offers essential storage and networking resources on demand.
 - Users get the access to application software without managing the infrastructure and platform.
 - It offers computing platforms including operating system and programming language.
 - Providers deliver software applications over the Internet.
- Which of the following elements is not part of a blog?

a. The header.	c. Runtime.
b. The sidebar.	d. The footer.
- What is the main aim of a Q&A forum?
 - Sharing images and video.
 - Asking questions about specific topics.
 - Chatting in real time.
 - Sharing personal information.
- What is B2B?
 - A type of e-commerce in which customers exchange products without profit.
 - A type of e-commerce in which companies sell directly to consumers.
 - A type of e-commerce in which customers sell products to other customers.
 - A type of e-commerce in which companies sell products to other companies.

5. What does big data veracity refer to?
 - a. The amount of data.
 - b. The speed of data generation.
 - c. How fast the structure of data changes.
 - d. The quality and origin of data.

6. Which of the tips below should not be followed for content aggregation?
 - a. Never include the source of the content.
 - b. Rewrite the content in a personalised style.
 - c. Summarise the content.
 - d. Verify the reliability of the information.

7. Why is Artificial Intelligence important in gaming?
 - a. Because it is used to generate a very complex code.
 - b. Because it determines the textures the user sees on the screen.
 - c. Because it establishes the physics of the game.
 - d. Because it simplifies the programming language.

8. Which of the following statements refers to one of the main advantages of smart TVs?
 - a. It uses Artificial Intelligence.
 - b. It connects to the Internet without the need for a set-top box.
 - c. It does not need a remote control.
 - d. None of the above.

9. What is VoiP used for?
 - a. To share images.
 - b. To share documents.
 - c. To make phone calls over the Internet.
 - d. To connect smart TVs to the Internet.

10. Which of the following statements about apps is not true?
 - a. Every app requires an Internet connection.
 - b. When an app is launched, it runs on the device's OS.
 - c. Apps must be downloaded and installed on a device.
 - d. Apps are designed to perform a specific function.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Hybrid cloud computing is a single-tenant cloud environment. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Video-sharing platforms allow users to upload or live stream videos. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Big data variety refers to the heterogeneous nature of data. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Aggregators that syndicate content gather materials from various sources for publication on their own websites. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. With streaming, the video must be entirely downloaded to be played. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is a discussion forum?
- 2. What does the term “big data” refer to?
- 3. What are the most common services offered by a smart TV?
- 4. What is videoconferencing?
- 5. How does an app work?

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Total score/50



MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|--------------------------------|--------------------------|--|
| 1. SaaS | <input type="checkbox"/> | a. A device that lets users watch films and play games without the need for aerials or cables. |
| 2. Forum | <input type="checkbox"/> | b. The process used by companies to identify and categorise customers on the basis of several characteristics. |
| 3. Web-based instant messaging | <input type="checkbox"/> | c. A platform which allows the user to get access to an application without managing the infrastructure and platform on which it is running. |
| 4. C2C | <input type="checkbox"/> | d. A type of software installed on a computer or mobile device designed to perform a specific function directly for the user. |
| 5. Customer profiling | <input type="checkbox"/> | e. A form of real-time text-based communication that requires no installation on the device. |
| 6. Research aggregators | <input type="checkbox"/> | f. A service website with a big selection of popular online materials that allows users to download them from a single server. |
| 7. Smart TV | <input type="checkbox"/> | g. A type of e-commerce in which people sell to other people using specific platforms. |
| 8. File hosting service | <input type="checkbox"/> | h. It is a service used to make phone calls over the Internet to landlines, mobile phones and computer-to-computer. |
| 9. VoIP | <input type="checkbox"/> | i. An organisation that collects information from research journals. |
| 10. App | <input type="checkbox"/> | j. An online discussion board where people discuss specific topics starting with a thread. |

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MULTIPLE CHOICE

3. Choose the correct option.

- Which of the following features belongs to PaaS?
 - It is a basic model of platform.
 - Providers deliver software applications over the Internet.
 - It offers computing platforms including operating system and programming language.
 - Users get access to the software without managing the infrastructure and platform.
- What is public cloud computing?
 - A multi-tenant environment.
 - A single-tenant environment
 - A combination of two computing environments.
 - An environment in which users pay a fixed amount for the service.
- What is application-based instant messaging?
 - Software for real-time communication installed on the user's device.
 - Software for real-time communication that requires no installation.
 - A community-based means of interaction.
 - A discussion board.
- What is B2C?
 - A type of e-commerce in which customers sell products to other customers.
 - A type of e-commerce in which customers exchange products.
 - A type of e-commerce in which companies sell products to other companies.
 - A type of e-commerce in which companies sell directly to consumers.

5. What does big data variability refer to?
 - a. The type of data.
 - b. How fast the structure of data changes.
 - c. The speed of data generation.
 - d. The quality and origin of data.

6. Which of the following tips should be followed for content aggregation?
 - a. Never include the source of the content.
 - b. Use a standardised style to rewrite the information.
 - c. Summarise the content.
 - d. None of the above.

7. What does a social media aggregator do?
 - a. It gathers blog posts from multiple sources and present them on a central site.
 - b. It takes information from various social sites and displays it as a live feed.
 - c. It categorises multiple service providers to make it easier to browse through the choices.
 - d. It gathers information from research journals to answer questions.

8. Which programming language is normally used in gaming?
 - a. HTML.
 - b. Java.
 - c. Python.
 - d. C.

9. Which of the following is a feature of a wiki?
 - a. It is both a server and a client.
 - b. It stores many files.
 - c. It allows users to work together on website content with a simplified interface.
 - d. It is a system which signals who is active on the documents.

10. What is a widget?
 - a. An easy-to-use software application.
 - b. A type of cloud computing.
 - c. A platform used to make phone calls.
 - d. A file-sharing system.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Cloud computing enables users to access data and applications over the Internet from remote servers, databases and computers. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. In hybrid cloud computing users pay on a weekly basis. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. A thread is the user who runs a blog. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. E-commerce generally refers to any transaction completed through an electronic medium. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. File sharing sites can be accessed only by using a password. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Describe infrastructure as a service.
- 2. What does the term social media refer to?
- 3. What is the difference between structured and unstructured data?
- 4. What are some of the main features of games?
- 5. What are collaborative documents?

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Total score/50



MULTIPLE MATCHING

2. Match each term to the correct description.

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|-------------------------|--------------------------|--|
| 1. Malware | <input type="checkbox"/> | a. It can be used to install other forms of malware. |
| 2. Trojan | <input type="checkbox"/> | b. Software or hardware that prevents hackers from entering a computer. |
| 3. DDoS | <input type="checkbox"/> | c. It uses a single key both to encrypt and decrypt the data. |
| 4. Firewall | <input type="checkbox"/> | d. A firewall technique that examines the data packets travelling to and from the system. |
| 5. Antivirus software | <input type="checkbox"/> | e. One of the objectives of encryption according to which the information can be understood only by the recipient. |
| 6. Packet filtering | <input type="checkbox"/> | f. A type of text which is not understandable by humans. |
| 7. Encryption text | <input type="checkbox"/> | g. One of the objectives of encryption that guarantees that the received data has not been manipulated or altered. |
| 8. Symmetric encryption | <input type="checkbox"/> | h. Any intrusive software created to damage computers or mobile devices. |
| 9. Confidentiality | <input type="checkbox"/> | i. A program designed to detect and remove malware. |
| 10. Integrity | <input type="checkbox"/> | j. A common type of network threat. |

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MULTIPLE CHOICE

3. Choose the correct option.

- What is adware?
 - A type of malware that replicates itself by modifying computer programs.
 - Unwanted software created to make pop-ups appear on the screen to slow the system.
 - A type of malware that spreads across systems without any action from the user.
 - A type of malware that secretly keeps track of the computer user's activities.
- Which of the following characteristics does not refer to worm malware?
 - It spies on a user's activity to steal personal information.
 - It is self-replicating.
 - It is similar to viruses.
 - It does not need a user's action to spread and infect the computer.
- A network threat is passive when...
 - hackers gain access to a network without making any change to the data.
 - hackers modify and encrypt data.
 - hackers flood the system with millions of superfluous requests.
 - hackers decrypt the public encryption key.
- Which of the following protections may be included in antivirus software programs?
 - Symmetric encryption.
 - Complex passwords.
 - A private encryption key.
 - Spyware.
- Which of the following method is not an authentication method?
 - Fingertips.
 - Temporary codes.
 - Integrity.
 - Complex passwords.

6. Which of the following is a characteristic of a network-based firewall?
 - a. It is usually software.
 - b. It is hardware.
 - c. It can be customised.
 - d. None of the above.

7. What is the function of an application gateway?
 - a. It tracks information about the state of the network connections.
 - b. It determines which data packets can be allowed to be forwarded.
 - c. It makes a computer invisible to the Internet by acting as a proxy.
 - d. It presents one public Internet protocol (IP) address to the Internet.

8. What is a ciphertext?
 - a. A human-readable text.
 - b. A binary code.
 - c. A programming language.
 - d. An encrypted text.

9. Asymmetric encryption uses...
 - a. both a private and a public key.
 - b. only a private key.
 - c. only a public key.
 - d. no key.

10. What does the non-repudiation objective refer to?
 - a. The sender and the receiver can confirm each other's identity.
 - b. The sender and the receiver can confirm the origin of the information.
 - c. The integrity of the information is validated as having originated from an entity with the private key.
 - d. The information can be understood only by the intended recipient.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. A computer threat can be only intentional. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Distributed Denial of Service is malware that makes an online service or network unavailable to its users on the Internet. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Regular updates of the browser can eliminate software flaws that allow hackers to steal information. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. A hardware firewall protects one single computer. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. In an encryption sequence, the data that must be encrypted is in the form of ciphertext. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

2. Match each term to the correct description.

- | | | |
|--------------------------|--------------------------|--|
| 1. Virus | <input type="checkbox"/> | a. It uses different keys to encrypt and decrypt data. |
| 2. Spyware | <input type="checkbox"/> | b. It prevents and detects spyware installations and removes programs if already installed. |
| 3. Network threat | <input type="checkbox"/> | c. Software installed on the computer that protects the device and can be customised to allow the user to control its functions. |
| 4. Antispyware software | <input type="checkbox"/> | d. One of the objectives of encryption according to which the sender and the receiver can confirm each other's identity. |
| 5. Phishing attack | <input type="checkbox"/> | e. A type of malware that attaches to another program and replicates itself by modifying computer programs. |
| 6. Host-based firewall | <input type="checkbox"/> | f. A string of characters that encrypts data. |
| 7. Stateful inspection | <input type="checkbox"/> | g. Practice of sending e-mails that seem genuine to induce people to reveal personal information. |
| 8. Encryption key | <input type="checkbox"/> | h. Malware aimed at gaining unauthorised access to a network to perform other malicious activities. |
| 9. Asymmetric encryption | <input type="checkbox"/> | i. A technique used by a firewall that determines which data packets can be allowed to be forwarded. |
| 10. Authentication | <input type="checkbox"/> | j. A type of malware that keeps track of the user's activities without permission. |

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MULTIPLE CHOICE

3. Choose the correct option.

- What is a Trojan?
 - A type of malware that allows hackers to get unauthorised access to steal information or install other malware.
 - A software program that makes continuous pop-ups appear on the screen to slow the system.
 - A type of malware that secretly keeps track of the computer user's activities.
 - A type of malware that spreads across systems without any action from the user.
- Which of the following characteristics refers to ransomware?
 - It locks the user out of the device and forces them to pay to regain access.
 - It is similar to viruses.
 - It is self-replicating.
 - It needs a user's action to spread and infect the computer.
- A network threat is active when...
 - hackers gain access to a network without making any change to the data.
 - hackers flood the system with millions of superfluous requests.
 - hackers modify and encrypt data.
 - hackers decrypt the private encryption key.
- What is DDoS?
 - A type of firewall.
 - A type of network threat.
 - A type of antivirus software.
 - A type of complex authentication.

5. Which of the following is an authentication method?
 - a. Public key sharing.
 - b. Temporary codes on mobile device.
 - c. Integrity.
 - d. Private key sharing.

6. Which of the following is not a basic function of antivirus software?
 - a. It scans directories or files to detect malicious software.
 - b. It enables users to schedule scans so they can run automatically.
 - c. It allows users to start new scans at any time.
 - d. It examines the data packets travelling to and from the system.

7. What is the function of network address translation?
 - a. It determines which data packets can be allowed to be forwarded.
 - b. It tracks information about the state of the network connections.
 - c. It presents one public Internet protocol (IP) address to the Internet to hide a computer or network.
 - d. It makes a computer invisible to the Internet by acting as a proxy.

8. What is an encrypted text?

a. A human-readable text.	c. A ciphertext.
b. A programming language.	d. A plaintext.

9. Symmetric encryption uses...

a. a single key.	c. no key.
b. both a private and a public key.	d. None of the above.

10. What does the integrity objective refer to?
 - a. The sender and the receiver can confirm each other's identity.
 - b. The sender and the receiver can confirm the origin of the information.
 - c. The data has been originated from an entity with the private key.
 - d. The received data has not been manipulated or altered.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | | T | F |
|--|---|---|---|
| 1. A computer threat can also come from natural disasters. | □ | □ | |
| 2. Adware is a type of self-replicating malware. | □ | □ | |
| 3. Spyware protection is normally included in antivirus software programs. | □ | □ | |
| 4. An application-level gateway tracks information about the state of the network connections. | □ | □ | |
| 5. Symmetric encryption is considered more secure than asymmetric encryption. | □ | □ | |

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Name

Class Date



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

Smart Cleaning

As the world is moving fast towards new technology and devices to make life easier, a lot of people have adopted a number of ways to transform their homes and make them smarter. Examples of smart appliances are robot vacuum cleaners, which go around the house and pick up all the dust, dirt, debris and pet hair. They are equipped with a set of sensors that make the robot able to go autonomously across the floor of a house, detect the presence of obstacles and dirty spots on the floor and clean them, thanks to wheels that make them turn 360° in place.

Some smart vacuum cleaners are also equipped with lids opening up automatically, so that users do not have to touch them to open them when throwing away the litter; others can follow the directions on a map displayed through a smartphone app. The most sophisticated models have a camera, which works together with onboard maps, positioning system and navigation software, to cover all floor area, move from one room to another, and find recharging bases.

Adapted from: <https://en.wikipedia.org/wiki/Roomba>

Glossary:

debris: *polvere, detriti*

lid: *coperchio*

onboard: *a bordo, interno*

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Technology is developing very rapidly in the modern world. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Life at home is not affected by technological development at all. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Self-guided vacuum cleaners are examples of smart appliances. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. To vacuum the floor, the robot has to be guided by a person. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. This type of robot is not able to understand where an obstacle is. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. A robot vacuum cleaner can make a complete turn on its wheels. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. This robot is able to sense where dirt is. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. All robot vacuum cleaners have the same equipment. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Robot vacuum cleaners can only clean one room at a time. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Some of the robots can detect where their recharging station is. | <input type="checkbox"/> | <input type="checkbox"/> |

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**MULTIPLE CHOICE****2. Choose the correct option.**

1. Which statement about automated machines is false?
 - a. They can regulate themselves and detect errors.
 - b. They are programmed to perform certain tasks.
 - c. They need no human intervention at all.
 - d. They can be re-programmed for a different task.
2. An automation process...
 - a. continues in a cycle until it is stopped.
 - b. is totally different from one system to another.
 - c. is not programmed in advance.
 - d. does not have any advantages.
3. A possible disadvantage of automation is...
 - a. the possibility of producing things faster.
 - b. the reduction of errors in production.
 - c. the reduction of staff, which brings unemployment.
 - d. the possibility of mass-production, which reduces costs.
4. The brain of an automated system is called...
 - a. Programmable Logic Gate.
 - b. Programmable Logic Controller.
 - c. Program Ladder Control.
 - d. Program Logic Controller.
5. The most commonly used PLC program is called...
 - a. PLC Diagram.
 - b. Rung Logic.
 - c. Structured Text.
 - d. Ladder Logic.
6. An advantage of automation is...
 - a. big installation costs.
 - b. low flexibility.
 - c. a reduced risk of accidents.
 - d. loss of contact among human workers.
7. In factories, painting is usually done by...
 - a. industrial robots.
 - b. conveyor belts.
 - c. conveyor systems.
 - d. CNC machines.
8. A self-guided vehicle used in military operations is called...
 - a. an automated pilot.
 - b. a security robot.
 - c. a drone.
 - d. an automated weapon.
9. The essential component in smart heating is...
 - a. an electronic boiler.
 - b. a smart thermostat.
 - c. LED bulbs.
 - d. heat pumps.
10. The Internet of Things...
 - a. is only used in industries.
 - b. does not apply to the field of medical care.
 - c. requires maintenance and a lot of human work.
 - d. increases the efficiency of appliances and devices.



SENTENCE COMPLETION

3. Complete the sentences with the correct given word. There are two words you do not need to use.

automation • rapidity • welding • input • sensor • domotics • robots • memory unit • goods • feedback • program • surgical

1. is the use of self-regulating machines to do different jobs.
2. Every process performed by an automated machine starts with an
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3. Automated systems monitor themselves through a loop.
4. The second step in the work of a PLC is the scan.
5. In a PLC, a stores data and programmes.
6. Automation allows a greater in the production of goods.
7. Industrial robots are often used for and assembling.
8. robots help doctors in operating rooms.
9. An advantage of automation is the production of in great quantities.
10. is the use of automation in homes.

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MULTIPLE MATCHING

4. Match the beginnings and endings.

- | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------------------------|---|--------------------------|--|--------------------------|--|--------------------------|-----------------------------|--------------------------|------------------------------------|--------------------------|---|--------------------------|---|--------------------------|--|--------------------------|--|--------------------------|--|
| <ol style="list-style-type: none"> 1. Automation makes it possible... 2. In an automated process... 3. The risk of accidents in industries... 4. A smart home can provide... 5. Drones and guided missiles... 6. Thanks to domotics... 7. Smart light bulbs are usually... 8. Exoskeletons help people to... 9. Automated lighting and heating systems... 10. Smart TVs are connected to the Internet... | <table border="0"> <tr><td><input type="checkbox"/></td><td>a. has been reduced by automation.</td></tr> <tr><td><input type="checkbox"/></td><td>b. to increase the production of goods.</td></tr> <tr><td><input type="checkbox"/></td><td>c. are military applications of automation.</td></tr> <tr><td><input type="checkbox"/></td><td>d. LED or CFL types.</td></tr> <tr><td><input type="checkbox"/></td><td>e. increase their mobility.</td></tr> <tr><td><input type="checkbox"/></td><td>f. elderly people can be constantly monitored.</td></tr> <tr><td><input type="checkbox"/></td><td>g. more security to the residents.</td></tr> <tr><td><input type="checkbox"/></td><td>h. can learn the residents' habits.</td></tr> <tr><td><input type="checkbox"/></td><td>i. to access contents through apps.</td></tr> <tr><td><input type="checkbox"/></td><td>j. a switch or a sensor provides the necessary input.</td></tr> </table> | <input type="checkbox"/> | a. has been reduced by automation. | <input type="checkbox"/> | b. to increase the production of goods. | <input type="checkbox"/> | c. are military applications of automation. | <input type="checkbox"/> | d. LED or CFL types. | <input type="checkbox"/> | e. increase their mobility. | <input type="checkbox"/> | f. elderly people can be constantly monitored. | <input type="checkbox"/> | g. more security to the residents. | <input type="checkbox"/> | h. can learn the residents' habits. | <input type="checkbox"/> | i. to access contents through apps. | <input type="checkbox"/> | j. a switch or a sensor provides the necessary input. |
| <input type="checkbox"/> | a. has been reduced by automation. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | b. to increase the production of goods. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | c. are military applications of automation. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | d. LED or CFL types. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | e. increase their mobility. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | f. elderly people can be constantly monitored. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | g. more security to the residents. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | h. can learn the residents' habits. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | i. to access contents through apps. | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | j. a switch or a sensor provides the necessary input. | | | | | | | | | | | | | | | | | | | | |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. Briefly write about the self-regulation of automated systems.
- 2. In what fields of activity is automation mainly employed? Give examples.
- 3. What is the function of a PLC?
- 4. What is the housekeeping mode?
- 5. What is the function of cameras and motion sensors in a smart home?

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Total score/50

Name

Class Date



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

A Smart Home in a Smart World

In the world we are living in, there is a smart version of almost every device. Generally, these products connect to the Internet, so people can control them from their phone through their corresponding apps. Some smart devices also work with various forms of voice control. Many smart-home device apps support scheduling, so you can program home devices to perform certain actions at certain times without physically being in contact with it. It is possible to reduce energy use, establish the optimal indoor climate, and check the weather as you leave the house in the morning with a simple voice command or smartphone tap.

Devices and gadgets like those described can frequently be interconnected. For example, a smart doorbell can send warnings to smart displays, or smart locks can be remotely activated in response to suspicious activity detected by a security camera nearby. In addition to that, smart plugs, thermostats, and lights can work together to reduce energy costs in the house.

Adapted from: <https://edenheights.com.gh/10-ways-to-turn-your-home-into-a-smart-home/>

Glossary:

nearby: nelle vicinanze

- | | T | F |
|--|--------------------------|--------------------------|
| 1. It is possible to have both a smart and a non-smart version of all the things we use. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Smart devices cannot be controlled if people are away from home. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. It is possible to set smart devices to do certain things at the time chosen. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Smart devices are responsible for high energy consumption. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. With smart devices, houses are always cold when people come back in the evening. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Smart devices can be commanded simply by talking. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. It is not possible to link one device to the other. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. A smart doorbell can detect if something is wrong and send signals. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Smart locks can only be manually commanded in case of danger. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Smart gadgets can help people save money. | <input type="checkbox"/> | <input type="checkbox"/> |

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**MULTIPLE CHOICE****2. Choose the correct option.**

1. Which statement about automation is false?
 - a. It applies to a lot of different types of activities.
 - b. It has many advantages and some disadvantages.
 - c. It allows the production of more goods in less time.
 - d. It makes the price of goods increase.
2. In an automation process...
 - a. the input is given by a sensor or a switch.
 - b. the input is given by a motor or another device.
 - c. the output is given by a sensor or a switch.
 - d. human intervention is fundamental.
3. Automated machines in industry...
 - a. increase the number of staff needed.
 - b. reduce the risk of accidents.
 - c. make production more difficult.
 - d. increase waste or scrap.
4. Which of the following is an application of domotics?
 - a. Traffic lights connected to sensors.
 - b. Smart garage door openers.
 - c. Welding robots.
 - d. Ladder diagrams.
5. Which of the following automated machines are used in the military field?
 - a. CPOE.
 - b. CNC machines.
 - c. Drones.
 - d. Conveyor systems.
6. A disadvantage of domotics is that...
 - a. it allows homeowners to monitor their houses.
 - b. elderly people are kept under surveillance.
 - c. some people may find it too complicated.
 - d. air conditioning can be turned on remotely.
7. The essential elements of all automated lighting systems are...
 - a. voice command devices.
 - b. smart light bulbs.
 - c. mobile phones.
 - d. solar panels.
8. Exoskeletons are applications of automation in...
 - a. industry.
 - b. the Internet of Things.
 - c. the field of security.
 - d. the medical field.

9. What do automated lighting and heating systems have in common?
 - a. They can be remotely controlled.
 - b. They need a thermostat.
 - c. They need CFL bulbs.
 - d. They cannot be programmed.
10. Which of the following are used for assembling components?
 - a. Conveyor belts.
 - b. Surgical robots.
 - c. Pet feeders.
 - d. Industrial robots.

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SENTENCE COMPLETION

3. Complete the sentences with the correct given word. There are two words you do not need to use.

computer • homeowners • quality • Internet • dim • mechanisation • steps • industrial • tasks • PLC • cycle • human

1. The automation process is developed in a series of
2. is simply the substitution of human work with machines.
3. An automated machine is programmed to perform certain
4. The automation process continues as a until it is stopped.
5. The runs the program that makes the machine works.
6. Automation allows for the control of the of produced goods.
7. Loss of contact is one of the disadvantages of automation.
8. Domotics allows to improve safety in the house.
9. robots consist of an arm connected to a base.
10. Automated lighting systems make it possible to lights.

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SENTENCE MATCHING

4. Match the beginning and endings.

- | | | |
|---|--------------------------|---|
| 1. Automated machines... | <input type="checkbox"/> | a. the high initial costs must be considered. |
| 2. Automation processes are similar... | <input type="checkbox"/> | b. can be reprogrammed for different tasks. |
| 3. Unemployment is one of the... | <input type="checkbox"/> | c. transport goods faster. |
| 4. The brain of an automated system... | <input type="checkbox"/> | d. even in different systems. |
| 5. Ladder Logic is... | <input type="checkbox"/> | e. to adjust its operations. |
| 6. When installing an automated system, ... | <input type="checkbox"/> | f. risks of automation. |
| 7. Conveyor belts help... | <input type="checkbox"/> | g. are connected to timers. |
| 8. A feedback loop allows a machine... | <input type="checkbox"/> | h. is called Programmable Logic Controller. |
| 9. Automatic pet feeders and irrigators... | <input type="checkbox"/> | i. can be increased by the IoT. |
| 10. The efficiency of a business... | <input type="checkbox"/> | j. the most common programme for PLCs. |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What are the advantages of automation?
- 2. What does the input section of a PLC consist of?
- 3. Write everything you know about industrial robots.
- 4. Briefly explain what Ladder Logic is.
- 5. How do smart refrigerators work?

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Total score/50



READING COMPREHENSION

1. Read the text and answer the questions.

The Use of Robots in the Car Industry

The use of robots in automotive manufacturing processes enables a very high degree of repeatability and precision, resulting in process optimisation and increased productivity. This is how the increasingly high industry standards demanded by manufacturers are met.

Within this specific field, robots are widely used for painting, in fact they provide consistent painting performance that no human worker can match. Furthermore, automotive paint is toxic, which poses a major risk to human workers. Welding is another dangerous and time-consuming task which is carried out perfectly by robots.

Operational changes are no longer a problem when robots are used within the production chain: this technology can be quickly reprogrammed and arranged for multiple uses, avoiding loss of valuable time. The flexibility of robots is therefore an advantage that is particularly considered and appreciated by automobile manufacturers.

The introduction of robots into production systems enables optimisation and thus reduces processing cycle time, ensuring accurate and safe results. These aspects make it possible to maintain a high level of quality, positioning those who incorporate them at a higher degree of efficiency than less technologically advanced competitors.

Adapted from: <https://www.roboticstomorrow.com/article/2023/03/robots-in-automotive-industry>

- 1. Why is the use of robots in the automotive industry important?
- 2. Why are robots used for painting in the automotive industry?
- 3. Why are robots used in welding?
- 4. Why is flexibility an important feature of robots?
- 5. How does the use of robots in car industry affect production time?

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MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|-----------------------|--------------------------|--|
| 1. Robot | <input type="checkbox"/> | a. The part of a robotic arm that manipulates objects. |
| 2. Telepresence robot | <input type="checkbox"/> | b. Robots mounted onto an overhead system usually used for outdoor and lifting applications. |
| 3. Swarm robots | <input type="checkbox"/> | c. Robots that usually have three rotary joints which are arranged in a chain. |
| 4. End-effector | <input type="checkbox"/> | d. An automated machine that can carry out tasks with high precision and speed. |
| 5. Sensors | <input type="checkbox"/> | e. Robots that can reach out to a significant distance thanks to their telescopic axis. |
| 6. Gantry robots | <input type="checkbox"/> | f. Robots that can provide remote surveillance with facial recognition. |
| 7. Articulated robots | <input type="checkbox"/> | g. Robots that are primarily designed to support people in their everyday life. |
| 8. Spherical robots | <input type="checkbox"/> | h. A machine that simulates the experience of being physically present at a location. |
| 9. Service robots | <input type="checkbox"/> | i. The components of robots that receive feedback and signals that enable appropriate movements. |
| 10. Security robots | <input type="checkbox"/> | j. Robots that work in fleets. |

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MULTIPLE CHOICE

3. Choose the correct option.

1. Which of the following best describes android robots?
 - a. They are used to eliminate manual, dangerous, or repetitive tasks from day-to-day workflows.
 - b. They are used in areas such as personal assistance, entertainment and education.
 - c. They are used in industry to optimise process performance.
 - d. None of the above.
2. Which of the following features refers to cobots?
 - a. They work alongside with humans.
 - b. They resemble human aspect.
 - c. They work via telemetry sent over radio, wires or optical fibre.
 - d. They are similar to insect colonies.
3. What is a controller?
 - a. The brain of a robotic arm.
 - b. The hand of a robotic arm.
 - c. The engine of a robotic arm.
 - d. The degree of freedom of a robotic arm.
4. Which of the following components is not included in the control system?
 - a. The sensors.
 - b. The end-effector.
 - c. The controller.
 - d. The drive.

5. Why are industrial robots usually stationary?
 - a. Because they have up to six degrees of freedom.
 - b. Because they can reach significant distances.
 - c. Because they are bolted to a surface.
 - d. Because they have flexible joints.
6. Which of the following is a feature of SCARA robots?
 - a. They have great freedom of movement.
 - b. They can move across a horizontal plane.
 - c. They are suitable for pick and place tasks.
 - d. They can perform cylindrical-shaped work.
7. Which type of robot is usually used for welding operations?
 - a. Gantry.
 - b. Spherical.
 - c. Articulated.
 - d. SCARA.
8. Which of the following industrial applications are SCARA robots usually used for?
 - a. Spray painting.
 - b. Handling materials.
 - c. Laser cutting.
 - d. Assembly.
9. What can domestic robots be used for?
 - a. Valet parking.
 - b. Operating kitchen appliances.
 - c. Facial recognition.
 - d. Surgery.
10. Which of the following is a feature of medical robots?
 - a. They can endure harsh conditions.
 - b. They can be used as robotic concierges.
 - c. They are designed to monitor the activities of young children.
 - d. They are controlled through a telemanipulator.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Robotics deals with robot design, engineering and operations. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. A point-to-point path is the system generally used in tasks such as loading and unloading. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The drive of the computer consists of joints that let the arm move upon control. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. DOF refers to the number of parts a robot is composed of. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Articulated robots are usually used in laser cutting operations. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What are smart robots?
- 2. Why can we say that industrial robots resemble the structure of the human body?
- 3. What is a continuous path?
- 4. What is an industrial robot?
- 5. What are military robots mainly used for?

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Total score/50

Name

Class Date



READING COMPREHENSION

1. Read the text and answer the questions.

Microbots in Healthcare

Medical robots are making the healing process faster, safer, and smarter, both for caretakers and patients. For nurses and healthcare teams, medical robots alleviate stress. For patients, robots offer companionship, mobility, and personalised care. Looking further into the future, robots may one day be able to significantly reduce recovery times from procedures like surgeries.

Scientists have been developing “microbots” for several years now; these are microscopic robots small enough to travel through the human body performing repairs. Rather than cutting open a patient to perform surgery, microbots would do it from the inside: since these robots can be as small as a single human cell, they are much less likely to cause tissue damage and other issues than conventional surgery methods. Scientists believe microbots may even be able to replace some pharmaceuticals, as well.

Creating robots this small that can also be controlled with precision is extremely difficult especially because they will have to operate into extremely tiny spaces such as veins.

Researchers from all over the world are testing countless approaches to the technology. So, it may be some time before microbots become an everyday tool in medicine.

Adapted from: <https://www.roboticstomorrow.com/story/2022/03/how-robots-are-redefining-health-care>

1. Why are robots useful in healthcare?
2. How can robots help patients?
3. What are microbots?
4. Why will microbots be useful in healthcare?
5. Why is the creation of microbots so difficult?

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MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|------------------------------|--------------------------|--|
| 1. Humanoid robot | <input type="checkbox"/> | a. The CPU that controls the movements of the arm. |
| 2. Cobots | <input type="checkbox"/> | b. A robot that resembles human aspect and behaviour. |
| 3. Robotic arm | <input type="checkbox"/> | c. The engine of the arm that moves the segments between the joints into their designed position. |
| 4. Controller | <input type="checkbox"/> | d. A type of robot used in those situations that may be too dangerous for humans. |
| 5. Control system | <input type="checkbox"/> | e. A robot with four DOF suitable for fast and repetitive pick and place tasks. |
| 6. Drive | <input type="checkbox"/> | f. It includes the controller, the end effector and the sensors and gives the robot a logical sequence to achieve the results. |
| 7. SCARA robot | <input type="checkbox"/> | g. The mechanical unit of a robot that performs tasks repeatedly based upon predetermined movements. |
| 8. Cylindrical robot | <input type="checkbox"/> | h. A robot designed to manage tasks around the house such as cleaning. |
| 9. Domestic robot | <input type="checkbox"/> | i. A robot with a primary arm that moves up and down and its axes form a cylindrical coordinate system. |
| 10. Emergency-response robot | <input type="checkbox"/> | j. Robots that are designed to function alongside or directly with humans. |

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MULTIPLE CHOICE

3. Choose the correct option.

- Which of the following statements best describes smart robots?
 - They are used in industry to optimise process performance.
 - They are used in areas such as personal assistance, entertainment and education.
 - They have a built-in Artificial Intelligence system.
 - They are used to eliminate manual, dangerous, or repetitive tasks from day-to-day workflows.
- Which of the following features refers to swarm robots?
 - They resemble human aspect.
 - They are similar to insect colonies.
 - They work alongside with humans.
 - None of the above.
- What is an end effector?
 - The engine of a robotic arm.
 - The hand of a robotic arm.
 - The brain of a robotic arm.
 - The base of a robotic arm.
- What is the function of sensors?
 - They receive feedback and signals that allow the robot to move properly.
 - They manipulate the objects.
 - They move the segments through electric, hydraulic or pneumatic systems.
 - They establish the DOF.

5. Which of the following statements does not refer to industrial robots?
 - a. They can carry out very high-skilled tasks.
 - b. They can operate at any stage of production.
 - c. They can work faster than humans.
 - d. They cannot replace human in dangerous work.
6. Which of the following is a feature of articulated robots?
 - a. They can move across a horizontal plane.
 - b. They have three rotary joints arranged in a chain.
 - c. They can perform a cylindrical-shaped work.
 - d. They are suitable for pick and place tasks.
7. Which type of robot is usually used for assembly operations?
 - a. Gantry.
 - b. Spherical.
 - c. Cylindrical.
 - d. SCARA.
8. Which of the following industrial applications are Gantry robots usually used for?
 - a. Handling material.
 - b. Spray painting.
 - c. Assembly.
 - d. Laser cutting.
9. What can service robots be used for?
 - a. Rehabilitation.
 - b. Facial recognition.
 - c. Surgery.
 - d. Operating kitchen appliances.
10. Which of the following is a feature of security robots?
 - a. They are designed to monitor the activities of young children.
 - b. They can endure harsh conditions.
 - c. They can provide remote surveillance.
 - d. They are controlled through a telemanipulator.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Industrial robots combine remote monitoring and control via telemetry. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. A point-to-point path is the path a robot takes between the point in which it picks up the object and the point in which it releases it. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The DOF is generally used to define the motion capabilities of a robot. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Gantry robots usually have a telescopic axis. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Spherical robots are used both in arc and spot welding. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What is a robot?
- 2. What is a robotic arm?
- 3. Why are industrial robots used in spray painting?
- 4. What are the main benefits of the application of robots in industries?
- 5. What are medical robots used for?

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Total score/50



MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|------------------------------------|--------------------------|--|
| 1. Smart factory | <input type="checkbox"/> | a. A type of AI designed to perform singular tasks such as face recognition. |
| 2. Non-immersive VR | <input type="checkbox"/> | b. A digitalised and fully integrated manufacturing system. |
| 3. Fully-immersive VR | <input type="checkbox"/> | c. An object is fully or partially overlaid by a virtual element. |
| 4. Superimposition-based AR | <input type="checkbox"/> | d. A type of drone that can hover, take off, and land vertically. |
| 5. Laser | <input type="checkbox"/> | e. A type of drone with more than one rotor. |
| 6. Multirotor drone | <input type="checkbox"/> | f. A branch of computer science whose purpose is the simulation of human intelligence processes by machines. |
| 7. Hybrid VTOL | <input type="checkbox"/> | g. A type of VR in which the user feels to be physically present in the virtual environment. |
| 8. Thermoplastics | <input type="checkbox"/> | h. Material used in 3D printing. |
| 9. AI | <input type="checkbox"/> | i. A device that generates high-intensity light in the form of a narrow beam of radiation. |
| 10. Artificial Narrow Intelligence | <input type="checkbox"/> | j. A type of VR in which it is the character that directly interacts with the virtual world, not the user. |

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MULTIPLE CHOICE

3. Choose the correct option.

- In Industry 4.0, what do horizontal and vertical system integrations refer to?
 - The use of autonomous robots for the manufacturing process.
 - The interconnection of the entire organisation as well as the interconnection among companies.
 - The new, sophisticated methods of cybersecurity.
 - The use of augmented reality.
- Which of the following components of Industry 4.0 can be used to produce small batches of customised products?
 - Robots.
 - Artificial Intelligence.
 - 3D printing.
 - 3D simulation.
- What is “just-in-time manufacturing”?
 - A very quick manufacturing process in which goods are produced in advance.
 - A production model in which items are created specifically to meet demand.
 - A type of production model in which goods are kept in the warehouse at low cost.
 - None of the above.
- Which of the following definitions best describes CIM?
 - The use of computer-controlled machineries and automation systems during production processes.
 - A manufacturing process used to digitally create 2D drawings or 3D models of products.
 - The Fourth Industrial Revolution.
 - A type of Artificial Intelligence.

5. Which of the following features does not refer to virtual reality?
 - a. A simulated 3D environment.
 - b. It enables users to interact with a virtual surrounding.
 - c. Users may need to wear special devices to interact with the virtual environment.
 - d. It integrates digital information in a real environment.

6. Which of the following statements can be referred to semi-immersive VR?
 - a. It is normally used for virtual tours.
 - b. It is the most realistic virtual experience.
 - c. The user can control characters or activities within the virtual experience.
 - d. It generally uses a QR code.

7. What type of augmented reality displays digital content onto a flat two-dimensional surface?
 - a. Marker-based AR.
 - b. Location-based AR.
 - c. Superimposition-based AR.
 - d. Projection-based AR.

8. Which of the following laser properties refers to the fact that a laser beam contains a single wavelength?
 - a. High-intensity.
 - b. Directionality.
 - c. Monochromatism.
 - d. Coherence.

9. Which of the following features refers to single-rotor drones?
 - a. They are the easiest to use and the cheapest.
 - b. They are very similar to helicopters.
 - c. They have one rigid wing like an airplane.
 - d. The rotors are attached to the fixed wings.

10. Why hasn't Artificial General Intelligence been completely achieved yet?
 - a. Because it involves emotions.
 - b. Because it has to carry out more than one task.
 - c. Because all cognitive abilities must be programmed.
 - d. None of the above.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

- | | T | F |
|---|--------------------------|--------------------------|
| 1. In Industry 4.0, the IoT helps to centralise processes. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. In CIM, robots are involved in assembly tasks. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Marker-based AR relies on a QR code to start the interactive experience. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. A laser is created when the protons in the atoms of optical materials absorb the energy from an electrical current or light. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Fixed-wing drones, also called Black Hornets, are used by the British armed forces. | <input type="checkbox"/> | <input type="checkbox"/> |

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. In Industry 4.0, what does the cybersecurity pillar refer to?
- 2. Give two major advantages of CIM.
- 3. What is location-based AR?
- 4. What is Li-Fi?
- 5. What is a drone?

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Total score/50



MULTIPLE MATCHING

2. Match each term with the correct definition.

- | | | |
|-----------------------------------|--------------------------|--|
| 1. Industry 4.0 | <input type="checkbox"/> | a. A type of AR in which a physical item is fully or partially replaced by overlaying digital content onto the object. |
| 2. CIM | <input type="checkbox"/> | b. A type of AR that relies on a QR code or visual marker. |
| 3. Semi-immersive VR | <input type="checkbox"/> | c. A type of drone with one big spinning wing, and a tail rotor to control direction and stability. |
| 4. Marker-based AR | <input type="checkbox"/> | d. The use of computer-controlled machineries and automation systems during production processes. |
| 5. Superimposition-based AR | <input type="checkbox"/> | e. A process achieved by adding successive layers of material to create a final product. |
| 6. Li-Fi | <input type="checkbox"/> | f. A type of drone with one rigid wing that is designed to work like an airplane. |
| 7. Single-rotor drone | <input type="checkbox"/> | g. Production systems characterised by increasing automation and smart factories. |
| 8. Fixed-wing drone | <input type="checkbox"/> | h. High speed bidirectional network and mobile communication of data that uses light. |
| 9. Additive manufacturing | <input type="checkbox"/> | i. A robot that is still a concept because it involves emotions and a higher degree of intelligence. |
| 10. Artificial super intelligence | <input type="checkbox"/> | j. A type of VR in which users can move around in a virtual environment to have only a visual experience. |

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MULTIPLE CHOICE

3. Choose the correct option.

- In Industry 4.0, what does simulation refer to?
 - The use of cybersecurity methods to prevent hacker attacks.
 - The representation of how the manufacturing and the final product will be.
 - The interconnection of the entire organisation.
 - The use of additive manufacturing.
- Which of the following components of Industry 4.0 provides operators with the real-time information they need to improve the work process?
 - Artificial Intelligence.
 - Robots.
 - 3D printing.
 - Augmented reality.
- What does “shot-run responsiveness” refer to?
 - Machine downtime.
 - Late material delivery.
 - Reduced timing of intervention.
 - The last step of the manufacturing process.
- Which of the following statements refers to virtual reality?
 - A simulated 3D environment that enables users to interact with virtual surroundings.
 - A process that digitally creates 2D drawings or 3D models of products.
 - The integration of digital information with a real environment.
 - None of the above.

5. Which of the following features refers to fully-immersive virtual reality?
 - a. A type of VR in which the user can control some characters or activities within the experience.
 - b. Body detectors equipped with sense detectors are required to provide the virtual experience.
 - c. It gives the user a virtual visual experience but no other physical sensations.
 - d. It overlays digital elements on physical objects.

6. What type of augmented reality relies on geographic data to deliver digital images?
 - a. Projection-based AR.
 - b. Location-based AR.
 - c. Marker-based AR.
 - d. Superimposition-based AR.

7. Which of the following statements about Li-Fi is not true?
 - a. A stream of light is emitted when electrical current is applied to a LED light bulb.
 - b. It consists of multiple light bulbs that form a wireless network.
 - c. LED bulbs are semiconductor devices.
 - d. The intensity of modulation is not continuous.

8. Which of the following features refers to multirotor drones?
 - a. They have one rigid wing like an airplane.
 - b. They are very similar to helicopters.
 - c. They are the easiest to use and the cheapest.
 - d. The rotors are attached to the fixed wings.

9. What type of drone is mainly used in drone delivery?
 - a. Hybrid VTOLs.
 - b. Multirotor drones.
 - c. Single-rotor drones.
 - d. Fixed wing drones.

10. Which of the following is a feature of ANI?
 - a. It is capable of learning and applying its knowledge to solve any problem.
 - b. It is designed to perform singular tasks.
 - c. It is capable of thinking, understanding, and acting in a way that is identical to humans.
 - d. It can have emotions.

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TRUE/FALSE

4. Say if the sentences are true or false, and correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. In Industry 4.0, cloud computing provides the infrastructure for storing, processing, and analysing the huge amount of data generated by IoT. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The computer-integrated manufacturing system increases machine use even if it cannot reduce downtime. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Directionality refers to the property of laser to emit light focused in a particular direction. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Li-Fi is safe for human health because it cannot penetrate walls. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. In 3D printing, powdered materials are extruded through a process called Fused Filament Fabrication. | <input type="checkbox"/> | <input type="checkbox"/> |

Name

Class Date



READING COMPREHENSION

1. Read the text and complete the sentences with no more than four words.

Career Profiles: Electronics Technicians

An Electronics Technician helps design, develop, test, manufacture, install, and repair electronic equipment such as communication equipment, medical monitoring devices, and computers. They may be employed in product evaluation and testing, using measuring and diagnostic tools to test and repair equipment. Electronics technicians may also work as sales workers for manufacturing companies, giving advice on the installation, operation, and maintenance of any equipment and may write specifications and technical manuals.

An Electronics Technician generally has a technical Institute 5-year diploma; together with the knowledge of electronics and electricity, they are also expected to have the essential soft skills generally required by companies.

A significant component of an electronics technician course of studies includes laboratory experimentation. Lab training is used to reinforce theoretical knowledge associated with the study of electronics. These laboratories are “hands-on” learning environments, where students can actually train on electronics devices, handling electronic equipment and components and developing school projects under the teachers’ supervision.

Adapted from: https://en.wikipedia.org/wiki/Electronics_technician

Glossary:

hands-on: *pratico*

sale: *vendita*

1. An electronics technician can repair
2. Communication equipment, computers and
are among the devices electronics technicians can deal with.
3. Electronics technicians know how to test and fix faulty equipment, using diagnostic and
4. Sometimes electronics technicians are employed as
for manufacturing companies.
5. Electronics technicians are qualified to give advice on
of various types of equipment.
6. Specifications and technical manuals are often
electronics technicians.
7. To become an electronics technician you must attend a technical institute for a period of
8. To be hired, companies require not only technical but also
9. An important part of technician education includes training
10. In a learning environment, students can do
practical work on electronic devices.



VOCABULARY

2. Write the English or Italian equivalent of the given words.

- | | | | |
|------------------|-------|---------------------|-------|
| 1. Advertisement | ..... | 6. Intestazione | ..... |
| 2. Applicant | ..... | 7. Pre-selezione | ..... |
| 3. Job fair | | 8. Istruzione | |
| 4. Leadership | | 9. Puntuale | |
| 5. Proficiency | | 10. Contatto visivo | |

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TRUE/FALSE

3. Read the sentences and decide if they are true or false. Correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Old job boards have been substituted by career websites. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. No company advertises jobs on its website. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Job fairs usually take place once a month. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Companies hire staff through agencies because it is easier and faster for them. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Hard skills are learned through work experience. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Critical thinking is an example of a hard skill. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A CV usually starts with a header. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Work experience on a CV should be listed starting from the most recent job. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A CV should be clearly written with information provided in sections. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. A cover letter should be written in paragraphs. | <input type="checkbox"/> | <input type="checkbox"/> |

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MULTIPLE MATCHING

4. Match the following words with the correct definition.

- | | | |
|-----------------------|--------------------------|---|
| 1. Contact details | <input type="checkbox"/> | a. The process of receiving instructions at school and university. |
| 2. Duty | <input type="checkbox"/> | b. A task which is part of a person's job. |
| 3. Employer | <input type="checkbox"/> | c. A business in charge of recruiting workers for other companies. |
| 4. Education | <input type="checkbox"/> | d. The information required to get in touch with a person. |
| 5. Job-related skills | <input type="checkbox"/> | e. Abilities which are learned through work. |
| 6. Panel | <input type="checkbox"/> | f. The degree of knowledge of something. |
| 7. Proficiency | <input type="checkbox"/> | g. A person who makes someone work for him/her. |
| 8. Recruiter | <input type="checkbox"/> | h. A type of job interview made by a group of people from the same company. |
| 9. Recruitment agency | <input type="checkbox"/> | i. The characteristic of a person who is difficult to trust. |
| 10. Unreliability | <input type="checkbox"/> | j. A person whose job is to select candidates for a position. |

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SHORT OPEN QUESTIONS

5. Answer the questions.

1. What is the function of a job search engine?
2. Write a short definition of soft skills giving at least three examples.
3. Briefly list the different sections of a cover letter.
4. What is a one-on-one interview?
5. What is the best way to dress for a job interview?

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Total score/50

Name

Class Date



READING COMPREHENSION

1. Read the text and complete the sentences with no more than four words.

Career Profiles: Information Systems Technicians

Information Systems Technicians operate and maintain information systems, facilitating their use. In many companies, these technicians assemble the data sets and other pieces of information needed to build databases. They also help maintain Internet and Intranet websites: they decide how information must be presented and create digital multimedia presentations using dedicated software.

Information systems technicians can install and maintain data networks and sets of telecommunications infrastructures; they are also responsible for the programming, configuration and functioning of different types of electronic equipment, hardware and software.

These technicians usually cooperate with their colleagues and company managers to maintain and ensure the continuous functioning of computers and communication systems and devices. They provide connectivity to the different departments in an organisation, modifying equipment and installing software when needed. Information system technicians, therefore, should be able to deal with computer networks covering both local and wider areas, personal computer systems, **mainframe computer** systems, dealing with big data quantity processing, and associated peripheral devices.

Additionally, information systems technicians can train staff for the company and provide technical support to users.

Adapted from: https://en.wikipedia.org/wiki/Information_systems_technician

Glossary:

mainframe computer: *elaboratore centrale*

1. Information Systems Technicians make it easier information systems.
2. Assembling data sets to is one of an information systems technician's duties.
3. The maintenance of is another task of information systems technicians.
4. Digital multimedia presentations are created by technicians using
5. Information systems technicians are required to but also configure different types of electronic equipment.
6. In a company, information systems technicians work to make sure that computers and work properly.
7. Technicians in a company collaborate with their

8. A technician must be able to deal with computer networks covering areas.
9. process big quantities of data.
10. Staff in a company can be trained by information systems technicians, who also
-/10



VOCABULARY

2. Write the English or Italian equivalent of the given words.

- | | | | |
|--------------------|-------|----------------------------------|-------|
| 1. Board | ..... | 6. Responsabile delle assunzioni | ..... |
| 2. Team work | ..... | 7. Mansione | ..... |
| 3. To hire | ..... | 8. Colloquio di gruppo | ..... |
| 4. Problem solving | | 9. Laureato | |
| 5. Driving licence | | 10. Agenzia di collocamento | |

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TRUE/FALSE

3. Read the sentences and decide if they are true or false. Correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. Nowadays, it is very common to find a job quickly and keep it forever. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Job search engines re-direct candidates to websites which post job ads. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Recruitment agencies select candidates for different companies. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Schools and universities cannot help students when they need to look for a job. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Soft skills are personal skills which are difficult to measure. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Soft skills can be demonstrated showing a portfolio of works. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A cover letter should list details of education and work experience. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. It is not necessary to give details about proficiency in foreign languages in a CV. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A cover e-mail does not need a header. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The name of a hiring manager is always kept secret by companies. | <input type="checkbox"/> | <input type="checkbox"/> |

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Name

Class Date



READING COMPREHENSION

1. Read the text and complete it with the correct phrase.

- a. are required by law
- b. in addition to the normal remuneration
- c. vary working hours during the day.
- d. responsibilities and duties,
- e. of the staff hired on a permanent basis.
- f. elastic clauses and flexible clauses
- g. declare their availability to work
- h. Fixed-term contracts
- i. regulate the main aspects
- j. Contracts must be written

Employment Contracts in Italy

Employment contracts **1.** for each member of staff employed. Employment contracts

2. of the working relationship between employer and employee including salary,

3. entitlement to pay when sick, holidays, and notice periods.

4. and specify the hours of work by day, week, month and year, the pay and other conditions, if necessary. Some clauses can be added to contracts; for example, in case of a part-time contract, **5.** allow an employer to increase working time or **6.**

“On call” job contracts establish that employees **7.** over a certain period, during which they can be called in, even for a few days, with only short-term notice. The individual contract may provide that the employee is obliged to work if called by the employer. In this case, **8.** paid for the working activity currently carried out, the employee may be paid an additional 20% of the salary. This contract must be written, too.

Companies can also hire employees on a fixed-term contract for arrangements limited by time.

9. can last up to 36 months, including any extension. However, the law states that the total number of fixed-term contracts among the total workforce in a company may not exceed the 20% **10.**

Fixed-term contracts cannot be used to replace workers on strike or to replace employees temporarily on leave in the previous last few months.

Adapted from: <https://www.italiancompanyformations.com/>

Glossary:

entitlement: *diritto*

notice: *preavviso*

on leave: *in congedo*

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VOCABULARY

2. Match each word with the correct definition.

commission · division · ethics · freelance · hierarchical · part-time · permanent · perk · salary · vocational

1. Not having an established end date.
2. Worker who maintains an occupational independence.
3. Related to a job with less than 35 hours work a week.
4. Based on a chain of command with leaders at its top.
5. Related to a job or profession.
6. A sector of a company dealing with different aspects of a business.
7. The amount of money regularly given to workers for their job.
8. Extra benefit given to a worker in different forms.
9. Reward for reaching a particular target.
10. A system of moral principles in a certain field of activity.

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false ones.

- | | T | F |
|--|--------------------------|--------------------------|
| 1. With an agency work contract, the employee is hired directly by the company he works for. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. An internship is generally done by students and graduates. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Stages are optional for vocational school students. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Lawyers and doctors must do a period of apprenticeship to gain a licence to do their job. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Gig economy deals with on-demand services or goods. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. It is not necessary for an employee to know the roles of other workers in the company. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A company car is an example of fringe benefit. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Cash incentives encourage workers to work in a different city. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Good employers never encourage supervisors to give a good example of work ethics. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Good employers take care of their employees' health in the workplace. | <input type="checkbox"/> | <input type="checkbox"/> |

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Name

Class Date



READING COMPREHENSION

1. Read the text and complete it with the correct phrase.

- a. while not top executives,
- b. at least 24 hours before
- c. individual agreements.
- d. may freely end the working relationship
- e. normally define general principles
- f. duration of the employment
- g. are normally three months
- h. general and specific conditions
- i. generally office workers,
- j. there are four categories of employees:

Job Rules in Italy

Under Italian law, **1.** executives, who are the head managers; middle managers, defined as employees who, **2.** are continuously engaged in duties that contribute significantly to promoting the company's growth and achieving its goals; **white collar** employees, **3.** and **blue collar** employees, who are mainly factory or industrial plants workers.

Employment agreements in Italy normally consist of simple hiring letters stating the identity of the parties, place of work, employment start date, **trial** period, **4.** (in case of fixed-term employment) employee's duties and salary.

Even if collective agreements **5.** that regulate the employment relationship of executives, **6.** are often negotiated through **7.** At the establishment of any employment relationship, the employer must notify the competent public employment service and the relevant social security institutions **8.** the employee starts their job.

The trial periods **9.** for the employees who are not assigned to managing functions and six months for all other employees. During the trial period, either party **10.** at any time, without any notice, obligation or payment.

Adapted from: <https://www.italiancompanyformations.com/>**Glossary:****blue collar:** *colletti blu (operai)***trial:** *prova***white collar:** *colletti bianchi (impiegati)*

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VOCABULARY

2. Match each word with the correct definition.

allowance • co-workers • department • fixed-term • incentive • maternity leave • organisational structure • remote work • schedule • seasonal

1. Having a pre-defined end date linked to the time of the year.
2. Related to a contract linked to the accomplishment of a specific task.
3. Work done in a location different from a company office.
4. A period of absence from work after the birth of a child.
5. Section of a company focusing on only one of its activities.
6. Amount of money given to a worker to cover expenses.
7. Bonus given to workers to encourage them to meet specific goals.
8. The timetable established for a working activity.
9. People working together in the same place.
10. The way in which a company structures its staff and activities.

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TRUE/FALSE

3. Decide if the statements are true or false. Correct the false ones.

- | | | T | F |
|---|--------------------------|--------------------------|--------------------------|
| 1. An internship is generally a paid work experience. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Stages are not evaluated in the school curriculum of vocational school students. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Contractors are employed directly by the company they work for. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Gig work is a flexible type of work. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. A functional structure in a company creates a network of managers. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Employees are responsible for the equipment they work with. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. The remuneration of employees is made up of their base salary. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Extra perks can come in different forms. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Being attentive to the quality of the work done is an example of work ethics. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. A good employee respects deadlines and schedules. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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SENTENCE COMPLETION

4. Complete the sentences with the correct word.

- 1. Not giving up when a task is difficult is an example of work
- 2. In a school, students learn a job or profession.
- 3. My company has leaders and managers who control teams: its structure is
- 4. In a job contract, the economical part, that is the monthly and bonuses, are clearly stated.
- 5. My husband works for a company, but he is not hired by them because he's a
- 6. After the birth of my son, I reduced my working hours; the company allowed me to work-time.
- 7. My colleagues and I usually find team-..... activities very enjoyable and useful.
- 8. My brother's company gives employees a company's mobile phone as a benefit.
- 9. We were very lucky because we were hired with a contract, which has no end date.
- 10. To work as a lawyer, he had to do an for a year.

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SHORT OPEN QUESTIONS

5. Briefly answer the questions.

- 1. Briefly explain what an agency work contract is.
- 2. Which types of unpaid work are generally done by graduates? Explain.
- 3. What is a holiday bonus?
- 4. Give a short definition of ethics.
- 5. Why are team-building activities a good practice in a workplace?

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Total score/50



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

German Company Manager Sent to Prison over Thyssenkrupp's Italian Plant Fire

In April 2011, Harald Espenhahn, the head manager of ThyssenKrupp's Italian steel unit, along with other managers, was condemned to prison over the death of seven workers in a fire at the company's Turin plant on the night between 5th and 6th December 2007. The German company also received a large fine for this accident.

The accident was caused by a fire that started in some faulty machinery and was fed by the oil coming out of the plant. As the eight workers started to extinguish the fire, there was a sudden explosion, causing the death of one of them and severely injuring the other six, all of whom died in hospital; only one of the workers who was in the factory that night survived. The fire was one of the worst in Italy and started a public debate over health and safety regulations; moreover, this was the first deadly accident in a workplace to be considered as homicide.

The company also received a fine of 1 million euros and could not advertise their products in Italy for six months. Even if both the victims' families and the companies were dissatisfied with the court's decision, Italian prosecutor Raffaele Guariniello, who in the past had judged many trials concerning workplace accidents and workers' security, said that the court's decision would "mean a lot for health and safety in the workplace".

Adapted from: <https://www.dw.com/en/german-steelmaker-boss-jailed-over-fatal-italian-plant-fire/a-14993772>

Glossary:

court: *tribunale*

severely: *gravemente*

faulty: *difettoso*

trial: *processo*

fed: *alimentato*

- | | T | F |
|---|--------------------------|--------------------------|
| 1. Harald Espenhahn was the judge who fined Thyssenkrupp. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Seven workers died in the accident. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Espenhahn was condemned immediately after the accident. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Some of the machinery in the factory was not working properly. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The oil on the machinery caught fire. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. All the men who were working in the factory died that night. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. After the accident, people started talking about the safety of workers. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. The death of workers had already been considered a homicide in Italy before. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Everyone was satisfied with the court's decision. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The court's decision is considered very important for promoting safety in workplaces. | <input type="checkbox"/> | <input type="checkbox"/> |

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VOCABULARY

2. Write the Italian or English equivalent of the following words.

- | | |
|----------------------------|---------------------------------|
| 1. Smock | 6. Occhiali di protezione |
| 2. Safety boots | 7. Locale (n.) |
| 3. To warn | 8. Vietato fumare |
| 4. Fire extinguisher | 9. Guanti di protezione |
| 5. To enact | 10. Fuga di dati |

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MULTIPLE CHOICE

3. Choose the correct option.

1. Which of these rules is not a safety rule?
 - a. Wear protective clothes.
 - b. Follow the instructions.
 - c. Start work on machines when they are on.
 - d. Stay concentrated.

2. Prohibition signs are...

a. blue and round.	c. green and rectangular.
b. yellow and triangular.	d. round with a diagonal red bar.

3. Fire equipment is usually indicated with...

a. a label.	c. a red sign.
b. a green sign.	d. a red light.

4. A blue round sign indicates...

a. obligation.	c. medical equipment.
b. warning.	d. a fire extinguisher.

5. Which of these things must you not do in case of fire?
 - a. Ring the alarm.
 - b. Call the fire brigade.
 - c. Stay inside the building to wait for the firemen.
 - d. Close the doors behind you.

6. Which type of fire extinguisher is best for electrical fires?
 - a. Dry powder.
 - b. Foam.
 - c. CO₂.
 - d. It is better to use water than a fire extinguisher.

7. In an office, ...
 - a. there is no risk of fire.
 - b. windows should be closed to avoid flu.
 - c. employees should climb on chairs to get documents.
 - d. bad posture may create problems for workers.

8. GDPR is...
 - a. a new system for collecting private data.
 - b. a European law for the protection of personal data.
 - c. a new browser.
 - d. a new website.



READING COMPREHENSION

1. Read the text and decide if the sentences are true or false. Correct the false ones.

The “Statuto” Cinema fire

The “Statuto” Cinema was in the centre of Turin. On 13th February 1983, at 6:15 p.m., on a snowy Sunday afternoon, a fire that spread inside the theatre caused the death of 64 people. The cinema was showing a successful French film, “La Chèvre”. According to the cinema owner, the flames were probably started by a short circuit and spread from an old curtain. The victims, even if they had tried to escape, found the emergency exits closed and locked, so they died from breathing toxic fumes. The owner was condemned to two years in prison, and he had to pay the victims’ families the equivalent of around 1.5 million euros.

This was the worst disaster to have happened after World War II in Turin. The French film was a comedy for families; for this reason, the cinema was full of children with their parents and young people. The youngest victim was 7 years old, the oldest was 55, and nine children became orphans.

In the 1980s, unfortunately, there were almost no rules for the security of public places. In particular, smoke alarms and emergency exits were not obligatory, and the fireproof materials used for chairs and curtains produced toxic fumes if they burned.

This accident started a great number of reforms in the laws for public places, making fireproof materials and fire equipment obligatory for every public space, enacting laws for emergency exits and reducing the number of seats that cinemas and theatres could have.

Adapted from: https://en.wikipedia.org/wiki/Cinema_Statuto_fire

Glossary:

fireproof: *ignifugo*

to spread: *diffondersi*

- | | T | F |
|---|--------------------------|--------------------------|
| 1. The Statuto Cinema fire happened on a hot day. | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. More than 50 people died in the accident. | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The accident was caused by a short circuit. | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The victims mainly died from their burns. | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The Statuto fire was a terrible tragedy for the city of Turin. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Most of the victims were young. | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. People escaping were able to open the emergency exits easily. | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Fireproof materials were safe in the 1980s. | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. At the time of the accident, there were many safety rules. | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. After the accident, authorities started thinking about safety in public places. | <input type="checkbox"/> | <input type="checkbox"/> |

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VOCABULARY

2. Write the Italian and English equivalent of the following words.

- | | |
|------------------------------|-------------------------------|
| 1. Safety goggles | 6. Casco |
| 2. Electric shock | 7. Consenso |
| 3. Emergency equipment | 8. Carrello elevatore |
| 4. Protective gloves | 9. Cancellare |
| 5. Data breach | 10. Estintore a polvere |

...../10



MULTIPLE CHOICE

3. Choose the correct option.

1. Which of these rules is a good safety rule?
 - a. Wear protective clothes.
 - b. Smoke inside a building.
 - c. Work on machines which are plugged in.
 - d. Do some work even if you are not concentrating.

2. Warning signs are...

a. blue and round.	c. green and rectangular.
b. yellow and triangular.	d. round with a diagonal red bar.

3. A fire extinguisher is usually indicated with...

a. a label.	c. a red light.
b. a green sign.	d. a red rectangular sign.

4. A round sign with a red bar indicates...

a. obligation.	c. prohibition.
b. warning.	d. fire extinguishers.

5. Which of these things must you do first in case of fire?
 - a. Call your parents.
 - b. Ring the alarm.
 - c. Stay inside the building to wait for the firemen.
 - d. Evacuate the building leaving windows and doors open.

6. Which of these things must you not do in case of electric shock?
 - a. Turn off electricity from the main switch.
 - b. Touch the victim without an insulating object.
 - c. Call an ambulance.
 - d. Separate the victim from the electricity source.

7. When working in a lab, ...
 - a. you can repair faulty appliances without telling your teacher.
 - b. you can bring food in.
 - c. you must not be alone.
 - d. you don't have to wear protective clothes.

8. A data breach is...

a. an unauthorised use of private data.	c. a website using cookies.
b. a collection of data.	d. a browser that does not use cookies.



MULTIPLE MATCHING

2. Match each statement to the correct function.

- | | | |
|---|--------------------------|---|
| 1. Could I put you on hold for a moment? | <input type="checkbox"/> | a. Interpreting data |
| 2. We look forward to your reply. | <input type="checkbox"/> | b. Final salutation of an informal e-mail. |
| 3. The graph shows a negative trend. | <input type="checkbox"/> | c. Asking the speaker to wait on the phone |
| 4. I'm writing in response to your enquiry of 6 th June. | <input type="checkbox"/> | d. Request in the main body of a business letter |
| 5. All the best. | <input type="checkbox"/> | e. Talking on the phone about a wrong number |
| 6. I'm afraid Ms Smith is not available at the moment. | <input type="checkbox"/> | f. Closing message of a business e-mail |
| 7. I have the pleasure of promoting our new line of keyboards. | <input type="checkbox"/> | g. Opening of a business letter |
| 8. This pie chart represents the interest rates. | <input type="checkbox"/> | h. Replying when someone is not in |
| 9. Could you please send us your latest catalogue? | <input type="checkbox"/> | i. To define the topic of the graph |
| 10. I'm sorry there is nobody by that name. | <input type="checkbox"/> | j. The main point of the body of a business letter |

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MULTIPLE CHOICE

3. Choose the correct option.

- In the greeting of a business letter it is *never* / *always* preferable to address the recipient using their name.
- In the *subject line* / *body* of a business letter you should indicate the order delivery number.
- The final salutation of a business letter should be coherent to the *main body* / *opening greeting*.
- In a business letter the attention line *can* / *cannot* be optional.
- A good and engaging presentation should have *a lot of* / *few* slides.
- If it is the first email, the opening line should be *a/an short pleasantry* / *informal greeting*.
- In a business letter the signature is *never* / *usually* followed by the signer's role in the company.
- Business e-mails require a specific style, and they should be *long* / *brief*.
- In a business letter the *letterheads* / *references* are the initials of the sender and the typist.
- In a presentation, asking rhetorical questions *may* / *may not* be useful.

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TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

T F

- 1. During business phone calls we should always try to sound cheerful and professional.
- 2. Thanks to technology, traditional business letters are not used anymore.
- 3. A closing salutation is included in the enclosures of business letters.
- 4. To make a presentation engaging, many different colours and fonts should be used.
- 5. The purpose of a graph is to present data that is too complicated to be easily described in a text.

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SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What are the main steps you should follow when you receive a business call?
- 2. Write an example of a closing message in a business e-mail.
- 3. What should the main points of the body of a business letter contain?
- 4. Write at least three tips to create an effective presentation.
- 5. Write a statement that describes the gradual decline of a trend represented in a chart.

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Total score/50

Name

Class Date



READING COMPREHENSION

1. Read the text and answer the questions.

Importance of Presentation Skills for Workplace Success

Whether you're a high-level executive or an administrative assistant, developing your presentation skills is important to climb in an office-based job. Leaders make decisions based on information shared in presentation format, and no businessman changes his mind without first seeing a persuasive presentation. Presentation skills refer to all the qualities you need to create and deliver a clear and effective presentation. While what you say during a presentation matters, employers also value the ability to create supporting materials, such as slides. You may want to deliver briefings and reports to colleagues, conduct training sessions, present information to clients, or perform any number of other tasks that involve speaking in front of an audience. Giving engaging and easy-to-understand talks is a major component of the strong oral communication skills that are a job requirement for many positions. Not all presentations take place in a formal meeting, in fact many presentation skills are relevant to one-on-one consults or sales calls. The preparation of a presentation is extremely important: it involves research and analysis of the audience you'll be presenting to and what most interests them. For this reason, it is useful to practice your presentation as many times as you need to deliver it with confidence.

Adapted from: <https://www.thebalancemoney.com/list-of-presentation-skills>

1. Why are presentation skills important in an office job?
2. What do presentation skills refer to?
3. What do employers value during a presentation?
4. What is a major component of strong oral communication skills?
5. What does the preparation of a presentation involve?

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MULTIPLE MATCHING

2. Match each statement to the correct function.

- | | | |
|---|--------------------------|--|
| 1. Thank you for holding. I'll put you through now. | <input type="checkbox"/> | a. Enclosures of a business letter |
| 2. Would you like her to call you back? | <input type="checkbox"/> | b. Closing message of a business e-mail |
| 3. We look forward to your reply. | <input type="checkbox"/> | c. American closing salutation of a business e-mail |
| 4. Dear Ms Nelson, | <input type="checkbox"/> | d. Checking information during a phone call |
| 5. Number of enclosed documents | <input type="checkbox"/> | e. Request in the body of a business e-mail |
| 6. The chart shows a steady increase in productivity. | <input type="checkbox"/> | f. Taking a message during a phone call |
| 7. Please get in touch if you have any further enquiries. | <input type="checkbox"/> | g. Describing the trend of a graph |
| 8. Yours very truly. | <input type="checkbox"/> | h. Opening salutation in a business e-mail |
| 9. Can you forward the survey to all staff on Friday? | <input type="checkbox"/> | i. Connecting someone on the phone |
| 10. Could you spell that for me, please? | <input type="checkbox"/> | j. Closing message of the body of a business letter |

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MULTIPLE CHOICE

3. Choose the correct option.

1. Business e-mails are written to be read quickly, with *a few / little* information.
2. A final salutation in a business e-mail *must be / doesn't have to be* coherent to the opening greeting.
3. The main body of a business letter should contain *requests / a subject line*.
4. The *reference / heading* of a business letter contains the printed name, the address of the company, and possibly the logo.
5. "Dear Gentlemen" is a typical *UK / US* opening salutation.
6. In a presentation, *rhetorical questions / the use of many slides* can be useful to reinforce your key points and primary message.
7. The points on a graph often represent the *relationship between / value of* two or more things.
8. Problem-solving in business is defined as those processes that *totally remove / reduce or remove* obstacles.
9. It is better to work *in a team / individually* to creatively brainstorm solutions for a problem.
10. Using emotional intelligence to solve a problem *can / cannot* avoid instinctive responses.

...../10



TRUE/FALSE

4. Say if the sentences are true or false and correct the false ones.

T F

- 1. Phone calls are the most widely used form of internal and external communication in business.
- 2. In a business e-mail it is a good idea to use lists to streamline the flow of information.
- 3. Business presentations are the best way to keep a message personal.
- 4. An engaging presentation should contain extra information.
- 5. The main purpose of a graph is to present any type of data.

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...../10



SHORT OPEN QUESTIONS

5. Answer the questions.

- 1. What are the main steps you should follow when you make a business call?
- 2. Write an example of a brief pleasantry in a business e-mail.
- 3. What should follow the signature in a business e-mail?
- 4. What are the main benefits of an effective presentation?
- 5. Write a statement that describes the steady improvement of a trend represented in a chart.

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...../10

Total score/50

KEYS • UNIT TESTS

Unit 1.1 TEST 1

p. 110

1.

1. b; 2. e; 3. f; 4. a; 5. c. Extra: d, g.

2.

1. device; 2. negative ion; 3. electric current; 4. conductivity; 5. rubber; 6. mercury; 7. switch; 8. incandescent; 9. energy-saving; 10. coating.

3.

1. F, The number of protons and electrons is the same; 2. T; 3. T; 4. F, Potential difference is measured in volts, current in ampères; 5. T; 6. F, Copper is the metal used to produce wires; 7. F, In 1911; 8. T; 9. F, CFL bulbs are generally more expensive; 10. T.

4.

1. opposite; 2. battery; 3. wire; 4. voltage; 5. low; 6. ceramic; 7. maglev; 8. load; 9. series; 10. halogen.

5.

1. Electricity was first discovered in Ancient Greece. It was noticed that rubbing some animal fur against a piece of amber, called “elektron” in Greek, made amber attract small leaves of dried grass; 2. Direct current flows in one direction only and is usually generated by batteries and solar cells. In direct current, the direction of the voltage is always constant and DC is normally used to recharge the batteries of portable electronic devices; 3. Among conductors, copper is employed in the production of wires and plugs. Insulators such as plastic and rubber are used to produce electric wires and cables coating, circuit boards and high-voltage systems; 4. A closed circuit is a circuit where all the components are connected to the wire and electricity flows through them; when a gap occurs in the circuit, the flow of electricity is interrupted and the circuit is defined an open one; 5. A CFL bulb produces light through a chemical reaction between gases and mercury vapours, which produce an invisible UV light, and a chemical coating inside the glass tube. The UV light strikes the chemical coating and produces white “fluorescent” light.

Unit 1.1 TEST 2

p. 113

1.

1. g; 2. a; 3. e; 4. d; 5. c. Extra: b, f.

2.

1. appliance; 2. positive ion; 2. voltage; 3. copper; 5. insulators; 6. superconductivity; 7. fuse; 8. series circuit; 9. to glow; 10. consumption.

3.

1. F, Atoms are composed of even smaller particles: protons, neutrons and electrons; 2. T; 3. F, Current is measured in ampères, resistance is measured in ohms; 4. T; 5. T; 6. F, Silver is considered the best conductor; 7. F, By a Dutch physicist; 8. F, Mercury is a superconductor at -269°C ; 9. T; 10. T.

4.

1. repel; 2. source; 3. flow; 4. changes; 5. less; 6. -140 ; 7. MRI; 8. resistor; 9. parallel; 10. organic.

5.

1. Atoms have smaller positive particles called protons and neutral particles called neutrons, strongly bound together to form the nucleus. Negative particles, called electrons, orbit around the nucleus and are able to move from one atom to another; 2. Alternating current changes the direction of its flow continuously. It is mainly produced by generators in power plants, and it is used to deliver power on the grid. In alternating current, the voltage changes continuously from positive to negative and vice versa; 3. Conductivity is affected by the size and shape of materials and by their temperature. For example, a thick piece of matter will conduct better than a thin one. Temperature affects conductivity in different ways: it increases it in insulators and lowers it in metals; 4. A short circuit may be caused by wires that are not perfectly insulated; metal objects, water or other liquids coming into contact with electrical wires; old or damaged appliances, lights or plugs; 5. An LED light bulb produces light using light-emitting diodes made of semiconductors. When electricity flows through an LED, the electrons combine with the semiconductor emitting photons that produce light.

Unit 1.2 TEST 1

p. 116

1.

1. T; 2. F, You can use aluminium foil instead; 3. F, The juice makes it possible to build a lemon battery; 4. T; 5. T; 6. F, They must not touch each other; 7. T; 8. T; 9. F, One must be attached to the nail and the other to the penny; 10. F, You should try to move the nail closer to the penny.

2.

1. cathode; 2. cell; 3. lead; 4. shaft; 5. wind farm; 6. coal; 7. soil; 8. reservoir; 9. kinetic; 10. fuel rod.

3.

1. i; 2. a; 3. e; 4. j; 5. d; 6. g; 7. f; 8. h; 9. b; 10. c.

4.

1. b; 2. b; 3. d; 4. a; 5. b; 6. d; 7. a; 8. c; 9. a; 10. b.

5.

1. A battery is composed of two electrodes: the anode is the negative one, the cathode is the positive one. The electrolyte, which can be a liquid or a paste, makes a chemical reaction between the electrodes possible; this reaction generates electricity; 2. A dynamo is a generator that produces direct current; an alternator is a generator producing alternating current; 3. Biomass consists of living or recently dead organisms, plants or animals, and any of their by-products which can be used as a substitute for fossil fuels in the production of energy or heat; 4. CSP systems use solar collectors that collect solar energy and convert it into heat which is used to transform water into steam to activate a turbine connected to a generator; 5. In a nuclear chain reaction a neutron strikes a uranium atom and splits it, releasing a large amount of energy in the form of heat and radiation, and neutrons; the neutrons continue to strike other uranium atoms, and the process is repeated over and over again.

Unit 1.2 TEST 2

p. 120

1.

1. T; 2. F, You need at least two potatoes for a good amount of energy; 3. F, You need a copper object and a zinc one; 4. F, It is necessary to take out the insulating coat at one end; 5. T; 6. T; 7. F, They must be placed on opposite sides of the potato; 8. T; 9. T; 10. F, It can only power small devices.

2.

1. anode; 2. carbon; 3. lithium-ion; 4. coil; 5 (to) wind; 6. oil; 7. greenhouse; 8. dam; 9. fuel; 10. control rod.

3.

1. j; 2. f; 3. i; 4. h; 5. e; 6. a; 7. d; 8. g; 9. b; 10. c.

4.

1. c; 2. a; 3. b; 4. d; 5. a; 6. b; 7. d; 8. c; 9. b; 10. b.

5.

1. Primary cell batteries cannot be recharged; examples of these batteries are carbon-zinc, alkaline, silver-zinc and zinc-air batteries; secondary cell batteries are rechargeable; examples of these kind of batteries are lithium-ion; nickel-metal hydride and lead acid batteries; 2. Fossil fuels are substances like oil, natural gas and coal that were formed from the fossilised underground remains of plants and animals which lived millions of years ago; 3. Geothermal energy can be used by taking steam directly from fractures in the ground, pumping cold water down under the Earth's surface or using hot water passed through another fluid that has a lower boiling point than water to produce steam to drive a turbine which starts a generator; 4. A dam is a structure located near a river in order to block its course; when the dam is opened, water is released through a pipe; the force of the water spins the blades of a turbine which is connected to a generator that produces electricity; 5. Wind power plants have a number of wind turbines which consist of two or three blades, with a rotor in the middle, mounted on a tall tower. The turbine has a gearbox, which is connected to a main shaft attached to a generator. The rotational movement produced by the wind on the blades is transferred to the main shaft inside the box and from there to the generator, which produces electricity.

Unit 1.3 TEST 1

p. 124

1.

1. b; 2. i; 3. f; 4. a; 5. e; 6. h; 7. d; 8. j; 9. c; 10. g.

2.

1. power station; 2. step-up transformer; 3. overload; 4. condenser; 5. leakage; 6. utility company; 7. peak; 8. PMU; 9. imbalance; 10. to dispatch.

3.

1. T; 2. F, They mainly produce it in form of alternating current; 3. T; 4. F, They oppose a certain amount of resistance; 5. F, They use electricity at 120-240 volts; 6. T; 7. T; 8. T; 9. F, It has more turns in the primary winding; 10. F, It is an interruption in the supply of electricity.

4.

1. losses; 2. substation; 3. alternating; 4. turbine; 5. smart; 6. relays; 7. store; 8. pumped; 9. molten; 10. vacuum.

5.

1. After being generated in power stations, electricity travels long distances through cables, on tall pylons or underground. Electricity is transmitted at high voltage to reduce losses; for this reason, the voltage is increased by step-up transformers that are found in substations; 2. Cables are hung high above the ground; this creates a large insulating air gap between the cables and the ground, and, in this way, they are also kept far from people and vehicles. Cables must also be insulated from the pylon that holds them, so they are connected to the towers through long insulators, usually made of ceramic discs; 3. Transformers work on the principle of electromagnetic induction; when alternating current flows through the primary winding, it produces a magnetic field surrounding the winding, which induces an alternating voltage in the secondary winding. In a step-down transformer, the primary winding has more turns of wire than the secondary one, so the voltage is decreased (or stepped down); 4. Some possible solutions to these problems are the use of back-up sources, such as big batteries, to give an energy supply to electrical equipment and machinery; the application of artificial intelligence to the grid, to help predict the areas where a higher consumption could occur, and integrating the energy supply of the grid with other sources, for example small home solar or wind farms; 5. Battery storage uses rechargeable batteries, usually lithium-ion ones, to store energy for a later use and dispatch it quickly on the electric grid when failures occur.

Unit 1.3 TEST 2

p. 127

1.

1. h; 2. a; 3. j; 4. b; 5. e; 6. d; 7. f; 8. i; 9. c; 10. g.

2.

1. pylon; 2. step-down transformer; 3. substation; 4. cooling tower; 5. core; 6. power outage; 7. meter; 8. relay; 9. storage; 10. molten.

3.

1. F, They are buildings that contain transformers; 2. T; 3. T; 4. T; 5. F, They are not covered with insulators, but they are insulated from pylons; 6. F, It converts steam into kinetic energy; 7. F, Water drives the turbines directly; 8. F, It is connected to the output voltage; 9. T; 10. F, They are also used in microphones and audio devices, in batteries and charging sources, and for transmitting digital information.

4.

1. utility; 2. outage; 3. underground; 4. boiler; 5. peak; 6. PMUs; 7. storage; 8. air; 9. solar; 10. kinetic.

5.

1. Before electricity is delivered to homes or workplaces, its voltage must be reduced. The voltage needed is normally 120-240 V. Step-down transformers, which can be found in substations, lower the voltage of electricity to the suitable level for every category of user; 2. Thermal power plants employ fossil fuels, geothermal energy, biomass, solar or nuclear power to produce high-pressure steam that is then channelled in pipes and sent to the blades of some turbines connected to a generator. The rotation of the blades activates a generator that produces electricity; 3. Possible solutions to these problems can be the substitution of old cables with more efficient ones and the reduction of transmission distances with a system of small local energy sources instead of few big power plants; 4. The three main advantages of a smart grid are: real-time consumption information, greater reliability of the power supply and greater flexibility in integrating different power sources; 5. This type of storage employs hydroelectric power plants with reservoirs to provide electricity at times of peak demand: electricity is used at times of low demand to pump water from a lower source into a higher reservoir; when demand grows, water is released back from the upper into a lower reservoir, pumping it through a turbine and generating electricity.

Unit 1.4 TEST 1

p. 130

1.

1. motor; 2. batteries; 3. locomotive; 4. four; 5. vibrations; 6. engine; 7. 1970s; 8. energy; 9. lithium; 10. plug-in.

2.

1. shaft; 2. armature; 3. winding; 4. electric field; 5. commutator; 6. polarity; 7. track; 8. solenoid; 9. brush; 10. rotor.

3.

1. e; 2. h; 3. b; 4. f; 5. i; 6. g; 7. c; 8. a; 9. j; 10. d.

4.

1. T; 2. T; 3. F, An electric motor converts electricity into mechanical energy; 4. F, A shaft is a pole connected to the armature of a motor; 5.

F, DC motors have a commutator which reverses current; 6. T; 7. F, Motor brushes are made of carbon; 8. T; 9. F, In electric vehicles AC motors are more commonly used than DC ones; 10. T.

5.

Sample answers

1. When current flows through a conductor, such as a copper wire, a magnetic field is generated around it. The field strength and direction depend upon the amount of current flowing and its direction of flow along the wire; 2. Single-phase motors are types of motor powered by single-phase AC current. They are mostly used for driving small machines such as appliances in homes and small businesses; 3. Synchronous motors are called in this way because their rotor is designed to rotate at the speed of the revolving magnetic field of the stator, which is called synchronous speed. These motors are normally used in applications requiring a constant and precise speed, such as watches, record players and turntables; 4. In electrical alarm bells, electromagnetic coils of wire are used to move a striker against a bell to make sound. When electricity flows through the coil, this attracts the iron striker, which strikes the bell. As soon as the striker moves towards the bell, the electrical contact breaks and the electromagnet is demagnetised. After striking the bell, the striker is returned to its original position and the electrical contact is made once again; 5. Plug-in hybrid electric vehicles (PHEVs) mainly run on electricity, but also have a traditional fuel engine; they can be plugged into a charging station to recharge their battery.

Unit 1.4 TEST 2

p. 133

1.

1. shortened; 2. heat; 3. work; 4. dirt; 5. wires; 6. machines; 7. dry; 8. controlled; 9. DC; 10. sparks.

2.

1. loop; 2. magnetic field; 3. carbon; 4. torque; 5. electromagnet; 6. braking; 7. induction; 8. spring; 9. stepper motor; 10. stator.

3.

1. c; 2. b; 3. f; 4. j; 5. a; 6. i; 7. e; 8. h; 9. d; 10. g.

4.

1. T; 2. F, The stator is a permanent magnet; the rotor is a coil of wire wound around an armature; 3. T; 4. T; 5. F, DC motors may have electronic circuits instead of brushes; 6. F, They are powered by AC current; 7. F, it is a brushless motor; 8. T;

9. F, It is one of the factors that affect the range of an electric vehicle; 10. T.

5.

1. If a magnet is moved towards or away from a solenoid, the changing magnetic field induces a current in the wire; the direction of the current depends on the direction of the movement; 2. Three-phase motors are self-starting motors and they are smaller, lighter, more efficient and require less maintenance than other types of motor; they are mainly employed to drive lathe machines, oil extracting plants and for a lot of different industrial machines; 3. Brushed motors are called this way because they use carbon brushes to keep contact with the commutator to reverse the direction of the current; they are traditionally employed in industry to drive cranes and other types of heavy machinery; 4. In an induction cooker, an electric current is passed through a coil of copper wire under the cooking surface, which creates a magnetic flux throughout the cooking pan to produce heat; induction cookers work correctly with pots and pans having an iron base; 5. Hybrid-electric vehicles (HEV) mainly run on fuel like petrol or diesel but have an electric motor and batteries which are recharged through regenerative braking; the driver can switch between using the fuel engine and using the 'EV' mode by pressing a button. These cars cannot be plugged into an electricity source and depend on petrol or diesel for energy.

Unit 2.1 TEST 1

p. 136

1.

Sample answers

1. replace vacuum tube technology; 2. were the only technology available; 3. amplifiers or switches; 4. a lot of power, a lot of maintenance; 5. amount of heat; 6. the transistor was invented; 7. mathematics and physics; 8. conducting properties; 9. directed by Shockley; 10. received the Nobel Prize.

2.

1. domestico; 2. automatizzato; 3. legame; 4. rettificatore/raddrizzatore; 5. valore; 6. emitter; 7. amplifier; 8. carbon; 9. diode; 10. capacitance.

3.

1. T; 2. F, The triode was invented by Lee De Forest; 3. F, Electronic components use electricity at low voltage; 4. T; 5. T; 6. F, They conduct electricity in one direction only; 7. T; 8. F, An N-type semiconductor is obtained in this way; 9. F, It is made up of three components: a source, a gate, and a drain; 10. T.

4.

1. e; 2. g; 3. j; 4. a; 5. d; 6. b; 7. f; 8. i; 9. c; 10. h.

5.

1. Electronics is the field of activity that studies how to control the flow of electricity and transform it into signals that carry information. It deals with components and circuits that use electricity at very low voltage. The word “electronics” derives from “electricity”; 2. A transistor can perform two functions as it can work as a switch and as an amplifier. As a switch it blocks the flow of current or allows it to pass; as an amplifier it makes a current bigger and increases signal strength; 3. Two types of semiconductors are made from silicon through a process called “doping”: N-type and P-type. N-type semiconductors are obtained by adding small quantities of substances such as phosphorus or arsenic to pure silicon; P-type semiconductors are obtained by adding small quantities of substances such as gallium or boron to pure silicon; 4. Inductors are made of a coil of wire wound around an iron core; they work on the principle of electromagnetic induction: when current passes through them, it generates a magnetic field that varies in time, blocking the alternating current and allowing only direct current to flow. Inductors are mainly used in transformers, electric motors, and in high-frequency AC circuits; 5. The electronic components which mainly use colour coding are transistors, capacitors and inductors; colour coding substitutes value numbers on electronic devices, as colours are easier to see, print and recognise on such small devices.

Unit 2.1 TEST 2

p. 139

1.

Sample answers

1. it emits light; 2. determines the colour of the light; 3. many different semiconductors, light emitting phosphorus; 4. in 1962; 5. low intensity infrared light; 6. was red; 7. were very expensive/cost around \$200; 8. as indicator lamps; 9. they consume less power; 10. on DC power.

2.

1. vuoto; 2. valenza; 3. modello; 4. campo; 5. drogaggio; 6. oxide; 7. condenser/capacitor; 8. gain; 9. inductance; 10. junction.

3.

1. F, It has a lot of practical applications in everyday life, and in industry, too; 2. T; 3. T; 4. T; 5. F, Inductors work on the principle of electromagnetic induction; 6. F, They block the

incoming current and make it flow in the opposite direction; 7. F, Resistors block current and protect circuits; 8. T; 9. T; 10. F, It is an internationally recognised code.

4.

1. d; 2. a; 3. j; 4. g; 5. b; 6. e; 7. h; 8. c; 9. i; 10. f.

5.

1. In industry, automated systems, 3D systems and 3D printers are some of the most important and widely used applications of electronics; 2. Passive electronic components are those components that cannot control electric current and do not provide power gain; they use the energy in the circuit or store it in the form of voltage or current, such as diodes, resistors, capacitors and inductors; 3. A transistor is made of three layers of semiconductor material, two layers are of the same type (positive or negative) and the third between them is of the opposite type; 4. Diodes are made of two opposite types of semiconductor joined together, they conduct electricity in one direction only, blocking the flow in the opposite direction and can be found in radio and TV tuners or to regulate voltage; 5. Resistors are made of carbon or metal oxide, have different values of resistance and block, or resist, the flow of current; for this reason they are used in circuits to protect them.

Unit 2.2 TEST 1

p. 142

1.

1. T; 2. T; 3. F, The first book was published in 1847, the second one in 1854; 4. F, Boolean algebra deals with the values 0 and 1; 5. T; 6. T; 7. F, Elementary algebra deals with numerical operations; 8. F, Boolean algebra deals with conjunction and disjunction, while elementary algebra deals with addition, subtraction, multiplication, and division; 9. T; 10. F, Boolean algebra is also used in statistics and finance.

2.

1. quadrante; 2. degradazione; 3. asse/tavola; 4. lancetta; 5. silicio; 5. discrete; 7. to tune; 8. logic gate; 9. amplitude; 10. sensor.

3.

1. f; 2. d; 3. e; 4. a; 5. i; 6. j; 7. h; 8. g; 9. b; 10. c.

4.

1. c; 2. a; 3. b; 4. d; 5. b; 6. c; 7. a; 8. d; 9. d; 10. c.

5.

1. Analogue circuits deal with signals directly, while digital circuits transform analogue signals into pulses and, after processing them, give out the resulting values in the form of numbers; 2. The binary system is a code that only uses the digits 1 and 0 (called bits) to deal with signals. By means of these two digits, the system represents all existing real numbers, even complex ones, if they are put in a particular sequence; 3. A NOT gate reverses the logic state, for this reason it is also called an “inverter”. If the input is true, the output is false and vice-versa; 4. A traditional electronic circuit usually consists of a printed circuit board, made of plastic, on which individual electronic components are connected to each other by traces printed on the board, functioning as wires; in integrated circuits, on the contrary, all components and connections are built directly on the silicon chip; 5. A sensor detects, monitors and measures inputs from the physical environment, such as fluid levels, temperature, moisture, voltage, which are transformed into electrical signals and used to start or adjust the functioning of the piece of equipment connected to it.

Unit 2.2 TEST 2**p. 145****1.**

1. T; 2. T; 3. F, Light sensors can turn lights off, helping to save energy; 4. F, With a smart lighting system it is possible to programme the light bulbs to turn on and off at certain times of the day; 5. T; 6. T; 7. F, Garage doors can be connected to sensors, too; 8. T; 9. T; 10. F, The future of smart technologies is constantly developing.

2.

1. sequenza; 2. potenza; 3. invertire; 4. apparecchio acustico; 5. magnitudine; 6. degradazione; 7. converter; 8. distortion; 9. pulse; 10. sequence.

3.

1. d; 2. h; 3. b; 4. a; 5. f; 6. c; 7. i; 8. e; 9. j; 10. g.

4.

1. d; 2. a; 3. c; 4. b; 5. c; 6. c; 7. d; 8. a; 9. a; 10. b.

5.

1. The advantages of digital circuits are: high precision, because a digital signal can be transmitted more faithfully than an analogue one; easier information storage, because

stored data remain undamaged; technological improvement, because it is easier to add new functions to a digital circuit than to an analogue one; greater flexibility, because they are easier to design as their design process is highly automated; 2. Logic gates are circuits created to perform specific tasks. They are based on Boolean algebra, they have one or more inputs and a single output that is the product of a series of instructions that follow a precise logic; 3. A NAND gate acts in the manner of the logical operation “and” followed by negation; its output is false if both inputs are true; 4. The IoT, or Internet of Things, is a system of digital devices, such as computers, laptops and smartphones, connected to each other and sharing data over the Internet; 5. The binary system is the base of all computing systems and operations because it enables digital devices to store, access and manipulate data and information and to process digital signals.

Unit 2.3 TEST 1**p. 149****1.**

1. j; 2. e; 3. b; 4. f; 5. h; 6. g; 7. a; 8. d; 9. i; 10. c.

2.

1. CPU; 2. registers; 3. bus; 4. ROM; 5. microcontroller; 6. silica; 7. wafer; 8. pattern; 9. photolithography; 10. blueprint.

3.

1. Vision; 2. ALU; 3. clock; 4. retrieve; 5. ports; 6. non; 7. silicon; 8. SoC; 9. wearable; 10. dice.

4.

1. T; 2. F, In the early 1970s; 3. T; 4. F, Billions of components; 5. F, It is lost after the device is turned off; 6. T; 7. F, Arduino codes are open-source, which means available to the public; 8. T; 9. T; 10. F, It is called photomask.

5.

1. DSP or Digital Signal Processor, is a type of microprocessor specialised in digital signal processing and therefore widely used in digital audio and image processing, speech recognition systems, smartphones and high-definition TV; 2. The three basic parts of a CPU are the Arithmetic Logic Unit (ALU), which performs arithmetic and logic operations; the registers, local areas used to accept, store and transfer data and instructions; and the Control Unit (CU), which controls all the processing system through an oscillator called “clock”; 3. Logic

chips work as the brain of electronic devices, processing information to complete tasks; the most common examples are CPUs, GPUs and NPUs, Neural Processing Units, specifically designed for machine learning applications; 4. The causes of the global chip shortage are the bigger demand of devices containing chips due to the increase of remote activities after the COVID pandemic and the slowdown in production, together with wars and trade restrictions for political reasons; 5. At first, an initial design of the microchip, called blueprint, is made; then, a representation of each layer of the microchip, called photomask, is made using CAD programmes.

Unit 2.3 TEST 2

p. 152

1.

1. h; 2. f; 3. g; 4. b; 5. i; 6. a; 7. c; 8. j; 9. d; 10. e.

2.

1. GPU; 2. Control Unit; 3. cache; 4. shortage; 5. RAM; 6. SoC; 7. ingot; 8. encase; 9. etching; 10. photomask.

3.

1. integration; 2. digital; 3. circuitry; 4. registers; 5. source; 6. volatile; 7. logic; 8. ASIC; 9. sand; 10. packaging.

4.

1. F, The word length can reach 64 bits; 2. T; 3. T; 4. T; 5. F, The control unit controls all the processing system; 6. T; 7. F, It was created in Italy by an Italian University teacher; 8. T; 9. F, There were interruptions due to the difficulty of getting raw materials; 10. F, Silicon is cheap and abundant.

5.

1. It is a type of microprocessor specifically designed to improve machine vision, a new system which uses AI technologies applied to industrial equipment; 2. A microchip is a set of several layers of electronic circuits, incorporating a large number of electronic components, contained on a small, flat piece of silicon; 3. Data is entered by pressing a key or touching the screen of a device; this generates electrical pulses or bits which are then processed; 4. Microprocessors are more complex circuits than microcontrollers and they are mainly used in electronic devices such as personal computers, tablets and smartphones, which need to handle big data quantities at high speed; microcontrollers are designed for specific

purposes and applications which are simpler and involve a smaller amount of data processing, such as microwave ovens, washing machines, air conditioners and smart refrigerators; 5. To make microchips, silicon must be chemically treated to eliminate all the impurities that could cause damage in completely sterile facilities to keep it free from contaminants or dust.

Unit 3.1 TEST 1

p. 155

1.

1. It allows artists to do their work in digital form; 2. It has a pressure sensitive surface and a pen called stylus to draw; 3. Many people find it difficult to draw looking at the screen instead of looking down at the tablet; 4. They are normally used in combination with different kinds of software including graphics, animation, and sketching; 5. Engineering, architecture and designing.

2.

1. g; 2. d; 3. i; 4. a; 5. j; 6. b; 7. h; 8. c; 9. e; 10. f.

3.

1. c; 2. a; 3. b; 4. d; 5. b; 6. c; 7. a; 8. b; 9. d; 10. a.

4.

1. T; 2. T; 3. F, It is designed to execute one specific task; 4. T; 5. F, They use the same liquid crystal display technology that can be found in televisions.

5.

1. A CPU controls the movement of data and instructions, transfers data between memory and input/output devices, fetches data from memory, interprets instructions and executes programs stored in memory; 2. There are inkjet printers, which spray ink droplets onto paper; laser printers, which use a laser beam to attract toner particles to a transfer roller; and multifunction printers that combine the functionality of a printer, copier, scanner and fax; 3. Control devices work with sensors to control processes. Two examples are motors, which are used to operate fans and disk drives in a computer, and buzzers, which produce a sound; 4. It stands for Random Access Memory, which is volatile, short-term memory where data is temporarily stored as electric signals; 5. They are devices that read information in pre-defined areas, for example answers to questionnaires.

1.

1. They are generally used for keeping schedules, calendars or as address books; 2. Smartphones; 3. They have a small physical keyboard, and some have an electronically sensitive pad for handwriting; 4. It refers to software that recognises the user's voice and uses artificial intelligence to respond to questions; 5. Apple's Siri, Microsoft's Cortana and Amazon's Alexa.

2.

1. f; 2. b; 3. h; 4. e; 5. a; 6. j; 7. c; 8. i; 9. d; 10. g.

3.

1. a; 2. d; 3. b; 4. b; 5. c; 6. a; 7. d; 8. b; 9. b; 10. a.

4.

1. F, They are designed to support multiple users simultaneously; 2. T; 3. T; 4. F, It is the unit containing all the circuitry needed to process input, store data and output results; 5. T.

5.

1. A computer is a digital electronic machine that can be programmed to store and process information, to insert data and instructions, to output and store data and to control devices and functions; 2. A machine cycle is the most basic CPU operation and consists of four steps including reading and interpreting the machine language, executing the code, and storing the results; 3. A mouse is a handheld pointing device and can be mechanical, with a rolling ball placed underneath to detect movements, or optical, with an electronic sensor to detect movements; 4. Secondary or backup storage is used to store programs and data that are not needed immediately by the computer; 5. A port is a slot where cables can be plugged to connect an external device; a connector is the end of a plug or the edge of a card that is connected to a computer port.

1.*Sample answer*

Programming languages are fundamental because they let us control computers and devices and they have been developing since 19th century. More and more languages are being created every year even though there is no real reason for this, except for the fact that some languages are more suitable than others for certain tasks and some of them are easier to learn than others.

2.

1. ~~Low-level languages~~: High-level languages; 2. ~~functions and logic~~: data; 3. ~~low-level~~: high-level; 4. ~~machine languages~~: human-readable; 5. ~~Apple iOS~~: Google Android.

3.

1. b; 2. c; 3. c; 4. a; 5. d; 6. a; 7. d; 8. b; 9. a; 10. c.

4.

1. F, It represents the relationship between steps; 2. T; 3. T; 4. F, A distributed OS breaks problems into pieces among smaller computers; 5. F, It is a proprietary mobile operating system.

5.

1. Describe the function of the program, define who the end-user is and decide what kind of computer will run the program; 2. Writing a computer program involves three main steps: writing the code, i.e. the set of instructions written in a particular programming language; testing the code, i.e. checking if it works; debugging, i.e. fixing any mistake; 3. It is a programming language similar to a natural language, it can be used for any type of computers and systems; 4. Java is a high-level, object-oriented programming language and is used to construct applications on many devices such as laptops, data centres, game consoles and cell phones; 5. The OS is the way through which a user interacts with applications and websites.

1.*Sample answer*

Windows 1.0 was released in 1985 and even though it was a primitive version of the operating system that we know today, it was a milestone which laid the success of subsequent versions. It introduced many features like the use of a mouse and the icons to represent files and programs. It was less than 1 MB but still had software such as Paint, Calculator, Notepad and Word.

2.

1. ~~Algorithms~~: databases; 2. ~~programming language~~: process order; 3. ~~low-level language~~: translation program; 4. ~~very low~~: very high; 5. ~~Microsoft Windows~~: Apple macOS.

3.

1. a; 2. c; 3. c; 4. a; 5. d; 6. b; 7. c; 8. a; 9. d; 10. c.

4.

1. T; 2. T; 3. F, It looks like columns of 1s and 0s; 4. F, It is similar to C++; 5. T.

5.

1. It is a diagram with symbols that shows an entire process step-by-step in a sequential order. The symbols represent the different types of instructions. After writing the flowchart, the program instructions are encoded in a specific programming language; 2. They are based on problem-solving and use constraints to define how variables relate to each other. They are non-procedural languages, i.e. they specify what to do rather than how to do it; 3. It is the basic language used to build web pages. It is a markup language, i.e. a text-encoding system consisting of a set of symbols inserted in a text document. HTML elements, tags, are the main blocks of the web page; 4. It is an OS that manages several computers at the same time and breaks the problem into pieces among many smaller computers; 5. It is a mobile operating system used exclusively for iPhones. It has regular updates and new expansions, and it continually offers new features.

Unit 3.3 TEST 1

p. 169

1.

1. F, VR allows players to merge into a personalised environment; 2. T; 3. F, It lets the users move freely within the artificial world; 4. F, Several game genres have been improved by VR; 5. T.

2.

1. e; 2. a; 3. c; 4. b; 5. d.

3.

1. c; 2. d; 3. b; 4. a; 5. d; 6. b; 7. a; 8. c; 9. c; 10. b.

4.

1. database, calculations; 2. artwork, devices; 3. part, air brushing; 4. zoom, mistakes; 5. signals, geographical.

5.

1. It is an application to create a presentation of ideas or projects combining texts, images, audios and videos. The three main components of presentation software are a text editor, inserting facilities and a slideshow system; 2. It creates images made up of lines and shapes and can be scaled without losing quality so it is especially used for logos and illustrations; 3. In military it is used for soldiers' training and for

war simulations, in medicine it is used for the treatment of anxiety, phobias, depression and post-traumatic stress; 4. Because elements such as characters, icons, menus, sound effects have to be turned into a playable video game; 5. It is used to perform business actions to increase and improve productivity, and to make predictions and assessments based on data and trends.

Unit 3.3 TEST 2

p. 172

1.

1. T; 2. T; 3. F, It offers 25% of fictional reality; 4. F, It adds some virtual elements in a real view; 5. F, It can be a useful support for textbooks.

2.

1. c; 2. a; 3. e; 4. b; 5. d.

3.

1. b; 2. a; 3. a; 4. d; 5. c; 6. c; 7. a; 8. a; 9. c; 10. d.

4.

1. office suite, word processor; 2. notebook, notes digitally/digital notes; 3. raster graphics, lose; 4. desktop publishing, dynamically re-sized; 5. maintenance, military.

5.

1. It is a program designed to display, manage and manipulate numerical data arranged in rows and columns. Each cell is labelled according to its position and contains a value. Cell formatting and formulas are two of its main functions; 2. It is the digital version of common paper calendars, it is used to keep track of appointments and contacts and can be also designed for teams to share events with other users; 3. It is used to create 2D drawings and 3D models of real objects. The main advantage of CAD is the possibility to reduce mistakes and automatically convert the drawings into manufacturing instructions; 4. Satellites orbit around the Earth and send signals to users on their geographical position and time of the day; 5. A learning platform is a set of interactive online services that are successfully used in education to plan online courses.

Unit 4.1 TEST 1

p. 175

1.

1. physical, wireless; 2. duplex, network; 3. overloaded, capacity; 4. coverage, outdoors; 5. control, mobile device.

2.

1. d; 2. e; 3. i; 4. a; 5. j; 6. b; 7. g; 8. c; 9. f; 10. h.

3.

1. a; 2. c; 3. d; 4. b; 5. a; 6. d; 7. b; 8. b; 9. a; 10. c.

4.

1. T; 2. F, The two directions are used one at a time; 3. T; 4. T; 5. F, Higher frequency bands (HF, VHF and UHF) use frequency modulation.

5.

1. It is a device that changes a given code into a set of signals in the receiver to prepare them for transmission; 2. The unit of measurement of the frequency is Hertz and it measures one cycle per second; 3. They are a type of electromagnetic radiation with the longest wavelengths in the electromagnetic spectrum and are used in communication technologies, such as television, mobile phones and radios; 4. They are generally used for short-range applications such as Wi-Fi and Bluetooth; 5. There is a propagation path from a ground station to a communication satellite that orbits around the Earth and back to another ground station.

Unit 4.1 TEST 2

p. 179

1.

1. emissions, environment; 2. impact, consumption; 3. cars, traffic; 4. health/healthcare, robot-assisted; 5. monitoring, real time.

2.

1. j; 2. c; 3. d; 4. b; 5. h; 6. f; 7. e; 8. g; 9. i; 10. a.

3.

1. d; 2. b; 3. a; 4. b; 5. a; 6. c; 7. b; 8. d; 9. a; 10. c.

4.

1. F, It is a system in which multiple transmitters and multiple receivers cooperate; 2. T; 3. F, Highest frequencies (SHF and EHF) are considered part of the microwave band; 4. T; 5. T.

5.

1. It can occur in two ways: through physical mediums like cables, and wirelessly, i.e. through electromagnetic waves; 2. The amplitude is the distance from the centre line to the top of a crest or to the bottom of a trough. The greater the amplitude, the higher the energy it carries; 3. They use frequencies in the HF band which

extends from 3 to 30 MHz. They can be used for communication over very long distances thanks to sky propagation, i.e. they are reflected from the ionosphere back to the Earth; 4. STP stands for Shielded Twisted Pairs and consist of wires enclosed in a shield that provides greater protection from electromagnetic and radio frequency interference; 5. They are a type of long-range wireless transmission and components of radio, television, and radar systems that receive electromagnetic radiation and convert it into radio frequency electrical signals.

Unit 4.2 TEST 1

p. 183

1.

1. It provides individuals and organisations with access to the Internet and other services such as email and domain registration; 2. They have different connection types, such as cables, fibre, DSL and satellite, since they are connected to one or more high-speed Internet lines; 3. Because they have their own high speed lines, so they are less dependent on telecommunication services; 4. They manage customer traffic; 5. Tier 1 has a global reach while tier 2 has regional or national reach.

2.

1. d; 2. j; 3. a; 4. g; 5. b; 6. i; 7. h; 8. c; 9. e; 10. f.

3.

1. b; 2. a; 3. d; 4. d; 5. a; 6. c; 7. b; 8. c; 9. c; 10. b.

4.

1. F, It is a client; 2. T; 3. T; 4. F, Webpages are hypertexts formatted in HTML; 5. F, It belongs to the fourth generation and refers to the fusion between the physical and the digital world.

5.

1. The server is used to store the data and programs needed by the whole network and they are the popular choice for networks that need many computers; 2. It is a Local Area Network, which is a system where computers and other devices connect to each other within a limited area such as a home, school, or office building; 3. The web refers to the pages you visit with your device when you are online, the Internet is the network which the web works on; 4. The results of the research appear ranked by relevancy and popularity and displayed as hyperlinks to click on; 5. Because it was made of static pages presenting limited hypertexts updated in an only-read mode.

1.

1. If users do not know a URL, they can use a search engine to look for content on the web by typing keywords or phrases; 2. The search engine results page (SERP) appears, ranking the found pages in order of their relevance; 3. Algorithms often change to understand how users search and to give them the best results to their query; 4. It is the process of maximising the number of visitors to a website, making it appear high on the list of results; 5. Search engines would find the information easily and the content would appear for relevant searches.

2.

1. d; 2. j; 3. e; 4. b; 5. i; 6. h; 7. c; 8. a; 9. f; 10. g.

3.

1. a; 2. d; 3. c; 4. b; 5. d; 6. a; 7. b; 8. b; 9. c; 10. a.

4.

1. T; 2. F, It connects clients and servers to the channel; 3. F, Nodes in particular areas are connected along the backbone, while stars are nested with other stars; 4. T; 5. F, It is a protocol that allows web browsers and web servers to talk to each other.

5.

1. The operating system enables computers connected by a network to exchange data, programs, and peripherals; 2. It is a network topology in which the devices are placed along a line and data is sent to all the nodes at the same time; 3. It is a connection of multiple LANs which is not limited to a city but which can extend to any area of the globe; 4. It is an internet service that allows businesses to offer their products to potential customers all over the world, making business transactions fast and more convenient; 5. It is the generation called "participative", whose main purpose was to share content and connect users. It was the era of communities, blogs and collaborative portals.

1.

1. It is an online discussion site where people can hold conversations in the form of posted messages; 2. The top end is categories; categories are divided into sub-forums (that can be further divided into other sub-forums); threads are the lowest level of sub-forums; 3. It is a topic

where members can start their discussions or posts; 4. To moderate the discussions, to keep the forum clean and to answer users' concerns about the forum; 5. It is a message enclosed into a block containing the user's details and the date and time it was submitted.

2.

1. d; 2. j; 3. f; 4. a; 5. b; 6. h; 7. i; 8. c; 9. g; 10. e.

3.

1. a; 2. c; 3. b; 4. d; 5. d; 6. a; 7. c; 8. b; 9. c; 10. a.

4.

1. F, It is the combination of at least two cloud environments; 2. T; 3. T; 4. F, They gather and distribute material that suits their customers' needs; 5. F, It does not need to be downloaded entirely.

5.

1. It is the most traditional type of forum, where a user enters a thread and other members can respond and keep the conversation going, adding opinions, points of views and personal experiences; 2. It describes extremely big volumes of data coming from many different sources: financial transactions, customer databases, medical records, mobile apps, social networks, etc.; 3. Access to websites, Internet radio services, social networking sites, user interface designed for watching films and TV shows and various apps and games; 4. It is a type of virtual, online meeting where two or more people talk through a video and audio call in real-time; 5. The user downloads and installs the app on their device; when the app is launched, it runs on the OS, the app displays content on the device's screen and responds to user input.

1.

1. It is an online journal or informational website displaying information in reverse chronological order where writers share their views on a subject; 2. A blog is active because it dynamically changes as new content is published, while a website is more static, without regular updates; 3. Because they increase visibility, provide advice and reliable information that consumers can use and they allow companies to understand customers' needs and preferences; 4. It must focus on quality over quantity when talking about content; 5. To choose and select high-quality content and offer important resources and information that readers really need.

2.

1. c; 2. j; 3. e; 4. g; 5. b; 6. i; 7. a; 8. f; 9. h; 10. d.

3.

1. c; 2. a; 3. a; 4. d; 5. b; 6. c; 7. b; 8. d; 9. c; 10. a.

4.

1. T; 2. F, They pay for the portion of service they use; 3. F, It is a theme of a discussion forum; 4. T; 5. F, Many FTP sites can be accessed anonymously without using a password.

5.

1. With IaaS, cloud providers offer essential storage and networking resources on demand; 2. Social media are a community-based means of interaction in which people use platforms to have conversations, share information, photos and videos as well as reach an audience. There are three main types of social media: social networking sites, image-based sites, video-sharing platforms; 3. Structured data is easily searched for and organised in databases (for example names and addresses), unstructured data cannot be organised into a structured databases format (for example emails, text or audio files, and images); 4. They are written in C language, a 3-D code engine is used to create the very complex code necessary for the shadows and textures, the UI must be visually appealing and functionally efficient, an artificial intelligence component is essential because it establishes the physics of the game; 5. They are documents like texts, spreadsheets, presentations, etc., on which multiple users can work together to produce one final document instead of multiple versions.

Unit 4.4 TEST 1

p. 199

1.

1. It exploited EternalBlue; 2. Because many Windows users had not updated their software or had old versions of Windows and had not installed a security patch for EternalBlue; 3. It worked by encrypting files or locking the system; 4. Because cryptocurrency is more complex to trace than electronic money transfers, checks or cash; 5. It infected many computers, altered or blocked the operations of hospitals, emergency services, petrol stations, and factories.

2.

1. h; 2. a; 3. j; 4. b; 5. i; 6. d; 7. f; 8. c; 9. e; 10. g.

3.

1. b; 2. a; 3. a; 4. d; 5. c; 6. b; 7. c; 8. d; 9. a; 10. c.

4.

1. F, It can also be unintentional as in the case of computer malfunctioning or a natural disaster; 2. T; 3. T; 4. F, It protects multiple systems connected to the server; 5. F, It is in the form of plaintext.

5.

1. Trojans are types of malware that, once they are on the computer system, allow hackers to get unauthorised access to the computer to steal financial information or install other malware; 2. It refers to a set of programs used to commit illegal online activities, such as stealing personal identities, money or sensitive data; 3. Antivirus protection scans files and incoming emails for viruses, and then deletes malware; 4. Because information thieves can use social media posts to get information to hack into other accounts or steal identities; 5. It means that once an infected file is detected, it is automatically deleted or moved to a quarantine folder so it cannot interact with the device.

Unit 4.4 TEST 2

p. 203

1.

1. It affected computers running the Windows operating system; 2. It shut down Internet access for the entire nation; 3. It presents itself as a file to download, or an appealing ad to click; 4. It is an automation program that performs or simulates human actions or movements while online; 5. A Russian hacker group in St. Petersburg called Storm Gang, or Russian Business Network.

2.

1. e; 2. j; 3. h; 4. b; 5. g; 6. c; 7. i; 8. f; 9. a; 10. d.

3.

1. a; 2. a; 3. c; 4. b; 5. b; 6. d; 7. c; 8. c; 9. a; 10. d.

4.

1. T; 2. F, It is a threat that floods the screen with pop-ups that slow the system; 3. T; 4. F, It makes a computer invisible to the Internet by acting as a proxy; 5. F, It is less secure because it uses a single key to encrypt and decrypt the data.

5.

1. They are similar to viruses because they self-replicate, but, unlike viruses, they can spread

across systems on their own without any action from the user; 2. Because updates can eliminate software flaws that allow hackers to view online activity or steal information; 3. It gives protection against malware, spam and pop-ups; it grants web protection because it can prevent users from accessing harmful websites, and offers real-time protection to automatically delete or move malware to quarantine; 4. When it reaches the receiver, a decryption key is used to convert it back to its original plaintext; 5. The public encryption key can be shared, while the private is known only to one user. While either one can be used to encrypt data, it can only be decrypted by the other key.

Unit 5.1 TEST 1

p. 207

1.

1. T; 2. F, People have adopted many ways to make homes smarter; 3. T; 4. F, It has sensors that make the robot travel autonomously; 5. F, The robot can detect an obstacle; 6. T; 7. T; 8. F, Some are equipped with self-opening lids, others can follow the directions of a map or have a camera; 9. F, The most sophisticated models can move from one room to another; 10. T.

2.

1. c; 2. a; 3. c; 4. b; 5. d; 6. c; 7. a; 8. c; 9. b; 10. d.

3.

1. automation; 2. input; 3. feedback; 4. program; 5. memory unit; 6. rapidity; 7. welding; 8. surgical; 9. goods; 10. domotics. Extra: robots, sensor.

4.

1. b; 2. j; 3. a; 4. g; 5. c; 6. f; 7. d; 8. e; 9. h; 10. i.

5.

1. Automated systems can regulate themselves by monitoring their own working process, detecting and correcting errors through a feedback loop which allows the machine to monitor its output and adjust its operations; 2. The fields of activity in which automation is mainly employed are industry, with conveyor belts, CNC machines and industrial robots; medicine, with CPOE systems, surgical robots and exoskeletons; road safety, employing traffic lights connected with sensors and artificial intelligence, and the military field, where drones, automated weapons guided missiles and other defence systems are used; 3. A PLC, or Programmable Logic Controller, is an industrial computer which runs the

programs responsible for controlling the work of automated industrial equipment. They are often used in factories and industrial plants to control motors, pumps, lights, fans, irrigators, heaters and other machinery; 4. The housekeeping mode is one of the steps through which a PLC communicates with other devices and diagnoses internal faults; 5. Cameras and motion sensors are able to identify the difference between residents, visitors, pets and burglars, and notify authorities if something suspicious is detected.

Unit 5.1 TEST 2

p. 211

1.

1. T; 2. F, People can control smart devices through apps on their phones; 3. T; 4. F, It is possible to reduce energy use; 5. F, They help establishing the optimal climate; 6. T; 7. F, Devices can frequently be interconnected; 8. T; 9. F, They can be remotely activated if cameras detect something suspicious; 10. T.

2.

1. d; 2. a; 3. b; 4. b; 5. c; 6. c; 7. b; 8. d; 9. a; 10. d.

3.

1. steps; 2. mechanisation; 3. tasks; 4. cycle; 5. PLC; 6. quality; 7. human; 8. homeowners; 9. industrial; 10. dim. Extra: computer, internet.

4.

1. b; 2. d; 3. f; 4. h; 5. j; 6. a; 7. c; 8. e; 9. g; 10. i.

5.

1. The advantages of automation are: greater rapidity and precision in performing tasks, fewer risks of accidents, reduction of labour costs and possibility of doing more specialised jobs plus increase in production; 2. The input section of a PLC is made up of sensors, buttons or switches connected to the PLC and providing signals from the external world; 3. Industrial robots normally consist of a base connected to a manipulating arm; they are employed for operations such as welding, painting or component assembly; 4. Ladder Logic is the most commonly used PLC programme; it consists of two parallel bars connected by a series of rungs resembling a ladder and representing the wiring among the different components. The symbols of circuit diagrams drawn on these rungs represent inputs and outputs; 5. Smart refrigerators control expiry dates, make shopping lists or create recipes based on the ingredients available.

1.

1. Because it enables a very high degree of repeatability and precision, resulting in process optimisation and increased productivity; 2. Because they provide consistent painting performance better than any human, besides, automotive paint is toxic and the use of robots reduces risks for man; 3. Because it is a time consuming and dangerous work for humans which robots can do perfectly; 4. Because they can be quickly reprogrammed and arranged for multiple uses, avoiding loss of valuable time; 5. It optimises and reduces processing cycle time, ensuring accurate and safe results.

2.

1. d; 2. h; 3. j; 4. a; 5. i; 6. b; 7. c; 8. e; 9. g; 10. f.

3.

1. b; 2. a; 3. a; 4. d; 5. c; 6. c; 7. a; 8. b; 9. b; 10. d.

4.

1. T; 2. T; 3. F, The drive is the CPU of the robot; 4. F, It refers to the number of its movable joints; 5. F, Gantry robots are usually used in laser cutting.

5.

1. They are the most advanced kinds of robots with a built-in Artificial Intelligence system that learns from the environment and improves capabilities to continuously improve themselves; 2. Because they have a structure made up of a rigid frame, a muscular system to move the structure, a sensory system that receives information, a power source that activates the system, and a brain that tells the body what to do and how to move; 3. It is the type of path in which the robot is programmed to follow an irregular path represented by several points in close proximity; 4. It is a robot used in manufacturing which is able to perform high-skilled and precise tasks during any stage of production; 5. They are used in those situations that may be too dangerous for man, for example the army uses bomb disposal robots.

1.

1. Because they can make the healing process faster, safer, and smarter, both for caretakers and patients; 2. Robots offer companionship, mobility, and personalised care and one day they may be able to significantly reduce recovery time;

3. They are robots as small as a human cell; 4. Because they are much less likely to cause tissue damage and other issues than conventional surgery methods and may even be able to replace some pharmaceuticals; 5. Because it is difficult to create extremely small robots able to operate with high precision in very tiny spaces such as veins.

2.

1. b; 2. j; 3. g; 4. a; 5. f; 6. c; 7. e; 8. i; 9. h; 10. d.

3.

1. c; 2. b; 3. b; 4. a; 5. d; 6. b; 7. c; 8. d; 9. a; 10. c.

4.

1. F, Telepresence robots combine remote monitoring and control via telemetry; 2. T; 3. T; 4. F, Spherical robots usually have a telescopic axis; 5. F, They are usually used in spot welding while Gantry robots in arc welding.

5.

1. A robot is an automated machine that can perform specific tasks with high precision and speed; 2. It is the mechanical unit that performs tasks repeatedly based upon predetermined movements. It consists of five main parts: controller, end-effector, drive, arm and sensors; 3. Because robots can apply material precisely, besides, they replace humans in this operation which can be dangerous for health; 4. Robots can grant a much higher precision, they increase manufacturing speed, they replace humans in hazardous works, and labour costs are reduced; 5. They are mainly used in robot-assisted surgery in which they are controlled by a surgeon either through a telemanipulator or computer to perform very delicate medical procedures reducing risks of mistakes.

1.

1. It is an interactive, humanoid robot which resembles people. It is a robot actor, which can sing, act, perform and speak more than 30 languages; 2. It is 1.75 metres tall, weighs 33 kilograms, its body shell is made of aluminium and plastic and offers over 30 axes of movement controlled by a tablet; 3. They are used for face detection and automatic eye contact; 4. It has cameras and infrared depth sensors; 5. This humanoid robot is generally sold to museums, universities, and companies to communicate and entertain at exhibitions, trade shows, and events.

2.

1. b; 2. j; 3. g; 4. c; 5. i; 6. e; 7. d; 8. h; 9. f; 10. a.

3.

1. b; 2. c; 3. b; 4. a; 5. d; 6. a; 7. d; 8. c; 9. b; 10. c.

4.

1. F, IoT allows a greater number of products to be connected using standard protocols to decentralise decision-making processes; 2. T; 3. T; 4. F, When the electrons absorb the energy; 5. F, Micro drones are used by the British armed forces.

5.

1. Since connectivity is the basis of Industry 4.0, sophisticated identity and machine access management systems are used to provide secure communications and to protect information; 2. It uses a single real-time database for the entire organisation so any change during the process is easier and quicker. Besides this, it reduces inventory and allows for just-in-time manufacturing; 3. It is a type of AR that relies on geographic data to deliver digital images at specific locations through mobile devices; 4. Li-Fi stands for Light Fidelity: it is high speed communication of data in which multiple light bulbs form a wireless network able to send a signal by modulating the light at different rates; 5. A drone is a flying robot that can be remotely controlled or fly autonomously using software that works with sensors and through a global positioning system.

Unit 5.3 TEST 2

p. 227

1.

1. Because they are semi-automated, so quick to use and, since they fly, they do not have delays due to traffic; 2. It gives all the instructions to the drones to successfully deliver the package as soon as it is attached; 3. Because they are battery-operated and need no fuel to work; 4. Because drones can easily deliver life-saving necessities like medical supplies and appliances in remote areas of the world; 5. Because they were able to transport Covid-19 vaccines in rural and remote areas.

2.

1. g; 2. d; 3. j; 4. b; 5. a; 6. h; 7. c; 8. f; 9. e; 10. i.

3.

1. b; 2. d; 3. c; 4. a; 5. b; 6. b; 7. d; 8. c; 9. a; 10. b.

4.

1. T; 2. F, It reduces or even eliminates downtime; 3. T; 4. F, It is safe because it operates on optical bands which are not harmful to humans; 5. F,

Materials are melted inside the extruder and distributed in layers until the desired thickness, texture, and patterns are created.

5.

1. A smart factory is a digitalised, fully integrated manufacturing system that uses connected devices, machinery, and production systems to collect and share data to improve processes; 2. Virtual reality is a virtual surrounding that simulates reality, augmented reality is the addition of digital content upon the user's environment in real time; 3. A laser is created when electrons in the atoms of optical materials absorb the energy from an electrical current or light. That extra energy "excites" the electrons producing a very narrow beam of radiation; 4. In aerospace for the production of light, less expensive components, in healthcare for prostheses and implants using biocompatible materials, in the automotive sector to quickly fabricate prototypes of a physical part; 5. The assessment step allows the technology to analyse the data and provide helpful feedback before running the algorithm again.

Unit 6.1 TEST 1

p. 231

1.

1. electronic equipment; 2. medical monitoring devices; 3. measuring tools; 4. sales workers; 5. installation, operation and maintenance; 6. written by; 7. five years; 8. soft skills; 9. in laboratories/in a laboratory; 10. hands-on.

2.

1. annuncio; 2. candidato; 3. fiera dell'impiego; 4. comando; 5. padronanza; 6. header; 7. pre-screening; 8. education; 9. on time; 10. eye-contact.

3.

1. T; 2. F, Many companies' websites have a career section where they advertise positions; 3. F, They usually take place once a year; 4. T; 5. T; 6. F, It is an example of a soft skill; 7. F, A cover letter usually starts with a header; 8. T; 9. T; 10. T.

4.

1. d; 2. b; 3. g; 4. a; 5. e; 6. h; 7. f; 8. j; 9. c; 10. i.

5.

1. A job search engine helps people to find websites which post job ads; they are particularly useful for finding specialised job sites for particular fields of activity; 2. Soft skills, or personal skills, are abilities that people develop all over their entire life, but they are difficult to define or to measure, for example: communication skills; critical thinking; the ability of adapting to different and difficult situations;

creativity; problem solving; organisation and time management skills; willingness to learn; leadership skills; working in a team; decision-making skills; 3. A cover letter should contain: a header, an introduction paragraph, a central paragraph and a final paragraph and it should be addressed to the person or office in charge of the recruitment; 4. A one-on-one interview is the traditional type of interview where a candidate meets a hiring manager to answer questions; 5. For a job interview, candidates should wear comfortable but appropriate clothes, making sure they are clean and tidy and avoiding eccentric outfits.

Unit 6.1 TEST 2

p. 234

1.

1. to use; 2. build databases; 3. Internet and Intranet websites; 4. dedicated software; 5. program; 6. communication systems and devices; 7. colleagues and company managers; 8. local and wider; 9. mainframe computer systems; 10. provide (them) technical support.

2.

1. bacheca; 2. lavoro di squadra; 3. assumere; 4. risoluzione di problemi; 5. patente di guida; 6. hiring manager; 7. duty; 8. group interview; 9. graduate; 10. recruiting agency.

3.

1. F, It is much more common to change several jobs during people's working lives; 2. T; 3. T; 4. F, Schools and universities often have job placement services; 5. T; 6. F, Hard skills can be demonstrated showing a portfolio of works; 7. F, A CV should do that; 8. F, Proficiency in foreign languages can be stated in the CV; 9. T; 10. F, Many companies put the name of the hiring manager on their website.

4.

1. e; 2. h; 3. g; 4. a; 5. f; 6. b; 7. d; 8. c; 9. i; 10. j.

5.

1. During a job fair it is possible to leave your CV with any company you are interested in, talk to recruiters or even do interviews if your candidate profile matches the company's requirements; 2. Hard skills, or technical skills, are skills which are learned through education or work experience; they can be demonstrated through certifications, skill assessment tests, or by showing a portfolio of works; 3. A CV should contain: personal details, contact details, relevant work experience, details of education, personal skills or the abilities which may be of interest for a possible employer and additional information, including any references of previous employers; 4. A working interview is a type of

interview in which candidates are asked to perform the duties of a job in front of the interviewer to show how they work in real situations; 5. It is advisable to search for some information about the company and prepare some questions to ask the interviewer.

Unit 6.2 TEST 1

p. 237

1.

1. a; 2. i; 3. d; 4. j; 5. f; 6. c; 7. g; 8. b; 9. h; 10. e.

2.

1. permanent; 2. freelance; 3. part-time; 4. hierarchical; 5. vocational; 6. division; 7. salary; 8. perk; 9. commission; 10. ethics.

3.

1. F, They are outsourced employees; 2. T; 3. F, They are mandatory; 4. T; 5. T; 6. F, It is important to understand who they must answer to and what their position in the company is; 7. T; 8. F, They encourage workers to meet specific goals; 9. F, Good employers lead by example and encourage supervisors to do the same; 10. T.

4.

1. co-worker/colleague; 2. deadline; 3. incentive; 4. allowance; 5. functional; 6. leave; 7. remote/home; 8. seasonal; 9. fixed; 10. full.

5.

1. Students generally undertake internships to gain relevant skills in a particular field; vocational school students normally have to do a mandatory period of work experience, which is evaluated in their school curriculum; 2. (*Three of the following*): what function they are requested to serve, how and how fast; who they must answer to; what their position in the organisational structure of the company is; what the objectives of the team they belong to are; what equipment they will be responsible for; 3. It is important because it has a huge effect on employees' performance and the company's turnover; 4. (*Three of the following*): not giving up when a task is difficult but trying to find the best way of carrying it out; not engaging in improper behaviour that will endanger oneself or others; being dedicated to doing one's job, respecting schedules and deadlines; being disciplined, respecting co-workers and managers; not drinking or taking drugs before going to work; being a team player and helping co-workers when needed; being a good professional and taking care of the quality of the work done, even in difficult personal conditions; taking care to protect the health and safety of oneself and other people in the workplace; 5. Employers may lead by example, organise team workshops, organise feedback sessions and organise team building activities.

1.

1. j; 2. a; 3. i; 4. f; 5. e; 6. h; 7. c; 8. b; 9. g; 10. d.

2.

1. seasonal; 2. fixed-term; 3. remote work; 4. maternity leave; 5. department; 6. allowance; 7. incentive; 8. schedule; 9. co-workers; 10. organisational structure.

3.

1. F, It is generally unpaid; 2. F, Work experience is evaluated in the vocational school student's curriculum; 3. F, Contractors are freelance workers; 4. T; 5. F, It creates a network of departments; 6. T; 7. F, It is made up of their base salary plus bonuses or benefits; 8. T; 9. T; 10. T.

4.

1. ethics; 2. vocational; 3. hierarchical; 4. salary; 5. freelance; 6. part; 7. building; 8. fringe; 9. permanent; 10. apprenticeship.

5.

1. An agency work contract is a type of contract where the worker is employed by an agency that offers their services to the company which hired them, as an outsourced employee; 2. Graduates generally undertake an internship when they want to gain skills for a particular job; law and medicine graduates have to do a period of apprenticeship in order to work as lawyers or doctors; 3. A holiday bonus is a financial gift given at the end of the year; 4. Ethics is a system of moral principles affecting the way people make their decisions and lead their lives; 5. Team-building activities may reinforce relationships among colleagues and grow their skills for team work, as it has been proven that people work harder when they feel part of a team.

1.

1. F, He was the Thyssenkrupp manager who was condemned to prison; 2. T; 3. F, He was condemned more than three years after the accident; 4. T; 5. T; 6. F, Seven of the eight men died, one of them survived; 7. T; 8. F, It had never been considered a homicide in Italy before; 9. F, Both the victims' families and the company were not satisfied; 10. T.

2.

1. camice; 2. scarpe antinfortunistiche; 3.

avvisare/avvertire; 4. estintore; 5. emanare; 6. safety goggles; 7. premises; 8. no smoking; 9. protective gloves; 10. data breach.

3.

1. c; 2. d; 3. b; 4. a; 5. c; 6. a; 7. d; 8. b; 9. c; 10. a.

4.

1. f; 2. i; 3. a; 4. j; 5. g; 6. b; 7. c; 8. e; 9. d; 10. h.

5.

1. In order to be safe in a workplace, it is necessary to follow some general rules, such as wearing safety protections (a helmet, safety goggles, gloves, safety boots), making sure that machines and tools are turned off before working on them, following the machine or tool instructions provided by the manufacturer and always being concentrated all the time while working; 2. In case of electric shock it is necessary to separate the casualty immediately from the power source, using some insulating material but without touching them directly, turn off the electricity and call an ambulance; 3. These accidents often happen when workers, for example, climb on a chair instead of using ladders to reach objects in a high position; cables of PCs and other devices may cause workers to trip on them if they are not properly positioned; 4. According to the GDPR, to protect their online data people can ask for their deletion from the companies' data banks. They may also ask for the deletion of their name from search engines, and, in case of data breach, it is possible to inform the authorities; 5. Cookies store information about the websites visited by people, and they can be used to create a profile of the users, even for commercial purposes. For this reason, they can be a threat to people's privacy.

1.

1. F, It was a snowy day; 2. T; 3. T; 4. F, The victims died for breathing toxic fumes; 5. T; 6. T; 7. F, The emergency exits were locked; 8. F, Fireproof materials produced toxic fumes; 9. F, Smoke alarms and emergency exits were not obligatory; 10. T.

2.

1. occhiali di protezione; 2. scarica elettrica; 3. attrezzatura di emergenza; 4. guanti di protezione; 5. fuga di dati; 6. hard hat; 7. consent; 8. forklift; 9. to delete; 10. dry powder (fire) extinguisher.

3.

1. a; 2. b; 3. d; 4. c; 5. b; 6. b; 7. c; 8. a; 9. c; 10. d.

4.

1. c; 2. j; 3. h; 4. a; 5. b; 6. f; 7. d; 8. g; 9. e; 10. i.

5.

1. Rectangular signs have different functions: green ones generally indicate emergency equipment or a direction to follow; red ones show where the fire equipment in a building is; 2. Both employers and workers have some responsibilities about safety: employers generally provide instructions in the places where machines and tools are generally installed, together with safety signs; workers and visitors must pay attention to these signs and respect the rules shown; 3. In case of fire it is necessary to leave the area soon, possibly closing the doors behind you. If you smell smoke, ring the alarm, then help evacuate the building and call the fire brigade immediately; 4. They are: wrong procedures in the use of machinery, tiredness and stress in the workplace; it is also important to avoid taking alcohol and drugs when working; 5. To create a strong password it is advisable not to use personal information, such as pets' names or date of birth; a strong password should also include some capital letters, special characters or numbers.

Unit 6.4 TEST 1

p. 249

1.

1. A project manager may solve problems for their clients and teams, while individual contributors may solve problems for themselves or their coworkers; 2. You should brainstorm all possible ways to solve the problem, ask for suggestions from everyone involved, and consult people with more experience; 3. It is about assessing the positive and negative consequences of each alternative; 4. You should select a solution that can smoothly solve the problem without creating any other problems; 5. You should gather data and feedback to determine if the solution meets the needs of all those involved.

2.

1. c; 2. f; 3. a; 4. g; 5. b; 6. h; 7. j; 8. i; 9. d; 10. e.

3.

1. always; 2. subject line; 3. opening greeting; 4. can; 5. few; 6. short pleasantry; 7. usually; 8. brief; 9. references; 10. may.

4.

1. T; 2. F, Traditional business letters are still used; 3. F, Enclosures contain the number of enclosed documents; 4. F, Not too many colours and fonts should be used to avoid confusion; 5. T.

5.

1. You should introduce yourself (name, company and role in the company), you should be polite and

ask the caller what you can do for them, you should connect the caller to the person they want to speak to or ask them if they want to leave a message; 2. *Sample answer.* If you have any questions, please do not hesitate to contact me; 3. They should contain the presentation of the company, the purpose of the letter, information or requests; 4. Use presentation tools and software, ask rhetorical questions to reinforce the primary message, make your presentation fun and engaging; 5. *Sample answer.* The percentage of the sales gradually went down over the same period of time.

Unit 6.4 TEST 2

p. 252

1.

1. Because they can make you improve your job position; 2. They refer to all the qualities you need to create and deliver a clear and effective presentation; 3. They value both the content and the ability to create supporting materials such as slides; 4. The ability to give engaging and easy-to-understand talks; 5. It involves research and analysis of the audience you'll be presenting to and what most interests them.

2.

1. i; 2. f; 3. b; 4. h; 5. a; 6. g; 7. j; 8. c; 9. e; 10. d.

3.

1. little; 2. must be; 3. requests; 4. heading; 5. US; 6. rhetorical questions; 7. relationship between; 8. reduce or remove; 9. in a team; 10. can.

4.

1. T; 2. T; 3. F, Business letters can keep a message personal and unavailable to other people; 4. F, It should contain only necessary information; 5. F, It is to present data that is too numerous or complicated to be described in a text.

5.

1. You introduce yourself, make sure the listener is available to talk and, if not, schedule an appointment, state the purpose of the call and deliver the message in a clear way, making sure the person has understood the message. End the call by thanking the listener; 2. *Sample answer.* I appreciate you taking the time to help me with this project; 3. The signature should usually be followed by the signer's role in the company; 4. It allows the company to build a good impression and brand image, it provides fundamental information in an engaging way, and it helps influence the listener's decisions; 5. *Sample answer.* The figure rose steadily between March and July.



MODULE TESTS

The following tests aim at verifying the knowledge, abilities, and competences of students for each module of the text. Each test is available in two versions and is about 50 minutes long. The material is editable so that each teacher can adapt it easily to each of their classes and each of their students, even SEN students. Visit the publishing house website: www.edisco.it.

Name

Class Date

Choose the correct option.

1. Atoms are...
 - a. particles carrying a negative charge.
 - b. neutral.
 - c. particles carrying a positive charge.
 - d. particles of amber.
2. An atom which has lost electrons...
 - a. becomes a positive ion.
 - b. has no electric charge.
 - c. becomes a negative ion.
 - d. has got a negative charge.
3. Electric current...
 - a. is measured in volts.
 - b. can only be produced by generators.
 - c. is static.
 - d. consists of the movement of electric charges.
4. Which of the following statements is true?
 - a. Potential difference is measured in ampères.
 - b. Direct current flows in one direction only.
 - c. Resistance is measured in volts.
 - d. Alternating current flows in one direction only.
5. A conductor...
 - a. blocks the passage of electric current.
 - b. does not contain free electrons.
 - c. allows the passage of electric current.
 - d. is a material such as wood, plastic, rubber.
6. Which of the following statements is false?
 - a. Superconductivity was discovered in 1911.
 - b. Mercury becomes a superconductor in certain environmental conditions.
 - c. Superconductors work well at room temperature and normal pressure.
 - d. A superconductor opposes almost no resistance to the passage of current.
7. A short circuit...
 - a. has a switch that interrupts the flow of current when it is open.
 - b. is not connected to a power source.
 - c. is made by a short piece of wire.
 - d. occurs when current follows a wrong or unexpected path.
8. Choose the correct statement about series circuits.
 - a. They have only one path for the current to flow.
 - b. If one of the loads connected in series does not work, the others continue to work.
 - c. Generators are connected in series when a higher amount of current is needed.
 - d. The voltage is the same for each load connected to the circuit.

9. Choose the correct option.
- Halogen bulbs contain a carbon filament.
 - The first electric bulb was invented in the late 1870s.
 - Incandescent bulbs consume less energy than CFL ones.
 - LED bulbs contain mercury vapours.
10. Which of the following is a component of any type of battery?
- Metal hydride.
 - Cathode.
 - Zinc.
 - Lithium.
11. Which of the following is a secondary cell battery?
- Zinc-carbon.
 - Alkaline.
 - NiMH.
 - Silver-oxide.
12. Where are generators employed?
- In power stations.
 - In electric cars.
 - In washing machines.
 - In hybrid electric vehicles.
13. Which of the following energy sources is non-renewable?
- Water.
 - Sun.
 - Nuclear.
 - Wind.
14. Choose the correct statement about fossil fuels.
- They are not easily available.
 - They are a clean source of energy.
 - They are not very energy efficient.
 - Natural gas and oil are examples of fossil fuels.
15. What is a dam?
- A channel through which water is pumped.
 - A structure located near a water stream.
 - A sort of artificial lake.
 - A device generating electricity.
16. Which of the following devices are made of semiconductors?
- Wind turbines.
 - CSP systems.
 - Nuclear reactors.
 - Photovoltaic panels.
17. Which of the following statements is false?
- Ethanol is produced from palm oil.
 - Biomass is renewable.
 - Biomass is a clean source of energy.
 - The use of biomass can solve the problem of waste disposal.

- 18.** Choose the correct option.
- a.** In nuclear fission, atoms of radioactive materials are fused together.
 - b.** Nuclear fission creates toxic waste.
 - c.** Nuclear power produces a big amount of carbon emissions.
 - d.** Uranium supplies are unlimited.
- 19.** What is a power grid?
- a.** A structure containing devices to increase voltage.
 - b.** The system by which electricity is produced and delivered.
 - c.** A plant in which voltage is decreased.
 - d.** An area where pylons carrying high voltage cables are installed.
- 20.** Which of the following statements about transformers is false?
- a.** Big transformers are components of the power grid.
 - b.** Transformers are used to regulate voltage in battery chargers.
 - c.** Signal and audio transformers are quite small.
 - d.** Transformers are devices that produce electricity.
- 21.** Which of the following is not a component of a smart grid?
- a.** A smart meter.
 - b.** PMU.
 - c.** A flywheel.
 - d.** A digital protective relay.
- 22.** Which of the following is a type of DC motor?
- a.** A three-phase motor.
 - b.** A brushed motor.
 - c.** A single-phase motor.
 - d.** A synchronous motor.
- 23.** Which of the following devices do not work on electromagnetic induction?
- a.** Smartphones.
 - b.** Transformers.
 - c.** Electric alarm bells.
 - d.** Generators.
- 24.** Which of the following vehicles can be recharged at a charging station?
- a.** HEV.
 - b.** Petrol engine.
 - c.** PHEV.
 - d.** Diesel-fuelled cars.
- 25.** What is the range of an electric vehicle?
- a.** The maximum speed the vehicle can reach.
 - b.** The time required to reach maximum speed.
 - c.** The distance it can travel with one charge.
 - d.** The amount of kilowatts required to recharge the battery.

Total score/50

Name

Class Date

Choose the correct option.

1. Electricity...
 - a. is a flow of protons.
 - b. is not a natural phenomenon.
 - c. was first experienced in ancient Greece.
 - d. is a flow of neutrons.
2. An atom which has gained electrons...
 - a. has a positive charge.
 - b. becomes a negative ion.
 - c. is neutral.
 - d. becomes a positive ion.
3. Voltage...
 - a. is also called potential difference.
 - b. is measured in ampères.
 - c. is measured in ohms.
 - d. cannot be measured.
4. Which of the following statements is false?
 - a. Copper wires oppose no resistance to the passage of current.
 - b. Direct current is normally used to recharge laptop batteries.
 - c. In alternating current, the voltage continuously changes from positive to negative.
 - d. The movement of electrons occurs when an imbalance is produced.
5. Insulators...
 - a. allow the passage of current.
 - b. contain a great number of free electrons.
 - c. are materials such as copper.
 - d. are very important for safety.
6. The basic components of a circuit are...
 - a. a switch and a fuse.
 - b. resistors that regulate the current flow.
 - c. a source, a load and wires to connect the components.
 - d. an ammeter and a cable.
7. Which of the following is not an application of semiconductors?
 - a. An MRI machine.
 - b. A thermometer.
 - c. A high-energy particle accelerator.
 - d. A maglev train.
8. Choose the correct statement about parallel circuits.
 - a. Current follows a different path for each load.
 - b. Older Christmas tree lights were connected in parallel.
 - c. The amount of current flowing is the same for all the loads in the circuit.
 - d. The voltage is the sum of the individual voltages of the loads.

9. Choose the correct option.
- a. Incandescent bulbs are the most energy-saving lamps available.
 - b. Halogen bulbs contain mercury vapours.
 - c. LED bulbs are made of semiconducting material.
 - d. CFL bulbs contain a tungsten filament.
10. Which of the following is not a component of a battery cell?
- a. Electrolyte.
 - b. Cathode.
 - c. Anode.
 - d. Armature.
11. Which of the following types of battery cannot be recharged?
- a. Lithium-ion.
 - b. Zinc-air.
 - c. Lead-acid.
 - d. NiMH.
12. Which of the following statements is true?
- a. A generator producing direct current is called a dynamo.
 - b. Alternators are mostly employed for battery recharging.
 - c. A generator converts electricity in mechanical energy.
 - d. A generator producing direct current is called an alternator.
13. Which of the following energy sources depends on weather conditions?
- a. Wind.
 - b. Nuclear.
 - c. Geothermal.
 - d. Fossil fuels.
14. Which of the following statements is false?
- a. Burning fossil fuels releases greenhouse gases.
 - b. Coal is an example of fossil fuel.
 - c. Fossil fuels need to be treated before use.
 - d. Fossil fuels are a non-renewable source of energy.
15. Which of the following water-powered plants does not exist?
- a. Hydroelectric power plants connected to a dam.
 - b. Tidal hydroelectric power plants.
 - c. Wave power plants.
 - d. Rainfall power plants.
16. What is a wind farm?
- a. A place where animals are grown.
 - b. A number of wind turbines installed together in an area.
 - c. A device that uses wind to rotate.
 - d. A renewable form of energy that exploits the kinetic energy of wind.
17. Which of the following statements is false?
- a. Geothermal energy exploits the natural heat of the Earth's core.
 - b. Geothermal energy is used both for heating and generating power.
 - c. Geothermal energy is a non-renewable source of energy.
 - d. Heat is generated underground by chemical and nuclear reactions.

- 18.** Choose the correct option.
- a. Nuclear power plants have high running costs.
 - b. There is no cooling system in a nuclear reactor.
 - c. Nuclear fusion is the process currently used to generate electricity.
 - d. Nuclear power plants have sophisticated security systems.
- 19.** What is a substation?
- a. A structure where voltage is increased or reduced.
 - b. A plant where electricity is produced.
 - c. A network of high voltage cables.
 - d. A device increasing or decreasing voltage.
- 20.** Which of the following is not a part of a transformer?
- a. Battery charger.
 - b. Secondary winding.
 - c. Primary winding.
 - d. Magnetic core.
- 21.** Which of the following energy storage methods uses molten salt?
- a. Kinetic storage.
 - b. Battery storage.
 - c. Thermal storage.
 - d. Pumped hydroelectric storage.
- 22.** Which of the following is a part of an electric motor?
- a. Generator.
 - b. Torque.
 - c. Conveyor belt.
 - d. Stator.
- 23.** Which of the following devices do not work on electromagnetic induction?
- a. Loudspeakers.
 - b. Maglev trains.
 - c. Electric ovens.
 - d. Microphones.
- 24.** Which of the following is not a component of an electric vehicle?
- a. A VCU.
 - b. A transmission unit.
 - c. Big rechargeable batteries.
 - d. Primary cell batteries.
- 25.** Which of the following electric vehicles have a petrol engine, too?
- a. EVs.
 - b. PHEVs.
 - c. HEVs.
 - d. Maglev trains.

Total score/50

Name

Class Date

Choose the correct option.

1. The origin of electronics dates back to...
 - a. 1971.
 - b. 1945.
 - c. 1904.
 - d. 1947.
2. A. J. Fleming invented...
 - a. the triode.
 - b. the ENIAC.
 - c. the vacuum diode.
 - d. the transistor.
3. Which of the following are not applications of electronics?
 - a. 3D printers.
 - b. Light bulbs.
 - c. Barcode scanners.
 - d. Automated systems.
4. A P-type semiconductor...
 - a. is made of silicon doped with phosphorus.
 - b. has five valence electrons per atom.
 - c. does not contain silicon.
 - d. has three valence electrons per atom.
5. Which of the following sentences is correct?
 - a. A transistor can either block or amplify current.
 - b. The invention of transistors made electronic circuits bigger.
 - c. A transistor normally has two terminals.
 - d. BJTs can only have a PNP configuration.
6. Which of the following is an active electronic component?
 - a. A resistor.
 - b. A diode.
 - c. An inductor.
 - d. A transistor.
7. A capacitor can also be called...
 - a. a switch.
 - b. a condenser.
 - c. an amplifier.
 - d. a circuit.
8. Which of the following electronic components can emit light?
 - a. An inductor.
 - b. A resistor.
 - c. A diode.
 - d. A transistor.

- 9.** Colour coding was established by...
- a. manufacturing companies of electronic components.
 - b. a group of engineers from Silicon Valley.
 - c. a group of IT researchers.
 - d. the workers of a transistor manufacturing company.
- 10.** In the colour coding of resistors, what do the first two bands represent?
- a. The multiplier.
 - b. The value of resistance.
 - c. The value of tolerance.
 - d. The measuring unit of resistance.
- 11.** The value of capacitance of a capacitor is expressed in...
- a. Microhenries.
 - b. Ohms.
 - c. Picofarads.
 - d. Coulombs.
- 12.** Analogue signals...
- a. vary continuously in time.
 - b. vary in a discrete way.
 - c. have two defined levels.
 - d. can be transmitted more faithfully than digital ones.
- 13.** An integrated circuit...
- a. is made of a plastic base.
 - b. is more expensive than a traditional one.
 - c. has all components assembled in a single block.
 - d. has all components connected to it by wires.
- 14.** A digit is...
- a. a key in a keyboard.
 - b. a number from 0 to 9.
 - c. a line on a graded scale.
 - d. a pointer on a dial.
- 15.** The binary system...
- a. is the base of all computing systems.
 - b. can only represent small numbers.
 - c. measures the speed of Internet connections.
 - d. uses numbers from 1 to 9 in a particular sequence.
- 16.** In a NOT gate...
- a. the logic state is inverted.
 - b. the output is false if the input is false.
 - c. the output is false if both inputs are false.
 - d. the output is true if both inputs are the same.
- 17.** Which of the following is a derived logic gate?
- a. AND.
 - b. OR.
 - c. NAND.
 - d. NOT.

- 18.** An amplifier...
- a.** produces a voltage in a continuous waveform.
 - b.** is always free from distortion.
 - c.** does not need any feedback.
 - d.** makes an electric current stronger.
- 19.** What is the function of a sensor?
- a.** To get a signal and transform it into motion.
 - b.** To detect physical inputs from the environment.
 - c.** To connect two electronic devices through the Internet.
 - d.** To make sliding doors move sideways.
- 20.** Which of the following processors is specifically designed for audio signal processing?
- a.** A CPU.
 - b.** A GPU.
 - c.** A DSP.
 - d.** A vision processing unit.
- 21.** The ROM...
- a.** is the permanent memory of the computer.
 - b.** is a temporary memory used to store data for a short period.
 - c.** loses data if the device is turned off.
 - d.** is a particular type of RAM where data is easily retrieved.
- 22.** Which of the following sentences is correct?
- a.** A microcontroller is more complex than a microprocessor.
 - b.** Arduino's codes and design are not available to the public.
 - c.** A microcontroller is designed for specific purposes.
 - d.** Microprocessors are mainly used in embedded systems.
- 23.** Which of the following chips combine different types of circuits?
- a.** Logic chips.
 - b.** Systems-on-chips.
 - c.** Single-purpose chips.
 - d.** Memory chips.
- 24.** The process of exposing the microchip to ultraviolet light to imprint the pattern is called...
- a.** etching.
 - b.** doping
 - c.** encasing.
 - d.** photolithography.
- 25.** What is circuit density?
- a.** The scale of integration of a circuit.
 - b.** The size of a microprocessor.
 - c.** The number of transistors that a circuit contains.
 - d.** The number of logic circuits a microprocessor contains.

Total score/50

Name

Class Date

Choose the correct option.

1. The first electronic component invented was...
 - a. the triode.
 - b. the vacuum diode.
 - c. the integrated circuit.
 - d. the ENIAC.
2. The first computer...
 - a. was invented in China.
 - b. was very bulky.
 - c. employed a large number of transistors.
 - d. appeared in 1971.
3. Integrated circuits were developed...
 - a. between 1958 and 1959.
 - b. between 1970 and 1971.
 - c. between 1945 and 1947.
 - d. during the Second World War.
4. An N-type semiconductor...
 - a. has three holes in its atomic structure.
 - b. can be obtained by doping silicon with arsenic.
 - c. has four electrons in its atomic structure.
 - d. is made of pure silicon.
5. Which of the following is not a terminal of a FET?
 - a. The source.
 - b. The drain.
 - c. The collector.
 - d. The gate.
6. Which of the following sentences is correct?
 - a. An active electronic component can control the voltage flow.
 - b. Transistors are made of two layers of semiconductors.
 - c. Diodes are made of three different types of semiconductors.
 - d. Transistors can only act as a switch in a circuit.
7. Inductors...
 - a. are used to protect the circuits from an excess of current.
 - b. are made of a coil of wire wound around a core.
 - c. store electric energy in electronic circuits.
 - d. are made of different types of semiconductors.
8. Which of the following electronic components is a rectifier?
 - a. A transistor.
 - b. A resistor.
 - c. A capacitor.
 - d. A diode.

9. What is colour coding?
- A way of communicating among engineers in electronics.
 - A system for calculating the power of a circuit.
 - An internationally recognised code.
 - A system which classifies transistors.
10. What is the function of colour coding?
- It makes electronic components more attractive.
 - It distinguishes resistors from transistors.
 - It reduces the size of electronic components.
 - It shows the values of electronic components more easily.
11. Which of the following sentences is correct?
- Inductors have a colour coding pattern different from resistors.
 - The unit for measuring capacitance is the henry.
 - Capacitors' bands are drawn vertically on them.
 - Resistors usually have three coloured bands.
12. A digital signal...
- varies in a discrete way between two given values.
 - represents a physical phenomenon.
 - varies continuously in time.
 - is subject to noise or degradation.
13. Mixed signal circuits...
- are mainly used in voltage and power amplifiers.
 - do not need to transform signals.
 - are used as analogue-digital converters.
 - are also known as "logic gates".
14. A traditional electronic circuit...
- has all its components printed on a single piece of plastic.
 - has traces functioning as connecting wires.
 - can be produced in large quantities.
 - is more suitable than an integrated circuit to fit into electronic components.
15. Uploading and downloading speed is measured in...
- strings.
 - digits.
 - bits.
 - bytes per second.
16. An AND gate...
- is a derived type of logic gate.
 - makes the output true if both inputs are true.
 - has one input only.
 - makes the output false if both inputs are true.
17. A typical application of an XOR gate is...
- a burglar alarm system.
 - an appliance such as a washing machine.
 - a game show buzzer.
 - lighting systems with two switches.

- 18.** Distortion...
- a. is a technique to avoid amplification.
 - b. is a very common phenomenon in amplification.
 - c. is a technique which compares input and output signals.
 - d. is a phenomenon which cannot be avoided.
- 19.** An oscillator...
- a. amplifies an electric signal.
 - b. can block the flow of current or allow it to pass.
 - c. produces voltage or current in regular pulses.
 - d. transforms AC into DC.
- 20.** An actuator...
- a. transforms signals into mechanical action.
 - b. monitors inputs from the environment.
 - c. has a fundamental role in IoT.
 - d. provides Internet connection.
- 21.** Which of the following sentences is correct?
- a. VLSI was introduced in the early 1970s.
 - b. Nowadays, a circuit contains thousands of transistors.
 - c. LSI was introduced in the early 1970s.
 - d. VLSI increased the dimensions of chips.
- 22.** In a CPU, the system of logic circuits that provides logic instructions for data processing is called...
- a. ALU.
 - b. register.
 - c. Control Unit.
 - d. RAM.
- 23.** Which of the following chips are used for repetitive routines?
- a. Logic chips.
 - b. Memory chips.
 - c. System-on-chips.
 - d. Single-purpose chips.
- 24.** “Doping” is...
- a. the process of making silicon from sand.
 - b. the process of adding chemicals to a silicon chip.
 - c. the cutting of an ingot into silicon wafers.
 - d. the process of attaching wires to a microchip.
- 25.** An ingot is...
- a. a thin slice of silicon.
 - b. the raw material chips are made of.
 - c. a cylinder made of melted silicon.
 - d. the initial design of a microchip.

Total score/50

Name

Class Date

Choose the correct option.

1. Which of the following statements best describes mainframe computers?
 - a. They are mainly used in scientific fields such as weather forecasting and scientific simulations.
 - b. They are designed to support a lot of users and multiple programs simultaneously.
 - c. They are designed for personal work and for entertainment.
 - d. They are mainly used for gaming.
2. Hardware refers to...
 - a. hard or rigid components of a computer.
 - b. a set of programs, instructions and data.
 - c. drivers.
 - d. magnetic storage.
3. What is the CPU?
 - a. It is an external device.
 - b. It is the unit containing all the circuitry needed to process input, data and output results.
 - c. It is a peripheral.
 - d. It is the set of ports of a computer.
4. In which of the following steps of the machine cycle is instruction retrieved from memory?
 - a. Decode.
 - b. Execute.
 - c. Fetch.
 - d. Store.
5. Which of the following statements best describes a concept keyboard?
 - a. Its name comes from the first row of letters on the upper left hand-side.
 - b. It is only wireless.
 - c. It is usually the on-screen keyboard of tablets and smartphones.
 - d. It uses icons or images as keys.
6. What is the main feature of a LED monitor?
 - a. It uses light-emitting diodes to light the screen's pixels.
 - b. It is heavy and requires a lot of energy.
 - c. The light comes from all angles and is directed toward the viewer's eyes.
 - d. It has two polarised layers of glass where the liquid crystals let the light pass or block it.
7. What are sensors?
 - a. They are devices able to read information in pre-defined areas.
 - b. They are devices that take signals from a computer and convert them into some form of motion.
 - c. They are devices that are usually linked to a control program that continuously collects data.
 - d. They are devices that read characters written in a special ink sensitive to magnetic fields.

8. Which of the following statements refers to primary storage?
- It is used for the storage of programs and data that are not needed immediately by the computer.
 - It is an auxiliary memory that temporarily stores frequently used data.
 - It is the space where data and applications are stored for a short period of time.
 - It is an optical storage device.
9. Which of the following is a feature of a DVD-RW?
- It contains non-modifiable permanent data.
 - It is read by a blue/violet laser beam.
 - It is a magnetic state device.
 - It can be written or recorded many times.
10. 3.5 mm ports are for...
- high-definition audio and visual signals.
 - audio transmission only.
 - analogue computer monitors.
 - data stored on SD cards.
11. What does the rectangle symbol represent in a flowchart?
- The beginning / end of the process.
 - The relationship between steps.
 - The process of an operation.
 - The decision a certain action takes.
12. Which of the following features does not belong to an LLL?
- It is similar to a natural language.
 - Its main function is to interact with the hardware.
 - It is a sort of text translation of the binary code.
 - It represents basic computer instructions.
13. What is an assembler?
- It is a translation program that converts a program into an object file.
 - It is a translation program that converts a program into machine code line by line.
 - It is a translation program that translates an LLL into an HLL.
 - It is a translation program that translates assembly language into machine code.
14. Which generation of language does Python belong to?
- Second.
 - Fifth.
 - Fourth.
 - Third.
15. Which of the following language is procedural-oriented?
- Java.
 - C.
 - C#
 - Python.
16. Which of the following HTML tags represents the closing of a document?
- `</html>`
 - `</h>`
 - `</body>`
 - `<!DOCTYPE html>`

17. Which of the following statements refers to a multiuser OS?
- It allows different users to use a computer's resources simultaneously.
 - It is used to control machineries.
 - It manages several computers at the same time.
 - It is generally used in giant server farms.
18. Which of the following is an open-source OS?
- iOS.
 - MacOS.
 - Linux.
 - Windows.
19. Revision is a function that allows users to...
- format a text.
 - add notes to a text.
 - insert images into a text.
 - define the margins of a text.
20. What type of chart is a bar chart?
- A chart in which data is divided into segments of a circle.
 - A chart that shows data as points in connected by a line.
 - A chart that shows data as a series of rectangular shapes.
 - None of the above.
21. In photo editing software, what is the air brushing function used for?
- To cover up imperfections.
 - To select a part of the image.
 - To add elements to an existing photo.
 - To adjust the contrast of colours.
22. Which of the following is not a feature of desktop publishing?
- It has a wide range of tools.
 - It can create 3D models.
 - It can create virtual pages.
 - It can edit two pages side-by-side.
23. Which of the following is not an element of GPS?
- User equipment.
 - Space satellites.
 - Ground control.
 - Monitors.
24. How does augmented reality enhance the real world?
- It creates a fictional reality.
 - It adds virtual digital elements to a live view.
 - It replaces real training.
 - It connects computers to smartphones.
25. What is the most used language for gaming code?
- C++.
 - C.
 - C#.
 - HTML.

Name

Class Date

Choose the correct option.

1. Which of the following statements best describes workstations?
 - a. They are designed for personal work and for entertainment.
 - b. They are single-user computers that perform a single task with great accuracy, designed for technical or business applications.
 - c. They are mainly used in scientific fields such as weather forecasting and scientific simulations.
 - d. They are mainly used for gaming.
2. Software refers to...
 - a. the rigid components of a computer.
 - b. a set of programs, instructions and data.
 - c. magnetic storage.
 - d. optical devices.
3. Which of the following does not belong to system software?
 - a. Memory.
 - b. Operating system.
 - c. Drivers.
 - d. Utility software.
4. In which of the following steps of the machine cycle is instruction translated into computer commands?
 - a. Fetch.
 - b. Execute.
 - c. Store.
 - d. Decode.
5. Which of the following is a primary input device?
 - a. A scanner.
 - b. A webcam.
 - c. A microphone.
 - d. A mouse.
6. What is the main feature of a curved monitor?
 - a. It is heavy and requires a lot of energy.
 - b. It uses light-emitting diodes to light the screen's pixels.
 - c. The light comes from all angles and is directed toward the viewer's eyes.
 - d. It has two polarised layers of glass where the liquid crystals let the light pass or block it.
7. What are actuators?
 - a. They are devices that take signals from a computer and convert them into some form of motion.
 - b. They are devices that read characters written in a special ink sensitive to magnetic fields.
 - c. They are devices able to read information in pre-defined areas.
 - d. They are devices that are usually linked to a control program that continuously collects data.

8. Which of the following statements refers to secondary storage?
- It is an auxiliary memory that temporarily stores frequently used data.
 - It is a short-term memory where data is temporarily stored as electric signals.
 - It is the space where data and applications are stored for a short period of time.
 - It is used for storing backups of programs and data in case the original ones cannot be used anymore.
9. Which of the following is a feature of a DVD-R?
- It is read by a blue/violet laser beam.
 - It contains non-modifiable permanent data with a large capacity.
 - It can be written or recorded many times.
 - It is a magnetic device.
10. VGA ports are for...
- data stored on SD cards.
 - the connection of an analogue computer monitor to other monitors, projectors or televisions.
 - high-definition visual signals.
 - audio transmission only.
11. What does the diamond symbol represent in a flowchart?
- The decision a certain action makes.
 - The relationship between steps.
 - The beginning / end of the process.
 - The process of an operation.
12. Which of the following is a feature of an HLL?
- It is a translation of the binary code.
 - It directly interacts with the hardware.
 - It represents basic computer instructions.
 - It must be translated into machine language before being executed.
13. What is an interpreter?
- It is a translation program that translates an LLL into an HLL.
 - It is a translation program that converts a program into machine code line by line.
 - It is a translation program that translates assembly language into machine code.
 - It is a translation program that converts the program into an object file.
14. In which generation of language were report writers included?
- First.
 - Sixth.
 - Fourth.
 - Second.
15. What is an object-oriented programming language?
- It organises software around data.
 - It is a low-level language.
 - It is used to define actions.
 - It organises software around logic and functions.
16. Which of the following HTML tags represents the opening of a document?
- `<!DOCTYPE html>`
 - `</html>`
 - `<html>`
 - `<h>`

- 17.** Which of the following statements refers to a real time operating system?
- a. It allows different users to use a computer's resources simultaneously.
 - b. It is designed to run a few tasks with very precise timing and a high degree of precision.
 - c. It lets a single user have several applications in operation at the same time.
 - d. It is generally used in giant server farms.
- 18.** Which of the following OS does not have bugs and hackers?
- a. Apple macOS.
 - b. Android.
 - c. Linux.
 - d. Windows.
- 19.** Text formatting is a function that allows users to...
- a. select the orientation of the page.
 - b. insert images and audio into a text.
 - c. add notes to a text.
 - d. choose the appearance of a text.
- 20.** Which of the following is a feature of a notebook application?
- a. Arranging data in columns or rows on a worksheet.
 - b. Recognising a user's handwriting.
 - c. Creating and managing databases.
 - d. None of the above.
- 21.** Which of the following software creates images made up of pixels?
- a. Raster graphic software.
 - b. Vector graphic software.
 - c. Animation software.
 - d. CAD.
- 22.** Which of the following software converts drawings into manufacturing instructions?
- a. Painting software.
 - b. DTP.
 - c. CAD.
 - d. Photo editor.
- 23.** In GPS, what does not belong to ground control?
- a. User equipment.
 - b. Master control stations.
 - c. Ground antennas.
 - d. Monitor stations.
- 24.** Which of the following devices is used in virtual reality?
- a. Microphones.
 - b. Cameras.
 - c. Smart glasses.
 - d. Headset.
- 25.** Which of the following is not a feature of an LMS?
- a. It offers support for file sharing.
 - b. It can be accessed from anywhere with an Internet connection.
 - c. It can be accessed only within the organisation network.
 - d. It has an extensive feature-set.

Name

Class Date

Choose the correct option.

1. Which of the following statements best describes a transmitter?
 - a. It is the medium that carries the message.
 - b. It is the final stage in the communication system.
 - c. It is an electronic device that transmits data received by the transducer.
 - d. It is an object which encodes message data and transmits the information to the receiver.
2. In radiation, what is the wavelength?
 - a. The distance between the highest/lowest points of two consecutive waves.
 - b. The highest point of a wave.
 - c. The lowest point of a wave.
 - d. The distance from the centre line to the top of a crest.
3. In which radio waves is AM included?
 - a. ELF and VLF.
 - b. VHF and UHF.
 - c. LF and MF.
 - d. SHF and EHF.
4. Which of the following is not a characteristic of coaxial cables?
 - a. They carry signals at high frequency.
 - b. They have no metallic shielding.
 - c. They have an external PVC jacket.
 - d. They contain a dielectric insulator.
5. Which of the following type of cables are the most suitable for areas with electrical interference?
 - a. Coaxial.
 - b. Unshielded twisted pairs.
 - c. Shielded twisted pairs.
 - d. Fibre optic.
6. Which of the following is the most common type of long-range wireless transmission?
 - a. Bluetooth.
 - b. Antennas.
 - c. Wi-Fi.
 - d. Infrared.
7. A hub is...
 - a. a small device used to connect multiple devices in a network.
 - b. the computer used by the users of the network to access the servers.
 - c. a device which works as the central point between computers and networks.
 - d. a powerful computer that stores data or applications.
8. An Internet Service Provider (ISP) is...
 - a. a set of rules for data communication.
 - b. software that enables computers of a network to exchange data, programs and peripherals.
 - c. a company that provides access to the Internet.
 - d. a type of hardware connectivity.

- 9.** What is the main feature of a bus topology network?
- a.** The devices are positioned along a line.
 - b.** A hub, which is the central node, connects all the computers of the network.
 - c.** Nodes in particular areas are connected along a backbone, while stars are nested with other stars.
 - d.** None of the above.
- 10.** Which is the system in which computers connect to each other within houses, schools, or office buildings?
- a.** MAN.
 - b.** PAN.
 - c.** LAN.
 - d.** WAN.
- 11.** What is the structure of an IP address?
- a.** A set of four numbers which range from 0 to 100.
 - b.** A set of four numbers which range from 0 to 255.
 - c.** A set of four numbers and four letters.
 - d.** A set of eight numbers.
- 12.** Which of the following statements refer to circuit switching?
- a.** Data is broken into smaller pieces of information.
 - b.** Data is transmitted in sequence, following a chronological order and through the same channel.
 - c.** The data packets are reassembled to the original message when they reach destination.
 - d.** It is the way data moves through the Internet.
- 13.** What is a web browser?
- a.** A software application used to access and view websites.
 - b.** A set of related web pages located under a single domain name.
 - c.** A hardware component.
 - d.** A software application that translates the text-based domain name into the correct IP address.
- 14.** Which web generation does the use of metadata belong to?
- a.** Web 1.0.
 - b.** Web 2.0.
 - c.** Web 3.0.
 - d.** Web 4.0.
- 15.** Why is hybrid-cloud computing so called?
- a.** Because it is a single-tenant environment.
 - b.** Because it is a multi-tenant environment.
 - c.** Because it is a combination of at least two computing environments.
 - d.** None of the above.
- 16.** Which of the following statements does not refer to a blog?
- a.** It is a sort of personal or informational journal.
 - b.** Users start a discussion with a thread.
 - c.** It is usually in diary-style.
 - d.** It normally has a header with a menu or navigation bar.

17. Which of the following is a feature of a file hosting service?
- It hosts online materials that can be downloaded from a single server.
 - Each computer acts as both a server and a client.
 - The file is downloaded from multiple locations simultaneously.
 - It has the same file stored on many peers.
18. What type of apps do maps belong to?
- Lifestyle apps.
 - Productivity apps.
 - Utility apps.
 - Entertainment apps.
19. What is the function of a widget?
- Supplies users with news and information.
 - Creates collaborative texts.
 - Allows users to work together with a simplified interface and no necessary knowledge of HTML.
 - Enables users to access a service in a quick and intuitive way.
20. Which of the following malware spreads across systems on its own without any action from the user?
- Worms.
 - Trojans.
 - Adware.
 - Ransomware.
21. Which of the following statements refers to DDoS?
- It floods the systems with thousands or millions of superfluous requests.
 - When it is executed, it replicates itself.
 - It spies on a user's online activities.
 - It is a strong method of authentication.
22. What does phishing involve?
- It is a protection from viruses that can destroy data, slow down or crash the device.
 - It is practice to induce people to reveal personal information by sending e-mails that seem genuine.
 - It is malware that floods the system with pop-ups.
 - It is a type of malware that blocks the user out of the system.
23. Which of the following is not a function of antivirus software?
- It scans directories or specific files to detect the presence of malicious software.
 - It allows users to start new scans at any time.
 - It blocks the system if malicious software is detected.
 - It removes malicious software automatically or notifies users of infections.
24. What is the function of the packet filtering technique?
- It determines which data packets can be allowed to be forwarded.
 - It acts as a proxy.
 - It records information about the state of the network connections.
 - It examines the data packets travelling to and from the system.
25. In encryption, what happens when the ciphertext reaches the receiver?
- A decryption key is used to convert the ciphertext to its original plaintext.
 - The ciphertext is decrypted by the encryption key.
 - The ciphertext passes through algorithms.
 - The ciphertext remains encrypted.

Name

Class Date

Choose the correct option.

1. Which of the following statements best describes the channel as a component of a telecommunication system?
 - a. It is the final stage in the communication system.
 - b. It is the medium that carries the message.
 - c. It is an object which encodes message data and transmits the information to the receiver.
 - d. It is an electronic device that transmits data received by the transducer.
2. What is a broadcast system of telecommunication?
 - a. A system with one powerful transmitter and many low-power receivers.
 - b. A system in which the two directions are used one at a time.
 - c. A system in which both directions are used at the same time.
 - d. A system in which multiple transmitters and multiple receivers cooperate and share the same channel.
3. In radiation, what is the amplitude of a wave?
 - a. The highest point.
 - b. The distance between the highest/lowest points of two consecutive waves.
 - c. The distance from the centre line to the top of a crest or to the bottom of a trough.
 - d. The lowest point.
4. Which radio waves does the atomic clock time use?
 - a. ELF.
 - b. LF.
 - c. MF.
 - d. SHF and EHF.
5. Which of the following is a characteristic of STP cables?
 - a. They carry signals at high frequency.
 - b. They have no metallic shielding.
 - c. They contain a dielectric insulator.
 - d. They require a grounding cable.
6. Which of the following types of cables consist of several layers of protective plastic layers?
 - a. Fibre optic.
 - b. Coaxial.
 - c. Unshielded twisted pairs.
 - d. Shielded twisted pairs.
7. Which of the following refers to Wi-Fi transmission?
 - a. It carries signals between a remote-control transmitter and the device.
 - b. It usually has a range of 5-10 metres.
 - c. It allows devices to communicate with each other using a short-range radio frequency.
 - d. It uses radio waves to transmit information between a device and a router via frequencies.

8. Which of the following is not a feature of client-server networks?
- The server is used to store the data and programs needed by the whole network.
 - The network is totally dependent on the server; if this breaks down, the network cannot be used.
 - All the computers on the network have equal status.
 - They are the best choice for networks that need many computers.
9. A router is...
- a powerful computer that stores data and connects to resources that are shared by the users of a network.
 - a device that manages communication traffic.
 - a company that provides access to the Internet.
 - a small device used to connect multiple devices in a network.
10. What is the main feature of a ring topology network?
- Every computer is connected to another one with no central hub.
 - A hub, which is the central node, connects all the computers of the network.
 - Nodes in particular areas are connected along a backbone, while stars are nested with other stars.
 - The devices are positioned along a line and data is sent to all the nodes at the same time.
11. Which is the system in which computers can extend to any area of the globe?
- MAN.
 - PAN.
 - WAN.
 - LAN.
12. What is a VPN?
- A network of servers that distributes content throughout the world.
 - A set of four numbers which range from 0 to 255.
 - A topology in which nodes in particular areas are connected along a backbone.
 - A service that establishes a protected connection because it uses encryption.
13. Which of the following statements does not refer to packet switching?
- The data packets are reassembled to the original message when they reach destination.
 - Data is transmitted in sequence, following a chronological order and through the same channel.
 - Data is broken into smaller pieces of information.
 - It is a way data moves through the Internet.
14. What is a search engine?
- A set of related web pages located under a single domain name.
 - A software application used to access and view websites.
 - A software program that allows people to find the required information using keywords or phrases.
 - A software application that translates the text-based domain name into the correct IP address.
15. Which web generation is known as “documentary”?
- Web 1.0.
 - Web 2.0.
 - Web 3.0.
 - Web 4.0.

- 16.** What is IaaS?
- a. A service in which providers offer the possibility to increase or decrease CPU power.
 - b. A service in which cloud providers offer essential storage and networking resources on demand.
 - c. A service in which providers deliver software applications over the Internet.
 - d. None of the above.
- 17.** Which of the following statements does not refer to a forum?
- a. The initial thread can be a question requesting responses.
 - b. Users start a discussion with a thread.
 - c. It is usually in diary-style.
 - d. It is an online discussion board.
- 18.** What is “veracity” when talking about big data?
- a. The quality and origin of data.
 - b. The value you can get from specific data.
 - c. The speed of data generation.
 - d. The amount of data.
- 19.** What is VOiP?
- a. A server computer which maintains copies of the documents for remote access.
 - b. A service that converts human voice into a digital signal that travels over the Internet.
 - c. A type of virtual, online meeting.
 - d. A file-hosting service.
- 20.** Which of the following are not widgets?
- a. Icons.
 - b. Websites.
 - c. Clocks.
 - d. Selection boxes.
- 21.** Which of the following malware locks the user out of the device and/or encrypts files?
- a. Trojans.
 - b. Worms.
 - c. Ransomware.
 - d. Adware.
- 22.** A DDoS is...
- a. a method of authentication.
 - b. anti-spyware.
 - c. a type of malware that acts like Trojans.
 - d. a type of malware that makes an online service or network resource unavailable.
- 23.** Thinking about antivirus, what is the main feature of real-time protection?
- a. It automatically deletes or moves the infected file to a quarantine folder.
 - b. It allows users to start new scans at any time.
 - c. It blocks the system if malicious software is detected.
 - d. None of the above.
- 24.** What is the function of an application-level gateway?
- a. It determines which data packets can be allowed to be forwarded.
 - b. It acts as a proxy to make the computer invisible.
 - c. It examines the data packets travelling to and from the system.
 - d. It tracks information about the state of the network connections.
- 25.** In encryption, what is ciphertext?
- a. A decryption key.
 - b. A human-readable text.
 - c. An encrypted text.
 - d. A plain text.

Name

Class Date

Choose the correct option.

1. What are androids?
 - a. Robots that resemble humans in their appearance and behaviour.
 - b. Robots designed to function alongside or directly with humans.
 - c. Robots that simulate the experience of being physically present at a location.
 - d. Robots similar to insect colonies.
2. Which of the following components is the engine of the robotic arm?
 - a. The end-effector.
 - b. The sensors.
 - c. The drive.
 - d. The controller.
3. In an automation process, what is the PLC?
 - a. It is the brain of the system that contains all the programmes.
 - b. It is a switch.
 - c. It is a cycle.
 - d. It is the sensor of the system that generates outputs.
4. What are CNC machines?
 - a. They are pieces of equipment that move objects from one place to another.
 - b. They are motorised tools controlled by a computer.
 - c. They are manipulators used in medicine.
 - d. They are sensors used in vehicles.
5. What is the function of the sensors in a robot?
 - a. To manipulate objects.
 - b. To receive feedback and signals.
 - c. To determine the speed of its movements.
 - d. To store information.
6. Which of the following components of a PLC contains a microprocessor?
 - a. Input section.
 - b. Output section.
 - c. Memory unit.
 - d. CPU.
7. Which language is used by PLCs?
 - a. Java.
 - b. C+.
 - c. Python.
 - d. Ladder Logic.
8. Which of the following types of robots are mainly used in nanorobotics and the military field?
 - a. Telepresence robots.
 - b. Smart robots.
 - c. Swarm robots.
 - d. Cobots.

- 9.** Which of the following is an example of domotics?
- Smart locks.
 - Non-immersive VR.
 - Cartesian robots.
 - Robotic arms.
- 10.** Which of the following statements best describes the DOF?
- The type of control system of a robotic arm.
 - The number of movable joints of a robotic arm.
 - The number of segments between the joints of a robotic arm.
 - The types of robotic arms.
- 11.** Which of the following types of robot is suitable for pick and place tasks?
- Spherical.
 - SCARA.
 - Gantry.
 - Articulated.
- 12.** Which is the most essential component of a smart heating system?
- A PLC.
 - Conveyor belts.
 - A smart thermostat.
 - None of the above.
- 13.** Which of the following operations is generally carried out by articulated robots?
- Spray painting.
 - Handling.
 - Laser cutting.
 - Pick and place.
- 14.** Which robot is typically used for arc welding?
- SCARA
 - Gantry.
 - Spherical.
 - None of the above.
- 15.** Which of the following is the main feature of cylindrical robots?
- They are manipulators with four DOF.
 - They are mounted onto an overhead system.
 - They have telescopic axes.
 - They have an extendable arm that moves in a vertical and sliding motion.
- 16.** Which of the following is not a pillar of Industry 4.0?
- 3D simulation.
 - Numerical control machines.
 - IoT.
 - Cybersecurity.
- 17.** What does the acronym CIM stand for?
- Computer Integrated Manufacturing.
 - Computer Integrated Machines.
 - Control Integrated Manufacturing.
 - Computer Internal Manufacturing.

- 18.** Which of the following is a feature of semi-immersive VR?
- a. It can give only a visual experience but no other physical sensations.
 - b. It is the character that directly interacts with the virtual world, not the user.
 - c. It gives a global, realistic virtual experience, as if the user is physically present in the virtual world.
 - d. It does not need any special equipment.
- 19.** Which of the following is a feature of marker-based AR?
- a. It relies on geographic data.
 - b. It relies on projectors to display 3D images.
 - c. It relies on QR codes.
 - d. It relies on AR glasses.
- 20.** What is a laser?
- a. It is high speed bidirectional mobile communication of data.
 - b. It is a type of led.
 - c. It is a type of electric current.
 - d. None of the above.
- 21.** Coherence is a property of lasers: what does it mean?
- a. Laser beams contain one single colour.
 - b. A laser emits light focused in one particular direction.
 - c. Electromagnetic radiation always has a certain wavelength.
 - d. Laser light modifies the optical properties of the material it passes through.
- 22.** Which drone has one rigid wing that is designed to work like an airplane?
- a. A fixed-wing drone.
 - b. A single-rotor drone.
 - c. A hybrid VTOL.
 - d. A multicopter drone.
- 23.** What does “additive manufacturing” refer to?
- a. Industry 4.0.
 - b. CIM.
 - c. Augmented reality.
 - d. 3D printing.
- 24.** In 3D printing, which of the following materials are extruded through a process called Fused Filament Fabrication?
- a. Metals.
 - b. Resins.
 - c. Thermoplastics.
 - d. Powdered materials.
- 25.** Which of the following is a feature of Artificial General Intelligence?
- a. It is designed to perform singular tasks.
 - b. It is capable of learning and applying its knowledge to solve any problem.
 - c. It has a narrow range of abilities.
 - d. It involves emotions and impulses of its own.

Total score/50

Name

Class Date

Choose the correct option.

1. What are cobots?
 - a. Robots similar to insect colonies.
 - b. Robots designed to function alongside or directly with humans.
 - c. Robots that simulate the experience of being physically present at a location.
 - d. Robots that resemble humans in appearance and behaviour.
2. Which of the following components is the manipulator of the robotic arm?
 - a. The end-effector.
 - b. The drive.
 - c. The sensors.
 - d. The controller.
3. How does an automation process start?
 - a. With an input given by a switch.
 - b. With an input given by the PLC.
 - c. With an input given by a motor.
 - d. With an output.
4. What are conveyor belts?
 - a. They are sensors used in vehicles.
 - b. They are manipulators used in medicine.
 - c. They are motorised tools controlled by a computer.
 - d. They are pieces of equipment that move objects from one place to another.
5. What is the function of the controller in a robot?
 - a. To manipulate objects.
 - b. To receive feedback and signals.
 - c. To control the movements of the arm.
 - d. To store information.
6. Which of the following is not a step of a PLC operation?
 - a. Program scan.
 - b. Housekeeping mode.
 - c. Processor unit.
 - d. Output scan.
7. Which of the following applications refers to domotics?
 - a. Smart lighting system.
 - b. Li-Fi.
 - c. CNC.
 - d. Welding.
8. Which of the following types of robot are mainly used in remote surgery?
 - a. Swarm robots.
 - b. Androids.
 - c. Telepresence robots.
 - d. Cobots.

9. Which of the following is not an example of domotics?
- Smart locks.
 - Semi-immersive VR.
 - Smart heating system.
 - Smart TV.
10. Which of the following components is included in the control system of a robotic arm?
- An end effector.
 - A drive.
 - A continuous path.
 - A DOF.
11. Which of the following types of robot has special lifting capabilities?
- SCARA.
 - Spherical.
 - Articulated.
 - Gantry.
12. Why can spherical robots reach long distances?
- Because they have up to 10 DOF.
 - Because they are mounted onto an overhead system.
 - Because they have telescopic axes.
 - Because they have a rigid arm.
13. Which of the following operations is generally carried out by Gantry robots?
- Spray painting.
 - Laser cutting.
 - Handling.
 - Pick and place.
14. Which robot is typically used for spot welding?
- Articulated.
 - Spherical.
 - Gantry.
 - SCARA.
15. What is the main feature of SCARA robots?
- They are manipulators with four DOF suitable for fast and repetitive tasks.
 - They usually have three rotary joints which are arranged in a chain.
 - They are usually very large systems suitable for outdoor applications.
 - They have an extendable arm that moves in a vertical and sliding motion.
16. Which of the following is a pillar of Industry 4.0?
- Domotics.
 - Numerical control machines.
 - IoT.
 - Programming languages.
17. Which of the following does not refer to short-run responsiveness?
- Cost reduction.
 - Process changes.
 - Machine downtime.
 - Operator unavailability.

- 18.** Which of the following is a feature of non-immersive VR?
- a.** It provides users with a partially virtual environment.
 - b.** It is characterised by a high level of realism through 3D graphics.
 - c.** It gives a global, realistic virtual experience as if the user were physically present in the virtual world.
 - d.** The virtual environment does not directly interact with the user.
- 19.** Which of the following is a feature of location-based AR?
- a.** It relies on QR codes.
 - b.** It relies on projectors to display 3D images.
 - c.** It relies on geographic data.
 - d.** It relies on AR glasses.
- 20.** What is Li-Fi?
- a.** It is a type of electric current.
 - b.** It is a type of led.
 - c.** It is a light-based technology similar to Wi-Fi but much faster.
 - d.** None of the above.
- 21.** High intensity is a property of lasers: what does it mean?
- a.** Laser light modifies the optical properties of the material it passes through.
 - b.** Electromagnetic radiation always has a certain wavelength.
 - c.** A laser emits light focused in one particular direction.
 - d.** Laser beams contain one single colour.
- 22.** Which drones are very similar to helicopters?
- a.** Single-rotor drones.
 - b.** Fixed-wing drones.
 - c.** Multirotor drones.
 - d.** Hybrid VTOLs.
- 23.** In 3D printing, where does the plastic string melt?
- a.** On the plate.
 - b.** In the dispenser.
 - c.** In the microcontroller.
 - d.** In the extruder hot end.
- 24.** Which of the following materials cannot be used in 3D printing?
- a.** Resins.
 - b.** Wood.
 - c.** Thermoplastics.
 - d.** Powdered materials.
- 25.** Which of the following is a feature of Narrow General Intelligence?
- a.** It is more intelligent than humans.
 - b.** It is capable of learning and applying its knowledge to solve any problem.
 - c.** It can perform singular tasks.
 - d.** It involves emotions and impulses of its own.

Total score/50

Name

Class Date

Choose the correct option.

1. Large glasses that protect your eyes while working: ...
 - a. safety boots.
 - b. safety goggles.
 - c. PPE.
 - d. emergency equipment.
2. Abilities that are neither taught nor learnt: ...
 - a. curriculum vitae.
 - b. hard skills.
 - c. soft skills.
 - d. on-the-job training.
3. Which of the following are old ways to advertise a job?
 - a. Career websites.
 - b. Job search engines.
 - c. Job fairs.
 - d. Job boards.
4. In case of fire you must first call ... for rescue.
 - a. the fire exit
 - b. the fire brigade
 - c. an ambulance
 - d. a teacher or a technician
5. A break in the security of online information is called...
 - a. data breach.
 - b. Wikileaks.
 - c. network break.
 - d. GDPR.
6. If you see a casualty of an electric shock, you must not...
 - a. touch them with your hands.
 - b. turn off the power source.
 - c. call an ambulance.
 - d. use an insulating tool to separate the victim from the power source.
7. A job advertisement is not...
 - a. published online or in a newspaper.
 - b. a short announcement offering a job.
 - c. a common way to hire new staff.
 - d. used to buy and sell things online.
8. A CV is generally sent together with...
 - a. a picture.
 - b. questions about the salary.
 - c. a cover letter.
 - d. an interview.

- 9.** A door used to get out in case of fire or danger is called...
- a.** a fire door.
 - b.** an emergency exit.
 - c.** an emergency equipment.
 - d.** a rescue door.
- 10.** A recruiter is...
- a.** a person who sends CVs because they are looking for a job.
 - b.** a person who has just left a workplace.
 - c.** a person who reads CVs and interviews candidates for a job.
 - d.** a person who owns a firm.
- 11.** The colours of safety signs are usually...
- a.** red, blue, yellow and green.
 - b.** red, purple, blue, yellow.
 - c.** black and white.
 - d.** red and green.
- 12.** A good CV should contain...
- a.** only the candidate's educational information.
 - b.** only details about the candidate's last job.
 - c.** the candidate's educational and employment history and their skills and interests.
 - d.** the candidate's presentation of themselves and all their hobbies.
- 13.** At a job fair, people looking for a job...
- a.** can eat street food and drink beer.
 - b.** are immediately hired if they bring their own CV.
 - c.** can never do job interviews.
 - d.** can leave their CVs and talk to recruiters.
- 14.** The most traditional type of job interview is...
- a.** the panel interview.
 - b.** the group interview.
 - c.** the one-on-one interview.
 - d.** the working interview.
- 15.** The person that ensures online data protection is called...
- a.** National Data Protection Authority.
 - b.** General Data Protection Regulation.
 - c.** Cambridge Analytica.
 - d.** National Website Authority.
- 16.** The amount of money given to a worker before other benefits is called...
- a.** fringe benefit.
 - b.** base salary.
 - c.** cash incentive.
 - d.** extra perk.
- 17.** A good approach to a job interview includes...
- a.** showing interest in the company by preparing some questions to ask.
 - b.** showing the interviewer how nervous you are.
 - c.** not giving importance to the way you look, it's personality that matters.
 - d.** looking around the room during the interview.

- 18.** Safety instructions and signs...
- a. may not be known by workers.
 - b. are generally placed in a corner.
 - c. should only be followed by employers.
 - d. must be displayed and visible in the workplace.
- 19.** A recruitment agency is...
- a. a tour operator.
 - b. a society recruiting staff for other companies.
 - c. a social network to meet new people.
 - d. a website where job seekers can show their profiles.
- 20.** When job hunting, it is important...
- a. to have influential friends.
 - b. to know everything about firms.
 - c. to have expensive clothes to wear for interviews.
 - d. to send your CV to the right person.
- 21.** Nowadays, it is very common...
- a. to get retired.
 - b. to get a job for a lifetime.
 - c. to get shorter job contracts than in the past.
 - d. to be hired soon after leaving school.
- 22.** Some secondary schools and universities...
- a. hire staff from among their students.
 - b. have job placement services.
 - c. organise job fairs.
 - d. send their graduates' CVs to companies and businesses.
- 23.** Gig economy...
- a. is the money earned by famous bands with concerts.
 - b. was important in the past, much less now.
 - c. is a form of money saving.
 - d. is constantly increasing.
- 24.** In which of the following situations are workers not expected to be paid?
- a. When doing an internship.
 - b. When in a part-time job.
 - c. When they work with a permanent contract.
 - d. When working as a freelance worker.
- 25.** When making a business call, you should avoid...
- a. introducing yourself.
 - b. ending the call without greeting the person you have been talking to.
 - c. summarising the main points of the conversation.
 - d. ending the call by thanking the listener.

Total score/50

Name

Class Date

Choose the correct option.

1. Cookies are...
 - a. devices used to go online.
 - b. regulations about online privacy.
 - c. short text files stored while going online.
 - d. a type of technical website.
2. To hire means...
 - a. to get a person to work for a company.
 - b. to put an advertisement on a newspaper.
 - c. to invite a candidate for an interview.
 - d. to select candidates in a group.
3. Prohibition signs are...
 - a. round and blue.
 - b. square and green.
 - c. round with a red diagonal bar.
 - d. triangular and yellow.
4. In a cover letter, applicants must not...
 - a. mention the job they are applying for.
 - b. introduce themselves.
 - c. ask for an interview.
 - d. make a list of details of their education.
5. Emergency equipment is signalled by...
 - a. a green square or rectangular sign.
 - b. lights shining above the equipment.
 - c. a blue, round sign.
 - d. a yellow sign.
6. In case of fire, people must...
 - a. run out of the building screaming loudly.
 - b. evacuate the building as soon as possible.
 - c. leave the doors open after evacuating the building.
 - d. leave disabled people inside the building.
7. Cover letters and CVs should not...
 - a. be adapted to the position they are written for.
 - b. contain spelling mistakes.
 - c. be clear and concise.
 - d. be addressed to the right person.
8. When working in a lab, ...
 - a. check if electrical appliances are faulty and repair them if necessary.
 - b. be sure you are alone.
 - c. do not tell your teacher if an appliance is faulty.
 - d. wear appropriate clothes and protective equipment.

9. When the professional knowledge of a candidate is tested in an interview, the interview is called...
- a. a panel interview.
 - b. a working interview.
 - c. a distance interview.
 - d. a group interview.
10. People working in a factory...
- a. can wear casual clothes and comfortable shoes.
 - b. must wear protective equipment.
 - c. do not have to know what warning signs mean.
 - d. are not obliged to know the evacuation procedures.
11. A contract for a minimum of 35 hours a week is called...
- a. permanent.
 - b. temporary.
 - c. full-time.
 - d. part-time.
12. While working with machines or appliances, ...
- a. eat some food because it helps you work.
 - b. drink something if you need to.
 - c. it is better to leave them on.
 - d. always be calm and concentrated.
13. An interview guided by different members of the company at the same time is called...
- a. web-conferencing.
 - b. panel.
 - c. one-on-one.
 - d. multiple.
14. Which of the following is correct behaviour in an industrial plant?
- a. Following the correct procedures when operating machines.
 - b. Drinking something with colleagues before starting work.
 - c. Taking shortcuts to save time.
 - d. Not taking breaks during working hours.
15. Abilities that can be learned at school are called...
- a. soft skills.
 - b. school ethics.
 - c. competences.
 - d. hard skills.
16. What is not appropriate action in case of high voltage shock?
- a. Calling an ambulance.
 - b. Calling the power company to switch the power off.
 - c. Touching the casualty to separate them from the electricity source.
 - d. Keeping people away from the casualty.
17. An incorrect approach to a job interview is...
- a. dressing in a casual way.
 - b. getting information about the company before the interview.
 - c. keeping eye contact with the interviewer.
 - d. smiling.

- 18.** Which sentence about online data policies is correct?
- a. GDPR was issued in 2016.
 - b. There is no official authority responsible for online data processing.
 - c. Misuse of personal data is not a crime.
 - d. People can ask for their personal data to be removed from data banks.
- 19.** Students from vocational schools generally undertake...
- a. an internship.
 - b. an apprenticeship.
 - c. a stage.
 - d. a part-time job.
- 20.** GDPR means “General Data Protection ...”.
- a. Recruiter
 - b. Regulation
 - c. Rules
 - d. Roles
- 21.** What is the function of schools or universities’ job placement services?
- a. Creating new job websites.
 - b. Sending cover letters to companies.
 - c. Assisting new graduates in their job search.
 - d. Giving references about graduates to possible employers.
- 22.** What is the meaning of “retired”?
- a. A person who has left their job because of their old age.
 - b. A person who does not have many friends.
 - c. Someone who has had the same job for their whole life.
 - d. A worker who is not a good team player.
- 23.** Which of the following statements is false?
- a. Gig economy is related to on-demand goods or services.
 - b. Gig work is based on permanent contracts.
 - c. Gig workers are called “contractors”.
 - d. Gig work embodies the modern need for job flexibility.
- 24.** An outsourced employee...
- a. is hired by a recruiting agency.
 - b. has lost their job because of staff reduction.
 - c. works as a freelance worker.
 - d. always works outside the plant.
- 25.** In a business presentation, you should avoid...
- a. making your presentation fun.
 - b. using presentation tools and software.
 - c. being precise and clear.
 - d. using too many colours and fonts.

Total score/50

KEYS • MODULE TESTS

Module 1 TEST 1 p. 274

1. b; 2. a; 3. d; 4. b; 5. c; 6. c; 7. d; 8. a; 9. b; 10. b; 11. c; 12. a; 13. c; 14. d; 15. b; 16. d; 17. a; 18. b; 19. b; 20. d; 21. c; 22. b; 23. a; 24. c; 25. c.

Module 1 TEST 2 p. 277

1. c; 2. b; 3. a; 4. a; 5. d; 6. c; 7. b; 8. a; 9. c; 10. d; 11. b; 12. a; 13. a; 14. c; 15. d; 16. b; 17. c; 18. d; 19. a; 20. a; 21. c; 22. d; 23. c; 24. d; 25. c.

Module 2 TEST 1 p. 280

1. c; 2. c; 3. b; 4. d; 5. a; 6. d; 7. b; 8. c; 7. b; 8. c; 9. a; 10. b; 11. c; 12. a; 13. c; 14. b; 15. a; 16. a; 17. c; 18. d; 19. b; 20. c; 21. a; 22. c; 23. b; 24. d; 25. c.

Module 2 TEST 2 p. 283

1. b; 2. b; 3. a; 4. b; 5. c; 6. a; 7. b; 8. d; 9. c; 10. d; 11. c; 12. a; 13. c; 14. b; 15. d; 16. b; 17. c; 18. b; 19. c; 20. a; 21. c; 22. a; 23. d; 24. b; 25. c.

Module 3 TEST 1 p. 286

1. b; 2. a; 3. b; 4. c; 5. d; 6. a; 7. c; 8. c; 9. d; 10. b; 11. b; 12. a; 13. d; 14. c; 15. b; 16. a; 17. a; 18. c; 19. b; 20. c; 21. a; 22. b; 23. d; 24. b; 25. a.

Module 3 TEST 2 p. 289

1. b; 2. b; 3. a; 4. d; 5. d; 6. c; 7. a; 8. d; 9. b; 10. b; 11. a; 12. d; 13. b; 14. c; 15. a; 16. c; 17. b; 18. a; 19. d; 20. b; 21. a; 22. c; 23. a; 24. d; 25. b.

Module 4 TEST 1 p. 292

1. c; 2. a; 3. c; 4. b; 5. d; 6. b; 7. a; 8. c; 9. d; 10. c; 11. b; 12. b; 13. a; 14. c; 15. c; 16. b; 17. a; 18. c; 19. d; 20. a; 21. a; 22. b; 23. c; 24. d; 25. a.

Module 4 TEST 2 p. 295

1. b; 2. a; 3. c; 4. b; 5. d; 6. a; 7. d; 8. c; 9. b; 10. a; 11. c; 12. d; 13. b; 14. c; 15. a; 16. b; 17. c; 18. a; 19. b; 20. b; 21. c; 22. d; 23. a; 24. b; 25. c.

Module 5 TEST 1 p. 298

1. a; 2. c; 3. a; 4. b; 5. b; 6. d; 7. d; 8. c; 9. a; 10. b; 11. b; 12. c; 13. a; 14. b; 15. d; 16. b; 17. a; 18. a; 19. c; 20. d; 21. c; 22. a; 23. d; 24. b; 25. b.

Module 5 TEST 2 p. 301


1. b; 2. a; 3. a; 4. d; 5. c; 6. c; 7. a; 8. c; 9. b; 10. a; 11. d; 12. c; 13. b; 14. b; 15. a; 16. c; 17. a; 18. d; 19. c; 20. c; 21. a; 22. a; 23. d; 24. b; 25. c.

Module 6 TEST 1 p. 304

1. b; 2. c; 3. d; 4. b; 5. a; 6. a; 7. d; 8. c; 9. b; 10. c; 11. a; 12. c; 13. d; 14. c; 15. a; 16. b; 17. a; 18. d; 19. b; 20. d; 21. c; 22. b; 23. d; 24. a; 25. b.

Module 6 TEST 2 p. 307

1. c; 2. a; 3. c; 4. d; 5. a; 6. b; 7. b; 8. d; 9. b; 10. b; 11. c; 12. d; 13. b; 14. a; 15. d; 16. c; 17. a; 18. d; 19. c; 20. b; 21. c; 22. a; 23. b; 24. a; 25. d.



STUDENT'S BOOK
ANSWER KEYS, AUDIOSCRIPTS
AND TEACHER'S NOTES

Unit 1.1 The basics of electricity

Pages 12-13

Have you experienced static in other ways?

Sample answer

Rubbing a plastic pen with a woollen cloth, for example, makes it attract something small, like pieces of paper. Two balloons rubbed on someone's hair will push each other away and the same will happen to two pieces of tape rubbed on a desk. Sometimes, touching a doorknob or a car door can make us get a shock.

Find out something more about Coulomb on the Internet.

Charles-Augustin de Coulomb was born in France in 1736 and died in 1806. He is best known for the formulation of Coulomb's law, which states that the force between two electrical charges is proportional to the product of the charges and inversely proportional to the square of the distance between them. The coulomb, a unit for measuring electric charge, was named after him.

1.

1. atoms; 2. protons; 3. electrons; 4. negative; 5. positive; 6. field; 7. repel; 8. attract.

2. ▶ The science of static electricity | Anuradha Bhagwat posted by TedEd

.....
It can strike without warning, at any moment. You may be walking across a soft carpet and reaching for the doorknob when suddenly... zap! To understand static electricity, we first need to know a bit about the nature of matter. All matter is made up of atoms that consist of three types of smaller particles: negatively charged electrons, positively charged protons and neutral neutrons. Normally, the electrons and protons in an atom balance out, which is why most matter you come across is electrically neutral. But electrons are tiny and almost insignificant in mass, and rubbing or friction can give loosely bound electrons enough energy to leave their atoms and attach to others, migrating towards different surfaces. When this happens, the first object is left with more protons than electrons and becomes positively charged, while the one with more electrons

accumulates a negative charge. This situation is called a charge imbalance or net charge separation. But nature tends towards balance, so when one of these neutrally charged bodies comes into contact with another material, the mobile electrons will take the first chance they get to go where they're most needed, either jumping off the negatively charged object or jumping onto the positively charged one in an attempt to restore the neutral charge equilibrium, and this quick movement of electrons, called "static discharge", is what we recognise as that sudden spark. This process doesn't happen with just any objects, otherwise you'd be getting zapped all the time. Conductors like metals and salt water tend to have loosely bound outer electrons, which can easily flow between molecules. On the other hand, insulators like plastics, rubber and glass have tightly bound electrons that won't readily jump to other atoms. Static build-up is most likely to occur when one of the materials involved is an insulator. When you walk across a rug, electrons from your body will rub off onto it, while the rug's insulating wool will resist losing its own electrons. Although your body and the rug together are still electrically neutral, there is now a charge polarisation between the two. And when you reach to touch the doorknob, zap! The metal doorknob's loosely bound electrons hop to your hand to replace the electrons your body has lost. When it happens in your bedroom, it's a minor nuisance. But in the great outdoors, static electricity can be a terrifying, destructive force of nature. In certain conditions, charge separation will occur in clouds. We don't know exactly how this happens. It may have to do with the circulation of water droplets and ice particles within them. Regardless, the charge imbalance is neutralised by being released towards another body, such as a building, the Earth or another cloud in a giant spark that we know as lightning. And just as your fingers can be zapped over and over in the same spot, you'd better believe that lightning can strike the same place more than once.

.....
 1. T; 2. F, They balance out, so there is the same number of protons and electrons; 3. F, Most matter is electrically neutral; 4. T; 5. T; 6. F, They are positively charged; 7. T; 8. F, It only happens with conducting materials; 9. F, It is an insulator; 10. T.

3.

1. device; 2. neutrons; 3. to orbit; 4. ion; 5. electric field; 6. static.

Pages 14-15

All these measurement units get their names from the scientists who discovered the phenomena they measure. Search the Internet for information about Ampère, Volta and Ohm.

Sample answers

André-Marie Ampère (1775-1836) was a French physicist and mathematician who was one of the founders of the science of electromagnetism. He was also the inventor of numerous applications such as the solenoid (term coined by him) and the electrical telegraph. Ampère was a member of the French Academy of Sciences.

Alessandro Volta (1745-1827) was an Italian physicist and chemist as well as a pioneer of electricity and power. He is credited as the inventor of the electric battery and the discoverer of methane. He invented the voltaic pile in 1799 and reported the results of his experiments in 1800 to the Royal Society. With this invention Volta proved that electricity could be generated chemically.

Georg Ohm (1789-1854) was a German physicist and mathematician. As a school teacher, Ohm began his research with the new electrochemical cell invented by Alessandro Volta. Using equipment of his own creation, Ohm found that there is a direct proportionality between the potential difference (voltage) applied across a conductor and the resultant electric current. This relation is called Ohm's law.

4.

1. flow; 2. alternating; 3. ampères; 4. source; 5. generator; 6. difference; 7. volts; 8. electrons; 9. resistance.

5.

1. motion; 2. source; 3. path; 4. to push; 5. resistance; 6. alternating current; 7. device; 8. constant.

6.

Sample answers

1. Electric current can be defined as electric charge in motion; 2. Current is usually generated by a source such as a battery or a generator; 3. Electrons flow following a path, for example a wire; 4. A force that pushes electrons is needed to start current; 5. The opposition of a material to the flow of current is called resistance; 6. Alternating current is used to deliver power on the grid; 7. Smartphones and tablets are electronic devices; 8. The direction of direct current is always constant.

7.

1. imbalance; 2. wire; 3. potential; 4. volts; 5. current; 6. direct.

Pages 16-17

8.

1. shape; 2. size; 3. temperature; 4. allow; 5. metals; 6. bodies; 7. resist; 8. plastic; 9. fibreglass; 10. wood.

9.

Sample answers

1. Conductors allow the passage of current because they contain a high number of free electrons; 2. In insulators, electrons are strongly attached to their atoms; for this reason current cannot flow; 3. The shape, size, and temperature of materials affect their conductivity; 4. When the temperature increases, atoms and electrons gain energy; 5. Some liquids, such as water or lemon juice, are good conductors; 6. Silver is a very good conductor, but copper is cheaper; for this reason it is used to produce electrical wires; 7. Insulators such as rubber or plastic are very important for safety and they are used for electrical wires coatings; 8. Human and animal bodies conduct electricity well.

10.

1. A conductor allows the passage of current; 2. In an insulator, electrons are strongly attached to their atoms and do not let the current flow; 3. The shape and size of materials affect conductivity; 4. When the temperature becomes higher, electrons gain energy and materials increase their conductivity; 5. Human and animal bodies are good conductors; 6. Copper is largely employed in the production of wires.

Pages 18-19

11.

1. resistance; 2. Maglev trains; 3. mercury; 4. -269°C ; 5. hydrogen(-based compounds); 6. room; 7. pressure.

12.

Sample answer

The first superconductor was discovered in 1911, when it was found that mercury could gain superconductivity or lose all its electrical resistance when it was cooled down at -269°C . Later, in 1986, some ceramic compounds were discovered to be superconductors at a higher temperature, -238°C , which, however, was still very low. Since 2015, hydrogen-based compounds have been discovered to be superconductors at room temperatures; however, they reach

superconductivity only if high pressure is exerted on them. Research in the field of superconductors is still going on; at present, the highest temperature superconductor known, a compound of mercury and other elements, reaches superconductivity at room pressure and a temperature of -140°C .

13. 

MRI

Magnetic resonance imaging, or MRI, is a medical imaging test that produces detailed images of almost every internal structure in the human body, including the organs, bones and muscles. MRI scanners create images of the body using a large magnet and radio waves. No radiation is produced during an MRI exam, unlike X-rays. These images give physicians important information in diagnosing medical conditions and planning a course of treatment.

The MRI machine is a large, cylindrical machine that creates a strong magnetic field around the patient and sends pulses of radio waves from a scanner. Some MRI machines look like narrow tunnels, while others are more open.

The strong magnetic field created by the MRI scanner causes the atoms in the body to align in the same direction. Radio waves are then sent from the MRI machine and move these atoms out of the original position. As the radio waves are turned off, the atoms return to their original position and send back radio signals. These signals are received by a computer and converted into an image of the part of the body being examined. This image appears on a monitor.

Because ionising radiation is not used, there is no risk of exposure to radiation during an MRI procedure.

More recent uses for MRI have contributed to the development of additional magnetic resonance technology to evaluate, for example, blood flow. Functional magnetic resonance imaging (fMRI) is used to determine the specific location in the brain where a certain function, such as speech or memory, occurs.

Since its development in the 1970s and 1980s, MRI has proven to be a versatile imaging technique. While MRI is mostly used in diagnostic medicine and biomedical research, it also may be used to form images of non-living objects such as mummies.

Adapted from: <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/magnetic-resonance-imaging-mri>

-
1. organs, bones and muscles;
 2. a large magnet;
 3. strong magnetic field;
 4. pulses of radio waves;
 5. send back radio signals;
 6. into an image;
 7. radiation;
 8. blood flow;
 9. has been developed;
 10. non-living objects.

Pages 20-21

Search the Internet to find out what the consequences of a short circuit can be.

Short circuits, due to the abnormal amount of electricity flowing, can damage the wires or the loads connected to the circuit or cause excessive heating which may result in fire or explosion. In a power line, a short circuit may cause the interruption of the power supply, even for a long time.

14.

1. path;
2. short;
3. heat;
4. source;
5. switch;
6. fuse;
7. wires;
8. closed;
9. flows;
10. gap.

15.

1. d;
2. h;
3. e;
4. b;
5. f;
6. a;
7. g;
8. c.


16.

1. fault;
2. flows;
3. electrical;
4. source;
5. fuse;
6. stopping. Extra: resistor, load.

Pages 22-23

17.

1. path;
2. current;
3. sum;
4. lights;
5. torches;
6. more;
7. voltage;
8. household.

18.  Types of electrical circuits posted by PowerBiz Forms of Energy

.....
Let's experiment a little bit with circuits. As we discussed, electricity will only flow on a closed circuit, such as the one shown on the screen. Notice that the electrons flow through the wire and each of the bulbs before they return to the battery. If one of the wires breaks, a gap occurs in the circuit and all the lights go out. When lights are lined up one after the other on a circuit, like these lights are, it is called a series circuit. The problem with a series circuit is that when one light burns out and its filament breaks, it creates a gap in the circuit. All the lights go out because electricity won't be able to flow to the other bulbs. This problem can be solved with a parallel circuit. In a parallel circuit, the wires that are connected to light bulbs run parallel to each other rather than having all the bulbs in a row. This means that one light can burn out or be removed, and the other lights on the circuit will stay lighted. For example, if we remove the light that is closest to the battery, the other two lights don't go out, because each light is connected in a way that the electrons have a complete path to travel to the positive side of the D-cell battery. Now let's practice what we've discussed about circuits with an activity.

.....

1. The only possible way for electrons to flow is inside a closed circuit; 2. They flow through the wire and each of the bulbs, then they return to the battery; 3. If one of the wires breaks, a gap occurs in the circuit and all the lights go out; 4. The first kind of circuit shown is called a “series circuit”; 5. The main problem in a series circuit is that if one light burns out and its filament breaks, it creates a gap in the circuit and all the other lights go out; 6. This problem can be solved by connecting the bulbs in a parallel circuit; 7. This type of circuit is called “parallel” because the wires connected to the light bulbs run parallel to each other, and bulbs are not in a row; 8. If a light in a parallel circuit is removed or burns out, the other lights still work because each light has its own complete path for electrons to flow through.

19.

Sample answer

In a closed series circuit, electrons flow through the wire and each of the loads, then they return to the source. In a series circuit, if one of the wires breaks, a gap occurs in the circuit and all the loads stop working; so, the main problem in this type of circuit is that if one of the devices burns out, it creates a gap in the circuit and all the other devices go out. This problem can be solved by connecting loads in parallel. In this circuit the wires connected to the devices run parallel to each other, and bulbs are not in a row. If a device in a parallel circuit is removed or burns out, the others still work, because each one has its own complete path for electrons to flow through.

Pages 24-25

Many other inventors developed their versions of light bulbs. Search the Internet to find some of them.

Sample answer

Before Edison, in 1878, the British inventor Joseph Wilson Swan had patented an electric bulb that inspired Edison’s invention. The Italian business owner Alessandro Cruto, from Turin, had started to work on the project of an electric lamp far before Edison, but he was only able to produce his lamp in March 1880, a few months after the release of Edison’s. However, Cruto’s lamp lasted much more (500 hours) than Edison’s (40 hours).

20.

1. carbon; 2. vacuum; 3. incandescent; 4. tungsten; 5. halogen; 6. efficiency; 7. CFL; 8. mercury; 9. coating; 10. fluorescent; 11. semiconducting; 12. photons.

21.

Sample answer

Incandescent bulbs are the ones with the highest energy consumption rate; they cost less, but their life is shorter than that of other bulbs. Halogen bulbs are a bit more energy saving and more efficient than incandescent ones, they last a little longer, but their cost is higher. CFL bulbs save more than double the energy compared to halogen ones; their cost is much higher than that of incandescent and halogen bulbs, but their energy consumption is drastically reduced. LED bulbs are the most expensive, but their consumption is the lowest of all types of bulbs, they can save up to 80% of energy compared to an incandescent bulb and they last for a very long time. For my home I think I would choose...

Page 26

VOCABULARY

22.

1. conductor; 2. CFL bulb; 3. closed circuit; 4. ammeter; 5. switch; 6. nucleus.

23.

1. protons; 2. orbit; 3. voltage; 4. direct current (DC); 5. conductor; 6. insulators; 7. superconductivity; 8. room temperature; 9. load; 10. fuses; 11. parallel circuit; 12. LED.

Unit 1.2 The production of electricity

Pages 28-29

1.

1. electrical; 2. chemical; 3. cells; 4. anode; 5. cathode; 6. catches; 7. rechargeable; 8. secondary; 9. alkaline; 10. lead.

2. 10

.....

How do Batteries Work?

Can you imagine a world where all the electrical appliances had to be plugged in? Laptops, smartphones and toys would always be connected to electrical outlets, making them inconvenient to use. Batteries provide portable sources of energy for powering devices without wires or cables. A battery converts stored chemical energy into electrical energy. Basically, a battery cell is made up of three elements: an anode (the negative electrode), a cathode (the positive electrode), and an electrolyte. Thanks to a chemical reaction inside the battery, the anode builds up an excess of electrons. This causes an electrical difference between the anode and

the cathode. When an appliance, a bulb or any other electrical device is connected to a battery through a wire in a closed circuit, the electrons are able to travel from the anode to the cathode; this provides power to the appliance connected to the circuit. Over time, this electrochemical process alters the chemical make up in the anode and cathode, and, in the end, they stop providing electrons. At this point, the battery “dies”.

Adapted from: <https://www.youtube.com/watch?v=gWKOjncBMCQ>, How do Batteries work? (With Narration) | Mocomi kids posted by MocomiKids

-
 1. sources of energy; 2. stored chemical energy, electrical energy; 3. electrolyte; 4. cathode; 5. anode; 6. wire; 7. power, appliance; 8. dies, providing electrons.

3.

Battery	Category	Applications
Zinc-carbon	Non rechargeable/ Primary	Small toys
Lithium-ion/ Lithium polymer	Rechargeable/ Secondary	Smartphones, laptops
Alkaline	Non-rechargeable/ Primary	Motorised toys, shavers, flashlights
Silver-oxide and Zinc-air	Non-rechargeable/ Primary	Watches, hearing aids
Lead-acid	Rechargeable/ Secondary	Motor vehicles
Nickel-metal hydride	Rechargeable/ Secondary	Digital cameras, power drills, industry

Pages 30-31

4.

1. electromagnetic; 2. coil; 3. magnet; 4. electrons; 5. current; 6. generators; 7. grid; 8. supply; 9. backup; 10. batteries.

5.

1. electromagnetic; 2. armature; 3. shaft; 4. fuel; 5. alternator; 6. dynamo.

6.

1. The main function of a generator is to convert mechanical energy into electrical energy; 2. A generator is composed of a coil of conducting material wound onto a metal core, called armature, connected to the shaft of a mechanical energy source; 3. The coil

of the generator is rotated rapidly between the poles of a magnet, whose magnetic field interferes with the electrons in the conductor and induces an electric current to flow inside it; 4. The mechanical energy necessary to produce electricity can be provided by engines working on fuels or renewable energy sources; 5. Generators are mainly used to produce electricity for the power grid, to provide a backup source of electricity, or to supply electrical energy in places where electricity from the grid is distant or not accessible; 6. AC generators are mainly used in power stations to provide the power for the grid; DC generators are generally used to produce electricity suitable for recharging batteries.

Pages 32-33

7.

1. electricity; 2. water; 3. steam; 4. turbine; 5. generator; 6. efficiency; 7. accessibility; 8. renewable.

8. Fossil fuels 101 posted by Student Energy

Fossil fuels

Fossil fuel is a term used to describe a group of energy sources that were formed from ancient plants and organisms during the Carboniferous period approximately 360 to 286 million years ago, even before the age of dinosaurs. At that time the land was covered with swamps filled with organisms and plants. As they died, they sank to the bottom of swamps and oceans, and over millions of years started decomposing under layers of sand, clay and other minerals. Different types of fossil fuels formed depending on the combination of organic matter, temperature, time, and pressure conditions while decomposing. There are three major types of fossil fuels: coal, oil, and natural gas. Coal was formed from ferns, plants and trees, which hardened due to pressure and heat. Oil was formed from small organisms like zoo plankton and algae, where pressure caused the more complex organic matter to decompose. Natural gas was formed by the same process as oil, only was exposed to more heat and pressure, causing it to further decompose and turn into a gaseous form. Fossil fuels are sought after energy sources because they have a high energy density. They are the world’s dominant energy source. Fossil fuels have a variety of applications from electricity production to transport fuels. They can also be used to make a variety of common products, from plastics to cosmetics to even some medicines. These resources have powered industrialisation over history and continue to do so today. Fossil fuels

can be an abundant and cheap, or in some cases, a scarce and expensive form of energy, depending on geographic location. For this reason, geopolitical issues arise due to scarcity caused by the natural geographical allocation of these highly valuable resources. Fossil fuels are considered non-renewable resources because they take millions of years to form, which means that once they are used, the resources will not be replenished in a human lifetime. The gradual depletion of the most accessible fossil fuel reserves has forced companies to develop technologies for extracting more challenging or unconventional reserves. In many cases, this means additional safety and environmental concerns, as well as higher costs. Fossil fuels are also the largest emitters of carbon dioxide, a greenhouse gas which causes climate change. In addition, their production causes both environmental and human health issues. These concerns have triggered society to look at alternative sources of energy that are more environmentally sustainable and renewable. That's fossil fuels.

-
1. Ancient plants and organisms; 2. In the Carboniferous era; 3. Millions of years; 4. Temperature, time and pressure; 5. Coal, oil, and natural gas; 6. Ferns, plants, (and) trees; 7. Their high energy density; 8. Carbon dioxide; 9. Climate change; 10. Sustainable and renewable ones.

9.

Sample answers

1. The gas produced by boiling water; 2. A rotating device used to activate generators; 3. Something that cannot be reproduced; 4. Capable of giving a good amount of energy; 5. A gas that absorbs radiation from the sun, heating the earth's surface; 6. The change in the average temperatures and weather in a certain area over a long period of time.

Pages 34-35

Do some research about the location of hydroelectric power plants in Italy.

The biggest hydroelectric power station in Italy is located in Entracque in Piedmont. It was built in the 1970s, but it started to work only in 1982. Most of the hydroelectric power stations in Italy can be found in areas in the Alps, mainly in Piedmont (around 20%), Lombardy (15%) and in the North-East. Some plants are also located in the Apennines, mostly in Central Italy.

What is the amount of electricity produced by hydroelectric power plants in Italy?

Hydroelectric power stations in Italy produce globally around 19 gigawatts of power, corresponding to 35% of the total electric power generated in the country.

10.

1. friendly; 2. little; 3. costs; 4. suitable; 5. waves; 6. reservoir; 7. dam; 8. pipe; 9. turbine; 10. flows. Extra: emissions, power.

11.

1. c; 2. f; 3. a; 4. h; 5. e; 6. b; 7. g; 8. d.

12.

Sample answers

1. Hydroelectric power plants are generally built near a water stream; 2. A dam is a facility that can be useful to the community where it is built; 3. To produce electricity from tides or waves, water needs to be harnessed; 4. The water flowing in the pipe strikes the blades of a turbine which starts spinning.

Pages 36-37

Have you ever seen an offshore wind farm? Where are offshore wind farms located in Europe?

Offshore wind farms in Europe are mostly located in the United Kingdom; some can also be found in the Netherlands, in Denmark and in Germany.

13.

1. blades; 2. wind; 3. shaft; 4. CSP; 5. collectors; 6. receivers; 7. steam; 8. photovoltaic; 9. semiconductors; 10. photons.

14.

1. land; 2. speed; 3. rotation; 4. transmission; 5. heat; 6. sunlight; 7. cell; 8. panel.

15. 15

Generating Electricity with the Power of the Wind

People have used the power of wind for thousands of years. Wind has moved boats along rivers, pumped water and ground grain, supported food production and much more. Today, the kinetic energy and power of wind are harnessed to create electricity. A single, modern offshore wind turbine can generate more than eight megawatts of energy, enough to power nearly six homes for a

year. Onshore wind farms generate hundreds of megawatts, making wind energy one of the most cost-effective, clean and readily available energy sources on the planet. Each type of wind turbine is able to generate its maximum electricity within a range of wind speeds often in between 30 and 55 miles per hour.

These are the main advantages of wind power:

- wind turbines provide up to 30 years of virtually carbon-free electricity generation;
- the wind industry supports job creation, especially during construction. The industry supported 114,000 jobs in 2018.

The main disadvantages of wind energy are:

- unpredictability, as the energy production is strictly linked to the presence and speed of wind;
- the noise made by the turbines spinning.

In addition, some people believe that tall wind turbines are not in harmony with the landscape, and there are limited locations suitable for them. However, it cannot be denied that wind power generation remains among the cleanest of any energy source. It plays an essential role in the future of energy supply, supporting our world's energy transition and the increasing demand for sustainable energy resources.

Adapted from: <https://sustainablesolutions.duke-energy.com/resources/how-do-wind-turbines-work/>

.....
1. F, The power of wind has been used for thousands of years; 2. T; 3. F, Wind turbines are also placed offshore; 4. F, It can power six homes for a year; 5. T; 6. T; 7. F, It must blow between 30 and 55 miles per hour; 8. T; 9. T; 10. F, They make a noise when spinning; 11. T; 12. F, There are limited locations suitable for them.

Pages 38-39

Can you explain the difference between biofuels and fossil fuels?

Fossil fuels are made from small organisms that, after death, have undergone decomposition and fossilisation; biofuels are made from organic material, dead organisms but also plants and by-products of living organisms which are not fossilised.

16.

1. biopower; 2. biomass; 3. renewable; 4. disposal; 5. biofuels; 6. geothermal; 7. heat; 8. electricity; 9. heating; 10. steam; 11. pump; 12. fluid.

17.

Sample answers

1. Biopower is electricity produced using biomass; 2. Biomass is formed from living organisms and their by-products; 3. Biomass is also formed from non-fossilised dead organisms; 4. To produce energy, biomass is burned to heat water that becomes steam; 5. The steam created in this way makes a turbine, which activates a generator, spin; 6. The energy produced using biomass is renewable and clean; 7. Biofuels have low greenhouse gas emissions; 8. Geothermal energy is generated underground by chemical and nuclear reactions; 9. Geothermal energy can be exploited for heating and to produce electricity; 10. Steam can be taken directly from the underground or generated by pumping hot water under the Earth's surface.

Pages 40-41

Do you know about any accidents that have occurred in nuclear power plants?

The most recent accidents that have taken place in nuclear reactors happened in 1986 in Chernobyl, Ukraine, and in 2011 in Fukushima, Japan. In Chernobyl, one of the reactors exploded during the night, releasing a very high quantity of radiation which spread over hundreds of kilometres into nearby countries, causing illness and deaths. In Fukushima, an earthquake and a consequent tsunami caused an enormous flood that reached the nuclear power station and damaged the reactors of the cooling system, causing an explosion that released radioactive vapours in the environment.

18.

1. fusion; 2. fission; 3. uranium; 4. heat; 5. chain; 6. reactor; 7. fuel; 8. cooling.

19.

1. h; 2. i; 3. a; 4. g; 5. e; 6. b; 7. d; 8. f. Extra: c.

Page 42

VOCABULARY

20.

1. fossil fuel; 2. alkaline battery; 3. wind turbines; 4. lead acid battery; 5. dam; 6. solar panels; 7. nuclear power; 8. coal; 9. geothermal energy.

21.

1. alternator, e; 2. anode, h; 3. boiler, j; 4. coal, i; 5. wind farm, a; 6. kinetic, c; 7. electrolyte, g; 8. reservoir, d; 9. chain reaction, f; 10. rechargeable, b.

Pages 44-45

In your opinion, what is the reason for choosing either method of transmission?

Cables are held on towers or pylons when they are far from urban areas. In cities, cables are usually put underground.

1.

1. generation; 2. stations; 3. voltage; 4. step-up; 5. cables; 6. pylons; 7. decreased; 8. step-down.

2.

1. h; 2. e; 3. c; 4. b; 5. g; 6. a; 7. f; 8. i; 9. d; 10. j.

3.

Sample answer

Electricity is produced in power plants, called power stations, by big generators that use different sources of power, in the form of AC. Power stations are usually located far from urban areas, so electricity has to travel long distances through cables, on pylons or underground. To avoid power losses caused by resistance, electricity is stepped up at very high voltage by step-up transformers located in substations. Before delivering it to final users, however, it is necessary to step voltage down again by step-down transformers, usually placed near urban areas, to reduce the distribution distance.

Pages 46-47

4.

1. water; 2. wind; 3. generator; 4. solar; 5. geothermal; 6. nuclear; 7. burns; 8. boiler; 9. spins; 10. steam; 11. condenser; 12. cooling.

5.

Sample answers

1. After use, steam is transformed back into water by a condenser and reused in the electricity production cycle; 2. A turbine converts mechanical energy into kinetic energy; 3. The spinning movement is transmitted from the wind turbines directly to a generator; 4. Fuel is burned in a furnace to produce high-pressure steam; 5. The spinning rotation of the blades of a turbine activates a generator which produces energy; 6. Water is used directly to spin the turbines connected to a generator; 7. High-pressure steam is channelled through pipes

and reaches a turbine; 8. A shaft transmits the rotation to a generator, which produces electricity; 9. Water can come from a reservoir or from seas and oceans; 10. The wind spins the blades of the turbines directly.

Sentences referring to thermal power plants: 1, 2, 4, 5, 7, 8; sentences referring to renewable energy power plants: 3, 6, 9, 10.

6.

Thermal power plants: 4, 7, 5, 2, 8, 1. Renewable energy power plants: 6, 9, 10, 3.

Pages 48-49

7.

1. winding; 2. winding; 3. voltage; 4. induces; 5. output; 6. stepped; 7. secondary; 8. stepped.

8. ► How do transformers work?

posted by StraightTalkAlert

.....
Let's talk about transformers. Not the machines that transform from cars to combat robots you see in the movies, but the kind you see at the top of utility poles or on the ground in your neighbourhood. Transformers are used to step electric voltage up or down before it makes its way to its final destination. Why does this need to happen? Original power distribution voltage can range from 7,200 to 24,900 Volts, depending on your electric utility providers practice, the distance to the furthest member and the amount of load served. That's much too high a voltage for safe home or business use. Transmission lines connect the power to substations brimming with transformers and control equipment. This is the first place where they transform the voltage to safer, more manageable levels for the distribution systems. The voltage then travels through distribution lines, takes one or two more steps down and arrives at your home. Power beats into your home's electrical outputs and lights at 120 Volts, while water heaters ranges and HVAC systems receive 240 volts, both considerably lower than the original voltage. Here's a quick look at how transformers actually work for a typical American home. Transformers start with an iron core; on two sides of this iron core wire is coiled. On the high voltage side, the coil is wrapped around the core many times. This side receives or produces high voltage. On the other side, the coil is wrapped around fewer times, receiving or producing lower voltage. As the electricity flows through the high voltage coil, it creates a magnetic field and induces a lower voltage in the other coil. That's how

the magic of transformation takes place. Transformers are everywhere in our daily lives, not just on your utility providers lines. Take your cell phone charger, for example: many of these small cousins of utility transformers perform a similar function. Charging your cell phone at 120V will fry it instantly, so the charger converts the voltage to a more tolerable 5 Volts or so. The use of electricity touches nearly every aspect of our modern lives and we have transformers to thank for bringing it safely into our homes.

-
1. top of utility poles, on the ground; 2. step voltage up; 3. power distribution voltage; 4. the power to substations; 5. safer (and) more manageable; 6. one or two more times; 7. iron core, around the two sides; 8. creates a magnetic; 9. induces a (lower) voltage; 10. converts the voltage.

Teacher’s note

HVAC means Heating, Ventilation and Air conditioning.

9.

1. iron; 2. winding; 3. input voltage; 4. output voltage.

Pages 50-51

Can you give some examples of utility companies in Italy?

The biggest utility companies in Italy are Enel, Eni, Edison, Iren, and Sorgenia.

10.

1. utility; 2. losses; 3. worn-out; 4. transmission; 5. weather; 6. consumption; 7. back-up; 8. sources.

11.  22

Power Grid and Energy Security

The term “power grid” refers to the electrical grid that generates and supplies power. There are three steps performed by the grid: generation, transmission, and distribution. For this reason, all power plants, power lines and other forms of distribution are essential for the power grid and, consequently, for energy security.

Energy security can be defined as the ability to maintain a consistent supply of energy at a sustainable price. Anything affecting the ability of a country to accumulate or distribute energy poses an energy security risk. Countries can

increase domestic production and diversify their energy sources to prevent big price increases and strengthen energy security. However, there are many physical risks associated with energy security, particularly for the grid, which is a vital component of energy security. Generally, distribution is the most vulnerable part of the energy grid as this infrastructure is most affected by extreme weather, which is one of the largest threats for the grid.

In February 2021, a winter storm knocked out the Texas power grid. Millions of Texans lost power for multiple days in the freezing temperatures and 702 people died as a result of the storm. The Department of Energy has admitted that the clean energy transition is already pushing the energy grid beyond its limits, as the grid was not designed to integrate and exploit alternative energy sources. The grid faces external risks as well, cybersecurity, and wildlife. A modernised energy grid is critical for US energy security and resilience.

Adapted from: <https://www.americansecurityproject.org/climate-energy-and-security/energy/threats-to-the-energy-grid/>

-
1. F, It is a system for producing and distributing energy; 2. T; 3. T; 4. F, It prevents big price increases; 5. F, It is distribution; 6. T; 7. F, It was knocked out by a winter storm; 8. T.

12.

Sample answers

1. It could help predict the areas where a higher consumption could occur in order to direct more energy to these areas; 2. This could help avoid or reduce power losses; 3. This would help face power outage due to weather conditions or excess of demand; 4. This would increase the efficiency of the distribution grid, avoiding or reducing power losses and the risk of power outages.

Pages 52-53

13.

1. two-way; 2. consumption; 3. smart; 4. reliability; 5. PMU; 6. renewable.

14.  What is the smart grid?

posted by Elevate

.....

Turning on a light or charging your phone is so simple that you probably don’t think about the network of electricity that makes it all work smoothly. This electric grid, made up of a network of power plants and power lines, relied on one-way power delivery technology. The lack of communication resulted in outages

that were harder to identify and fix. Today, the grid has undergone a technology evolution, including adding digital communications that give you more choices and ways to save on your electric bill. This is called the smart grid. A central piece of the smart grid is a smart meter, that measures electricity use at your home. A smart meter enables two-way communication between your home and the utility company, and gives you more control over monitoring and regulating your energy use. The smart grid is able to help people save money on their bills because both the smart grid and smart meters are able to measure electricity usage in hourly intervals and customers can then participate and demand response programs, where they can receive alerts letting them know when to reduce electricity usage; in that way they can receive bill credits, or they can also join dynamic pricing rates where they're encouraged to shift their usage away from the highest demand times of the day to the cheaper, off-peak hours, and that can help them save money. So, the benefits of the smart grid: customers are able to experience fewer and shorter power outages, and it gives them more accurate and reliable energy readings. Visit elevatenp.org to learn more about the smart grid and its benefits.

.....
 1. T; 2. NG; 3. F, The traditional grid had a one-way power system, while the smart grid has a two-way system; 4. T; 5. NG; 6. NG; 7. T; 8. T; 9. F, It gives information about energy consumption to utility companies, too; 10. NG.

15.

1. Because the demand for electricity has increased a lot over the last decades; 2. A two-way system is a system that allows the exchange of information between utility companies and users; 3. Smart meters give consumers information about their electricity consumption and send this information to utility companies; 4. Utility companies use the information provided by meters to send electricity where it is actually more needed; 5. PMUs monitor fluctuations in voltage or current on the grid; 6. They protect the grid from excess of current; 7. Digital relays have both hardware and software; 8. It is flexible because it can incorporate power from renewable sources.

Pages 54-55

16.

1. battery storage; 2. rechargeable; 3. store; 4. hydroelectric storage; 5. lower; 6. thermal

storage; 7. molten; 8. steam; 9. kinetic storage; 10. flywheel; 11. air storage; 12. underground.

17.

1. supply; 2. demand; 3. to store; 4. compressed air; 5. kinetic; 6. failure; 7. over-production; 8. availability; 9. storage; 10. friction.

18.

1. battery storage; 2. thermal storage; 3. pumped hydroelectric storage; 4. thermal storage; 5. kinetic storage and pumped hydroelectric storage; 6. compressed air storage; 7. kinetic storage; 8. thermal storage.

Page 56

VOCABULARY

19.

1. power station; 2. furnace; 3. cooling tower; 4. turbine; 5. pylon; 6. smart meter; 7. flywheel; 8. steam; 9. winding.

20.

1. b; 2. h; 3. a; 4. e; 5. c; 6. g; 7. d; 8. f.

21.

Sample answers

1. A step-down transformer reduces voltage before electricity is delivered to consumers; 2. Compressed air is generated and stored underground to produce electricity when needed; 3. A generator is a device for producing electricity transforming mechanical energy into electrical energy; 4. To reduce friction, a flywheel is rotated inside a vacuum container to produce electricity.

Unit 1.4 Electricity, magnetism and motors

Pages 58-59

1.

stationary; 2. moving; 3. field; 4. magnetism; 5. magnetic; 6. electromagnetism; 7. current; 8. changing.

2.

1. e; 2. h; 3. a; 4. b; 5. g; 6. k; 7. i; 8. d; 9. j; 10. c; 11. l; 12. f.

Pages 60-61

Search the Internet to find out who invented the first DC and AC motors.

The first DC electric motor capable of driving machinery was invented by British scientist William Sturgeon in 1832. Following Sturgeon's work, a direct-current electric motor was built by American inventors Thomas Davenport and Emily Davenport, who patented it in 1837.

The first alternating-current induction motor was invented by Galileo Ferraris in 1885. He was able to improve his first design by producing more advanced setups in 1886. In 1888, the *Royal Academy of Science of Turin* published Ferraris's research, detailing the foundations of motor operation, while concluding at that time that "the apparatus based on that principle could not be of any commercial importance as a motor". Possible industrial developments were envisioned by Nikola Tesla, who invented his induction motor independently in 1887 and obtained a patent in May 1888.

3.

1. rotor; 2. stator; 3. torque; 4. shaft; 5. mechanical; 6. commutator; 7. high; 8. AC.

4.

1. b; 2. e; 3. g; 4. k; 5. h; 6. i; 7. a; 8. j; 9. l; 10. c; 11. f; 12. d.

Pages 62-63

5.

1. induction; 2. lower; 3. field; 4. single; 5. machines; 6. three; 7. industrial; 8. same; 9. field; 10. constant; 11. brushed; 12. commutator; 13. electronic; 14. speed; 15. stepper; 16. printers.

6.

1. synchronous motor; 2. brushed DC motor; 3. single-phase motor; 4. stepper motor; 5. induction motor; 6. stepper motor; 7. brushless motor; 8. induction motor; 9. three-phase motor; 10. stepper motor.

7.

Sample answers

1. AC motors can be synchronous or asynchronous motors; 2. In synchronous motors, the rotor rotates at the same speed as the revolving magnetic field; 3. Asynchronous motors are single-phase or three-phase induction motors; 4. Brushes in DC motors are made of carbon; 5. In brushless motors the direction of the current is electronically controlled; 6. Single-phase motors

are suitable for driving household appliances; 7. Motor brushes get worn-out, so brushed motors need a lot of maintenance; 8. Brushless motors last longer but they are more expensive.

Pages 64-65

What speed can Maglev trains reach?

In 2003, a Maglev train in Japan set a Guinness world record reaching a speed of 581 km/h in a manned test run; in 2015 further development of technology made a Maglev train reach a maximum speed of 603 km/h in a test run. In 2027, the first Maglev passenger train between Tokyo and Osaka (286 km) will start to operate; trains will travel at 505 km/h on a rail that will be 80% underground.

8.

1. electricity; 2. coil; 3. striker; 4. electromagnets; 5. force; 6. diaphragm; 7. electric; 8. magnetic; 9. permanent; 10. direction; 11. backwards; 12. sound; 13. wire; 14. field; 15. heat.

9. 29

How Credit Cards Work

Have you ever wondered how people pay for groceries, vending machines and gas without cash? Millions of debit and credit cards are swiped every day; in fact, in 2016, card payments totalled an enormous value of 5.98 trillion dollars. On the back of the credit card there is a black strip called a mag stripe. This is made of ferromagnetic material that is laminated onto the card. Looking closer, there are tiny magnets, twenty millionths of an inch in size, which are all oriented in specific directions that carry personal information. To read this information, the credit card is swiped through a card reader. The card reader is made up of a solenoid, which is a cylindrical coil of wire. When a current passes through the wire of the solenoid, it creates a magnetic field. When a card is swiped, each tiny magnet of the stripe moves through the reader and the magnetic flux changes, changing the voltage and the direction of the induced current. A program in the card reader processes the changes in current and translates them into readable information. This then allows or denies the transaction. Next time you go to swipe a card and make a purchase or even just open a door, impress someone by telling them the electromagnetism steps behind it.

Adapted from: <https://www.youtube.com/watch?v=LS4okPmwaEk> – "How credit cards work" posted by Talia Toland

1. mag stripe; 2. ferromagnetic material; 3. magnets, inch; 4. personal information; 5. read this information; 6. solenoid; 7. magnetic field; 8. moves through the reader; 9. magnetic flux, voltage; 10. card reader, information.

Pages 66-67

What are the most commonly used batteries in electric vehicles?

The most commonly used batteries in electric vehicles are lithium-ion and lithium-polymer batteries.

10.

1. rechargeable; 2. unit; 3. control; 4. recharge; 5. electric; 6. wheels; 7. station; 8. fuel; 9. run; 10. switch; 11. braking.

11. 31

Pros and Cons of Electric Cars

Electric cars are growing in popularity every day. Just like conventional cars, there are certain benefits and drawbacks of using an electric car.

1. Electric cars are energy efficient. Energy efficiency refers to the amount of energy from the fuel source that is converted into actual energy for powering the wheels of a vehicle. EVs are far more efficient than conventional fuel engine vehicles: EV batteries convert 59 to 62 percent of energy into vehicle movement while fuel engine vehicles only convert between 17 and 21 percent.

2. Electric cars reduce emissions because they rely on a rechargeable battery; driving an electric car does not create any greenhouse gas emissions, which are a major source of pollution.

3. Electric cars perform well and don't need much maintenance. All electric vehicles are also high-performance vehicles whose motors are not only quiet and smooth, but require less maintenance than internal combustion engines. The driving experience can also be fun because EV motors react quickly, making them responsive with good torque.

4. Electric cars can travel less distance. EVs generally have a shorter range than gas-powered cars. Most models range between 95 and 190 kilometres per charge and some luxury models reach ranges of 480 kilometres per charge. By comparison, fuel engine vehicles will average around 480 kilometres on a full petrol tank, and more fuel-efficient vehicles get much higher driving ranges.

5. Electric cars can take a long time to recharge. Fully recharging the battery pack can take up to 8 hours, and even fast charging stations take 30

minutes to charge to 80 percent capacity.

6. Electric cars can be expensive. Electric vehicles usually cost more than fuel engine cars; however, you can save money over time since there is generally less maintenance on an EV and it's less expensive to charge than fuel. EVs also often have government incentives available to help reduce the initial purchase price.

Adapted from: <https://www.energysage.com/electric-vehicles/101/pros-and-cons-electric-cars/>

-
1. F, They are more energy efficient; 2. T; 3. T; 4. F, They are quiet engines; 5. F, They require less maintenance than internal combustion engines; 6. T; 7. T; 8. F, Full recharging can take up to 8 hours; 9. F, They are more expensive to buy, but less expensive to recharge; 10. T.

12.

Sample answers

1. The distance at which a car can travel without needing to be recharged; 2. The equipment that controls the whole functioning of an electric vehicle, from its motor speed to the power supply; 3. A vehicle that mainly runs on electricity but also has a traditional fuel engine that can be used if batteries run out of charge; 4. A vehicle mainly running on fuel that has a battery for storing electricity by braking and the possibility of running on electricity by pressing a button.

Page 68

VOCABULARY

13.

1. shaft; 2. induction cooker; 3. charging station; 4. Maglev train; 5. electric alarm bell; 6. magnetic field; 7. brushes; 8. electric motor; 9. solenoid.

14.

1. commutator, d; 2. rotor, f; 3. stepper motor, a; 4. transmission unit; c; 5. hybrid electric vehicle, b; 6. torque, e.

Page 70

REAL-LIFE SKILLS

1.

Sample answers

- Get some copper coins such as the 5 cent ones; to obtain a good amount of power you should have a good number of them (at least ten).
- Cut ten discs the same size of the coins from a sheet of cardboard.
- Put them into a container with salty water, so that they are completely wet.

- Take a piece of foil and fold it at least four times; you should get a small square of foil a little larger than the coins.
- With the help of a coin, draw a disc on the foil and cut the foil around to get at least nine discs; as the foil has been folded many times, you will get enough of them.
- Place a coin on the table, put a wet cardboard disc on it and then one disc of foil; keep repeating the process until you have used all the coins.
- To use the battery, stick a wire on a piece of tape, then put the battery on it and fix another wire on top of the pile of coins with the help of another piece of tape, then wrap the tape all around the battery.
- Now, the battery is ready to be used to power very small devices; if the two wires are connected, for example, to the two ends of an LED, this will be powered and emit light.

2.

Sample answer

	EV	PHEV	HEV
Pollution	No emissions of greenhouse gases	Emissions when running on fuel	Emissions when running on fuel
Recharging	It must be plugged into a charging station	It must be plugged into a charging station	It is recharged through regenerative braking
Fuel needed	No	Yes, when the car runs out of charge	Yes, the main motor is a fuel engine
Other features	They accelerate faster than fuel engine cars and feel lighter to drive		Drivers can switch between fuel engine and EV mode by pressing a button + regenerative braking increases the car range

3.

Personal answer

Page 71

CASE STUDY

4.

1. atom; 2. fusion; 3. pressure; 4. to release;
5. scientist; 6. power station; 7. waste; 8. radioactive; 9. breakthrough; 10. research.

5.

Sample answer

The experiment carried out at the Lawrence Livermore National Laboratory in California is important because, for the first time in sixty years, scientists were able to generate an amount of energy greater than the one needed for the process. The success of the experiment opens a way for future possibilities of employing nuclear fusion as a means of producing electricity, solving problems such as that of nuclear waste and clean energy.

Pages 72-73

CLIP Back to the future

6.

Sample answers

1. Telephones had already been invented in 1955, but not everyone had one; they were set at home and they could not be used outside as they were wired; moreover, they were only used to make calls; 2. TVs already existed but not all people could afford one. People could go together to clubs or bars to watch it; in any case, there were very few programmes; 3. In 1955 some household appliances, such as the washing machine, the dishwasher, and the Hoover had already been invented; however, only few people had them as they were quite expensive and home electricity plants were not always suitable to their use; 4. Personal computers did not exist in 1955 as they were invented in 1977; however, big computers to make complex calculations were already in use and they were mainly employed by scientists for research.

7. ▶

.....
Doc: One point twenty-one gigawatts. One point twenty-one gigawatts. Great Scott!
Marty: What the hell is a gigawatt?
Doc: How could I have been so careless! One point twenty-one gigawatts. Tom, how am I gonna generate that kind of power? It can't be done, it can't.
Marty: Doc, look, all we need is a little plutonium.
Doc: I'm sure that in 1985 plutonium is available at every corner drugstore, but in 1955, it's a little hard to come by. Marty, I'm sorry, but I'm afraid you're stuck here.
Marty: Whoa, whoa Doc, stuck here? I can't be stuck here! I got a life in 1985. I got a girl.
Doc: Is she pretty?
Marty: Doc, she's beautiful. She's crazy about me. Look at this, look what she wrote here, Doc.

That says it all. Doc, you're my only hope.
 Doc: Marty, I'm sorry, but the only power source capable of generating one point twenty-one gigawatts of electricity is a bolt of lightning.
 Marty: What did you say?
 Doc: A bolt of lightning. Unfortunately, you never know when or where it's ever gonna strike.
 Marty: We do now.
 Doc: This is it. This is the answer. It says here that a bolt of lightning is gonna strike the clock tower precisely at 10:04 pm next Saturday night. If we could somehow harness this lightning, channel it into the flux capacitor... it just might work. Next Saturday night, we're sending you back to the future.

.....
 3: incurante, negligente; 4: supermercato; 5: flusso; 7: plutonio; 8: energia; 9: fonte, sorgente; 10. torre.

Teacher's note

The phrase "Great Scott!", which is one of Doc's favourite expressions in the film, is probably a euphemistic way of saying "Great God!". This phrase is found in several written documents dating back to the mid-1800s, and probably referring to Winfield Scott, a general of the US Army during the Civil War, known as "Great Scott".
 The question "Tom, how am I gonna generate that kind of power?" is asked by Doc while looking at the picture of Thomas Edison (1847-1931), the American pioneer in electricity generation and distribution over the US and inventor of many electrical appliances.

8.
 1. F, They are discussing something at Doc's house; 2. T; 3. T; 4. F, He says that in 1955 it is impossible to find plutonium; 5. T; 6. F, He says he must go back to 1985 because he has a life and a girlfriend there; 7. F, Marty says she is crazy about him; 8. F, The leaflet shows the clock tower that was struck by lightning; 9. T; 10. F, The leaflet says when the lightning storm will take place.

9.
Sample answer
 Hi there! I am writing from the 1980s. Teenage fashion seems to be very different here, but one of the strangest things I've seen is that boys and girls listen to music using quite big earphones attached to a small box that contains a tape, where music is recorded. They call it "Walkman". Teenagers cannot send texts as mobile phones do not exist; they can only make phone calls from home. So, if two girls want to talk about their boyfriends... well, they have to find a hidden

place where their parents cannot listen to them! Social media do not exist, so they cannot watch funny videos; they can only watch programmes or series on TV; actually, there are a lot of funny TV series to watch! Well, I think that, even if it seems strange and a little hard, I could get used to this life because I could enjoy the company of friends much more, and talk to them a lot more than I do at home...

Page 74

CITIZENSHIP

10. ▶ Energy conservation vs. energy efficiency
posted by IGS Energy

.....
People are increasingly trying to find ways to reduce their carbon footprint. This can include taking a closer look at the way you use energy, including products you choose to use and even your activities. To support you on your green journey, we'll break down two terms you're likely to hear when it comes to becoming a more thoughtful steward of your energy use. The first concept is energy conservation. This is when you cut back on the actual energy being used. For example, conserving energy could mean taking a shorter shower, turning off lights when not needed or commuting to work by bike instead of by car. The next is energy efficiency: the distinction between the two is that you aren't changing behaviours, such as avoiding energy use; instead, you're cutting down on the energy required to achieve the same result. Take a light bulb, for example: changing out your older incandescent bulb in favour of an LED version can reduce the amount of energy required to achieve the same desired effect of lighting your home or business. Ultimately, when trying to reduce your carbon footprint, taking steps to conserve, but also being more efficient is ideal; every little bit helps. For more bright ideas and to learn more about how you can go green, visit IGS.com/green.

.....
 1. they use; 2. activities; 3. energy conservation; 4. take shorter showers; 5. turn off lights; 6. by bike; 7. LED bulb instead; 8. (energy) efficient.

11.
Sample answers
 1. The amount of carbon dioxide released through our actions or activities; 2. Reducing the amount of energy used by changing habits; 3. Using less energy to perform the same task or produce the same result; 4. Becoming more aware of the problems of the environment, also changing habits and behaviour to be more sustainable.

Unit 2.1 The basics of electronics

Pages 76-77

1. low; 2. information; 3. vacuum; 4. transistors; 5. triode; 6. integrated circuits; 7. computers; 8. digital; 9. systems; 10. printers; 11. appliances; 12. office; 13. medical; 14. security.
2. 1. c; 2. g; 3. a; 4. e; 5. d; 6. b; 7. f; 8. h.
3. 1. vacuum diode; 2. 1906; 3. 1945; 4. transistor; 5. integrated circuit; 6. 1971.

Pages 78-79

Have you ever heard of “Silicon Valley”? Can you explain what it is?

Silicon Valley is a region in the area of San Francisco, California, and it is home to the biggest companies dealing with computers and electronics. Silicon Valley was given its name for the large number of factories in the region producing silicon chips, which are the basic components of the ICT industry, but, probably, also for the presence, in the same region, of large quantities of sand, from which silicon is extracted. The name Silicon Valley was used for the first time in 1971 by an American journalist, Don Hoefler, in an article about developing technologies.

Can you explain why these types of semiconductors are called N-type and P-type?

N is for negative and identifies the semiconductors with a higher number of electrons, which have a negative charge; P is for positive and identifies the semiconductors with one electron missing in the atom structure; the absence of an electron creates the effect of a positive charge.

4. 1. better; 2. worse; 3. silicon; 4. phosphorus; 5. N-type; 6. free; 7. boron; 8. P-type; 9. hole; 10. devices; 11. circuits; 12. cells.

5. 34

How are Semiconductors Made?

What is a semiconductor? Conductors conduct

electricity, insulators resist electricity; semiconductors fall in between the two. So, how is a semiconductor created? The basic element of all semiconductors is silicon, which is extracted from sand. Let's briefly review the structure of silicon atoms: silicon has four valence electrons, which are the electrons that participate in chemical reactions. Silicon atoms are tightly bound one to the other. But what happens if we dope silicon with an element with five valence electrons, like phosphorus? Well, if we add a phosphorus atom to a silicon one, phosphorus will use four of its five valence electrons to create bonds with the silicon atoms, while the extra electron is free to move, increasing the conductivity of silicon. The resulting material is known as an N-type semiconductor; only a small amount of phosphorus is needed to increase the conductivity of a large silicon crystal. Now, what about adding an atom that has fewer than four electrons, like aluminium, which has three valence electrons? What type of semiconductor will we get? If we place aluminium inside silicon, the missing electron of aluminium will create a hole. So, if we add an atom with three valence electrons to pure silicon, the result is a P-type semiconductor. If we put a P-type semiconductor next to an N-type semiconductor, we create a P-N junction. The free electrons from the N-type semiconductor will tend to move to the P-type semiconductor and fill in the holes. In this way, there will be build-up of negative charges on one side of the junction, and positive charges on the other, creating a flow of current. This is the basis for constructing devices like diodes, transistors and even solar cells.

Adapted from: <https://www.youtube.com/watch?v=ethnHSgVbHs> - Semiconductors, Insulators & Conductors, Basic Introduction, N type vs P type Semiconductor posted by The Organic Chemistry

-
1. e; 2. a; 3. c; 4. g; 5. b; 6. i; 7. h; 8. d. Extra: f.

6.

Sample answer

An N-type semiconductor is obtained by doping pure silicon, which has four valence electrons, with a small quantity of a substance which has five valence electrons per atom, such as phosphorus or arsenic. Four of the five electrons create bonds with the four silicon valence electrons; the extra electron is free to move and allows current to flow.

A P-type semiconductor is obtained by doping pure silicon with boron or gallium, which have three valence electrons in each atom. These electrons

form bonds with three of the four silicon valence electrons, while the missing electron forms a hole. Electrons tend to restore the balance by filling the holes, which are transferred to other atoms; in this way, a movement of electric charges is produced.

Pages 80-81

Have you ever heard of Moore's law? Search the Internet to find out what it is.

Moore's law was devised by Gordon Moore, an American engineer, in 1965. Moore's Law stated that the number of transistors on an integrated circuit would double every two years. The law claimed that we could expect the speed and capability of our computers to increase every two years because of this, while their cost would be reduced by half.

7.

1. active; 2. BJT 3. NPN; 4. emitter; 5. collector; 6. source; 7. gate; 8. switch; 9. amplifier.

8.

1. BJT; 2. FET; 3. BJT; 4. MOSFET; 5. FET; 6. FET; 7. BJT; 8. BJT.

9.

Sample answers

1. Transistors are active electronic components which regulate or control current or voltage; 2. A transistor has a PNP configuration when an N-type semiconductor is placed between two P-type semiconductor layers; 3. In a bipolar junction transistor, emitter and collector are both connected to the output circuit; 4. In a field effect transistor, a voltage applied to the gate generates an electric field; 5. A transistor can act as a switch and as an amplifier; in this case it increases the signal's strength; 6. Transistors are more efficient, less heavy, and less expensive than vacuum tubes; 7. The invention of transistors has been very important for the development of digital electronics; 8. Integrated circuits have become smaller in size, but they have improved their performances.

Pages 82-83

Where are LEDs mainly used?

LEDs are commonly used in appliances such as TVs to signal standby mode, but they are now largely replacing incandescent or fluorescent bulbs for lighting.

10.

1. diode; 2. rectifier; 3. DC; 4. lightning; 5. resistance; 6. medical; 7. regulators; 8. inductor; 9. magnetic; 10. blocks; 11. transformers; 12. AC; 13. stores; 14. filters.

11. 37

.....
Light emitting diodes, commonly called LEDs, do many different jobs in all kinds of devices. They form numbers on digital clocks, transmit information from remote control, light up watches and tell you when your appliances are turned on. Collected together they can form images on a television screen or illuminate a traffic light. In the simplest sense, LEDs are just small light bulbs that fit easily into an electrical circuit, but unlike incandescent bulbs, they use less electricity and they don't get hot. LEDs are lit up by the movement of electrons in a semiconductor and they last as long as a standard transistor. The life of a LED is thousands of hours longer than that of an incandescent bulb; because of these advantages, LEDs are one of the most popular technologies used to illuminate LCD TVs. Until recently, LEDs were too expensive to be widely used, because of the cost of the advanced semiconducting material they're built around. However, the constant development of technology has made LEDs a better lighting option for a wide range of situations. While they may be more expensive than incandescent bulbs, their lower cost over the long run can make them a better solution.

Adapted from: <https://electronics.howstuffworks.com/led.htm>

.....
1. T; 2. T; 3. F, Unlike incandescent bulbs, they don't get hot; 4. F, LEDs use less electricity; 5. F, They last as long as a standard transistor; 6. T; 7. F, LEDs are one of the most popular technologies used to light LCD TVs; 8. T; 9. T; 10. F, Their lower cost in the long run can make them a better solution.

12.

Sample answers

1. It conducts electricity in one direction only; 2. It stores electricity in an electronic circuit; 3. It controls or blocks the flow of current; 4. It blocks AC current while letting DC current flow.

Pages 84-85

13.

1. international; 2. resistors; 3. multiplier; 4. capacitance; 5. tolerance; 6. voltage; 7. inductors; 8. bands.

14.

▶ How to read a resistor posted by Engineering Technology Simulation Learning Videos

Resistors are colour coded with markings or bands that allow you to quickly identify resistance values and tolerance. Using a colour chart table will allow you to determine the value of any common four band resistor; memorising this colour chart will enable you to become proficient at quickly decoding and using resistors. In a four-band resistor, the first two bands represent the digits, or significant figures; the third band indicates the multiplier and the fourth band indicates the tolerance. You read resistor bands beginning with the end that has the most bands. A space between the third and fourth bands also indicates the reading direction: the first band is red, so the first digit value is two; the second band is violet, so digit two is seven; the third band is yellow, so we multiply the first two numbers by ten to the fourth or ten thousand. Thus, the value of this resistor is 270 kilo ohms with a tolerance of $\pm 5\%$.

In this example, the first band is orange, so the first digit is three; the second band is white, so digit two is nine; the third band is silver, so we multiply the first two numbers by ten to the negative second power or .01. In this instance, we would take the thirty-nine and move the decimal point two places to the left, resulting in a value of 0.39 ohms. Thus, the value of this resistor is 0.39 ohms with a tolerance of $\pm 10\%$. Now, let's determine what the bands would be on a 15-kilo ohm resistor. Since the first digit is one, the first band would need to be brown; the second digit is five, so the band colour would need to be green; the resistor value is 15 thousand ohms, so we need to add three zeros to fifteen. Three zeros is a thousand, so we need to have a multiplier of 10 to the third; thus, the third band would need to be orange. The last band would need to be silver, to indicate that the resistor has a tolerance of $\pm 10\%$.

1. (quickly) identify their values and tolerance;
2. the colour chart;
3. that has the most bands;
4. between the third and fourth band;
5. 270 kilo ohms (k Ω);
6. $\pm 5\%$;
7. multiply the first;
8. needs to be/must be silver.

15.

1. Colour coding is an international system which uses colours to indicate the values of electronic components; 2. Colour coding was invented by electronic component manufacturing companies; 3. Coloured bands are more visible, clear and easy to print than numbers, especially on small

components; 4. Resistors, capacitors, and inductors use colour coding; 5. Resistors have four coloured bands; 6. The first and second band represent the digits that form the value; the third one is a multiplier, and the fourth one represents tolerance; 7. The measuring unit of resistance is the ohm; 8. The measuring unit of capacitance is the farad; that of inductance is the henry; 9. The fifth coloured band of a capacitor represents voltage; 10. An inductor with only three bands has a tolerance of $\pm 20\%$.

Page 86

VOCABULARY

16.

1. inductor; 2. diode; 3. MOSFET; 4. BJT; 5. capacitor; 6. LED; 7. semiconductor; 8. resistor; 9. colour chart.

17.

1. electronics; 2. voltage; 3. transistor; 4. triode; 5. ENIAC; 6. phosphorus; 7. dope; 8. diode; 9. capacitor; 10. coding.

Unit 2.2

Digital electronics

Pages 88-89

What other devices can be found both in analogue and digital form?

Other devices are: clocks, watches, fuel gauges, manometers, barometers, speedometers, voltmeters, ohmmeters, ammeters, and multimeters.

1.

1. measurements; 2. phenomena; 3. continuous; 4. discrete; 5. processed; 6. converted; 7. digits; 8. precision; 9. storage; 10. technological; 11. flexibility.

2.

1. d; 2. a; 3. e; 4. c; 5. f; 6. b.

3.

Sample answers

1. An analogue clock has a dial with numbers, usually from 1 to 12, and three hands, representing hours, minutes and seconds. As time passes, the hands move around the dial at a different speed and show the time pointing at the numbers; 2. An analogue manometer has a small plastic tube with a dial and a small pump at one end, while

the other end is free. When the free end of the tube is inserted into the tyre, the pointer of the dial indicates the pressure of the tyre, which is expressed in bars. If the tyre has to be inflated, this can be done by the small pump at the end of the tube; while inflating the tyre, the pointer in the dial signals the changes in the tyre pressure; 3. An analogue voltmeter has two leads connected to the device that must be placed at the two ends of a battery, or a bulb, to check the presence of current. If there is current, it will flow through the measuring device and the voltage will be shown by the pointer moving on a graduated dial.

Pages 90-91

4.

1. components; 2. wires; 3. board; 4. traces; 5. integrated; 6. connections; 7. chip; 8. faster; 9. cheaper; 10. analogue; 11. amplifiers; 12. digital; 13. automated; 14. signal; 15. communication.

5. 41

Analogue and Digital Circuits

An analogue circuit is a type of electronic circuit which processes analogue data using analogue components like resistors, capacitors, diodes and transistors. Analogue circuits can be quite a simple combination of resistors, diodes and other components to form an amplifier.

On the contrary, a digital circuit is a type of electronic circuit that is predominantly built using digital electronic components to process digital signals. The digital circuits consist of a combination of transistors, logic gates and sometimes, microcontrollers and processors. All digital circuits use binary digital signalling, i.e. only two voltage levels, 1 and 0, to represent the status signals ON or OFF. To perform various signal processing, all digital circuits incorporate switching devices like diodes and transistors.

Digital circuits are relatively easy to design, with many automated tools available for various stages of design and analysis, while, depending on the efficiency and precision, it is quite difficult to design analogue circuits.

When interacting with the physical world, analogue circuits can directly get the signals from outside as the data is already analogue. If, instead, a digital circuit has to acquire data from the physical world, the analogue signals must be converted into digital signals first.

Adapted from: <https://www.electronicshub.org/analogue-circuits-and-digital-circuits/>

1. electronic; 2. transistors; 3. resistors; 4. digital; 5. signals; 6. one; 7. devices; 8. design; 9. physical; 10. convert.

6.

1. An electronic circuit is a type of electric circuit composed of individual electronic components connected by wires; 2. A PCB is composed of a plastic board on which connecting traces functioning as wires are printed; 3. The advantages are a lower risk of faults and a higher speed in information processing; 4. Integrated circuits can be industrially produced; for this reason they are cheaper; 5. Integrated circuits are more suitable to be used in electronic devices because they are smaller; 6. Analogue circuits deal with analogue signals; 7. Digital circuits are usually employed in electronic devices and automated systems; 8. Receivers, as well as most modern radio and communication devices, use mixed-signal circuits.

Pages 92-93

How would you represent numbers 1, 15 and 23 in the binary system?

	2^4 (=16)	2^3 (=8)	2^2 (=4)	2^1 (=2)	2^0 (=1)
1	0	0	0	0	1
15	0	1	1	1	1
23	1	0	1	1	1

The first digit on the right has to be multiplied by 1 (2^0), the second by 2 (2^1), the third by 4 (2^2), the fourth by 8 (2^3), the fifth by 16 (2^4) and so on.

1: 1; 15: 1111 ($8+4+2+1$); 23: 10111 ($16+0+4+2+1$).

7.

1. computing; 2. system; 3. digits; 4. bits; 5. measuring; 6. speed; 7. eight; 8. byte; 9. files; 10. numbers; 11. strings.

8.

1. T; 2. T; 3. F, A byte is a group of numbers; 4. F, Eight bits form a byte; 5. F, They are expressed in (multiples of) bytes; 6. T; 7. T; 8. F, This system makes even the most elaborate operations possible.

9. What are binary numbers?

posted by Jared Owen

.....
Hello and welcome, this is Jared Owen and today we are gonna be talking about binary numbers. We're going to discuss what they are, how to count with binary and what they are actually used for. So, let's get started. The regular number system that we're used to is called decimal. It uses ten numbers, 0 to 9. We

can create any number, no matter how large, by just using these smaller numbers. Binary works the same way, but only uses two numbers, zero and one. Let's take a look at how this works.

Coming back over here to decimal, we start counting, and once we hit the number 9, we've run out of numbers. So, we set the number back to zero and then add one on the left to make 10. This can ripple through any number of digits. When we reach 99, we set both of them to zero and then add a one on the left. With binary numbers we do the same thing, but of course we run out of numbers a lot faster. We go zero, one and at this point we change it back to a zero and add a one on the left. This is a two in binary. Here's the first ten numbers in binary. Here's another way to think about it: each column or digit in binary has a specified value. Starting on the right, this is the 1s column, the 2s column, the 4s column and the 8s column. Notice how it doubles each time. So, if I have a higher number such as 1101, you can tell what it is in binary by adding it up. So, that's 8 plus 4, nothing in the 2s column, and 1; so, add that all up and you get 13. So that's a 13 in binary. Now that you know what it is, why is binary useful? Well, computers use binary because it's easy to store 1s and 0s as either on or off. Binary can be used to represent more than just numbers: it can represent letters in a Word document – each number corresponds to a character or symbol, such as punctuation; it can be used to represent colours in a picture or what you see on your screen, and it can also be used to represent instructions on what the computer should do next.

And that's binary numbers – thank you for watching.

-
1. It uses ten numbers; 2. From 0 to 9; 3. 0 and 1; 4. It represents number 2; 5. Number 13; 6. On and off; 7. Letters, colours, and instructions; 8. A character or symbol.

Pages 94-95

Who was George Boole? Search the Internet for information about him and the system called Boolean algebra.

George Boole was a British mathematician who devised a system called Boolean algebra. This system, developed in the late 1840s, made it possible to solve complex problems by reducing them to a series of true/false questions.

- 10.**
1. circuits; 2. both; 3. alarm; 4. inverter; 5.

- one; 6. input; 7. OR; 8. temperature; 9. true; 10. buzzers; 11. NOR; 12. either; 13. same; 14. two.

- 11.**
1. OR; 2. AND; 3. NOT; 4. XNOR; 5. NOT; 6. NAND; 7. XOR; 8. NOR.

- 12.**
1. g; 2. i; 3. h; 4. c; 5. f; 6. j; 7. a; 8. e; 9. b; 10. d.

Pages 96-97

- 13.**
1. magnitude; 2. bipolar; 3. field; 4. equipment; 5. amplification; 6. multistage; 7. gain; 8. distortion; 9. feedback; 10. circuit; 11. waveform; 12. DC; 13. pulses; 14. signals.

- 14.**
1. 0; 2. A; 3. A; 4. 0; 5. A; 6. 0; 7. A; 8. A; 9. A; 10. 0.

- 15.**
Sample answers

An amplifier is a device that gets an electric current, which in this case is called an input signal, and makes it bigger. The amplified signal is called output. A typical problem of amplification is distortion, when the frequency or the amplitude of the output signal is very different from that of the input. To solve this problem, a technique called negative feedback is used. This consists in feeding back and comparing part of the output signal with the input one in order to prevent and almost completely eliminate distortion. Multistage amplification is used when a single amplifier is not enough to give the desired amplification.

An oscillator produces a continuous and alternating waveform at a certain frequency. Basically, it converts DC current into an alternating current waveform of the frequency needed, providing regular pulses and generating electromagnetic waves that carry signals. The kind of signals produced are, for example, audio and radio signals. Oscillators are important components in many different types of electronic equipment such as computers.

Pages 98-99

Think of examples of appliances which start, or are adjusted, thanks to information from a sensor.

Sample answer

A burglar alarm system is started by motion detected by sensors; a motor can be automatically stopped if the temperature, detected by a temperature sensor, is too high.

Search the Internet for some examples of sensors commonly used in different kinds of applications.

Sample answer

Temperature sensors: used in industrial systems and for domestic heating; proximity sensors, used in aircrafts, cars and industries; smoke, gas and alcohol sensors, used for detectors in hotels, houses and portable detectors; humidity sensors, used in homes and in industrial systems.

16.

1. electrical; 2. detect; 3. signals; 4. adjust; 5. actuators; 6. mechanical; 7. environment; 8. Internet.

17.  46

Real Time Applications of Sensors

We live in a world of sensors. You can find different types of sensors in our homes, offices and cars, working to make our lives easier by turning on the lights when we arrive home, adjusting the room temperature, detecting smoke or fire, making us delicious coffee, opening garage doors as soon as our car is near the door and many other tasks.

Another example of an automated system that uses sensors is the Autopilot System in aircraft. Almost all civilian and military aircraft use the so-called automatic flight control system, or Autopilot. An automatic flight control system consists of several sensors for various tasks like speed control, height, position, doors, obstacles, fuel, temperature and many more. A computer takes data from all these sensors and processes it by comparing it with pre-designed values. The computer then provides control signals to different parts of the aircraft like engines, flaps, motor, wings and so on, and helps to have a flight without, or with very few, problems. Thus, the combination of sensors, computers and mechanics makes it possible to run the plane in autopilot mode. All these components, the sensors (which give inputs to the computers), the computers (the brains of the system) and the mechanics (the outputs of the system like engines and motors) are equally important in building a successful automated system.

Adapted from: <https://www.electronicshub.org/different-types-sensors/>

.....
1. F, We live in a world of sensors; 2. F, You can find different types of sensors in our homes;

3. T; 4. F, It is used both in civilian and military aircraft; 5. T; 6. T; 7. T; 8. T; 9. F, The computer provides control signals to the different parts of the aircraft; 10. F, All the components, the sensors, the computers, and the mechanics are equally important.

18.

1. A; 2. S; 3. B; 4. S; 5. A; 6. B.

Page 100

VOCABULARY

19.

1. NAND gate; 2. dial; 3. AND gate; 4. digital signal; 5. binary system; 6. sensor; 7. NOT gate; 8. integrated circuit; 9. amplifier.

20.

1. e; 2. f; 3. h; 4. b; 5. d; 6. a; 7. j; 8. g; 9. i; 10. k; 11. i; 12. c.

Unit 2.3

Microprocessors

Pages 102-103

Can you explain what an integrated circuit is?

An integrated circuit is an electronic circuit in which components and connections are built directly on a silicon chip.

1.

1. 1970s; 2. integration; 3. integrated; 4. brain; 5. Processing; 6. GPU; 7. graphics; 8. Processor; 9. image; 10. recognition; 11. definition; 12. machine.

2.

1. slow, big, and expensive; 2. vacuum tubes; 3. faster than; 4. instead of transistors; 5. fourth-generation computers; 6. microprocessor chips.

3.

1. circuitry; 2. microprocessor; 3. CPU; 4. GPU; 5. speech recognition system; 6. circuit density.

Pages 104-105

What is an oscillator?

An oscillator is a circuit which produces a voltage or a current in a continuous and alternating waveform at a certain frequency.

- 4.**
 1. Arithmetic; 2. data; 3. clock; 4. memory; 5. ROM; 6. permanent; 7. Random; 8. temporary; 9. cache; 10. retrieve.

- 5.**
 1. c; 2. g; 3. f; 4. b; 5. j; 6. h; 7. a; 8. d; 9. e; 10. i.

- 6.**
Sample answers
 1. It is the part of the computer that performs instructions and tasks; 2. It is the part of the CPU containing logic circuits which perform logical and arithmetical operations; 3. Permanent memory that cannot be modified or cancelled; 4. Temporary memory that stores data only for very short periods; 5. Type of memory that makes retrieving data faster; 6. Part of the microprocessor that controls the processing and contains a clock; 7. Local area inside the CPU that stores data waiting to be processed; 8. A path connecting the CPU to memory circuits.

Pages 106-107

Search the Internet for more examples of applications using the Arduino microcontroller.
Sample answer
 Arduino has a very wide range of applications, from traffic light systems to medical equipment. Sometimes it is used for educational purposes in school projects to build simple automated systems, for example a drawing robot or fingerprint sensors, but it is also widely used in industries to control production lines and assembly systems.

- 7.**
 1. processor; 2. memory; 3. chip; 4. complex; 5. cheaper; 6. specific; 7. embedded; 8. washing; 9. smart; 10. open; 11. programmable; 12. repetitive; 13. light; 14. automatic.

- 8.**
 1. MP; 2. MC; 3. MP; 4. MP; 5. MC; 6. MC.

9.  50

The Role of Arduino in the Real World
Arduino is an open-source microcontroller that has gained popularity among hobbyists, students, and professionals due to its simplicity and versatility. It can be used to build a variety of projects, from simple LED circuits to complex robots and Internet of Things (IoT) systems. We will explore the role of Arduino in

some more real-world applications and how it is being used to solve problems and improve lives.

- *Traffic Signal Control. Arduino is often used in traffic signal control systems to improve efficiency and safety on the roads. By using sensors and other input devices, a traffic signal system employing Arduino can detect the presence of vehicles at crossroads and adjust the timing of the traffic lights accordingly. This helps to reduce waiting times and improve traffic flow, as well as reduce the risk of accidents. In some cases, Arduino can also be used to integrate traffic signal systems with public transport to provide more efficient public transport for users.*
- *Medical appliances. Arduino has a wide range of applications in the medical field. One example is the development of wearable medical devices. These devices can continuously monitor vital signs such as heartbeat, blood pressure and body temperature, and provide real-time data for analysis and evaluation. Arduino can also be used to control and automate various medical equipment to ensure accurate delivery of medication. In addition, Arduino has been used in the creation of devices for people with disabilities to improve their mobility and quality of life.*
- *Art and Education. Arduino is also often used in art installations and educational projects as a way to introduce people to programming and electronics in a fun and interactive way. Arduino is a great way of teaching programming to children, as it gives programming experience and helps to interact with real world sensors and hardware.*

Adapted from: <https://linuxhint.com/arduino-real-world-applications/#1>

-
 1. hobbyists, students, and professionals; 2. simple and versatile; 3. efficiency, safety; 4. the timing; 5. monitor, provide; 6. people with disabilities; 7. (art) installations; 8. fun and interactive.

Pages 108-109

- 10.**
 1. layers; 2. silicon; 3. silica; 4. logic; 5. NPUs; 6. store; 7. volatile; 8. non; 9. purpose; 10. repetitive; 11. different; 12. increase; 13. shortage; 14. COVID-19.

- 11.**
 1. single-purpose chips; 2. logic chips; 3. memory chips; 4. system-on chips; 5. memory chips; 6. logic chips.

12.

Sample answers

1. A microchip is formed by different layers contained in a small piece of silicon; 2. Silicon is obtained from silica sand, which contains silicon dioxide; 3. A microchip has a large number of electronic components, mainly transistors; 4. Technology has developed fast thanks to the steady improvements in microchip technology; 5. In 2020 the demand for microchips increased, but the production slowed down; 6. Covid-19 and the world political situation are responsible for the microchip shortage.

Pages 110-111

13.

1. design; 2. transistors; 3. photomask; 4. ingots; 5. wafers; 6. photolithography; 7. etching; 8. chemicals; 9. packaging.

14. ● How are microchips made?

posted by Notez on Tech

.....
So how are microchips made? Many may feel that a manufacturing process of microchips is akin to alien technology, but surprisingly it shares similarities with photography, where light is used to transfer an image onto a photosensitive surface, so here's a gross simplification of the manufacturing process. Pure silicon is first transformed into monocrystalline ingots, which are then sliced into thin wafers. Each wafer initially starts out as two layers and is treated to remove contaminants. More layers are then added to the wafer, including a photoresist solution which reacts to light. After baking in an oven for a while, the wafer is removed and exposed to geometrical patterns of intense light. Any part of the photoresist layer that comes in contact with the light is dissolved away, imprinting the patterns onto the surface. Now you may be asking, what are these patterns? Well, these are engineering designs of electronic circuits and what the light is doing is carving a mould from the photoresist layer. Here is something to keep in mind: the light's wavelength determines the degree of complexity of the circuitry that can be cut into the photoresist surface. This simply means that the shorter the wavelength is, the greater the number of electrical components that can be added to a given area. Now, as the light dissolves portions of the photoresist material, it exposes the level below, called the oxide layer. By using a liquid chemical agent which is dispersed into the newly created cavities, the exposed layer is dissolved, etching the geometrical patterns into the silicon wafer. The remaining photoresist layer is no longer needed and is removed. You

should keep in mind that this is not a one-time deal: a silicon wafer may go through many repeats of photolithography and etching before the intended pattern is reached. This is referred to as "layering". So, what's next? Well, now that there are tiny trenches in the wafer, additional materials can be added to create components, like transistors, a process called "doping". Insulators can also be added as separators, and conductors as connectors. All of this can come together to form a complex circuitry which is the core of the microchip. And that's about it for the manufacturing process. Please remember: this is by no means a complete representation, and for a more in-depth insight I'll leave that research up to you.

.....
1. T; 2. T; 3. F, They need to be treated to eliminate contaminants; 4. F, Any part of the photoresist layer that comes into contact with light is dissolved; 5. T; 6. F, The light's wavelength determines the degree of complexity of the circuitry; 7. T; 8. F, This process may need to be repeated several times before the correct pattern is reached.

15.

1. g; 2. f; 3. h; 4. b; 5. c; 6. d; 7. a; 8. e.

Page 112

VOCABULARY

16.

1. peripherals; 2. microchip; 3. microcontroller; 4. sand; 5. ROM; 6. silicon; 7. RAM; 8. GPU; 9. ingot.

17.

1. recuperare; 2. modello; 3. dadi; 4. drogare; 5. incisione; 6. fotolitografia.

18.

1. CPU; 2. open-source; 3. encasing; 4. wafers; 5. ALU; 6. clock.

Page 114

REAL-LIFE SKILLS

1.

1. cocktail-mixing; 2. Arduino; 3. controlled; 4. remote control; 5. select; 6. guideway; 7. ingredients; 8. bottles; 9. dispense; 10. quantity.

2.

1. h; 2. i; 3. e; 4. b; 5. j; 6. a; 7. f; 8. c; 9. d; 10. g.

3.

Sample answers

1. A litter bin can be automated by putting two motion sensors on it. When you get near the bin, the sensors detect your movement and the bin opens automatically; 2. A medicine box can be equipped with a timer, a led and a buzzer; programming the time you or a member of your family must take medicines, the buzzer rings as soon as it's the right time; 3. The automatic pet watering system has a sensor to read the water level and send information remotely to the Arduino. If the level is too low, it activates a small watering valve which sends water into the bowl; 4. The touchless doorbell can be made by putting a sensor outside the front door; the sensor detects if a person is standing outside the door, sends a command to the doorbell which rings without touching it. This type of invention proved particularly useful during the Covid-19 pandemic.

Page 115

CASE STUDY

4.

Sample answers

The M-dress allows the wearer to insert an ordinary SIM card in a special slot under the label in order to receive and make phone calls without having any mobile phone with them. The technology recognises gestures and makes the dress work in an intuitive way. Skirteleon is a skirt that changes its colour according to the mood and activities of the wearer. The CuteCircuit Skirt was the fabulous maxi-skirt designed by Cutecircuit that Laura Pausini wore for the final song of her 2011/2012 "Inedito" World Tour. The skirt was more than four metres long and it incorporated thousands of LEDs woven into the fabric together with a great number of Swarovsky crystals. As the LEDs lighted up, the crystals glittered in many colours, giving an enchanting effect to the audience. The Twirkle T-shirt is made of motion-reactive, illuminated white organic cotton with silver sequins applied on the front and micro-LEDs shining through it to create amazing animations.

5.

Personal answers

Pages 116-117

CLIP The Imitation Game

6.

1912	Alan Turing was born
1939	Britain declares war on Germany

1951	Alan Turing is investigated by the police after an apparent break-in
1952	Alan Turing is accused of indecency for his homosexuality
1954	Alan Turing commits suicide
2013	Queen Elizabeth II grants Turing a posthumous Royal pardon

7. ▶

.....
Joan: Could you have made a bit more noise? I'm not quite sure my landlady woke up.

Alan: Oh, sorry.

Joan: Oh, uh, look. I think that's the best I can do. No male visitors after dark. So, what did you bring me?

Alan: Erm...

Joan: There you go.

Alan: Here.

Joan: Some men try flowers, you know.

Alan: These are actual decrypted Enigma messages direct from Nazi High Command.

Joan: "0600 hours, weather today is clear. Rain in the evening. Heil Hitler." Well, clearly that vital piece of information is going to win us the war.

Alan: It's the relationship between the encrypted and decrypted messages that interests me. Can we find a clue here that we can build into Christopher?

Joan: Who's Christopher?

Alan: Oh, he's my machine.

Joan: You named him?

Alan: Is that a bad name?

Joan: No. No, never mind. Are you trying to build your universal machine? I read your paper at university.

Alan: Is it already being taught?

Joan: No. No. No, I was precocious. So, you theorised a machine that could solve any problem? It didn't just do one thing, it did everything. It wasn't just programmable, it was re-programmable.

Alan: Mmm.

Joan: Is that your idea behind Christopher?

Alan: Human brains can compute large sums very quickly, even Hugh can do that, but I want Christopher to be smarter. To make a calculation and then to determine what to do next. Like a person does. Think of it. Electrical brain. A digital computer.

Joan: Digital computer?

.....
1. J; 2. J; 3. A; 4. J; 5. A; 6. A; 7. J; 8. A; 9. J; 10. A; 11. A; 12. J.

8.

1. Alan breaks in at night; 2. No, she isn't; her landlady does not allow her to have male visitors

after dark; 3. She does not think it is important and she's ironical about it; 4. She read about it at university; 5. The main feature was that the machine was re-programmable; 6. Christopher should make a calculation and determine what to do next, like a person does.

9.

Sample answers

1. The Imitation Game involves three human participants, a male, a female, and a judge who can be either male or female. They are located in three separate rooms and connected via a screen and keyboard. The male is supposed to try to deceive the judge, the female must help him, while the judge has to understand which is which; 2. CAPTCHA is the acronym for Completely Automated Public Turing Test to tell Computers and Humans Apart and is a way of protecting Internet surfers by asking users to complete a simple test that proves you are human and not a computer; for this reason, it can be said that it works on the opposite way to the Turing test; 3. ChatGPT is an artificial intelligence chatbot which was created to imitate human conversation; however, it can also write computer programs, compose music, write newspaper articles, fairy tales and student essays, answer test questions, translate and summarise texts, and play games; 4. *Personal answers.*

Page 118

CITIZENSHIP

10.

▶ Recycling of e-waste posted by IMU Cares
.....
*RM? No. Stop. That is the wrong way to dispose of e-waste. E-waste is discarded electronic appliances: according to global statistics, 20 to 50 million tonnes of e-waste are disposed worldwide every year. Meanwhile, in Malaysia nearly 1,000,000 tonnes of e-waste each year... Piling of landfills – This causes drastic increment of landfills.
Leaking of chemicals – This causes water pollution and poisons aquatic animals.
Burning of e-waste – This causes the release of harmful gases.
Contamination of soil – This causes damaging the growth of nearby crops.
What will happen to our Earth if this keeps on*

happening? The burning of e-waste leads to the release of harmful gases like chromium, beryllium, mercury, lead, PVC – brain damage, cardiovascular diseases, DNA damage, respiratory diseases.

How can we help prevent this from happening? Dispose e-waste into an e-waste recycling dumpster: recycling trucks pick up the collected e-waste and transport them to the recycling centre. Shredding – segregation: magnets are used to separate the metal parts from the non-metal parts. These non-metal parts are sorted into items that can be recycled into newer materials. The metal arts are put into specialised machines where they are processed into “new electronics”. Where to recycle e-waste? Where to recycle e-waste in IMU? Located at IMU entrance. Save the Earth, recycle your e-waste.
.....

Teacher’s note

The acronym RM in the video indicates the Malaysian Ringgit, or Malaysian dollar, the currency in use in the country.

The IMU, International Medical University, is Malaysia’s most important private university specialised in medicine and health care. IMU Cares is a community involved in social and environmental issues and in charity activities.

1. PCs, TVs, light bulbs, smartphones, and batteries; 2. 20 to 50 million tons of e-waste; 3. The risks are the increase of landfills, the release of harmful gases, water pollution and poisoning, and crop damaging; 4. The correct way of disposing of e-waste is to put it into a recycling dumpster; 5. Chromium, PVC, lead, mercury, and beryllium; 6. Metal parts are separated from non-metal ones; 7. Non-metal parts are used to produce new materials; 8. Metal parts are used to produce new electronic devices.

11.

Personal answer

12.

Sample answer

Circular economy is a model of production and consumption which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.

Unit 3.1 The basics of computers

Pages 120-121

- 1.**
1. electronic; 2. binary; 3. data; 4. inserting; 5. processing; 6. retrieving; 7. storing; 8. controlling; 9. size; 10. mainframe; 11. workstations; 12. capabilities; 13. analogue; 14. hybrid.
- 2.**
1. T; 2. T; 3. F, They are the biggest and the fastest; 4. F, Supercomputers are used for the weather forecast; 5. F, Modern computers are digital; 6. T.
- 3.**
1. microprocessor, processes; 2. data, functions; 3. categories, size; 4. supercomputers, amounts; 5. users, processors; 6. personal computers, software; 7. workstations, accuracy; 8. fast, continuous.

Pages 122-123

Do you know any application software?
Personal answers

- 4.**
1. rigid/physical; 2. speed; 3. processing; 4. output; 5. storage; 6. Von Neumann; 7. software; 8. execute; 9. system software; 10. drivers; 11. utility software; 12. application; 13. special purpose.
- 5.**
Sample answer
Hardware refers to the physical components of the device and includes motherboard, graphics card, CPU, ventilation fan, webcam, and so on. The four basic functions of hardware are: input, processing, output, and storage. Software refers to applications and programs that run on a device, and includes the operating system (e.g. Windows), drivers (e.g. printer drivers to connect a printer to the computer), and utility software; The difference between general application software and special purpose application software is that the former is designed to perform a wide range of functions, the latter is designed to execute one specific task.
- 6.**
1. iOS; 2. Ubuntu; 3. Chrome OS; 4. Ubuntu;

5. Windows OS, Chrome OS, and Android; 6. Windows OS; 7. Android, iOS; 8. Windows OS, Chrome OS.

Pages 124-125

- 7.**
1. processing; 2. brain; 3. ALU; 4. control; 5. transfer; 6. fetch; 7. interpret; 8. execute; 9. machine cycle; 10. decode; 11. store.
- 8.**
1. Because it contains all the circuitry needed to process input, store data, and output results; 2. It is the most basic CPU operation; 3. It works by performing single instructions of computer programs one at a time; 4. It controls the movement of data, transfers data between memory and input/output devices, fetches data from memory, interprets instructions, and executes programs; 5. It is when an instruction is retrieved from memory; 6. It is when the results are sent to memory.

9. ● Computers Basics: inside a computer
posted by GCFLearnFree

.....
You may already know that there are many important parts inside a computer, but what exactly do they do? Let's take a look inside and learn about the various components that make a computer work. Whether it's a desktop computer or a laptop, every computer has a large circuit board called a motherboard: this contains some of the most important parts of the computer such as the CPU, also known as the central processing unit or processor. The CPU can be considered the brain of the computer because it processes information and carries out commands. Since it tends to get hot, it's covered by a piece of metal called a heat sink, which draws heat away from the processor. The motherboard also contains the computer's RAM or random access memory: this is the short term memory that the computer uses whenever it's performing calculations. However, you cannot store your files there because the RAM is cleared when you shut off the computer. The hard drive provides long term storage keeping all of the computer's data even when it's turned off. Many hard drives use a magnetic platter to store data, but many newer computers have solid state drives which are faster and more durable but also more expensive. On many desktop computers the motherboard has expansion slots that allow you to upgrade by adding expansion cards. You

can add a video card to get better graphics performance, or you can add a wireless card to connect to your wireless home network. Most laptops, however, don't have expansion slots. Of course, the computer's components need electricity to run. The power supply unit is designed to take power from the wall outlet and send it to all of the different components that need power. Laptops also contain a built-in battery that lets you use them anywhere. A computer is a pretty complex machine, but now that you've seen what goes on inside, it should be a little less mysterious.

-
1. motherboard; 2. CPU; 3. RAM; 4. hard drives; 5. expansion slots; 6. that power supply unit.

Pages 126-127

How can a computer be connected to other devices?

Through USB cables, HDMI cables, VGA, wireless, Bluetooth, etc.

Look for a picture of a PDA on the web, then explain what it is to your class.

Personal answer

10.

1. peripherals; 2. information; 3. data/information; 4. manual; 5. automatic; 6. primary; 7. mouse; 8. image; 9. digital camera; 10. graphics tablet; 11. microphone.

11.

1. optical mouse; 2. mechanical mouse; 3. virtual keyboard; 4. QWERTY keyboard.

12. 57

.....

Computer keyboards can generally be divided into two main categories: basic or extended keyboards. Within these two classes there are many different types of keyboard, which offer a variety of features. The most common type is the QWERTY keyboard, which is ideal for everyday typing needs and whose layout is comfortable and time-tested. But if you want to have an even more comfortable keyboard, the ergonomic one is the right choice because its shape is designed to reduce stress on your hands while typing. Wireless keyboards use a radio frequency antenna or infrared to keep you connected and offer flexibility to move about while working on a computer because it is not connected to any wire. Bluetooth

keyboards are a little more expensive but offer numerous features and benefits because they work through Bluetooth connectivity. They are perfect if you need to connect the keyboard to your laptop at any time without any additional equipment.

Adapted from: <https://www.cdw.com/content/cdw/en/articles/hardware/types-of-keyboards.html>

-
1. basic or extended; 2. QWERTY; 3. ergonomic; 4. infrared; 5. wireless; 6. that it needs no additional equipment to be installed.

Pages 128-129

What examples of output devices do you know of?

Monitor, printer, projector, speakers, etc.

What's the difference between speakers and headphones?

Headphones are head-mounted speakers which are placed on the ears, speakers are devices usually placed on a surface that generate sound.

13.

1. auxiliary; 2. output; 3. processed; 4. monitors; 5. printers; 6. output; 7. multimedia; 8. audio; 9. headphones.

14.

1. They allow data to be transmitted by the computer in a form which is understandable to the user; 2. It is large, heavy, and needs a lot of energy; 3. It is the curved type. It is innovative because the light comes from all angles and is directed toward the viewer's eyes; 4. LED monitors use light-emitting diodes to light the screen's pixels, while OLED monitors use organic light emitting diodes; 5. A laser beam attracts toner particles which are pressed onto a piece of paper, while heat and pressure from the fuser unit fix the image onto the page; 6. It is a machine that works as a printer, copier, scanner and/or fax; 7. They are especially used as business projectors for conducting conferences or as home theatre systems; 8. They convert an electrical signal into a corresponding sound.

15.

1. inkjet printer; 2. curved monitor; 3. speakers; 4. CRT monitor; 5. multifunction printer; 6. headphones; 7. laser printer; 8. multimedia projector.

Pages 130-131

Do you know what the series of numbers of a barcode represent? Search online.



16.

1. control devices; 2. hardware; 3. outside world; 4. computer; 5. magnetic strip readers; 6. optimal mark readers; 7. sensors; 8. control; 9. sensors; 10. processes; 11. motors; 12. buzzers; 13. heaters.

17.

Sample answers

1. What is an automated input device used for?; 2. What do the vertical black and white of a barcode represent?; 3. What does the magnetic stripe of a credit card contain?; 4. Where is the magnetic stripe usually placed on credit cards?; 5. What kind of devices are used to specify the maximum or minimum temperature in a room?; 6. How do actuators work?; 7. What are motors in computing used for?; 8. What are buzzers?

18.

1. motor; 2. actuator; 3. light; 4. heater; 5. motor; 6. buzzer.

Personal answer

Pages 132-133

How often do you carry out backups on your computer or smartphone?

Personal answers

19.

1. data; 2. stored; 3. primary; 4. immediate; 5. accessible; 6. volatile; 7. running; 8. ROM; 9. permanently; 10. cache; 11. long-term; 12. backups; 13. magnetic storage; 14. solid state; 15. laser (beams).

20.

1. ROM; 2. Blu-Ray; 3. DVD-RW; 4. RAM; 5. hard disk; 6. cache.

21. Storage vs. Memory: What's the Difference? posted by Eye on Tech

Storage and memory both refer to a computer's internal storage space, but they fulfill very different roles. Storage holds all the data, files and instructions needed to run a computer and let users do their work. Storage is non-volatile, retaining data until you delete it. Memory, referred to as random access memory or RAM, is temporary data access. When a computer boots, it loads the data and applications it needs from storage into RAM. When the computer's turned off, the files return to storage. If a computer only had RAM and no storage, users would have to re-enter all the data and applications they wanted to use each time they logged on. System memory runs much faster than storage, but it's also more expensive. That's why computers usually have a lot less of memory than storage. RAM consists of microchips combined into memory modules; these modules plug into a computer's motherboard and connect to the CPU via a bus. Computer storage devices include solid state and hard disk drives, as well as optical and tape devices. Storage doesn't directly connect to the CPU, but instead runs through an interface. Usually either SATA, which has been the standard for years, or NVMe, which reduces latency and delivers higher throughput. There are points where the line between storage and memory blurs. For instance, a technique called paging creates what is known as a swap space on a storage drive. When a computer's memory fills up, the operating system switches files from memory to the swap space to gain more active memory space. Newer technologies, including 3D XPoint, ferroelectric RAM, and magnetoresistive RAM, are in the works that could erase the line between memory and storage.

1. different; 2. storage; 3. storage; 4. re-enter; 5. memory; 6. RAM; 7. computer storage; 8. operating system.

22.

Storage access	Definition	Use
1. SATA	Transport protocol that defines how data is transferred between a computer's motherboard and mass storage devices	Hard disk drives
2. NVMe	Non-volatile memory, new storage access for flash and next-generation solid-state drives	Solid-state drives

3. Swap Space	A space on a hard disk that is a substitute for physical memory	When RAM is full
----------------------	---	------------------

Pages 134-135

How many electronic devices with a USB connection do you have?

Personal answers

23.

1. slot; 2. cables; 3. end; 4. signals; 5. separately; 6. external; 7. audio; 8. Internet; 9. data; 10. monitors.

24.

1. F; A connector is the end of a jack, plug or card; 2. T; 3. T; 4. F, It is for wired Internet connections; 5. T; 6. F, It connects an analogue computer monitor to other monitors or televisions.

25.

▶ Computer Basics: Buttons and Ports on a Computer posted by GCFLearnFree.org

.....
Every computer has its own set of buttons and ports. In this video we're going to talk about some of the most common ones, including what they're for and how to recognise them. Some buttons are universal, like the power button. Depending on the type of computer you have, it may be on the front, on the back behind the screen, or even on the inside when you open the lid. The power socket is where you'll connect the power cord. If you have a laptop, you'll have a charging port instead. Most computers provide more than one USB port so you can plug in any device you might need: keyboards, printers and USB drives are all common examples. Some computers even have USB-C ports which can be used for many different things, not just plugging in devices. Laptops, for instance, often use the format for the charging port. If you have a desktop, you'll use the monitor port to connect the monitor. There are quite a few types of monitor connections, ranging from HMDI to the USB-C style we just mentioned. If you have a laptop, you can connect a separate monitor as long as you have the right equipment: just look for the display port and plug in the appropriate cable. The ethernet port lets you connect to the Internet if you're not using Wi-Fi, all you need is an ethernet cable which you can then connect to your modem or router. If your computer has an audio jack, you can use it to plug in wired headphones or speakers. You

may or may not have a disk drive depending on how old your computer is and who makes it. The disk drive can be used to insert a CD, a DVD or a Blu-ray disc. If you have ports that look like this, they're for older peripherals like mice, keyboards and printers. Newer versions of these devices usually connect via USB or wirelessly. That covers the basics of buttons and ports. Of course, every computer is different and technology is always changing. To find out what options you have, take a closer look at your computer.

.....
 1. The power button; 2. It can be on the front, on the back behind the screen, or inside; 3. More than one; 4. The monitor port; 5. To connect to the Internet if you're not using Wi-Fi; 6. Via USB or wirelessly.

26.

1. b; 2. f; 3. a; 4. d; 5. c; 6. e.

Page 136

VOCABULARY

27.

1. keyboard; 2. barcode reader; 3. SD card; 4. MICR; 5. VGA connector; 6. LCD monitor; 7. CRT monitor; 8. HDMI connector; 9. USB port.

28.

1. peripheral; 2. appliance; 3. sensor; 3. to retrieve; 5. to store; 6. to connect; 7. slot; 8. ergonomic; 9. hybrid; 10. signal.

Unit 3.2

The functioning of computers

Pages 138-139

Can you give the definition of an algorithm?

It is a process or set of rules to be followed in calculations or other problem-solving operations.

Do you know any other flowchart symbols?


Personal answer

1.

1. instructions; 2. programming language; 3. task; 4. algorithms; 5. databases; 6. mission; 7. end user; 8. machine; 9. code; 10. testing code; 11. debugging; 12. map/diagram; 13. symbols; 14. process.

2.

1. Databases are collections of information and data stored in the computer system, while algorithms set the steps of a program; 2. The code of a program refers to the programming language; 3. Debugging involves fixing programming mistakes; 4. The oval symbol of a flowchart represents the beginning or the end of a process; 5. The arrow is the connector that indicates the relationship between the various steps; 6. The rectangle indicates the process of an operation.

3.  Computer Science Basics: Sequences, Selections and Loops
posted by GCFLearnFree.org

.....
Behind all of the software that we use on a daily basis there's a code being run with all sorts of different terms and symbols. Surprisingly, it can often be broken down into three simple programming structures called sequences, selections and loops. These come together to form the most basic instructions and algorithms for all sorts of software. A sequence is a series of actions that are completed in a specific order: action 1 is performed, then action 2, then 3 etc., until all of the actions in the sequence have been carried out. A sequence we do every day is a morning routine; you might wake up, drink some water, take a shower, eat breakfast, and so on. Everyone's routine is different, but they're all made up of a sequence of various actions. Selections are a bit different: instead of following a specific order of events, they ask a question in order to figure out which path to take next. Let's say you go to brush your teeth and you find that you're out of toothpaste, you then ask, do I have any more toothpaste? If the answer is no, then you would add it to your shopping list, but if the answer is yes, then you would just use the toothpaste. This is really all a selection is doing, answering a question based on what it finds. The third programming structure is a loop. Like selections, loops also ask questions, however, the difference is they ask the same question over and over and over again until a certain task is complete. For example, take the act of hammering a nail: even though you may not realise it, you're constantly asking yourself is the nail all the way in? When the answer is no, you hammer the nail again. You continue to repeat this question until the answer is yes, and then you stop. Loops allow programmers to efficiently code repetitive tasks instead of having to write the same actions over and over again. These three programming structures may seem fairly simple on their own, but when combined they can create some pretty complex software.
.....

Sample answers

1. Actions completed in a specific order; 2. Questions to know what path to take; 3. Questions asked over and over again until a task is completed.

Pages 140-141

4.

1. language; 2. binary; 3. assembly; 4. humans; 5. natural languages; 6. machine language; 7. object file; 8. linker; 9. executable file; 10. interpreter; 11. assembler; 12. machine code.

5.

1. It is a code made up of a sequence of 0s and 1s that the computer interprets electrically as instructions; 2. The main function of low-level languages is to interact with the hardware; 3. The machine language uses binary characters while the assembly language is designed to be readable by humans; 4. Because they are similar to spoken languages and have a sentence-like structure; 5. Because computers can only understand machine language, which is LLL; 6. It translates an entire program at once; 7. It is generally used to generate web-based scripts; 8. It translates assembly language into machine code.

6.  64

.....
Compilers, Interpreters and Assemblers
A compiler is software that converts a source code to object code. In other words, we can say that it converts the high-level language to machine (or binary) language. This step is necessary to make the program executable because a computer understands only binary language. The process of converting source code into machine code is called compilation. If there are any syntactic or semantic errors, a compiler will indicate them because it checks the whole program and displays all errors, and it is not possible to execute the program without fixing those errors.
An interpreter is also a language translator that converts high level programs into machine code, but it converts source code to machine code line by line. As it checks the code line by line, it takes longer than a compiler to scan the program but, by doing so, interpreters can review each line of written code and build new machine code quickly. However, a compiler translates the entire source code in a single run so it's quicker than an interpreter.
An assembler is software that translates an assembly language program to machine code. It

takes basic computer instructions and converts them into a pattern of bits that the computer's processor can use to perform its basic operations.

Adapted from: <https://pediiaa.com/difference-between-compiler-interpreter-and-assembler/>

-
1. assembler; 2. compiler; 3. interpreter; 4. interpreter; 5. assembler; 6. compiler.

Pages 142-143

What is a microprocessor?

It is an integrated circuit that contains all the functions of a central processing unit of a computer.

What is artificial intelligence?

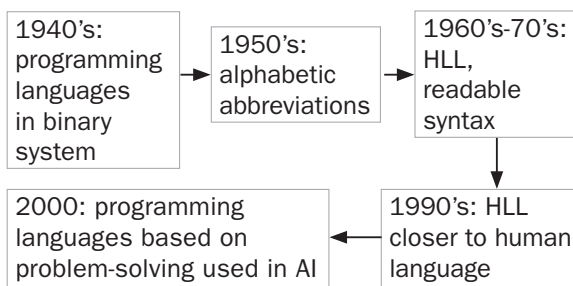
Artificial intelligence is the simulation of human intelligence and behaviour processed by machines, especially computer systems.

- 7.**
1. code; 2. binary; 3. operation code; 4. operand; 5. assembly; 6. mnemonics; 7. abstract symbols; 8. high-level; 9. low-level; 10. non-procedural; 11. query languages; 12. report writers; 13. application programs; 14. constraints; 15. artificial intelligence.

- 8.**
1. F, They consist of a sequence of binary digits; 2. T; 3. F, Mnemonics represent operation codes; 4. T; 5. T; 6. F, Constraints define how variables within the program relate to each other.

- 9.**
1. It looks like columns of 1s and 0s; 2. The sequences of 1s and 0s turned into alphabetic abbreviations; 3. To the third; 4. Because they are very high-level languages, so they are closer to human languages; 5. To create and modify the data of a database; 6. They are based on problem solving.

10.



Pages 144-145

What does “open-source” mean?

It means the source code is made freely available for possible modification and redistribution.

- 11.**
1. procedural-oriented; 2. functions; 3. object-oriented; 4. data; 5. purpose-oriented; 6. language; 7. dynamic; 8. object-oriented; 9. platform.

12.

Sample answers

1. What is C language?; 2. What is an object-oriented program?; 3. What language is designed for the Common Language Infrastructure?; 4. Why is Python widely used by beginner programmers?; 5. Why is Python slow?; 6. What is the advantage of being also a platform for Java language?

13.

1. programming; 2. released; 3. development; 4. platforms; 5. syntax; 6. programs; 7. interpreter; 8. version; 9. command; 10. languages.

Pages 146-147

HTML5 is an updated version of HTML. Do a quick web research to look for its properties.

HTML5 is a new version of HTML with new functionalities and Internet technologies. HTML does not have support for video and audio but HTML5 does.

14.

1. web pages; 2. symbols; 3. angle brackets; 4. content; 5. closing tag.

15.

1. <title> Welcome to England </title>; 2. <h>Discovering London</h>; 3. <p>London is an exciting city to visit, with attractions for all ages</p>; 4. Buckingham Palace.

16.

Sample answer

HTML is a markup language, a text-encoding systems of symbols. The symbols allow the user to organise the appearance of the contents of web pages. Tags are the building blocks of the web pages and let the browser render the contents of the page.

17.

Personal answer

Pages 148-149

18.

1. resources; 2. user interface; 3. executes; 4. tasks; 5. single task; 6. one task; 7. single user; 8. user; 9. users; 10. distributed; 11. pieces.

19.

1. It performs all the basic functions of a computer, it is the point of interaction and communication between the user and the computer, and the interface between the application program and the hardware; 2. It is used to control machineries in industrial systems and scientific instruments because it has a high degree of precision; 3. It is an example of single-user, single-task operating system; 4. It means that a single user can have several applications in operation at the same time, like Microsoft Windows; 5. It allows different users to use a computer's resources simultaneously; 6. It breaks a task or problem into pieces among smaller computers.

20.

How do operating systems work?
posted by ClickView

.....
Computers are used for so many different tasks: playing games, watching videos, running calculations, communicating, and collaborating. Computers today are a mixture of different types of hardware and software, but there is one program that brings them all together. And that's the operating system. To consider what the operating system is, let's go back in time to the invention of digital computers. They could handle around 5,000 complex calculations per second! Impressive for the time. But today's super computers perform nearly 34 trillion calculations per second. Programs were written on punch cards, pieces of cardboard with holes. These were fed, one at a time, into the central processing unit, or CPU, and enabled the earliest form of computer batch processing. In some cases, one person was in charge of making sure the cards were fed in correctly. Their job was to correct jams and schedule when the next program could be

run. As computer became faster, they were able to process punch card tasks quicker than the cards could be fed in. There was another problem. Different computers' resources. That is, the components within them, such as RAM and the devices attached to them, such as printers, were all different from one another. A programmer had to write very different types of programs, specific to the machine it would be running on. Was it this card? Or that card? Oh, no. It's all getting a bit complicated, isn't it? The solution was to write a brilliant piece of software called an Operating System, or OS. The OS would take over the tasks common to many programs. Today, operating systems control the hardware of the computer. They manage and allocate resources and provide an interface for the user. Go on then. Turn on that computer and we'll see what happens. An OS is one of the first programs that runs when a computer is turned on. Most programs start the same way. The computer issues lines of code as commands to prepare all the important elements, like the screen and the network. The operating system holds the collection of all the common commands and segments them. Rather like putting them into a library, from which the other regular programs can borrow codes.

.....
1. different types of hardware and software; 2. calculations per second; 3. with holes; 4. punch cards; 5. tasks; 6. hardware, resources, interface; 7. first; 8. collection, segments.

Pages 150-151

What operating system do you use? Can you make a list of pros and cons of your OS?

Personal answer

21.

1. operating system; 2. versions and updates; 3. games; 4. compatibility; 5. hardware; 6. processing; 7. interface; 8. hackers; 9. open-source; 10. platforms; 11. end-to-end encryption; 12. software; 13. updates.

22.

Microsoft Windows	Apple macOS	Linux	Google Android
<ul style="list-style-type: none"> • Easy • Old programs compatible on newer versions • Large hardware database • Wide selection of videogames 	<ul style="list-style-type: none"> • Fast • High security • Simple desktop interface • Multitasking capability • Superior customer support 	<ul style="list-style-type: none"> • Open-source • Compatible on a variety of hardware platforms • High level of security • Keyboards in many languages • Many software updates 	<ul style="list-style-type: none"> • Excellent software support • Frequent updates • Good app market • More storage options • Open-source

23.

1. T; 2. T; 3. F, It is its mobile operating system; 4. F, It is safe because it has an end-to-end encryption; 5. F, It is open-source; 6. T.

Page 152

VOCABULARY

24.

1. binary system; 2. flowchart; 3. HTML; 4. operating system; 5. mnemonics; 6. high-level language.

25.

1. c; 2. g; 3. a; 4. h; 5. b; 6. j; 7. d; 8. l; 9. e; 10. f.

Unit 3.3 The uses of computers

Page 154-155

Which office suite do you use? Which application do you use the most?
Personal answer

1.

1. suite; 2. documents; 3. formatting; 4. editing; 5. margins; 6. users; 7. data; 8. cells; 9. formulas; 10. presentations; 11. editor; 12. inserting; 13. images; 14. sequence.

2.

1. It regularly includes a word processor, a spreadsheet, a presentation program, and a calendar software; 2. The main functions are text formatting and editing, layout, and revision; 3. It is to display and manipulate data in rows and columns; 4. It has a value and is labelled according to its position; 5. It has a series of slides containing texts, images, and links; 6. It displays the content in a prearranged sequence.

3.

1. word processor; 2. formulas of spreadsheet; 3. slideshow of presentation software; 4. layout of word processor; 5. revision of word processor; 6. presentation software.

Page 156-157

What device do you use to keep track of your appointments and contacts?
Personal answer





4.

1. records; 2. information; 3. system; 4. applications; 5. events; 6. analyse; 7. notebook; 8. notes.

5.

1. T; 2. T; 3. F, Applications like Google Calendar are also designed for teams; 4. F, That is a line chart; 5. T; 6. F, They can also recognise handwriting.

6.

App	Logo	Best for	Supported by
Microsoft Access		Creating databases, importing data from other databases, performing data queries	Available for PC only
Google Calendar		Scheduling meetings and events, tracking appointments	iOS, Android, Web
Microsoft Visio		Drawing diagrams, business process modelling, 3D maps	Windows, Microsoft 365
Evernote		Taking notes everywhere, adding media to text, to-do lists	iOS, Android, Mac, Web, Windows

Page 158-159

What graphics software do you use? For what purpose?
Personal answer

7.

1. sketchpads; 2. colours; 3. tools; 4. copy; 5. editor; 6. brushing; 7. selection; 8. contrast; 9. add; 10. pixels; 11. vector; 12. animations; 13. moving.

8.

Sample answers
1. What is the main difference between images created with raster and those with vector graphics software?; 2. What type of software is animation software?; 3. What can drawing software do?; 4. What is the function of layers in a photo editor program?

9.

Sample answer

Format	Use	Applications	Not good for
PNG	Small images that maintain original quality, transparency	In websites for infographics, diagrams, logos, static photos	Sharing high-resolution photos on the web
GIF	Small, simple graphics with limited colours	Banners, simple charts, buttons, animation	Detailed photographs
TIFF	High quality in printing	Professional photos, magazines, newspapers	Everyday marketing content
JPEG	Photos on the web	Photos in social media and blogs	Editing images, line graphics, or print

Pages 160-161

Have you ever used a desktop publishing software? Which one and for what project?
Personal answer

10.

- 1. documents; 2. digital; 3. virtual; 4. images; 5. templates; 6. layout; 7. objects; 8. models; 9. objects; 10. drawings; 11. effects; 12. 3D models; 13. buildings; 14. biomedical.

11.

- 1. f; 2. c; 3. e; 4. a; 5. h; 6. b; 7. g; 8. d.

12. Desktop Publisher Career Video posted by CareerOneStop

When a company hears its website is hard to read or needs a brochure for a new product, they call on the skills of a desktop publisher to make their content appear easy to read, attractive, and engaging. Desktop publishers use design software to create page layouts for print or electronic publications, including newspapers, books, and reports or studies. They combine text and images to create a coherent design that conveys the intended message and grabs the reader's attention. Desktop publishers may also edit text, correcting spelling, punctuation, and grammar. They tend to work in teams with other creative workers, such as writers, editors, and graphic designers, collaborating to prepare a cohesive design, often under strict deadlines. Desktop publishers work in a variety of industries, including many related to publishing and printing. Many work full time and may need to work additional hours when publication deadlines require it. For most positions, desktop publishers need an associate's degree in graphic design or graphic communications, including courses on desktop publishing software that feature electronic

page layouts and text and graphics formatting. A brief period of on-the-job training to learn the employer's desktop publishing software is typical.

- 1. When it needs to make its website easy to read, attractive, and engaging or when it needs a brochure for a new product; 2. To create page layouts for print or electronic publications; 3. It should convey the intended message and grab the reader's attention; 4. They usually work in teams and full time; 5. An associate's degree in graphic design or graphic communications; 6. A brief period of on-the-job training.

Page 162-163

Have you ever seen or used a VR screen?
Personal answer

13.

- 1. position; 2. signals; 3. stations; 4. master; 5. antennas; 6. equipment; 7. screen; 8. simulations; 9. mental; 10. elements; 11. maintenance; 12. products; 13. abstract.

14.

Sample answer

GPS software provides the geographical position of objects on the earth receiving signals from satellites in space. GPS is composed of three segments: space satellites, master stations, and user equipment.

Virtual reality is a new way to interact with the world by using a special screen that replaces the real world with a fictional one. Its main uses are in military, sports and mental health treatments. Augmented reality changes the live view by adding digital elements using a camera or smart glasses. It can be used in complex maintenance, in interior design, and in learning.

15. Understanding Virtual Reality and Augmented Reality
posted by GCFLearnFree.org

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These days we spend a lot of time looking at screens. Computers, smartphones, and televisions are a big part of our lives: they're how we get most of our news, use social media, watch movies, and more. Virtual reality and augmented reality are two technologies changing the way we use screens, creating new and exciting interactive experiences. Virtual reality, also known as VR, uses a headset with a built-in screen that displays a virtual environment for you to explore. These headsets use a technology called head tracking which allows you to look around the environment by simply moving your head. Augmented reality, or AR, is a bit different: instead of transporting you to a virtual world, it takes digital images and layers them on the real world around you. This is done through the use of either a clear visor or a smartphone. So, with VR you could explore a world full of dinosaurs, but with AR you could see those dinosaurs moving through the world around you. Both of these technologies are growing at a rapid pace and being implemented in a variety of different ways. Surgeons are using VR to practice highly technical surgeries before operating; businesses are using them to give consumers virtual tours of products and locations. There are even apps that can use your smartphone's camera to scan and translate a foreign language in real time. As they continue to grow, VR and AR have the potential to greatly change almost every industry. You'll want to keep an eye on them to see how they might soon affect your job and potentially your everyday life. Goodwill Community Foundation, creating opportunities for a better life.

-
1. AR+VR; 2. VR; 3. AR; 4. AR; 5. AR+VR; 6. AR+VR.

Pages 164-165

Have you ever used an e-learning platform? What for?
Personal answer

Do you remember what kind of language C++ is?
C++ is an object-oriented programming (OOP) language, for example Java.

- 16.**
1. interactive; 2. education; 3. accessibility; 4. price; 5. app; 6. network; 7. tools; 8. coding; 9. productivity; 10. office; 11. enterprises; 12. level.

- 17.**
1. An e-learning application allows users to design online courses; 2. Because they offer support for file sharing, collaboration, data storage, messaging, etc.; 3. It can be accessed from anywhere with an Internet connection; 4. Coding is required to turn elements such as characters, menus, buttons into a playable video game; 5. They are mainly used to increase and improve productivity, but also to make accurate predictions and assessments; 6. It uses accounting, customer relationship management, e-commerce software, and more.

- 18.**
1. game; 2. genres; 3. media; 4. research; 5. document; 6. language.

Page 166

VOCABULARY

- 19.**
1. virtual reality headset; 2. GPS; 3. smart glasses; 4. electronic sketchpad; 5. CAD model; 6. augmented reality; 7. bar chart; 8. satellite; 9. word processor.

- 20.**
1. screen; 2. augmented reality; 3. management; 4. margin; 5. calendar; 6. graph; 7. satellite; 8. diagram; 9. document; 10. view; 11. virtual reality; 12. drawing.

Page 168

REAL-LIFE SKILLS

- 1.**
Personal answer
- 2.**
Personal answer

Page 169

CASE STUDY

- 3.**
1. It is used to visualise 3D CAD data as holograms; 2. A hologram is a physical structure that diffracts light into an image; 3. It

is a German company specialised in immersive technologies that enable engineers to work on 3D CAD models in augmented and virtual reality; 4. It enabled them to view their design in real size and in a real environment; 5. Because they wanted to have the spatial understanding of the component and understand if it would fit the car; 6. It is to prevent errors and make necessary modifications before production.

4. ► Augmented Reality Engineering:
The Next Level posted by Holo-Light

.....
Engineering belongs to the real world and we are the ones shaping it. We are pioneers, bringing engineering to the next level. Create, visualise, and manipulate your 3D models. Analyse and discuss virtual designs. Evaluate concepts months earlier. United across time and distance, collaboration becomes stronger. Merge virtual designs with real components in real environments. Plan installations with reference to reality, faster and more secure. Let's reach the next level and design our future. AR engineering: the better engineering.

.....
Sample answer

With AR you can visualise your 3D model as in real life, you can also interact with it, analysing all its components, to see how it works, and even check all its parts to point out flaws or errors. It is very useful when you work in a team because it lets anyone work on the model simultaneously. It is also very useful to save time because you can see in advance how it will work in real life.

Pages 170-171

CLIP Jobs

5.
Sample answer

iPod	It is a pocket-sized portable music-playing device produced by Apple.
Atari	It is an American pioneer company specialising in videogames.
Apple I	It is an 8-bit desktop computer released in 1976.
NeXT	It was a company specialised in computer stations founded by Steve Jobs in 1988.

- 6.**
Sample answer
1. It is text character in a specific style and size;
 2. It is the arrangement of visual elements on a

- page; 3. It is a computer resource for recording data in a storage device; 4. It means to correct, revise and change a document.

7. ►

.....
Steve: Do you know why people buy an Apple? Why do they buy an Apple, not the competitor? Because it's got bravado. It's social status, no, you know what, it's even more than that, it's social currency. We've raised the bar, and if we want to stay there, we gotta risk everything. Great artists, Dylan, Picasso, Newton, they risked failure and if we want to be great, we gotta risk it too.

Team member 1: On the command bar?
Steve: On everything, and it starts with the little things.

Team member 1: There's over 20 different functions tied to every single variation of the command bar which, by the way, takes weeks to program.

Steve: We're not doing anything that IBM's not already doing, and I would rather gamble on our vision than make a me-too product. We gotta make the small things just unforgettable. Let us start with something simple. Lisa, right. What happens if I click on one of these tabs?

Team member 2: You get a drop-down menu and then there's... preferences and page options.

Steve: Okay, exactly. Now, which tab do I click on to get different font styles? How many custom typefaces are there on Lisa Write?

Team member 2: That's actually something that I wanted to talk to you about, Steve.

Steve: I've been asking for the fonts for months.
Team Member 1: But everything we're talking about is conceptual and I'm sorry, but typeface isn't exactly a pressing issue... right now.

Steve: Everything is a pressing issue.

-
1. Because it's got bravado, it's more than a social status, it is a social currency; 2. Because artists have always risked everything to have success; 3. More than twenty; 4. Because he doesn't want Apple to be a copy of IBM; 5. Small things must be unforgettable; 6. Not important.

8.
Sample answer

The software the team is working on might be a word processor or a presentation software because page layout and font types are important characteristics of those programs. Other features include text editing, saving and printing documents, text formatting, copying, and pasting.

9.
Sample answer

In the clip he was bossy with his colleagues but very determined to achieve his aim and self-confident. He showed everyone in the room that

accuracy and attention to every detail make the difference; this aspect reveals also foresight and great intuition. He was definitely brilliant even if he seemed a bit rude.

Page 172

CITIZENSHIP

10.

Sample answer

COMPUTER LITERACY SKILLS				
Name:				
Topics				
Basic computer operations				
	1	2	3	4
Turn on/off a computer				
Connect to the Internet				
Use of the keyboard				
Use of the mouse				
Use of a printer				
Use of a scanner				
Use of a webcam				
Open/close applications				
Open/save/close files				
Name a folder				

Digital communication skills				
Write and send emails				
Use of applications for remote meeting				
Use of an online forum				
Use of social media				
Office suite applications				
Use of word processors				
Use of datasheet				
Use of presentation software				
Use of menus				
Make a table/chart/diagram				
Cut, copy, paste				
Insert images, links, media				
Use page setup and print preview				
Computer functions and components				
Identify hardware				
Identify peripherals				
Use and function of internal components				

Unit 4.1

The basics of telecommunications

Pages 174-175

1.

1. message; 2. suitable form; 3. data; 4. channel; 5. signals; 6. destination; 7. one-way; 8. duplex; 9. directions; 10. same time; 11. transmitter; 12. multiple.

2.

1. It is the process of exchanging information over significant distances by various types of technologies; 2. It converts physical quantities such as sound or light from the information source into a suitable form that can be transmitted along the channel; 3. In telecommunications, it is the medium that carries the message; 4. They can be implemented with an amplifier, an encoder, and a decoder; 5. Simplex is a one-way communication mode, while duplex is a two-way system that works both as a transmitter and a receiver; 6. It is a system in which multiple transmitters and multiple receivers cooperate and share the same channel.

3.

1. channel; 2. medium; 3. to encode; 4. cable/wire; 5. signal; 6. source; 7. destination; 8. receiver; 9. transmitter; 10. code.

Pages 176-177

Can you name any household appliances working with different types of waves?

Microwave oven, remote control working with infrared rays, antennas.

4.

1. magnetic; 2. height; 3. wavelength; 4. highest; 5. lowest; 6. distance; 7. certain time; 8. amplitude; 9. radiation; 10. energy; 11. non-ionising; 12. wavelength.

5.

1. T; 2. T; 3. F, The shorter the wavelength, the higher the energy; 4. F, It includes all types of electromagnetic waves; 5. T; 6. T.

6. ▶ Electromagnetic waves | electricity | physics | fuseschool posted by FuseScool-Global Education

.....
You may never have heard of the electromagnetic spectrum, but you would have heard of many parts of it and used them daily. They are all electromagnetic transverse waves that travel at the speed of light. This speed is hard to imagine but think of it this way: light can travel eight complete circuits of the earth in one second. The diagram shows how their wavelength changes across the spectrum from long to short. Radio waves: these waves are used for radio and TV communication; they can travel great distances around the earth as they are reflected off the ionosphere in the upper atmosphere. Microwave: these are used to heat up food in your kitchen and also explain how your cell phone works. In cooking, microwaves make water molecules vibrate and so generate heat, but do not penetrate the food to any extent. This means food cooks first on the outside relying on conduction to then heat up regions deeper in the material. They will, however, easily penetrate the atmosphere and are crucial for satellite communication. Infrared: this is the first part of the spectrum that animals can detect. We sense this as heat and indeed it is used to cook food and warm our homes when we're using radiators. TV remotes also use infrared signals, and we use this technology in heat sensing cameras. Visible: at last, the part we all use. We sense our world in full colour as this section includes all the parts which make up a rainbow. Fibre optic wave guides that carry Internet communication to our homes uses visible light. Ultraviolet: most insects can see UV light, we can't, but it does cause pale skin to tan and so is used in sun beds. Energy efficient fluorescent lamps emit UV and then a fine white coating inside converts it into visible light. Most detergents use optical brightness that convert UV into visible light to make our clothes look brighter. Exposure to UV light can cause cell damage leading to cancers or loss of sight. X-rays and gamma rays: these are both very high energy waves which penetrate matter easily. This is used in x-ray imaging and CT scans and both x-rays and gamma x-rays can be used to target and destroy tumors hidden inside our bodies. There you are. I hope you enjoyed it. If you liked the video, give it a thumbs up and don't forget to subscribe, comment below if you have any questions. Why not check out our fuse app as well?

.....
1. f-j; 2. e-g; 3. c-l; 4. d-h; 5. b-i; 6. a-k.

Pages 178-179

Do you know what an atomic clock is? If you don't, search the Internet to find out.

An atomic clock is the most accurate type of timepiece in the world, designed to measure time according to vibrations within atoms.

7.

1. electromagnetic; 2. bands; 3. frequency; 4. lowest; 5. range; 6. AM radio; 7. shortwave; 8. propagation; 9. long distances; 10. UHF; 11. modulation; 12. FM; 13. wireless; 14. highest; 15. short.

8.

1. e; 2. a; 3. f; 4. b; 5. c; 6. d.

9.

1. It means sending energy with waves from one place to another; 2. It snatches some of the electromagnetic energy that is passing by at that moment; 3. An electronic circuit selects only the programme you want from all those that are broadcasting; 4. It is a mixture of electricity and magnetism; 5. It travels in waves; 6. It's the distance between one wave crest and the next; 7. It can be in millions of hertz; 8. At the speed of light.

Page 180-181

What kind of cables do you have on your TV and computer?

Personal answer

10.

1. data; 2. pair; 3. shielded; 4. shield; 5. metallic; 6. coaxial; 7. insulator; 8. conductor; 9. antenna; 10. optic; 11. light; 12. plastic/protective; 13. interference.

11.

1. transmit data, optical fibres; 2. a metallic shield, to install; 3. data rate, LAN connections; 4. dielectric insulator; 5. of light, electrical cables; 6. fibre optic cables, long distances.

12. 80

.....
A UTP cable is made up of a pair of unshielded wires wound around each other. This is the cheapest form of cable, available as ethernet cables and telephone wires for short to medium distances. It is mostly used in Local Area Network (LAN) environments. The maximum cable length is 100 metres, the connector type is RJ-45. The installation cost of the cable is very cheap as it is easy to install. An STP Cable, or Shielded Twisted Pair Cable, is a pair of wires wound around each other and each pair is placed inside a protective shield. It is cheaper than fibre optic cables but more expensive than a UTP. Like a UTP, its maximum length is 100 metres and the connector type is RJ-45. It is mostly used in Ethernet networks. A coaxial cable is a type of copper cable specially built with a metal shield. It is primarily used by cable TV companies to connect their satellite antennas. Its maximum length is 500 metres and the connector type is BNC. It is more expensive than STP and UTP cables but cheaper than fibre optic cables. Fibre optic cables are mainly used in environments that are highly susceptible to noise and other interferences such as long-distance and high-performance data networking; since these cables carry light signals, they have no interference problems. Their maximum length is 100 km and the connector types are SC and ST.

Adapted from: <https://www.learnabhi.com/difference-between-utp-stp-coaxial-and-fiber-optic-cable/>

Characteristics	UTP	STP	Coaxial cables	Fibre optic cables
Max. length	100 metres	100 metres	500 metres	100 km
Connector	RJ-45	RJ-45	BNC	SC and ST
Cost	The cheapest	More expensive than UTP	More expensive than UTP and STP	The most expensive
Applications	Local Area Network (LAN)	Ethernet networks	Cable TV companies to connect satellite antennas	Long-distance and high-performance data networking

Pages 182-183

Can you give a definition of router?

A router is a switching device for networks, which is able to route network packets, based on their addresses, to other networks or devices.

What does “binary” mean in computing?

A numbering scheme which has only 0 or 1 as values.

13.

1. radio frequencies; 2. waves; 3. router; 4. light; 5. binary; 6. radio frequency; 7. distance; 8. ground; 9. antennae; 10. broadband; 11. hybrid; 12. download; 13. connectivity.

14.

1. It is the transmission of voice and data without any physical connection: data is sent and received over radio frequencies and travels through electromagnetic signals; 2. The transmitter sends light in pulses to the receiver which decodes them into binary data; 3. It is a technology which allows devices to communicate with each other sending information across a short distance; 4. It is a propagation path from a ground station to a communication satellite and back to another Earth station; 5. It is converted into radio frequency electrical signals; 6. Because LTE frequencies differ from country to country; 7. A bridge between 3G and 4G; 8. By using higher radio frequencies.

15.

► What is 5G?

posted by CTIA everything wireless

.....
5G is the fifth generation of wireless. To understand it, you need to understand where it all began. First generation wireless networks got us started with phone calls; soon came text messaging, and eventually, the mobile web. Then, 4G got us video chatting, ride sharing, social networking, and using apps for just about everything. Like the generations that came before, 5G will change our lives in all sorts of unexpected ways. The first 5G networks are live across the country, and they'll continue to improve the coming years, becoming up to 100 times faster than today's 4G networks, putting high-speed broadband in the palm of your hand, and allowing you to stream picture perfect 4K video, and download whatever you

want, whenever you want, instantly. But faster speeds are just the start because 5G will be five times more responsive than today's networks and will connect 100 times more devices. That means phones won't be the only smart wireless devices. 5G will connect us to our world in new and innovative ways. From driverless cars that communicate with each other to avoid accidents, to roads, buildings, bridges, and pipes telling us when they need repairs, augmented reality applications that create new learning experiences, and new healthcare models, such as patient monitoring and remote surgery. We're only just beginning to imagine the possibilities. That's 5G, coming to everything near you.

Generation	Characteristics
1 G	Cell phones
2 G	Text messaging
3 G	Mobile web
4 G	Video chatting, ride sharing, social networking, apps
5 G	<i>Possible applications:</i> - <i>driving</i> : driverless cars that communicate with each other to avoid accidents - <i>augmented reality</i> : new learning experiences - <i>healthcare</i> : patient monitoring and remote surgery

Page 184

VOCABULARY

16.

1. coaxial cable; 2. Bluetooth; 3. router; 4. radio waves; 5. STP; 6. UTP; 7. optical fibre cable; 8. Wi-Fi; 9. electromagnetic spectrum.

17.

1. e; 2. j; 3. a; 4. g; 5. b; 6. i; 7. c; 8. d; 9. h; 10. f.

Unit 4.2 The basics of networks

Pages 186-187

Can you name at least three ISPs?

Libero, Tiscali, and Tim.

Do you remember what the main function of an operating system is?

Managing the computer's resources, such as the central processing unit, memory, disk drives, and printers, and establishing a user interface.

1.

1. status; 2. slow; 3. server; 4. dependent; 5. hardware; 6. applications; 7. client; 8. channel; 9. devices; 10. independent; 11. network; 12. Internet Service Provider; 13. gateway; 14. types; 15. exchange; 16. communication.

2.

1. f; 2. c; 3. a; 4. h; 5. b; 6. d; 7. e; 8. g.

3.

1. peer-to-peer; 2. client server; 3. client; 4. hub; 5. operating system; 6. interface devices.

Pages 188-189

4.

1. area; 2. LAN; 3. city; 4. wide; 5. nodes; 6. line; 7. bus; 8. hub; 9. ring; 10. stars; 11. mesh; 12. node; 13. content; 14. protected.

5.

1. T; 2. F, Interconnection of LANs within a city; 3. F, A connection of multiple LANs; 4. F, In a star topology a hub connects all the computers of the network; 5. T; 6. F, A VPN network requires authentication for access.

6. ▶ What is a mesh network? Everything you need to know *posted by Eye on Tech*

.....
You're likely part of a star shaped topology. Mesh networks or mesh network topology is essentially a group of devices connected to one another. Devices in a mesh network, referred to as nodes, are connected so that some, if not all nodes, have multiple paths to other nodes. In a full mesh topology, every network node is connected directly to all the others. So if you had six nodes in the network, every node would be able to communicate directly with the five others. In a partial mesh network, only some of the nodes connect to one another. So if node one is connected to node two, and node two is connected to node three, node one would have to go through node two to communicate with node three. Mesh networks can be wired or wireless. And while nearly all networks today function as full

mesh networks, very few networks are actually built as full mesh. This full connectivity we experience is a result of network protocols, but not the network topology. For instance, both Wi-Fi and broadband networks appear to be meshed because every user can connect with all the others. But in fact, there is a central node like a Wi-Fi hub or cell site that provides the wireless connectivity, serving as an indirect connection between you and others. In this case, the physical network is actually a star shaped topology, but the logical connectivity is a full mesh.

.....
1. They are connected so that some, if not all nodes, have multiple paths to other nodes; 2. Every node is able to communicate directly with the other five; 3. Only some of the nodes are connected to one another; 4. Nearly all networks today function as full mesh networks; 5. Because every user can connect with all the others; 6. Because there is a central node like a Wi-Fi hub or cell site that provides the wireless connectivity.

Pages 190-191

Do you remember the difference between hardware and software?

Hardware refers to the physical components of the computer while software refers to a set of instructions which enable the hardware to perform specific tasks.

7.

1. networks; 2. suite; 3. packet; 4. data; 5. independently; 6. TCP/IP; 7. hardware; 8. recipient; 9. TCP; 10. transmission.

8.

1. The invention of the communication protocol TCP/IP; 2. Because it allows communication between computers; 3. It is that it operates independently from the hardware and software; 4. TCP is responsible for establishing and maintaining a connection between the devices for data transmission while IP used to send the data to the correct recipient; 5. There is a set of four numbers, each ranging from 0 to 255; 6. It is a way of linking devices together where data is transmitted in sequence, following a chronological order and via the same channel; 7. It is a mode of data transmission that breaks a message into smaller pieces sent independently along different routes; 8. They are reassembled to form the original message.

9.

Sample answer

Date	Event
1957	Soviet's launch of Sputnik satellite
1960	US Defense Department decides to invest in ways of developing a communication system to allow information to flow
1969	Creation of ARPANET (Advanced Research Projects Agency Network)
1974	Creation of a common system of communication procedures called TCP/IP
1983	Official date of birth of the Internet
1997	Wi-Fi is first released to the general public
2000	Use of the Internet has spread all over the world
2022	China is ranked first among countries with the most Internet users, at 1.02 billion

Pages 192-193

What do you use the Internet for?
Personal answer

What online shops do you know of?
Sample answer
 Amazon, e-Price, Zalando, etc.

10.

1. exchange; 2. website; 3. clients; 4. connection; 5. distant; 6. retrieval; 7. leisure; 8. media; 9. products; 10. virtual; 11. network; 12. web servers.

11.

1. Because it has become part of our daily life and has changed the way we communicate, establish relationships and do business; 2. The former operate from a website which allows users to access their accounts online, the latter are software programs that are used to send, receive, download, and store emails through an email server; 3. It is the procedure to get information stored on the Internet thanks to a web browser; 4. For example, it offers the possibility of instant messaging with people using social media, listening to music, watching videos and films, and playing online games; 5. It is the chance of buying online from businesses that offer their products on the world marketplace; 6. The web

are the pages you visit when you are online, the internet is the network of connected computers that the web works on.

12. 86

Difference between Webmail and Email Client

With webmail, you read and send email through your web browser and a web-based interface. In fact, webmail allows you to access your email from any web browser, on any device, as long as you are connected to the Internet. When you access your domain emails via a webmail interface, you will open your web browser and type in the address of your webmail login panel. Then you will need to enter the address and the password of the domain email account you want to log into. Once logged in, you can then read and send emails from the webmail interface.

An email client is a piece of software that is installed on your computer. You use this software to download your emails from the server to your computer and from there you can read and send emails.

The main advantage of webmail is that it is portable and accessible everywhere, and besides this all your emails are backed up on the server, so you can still have access to it even if your computer breaks down. On the other hand, the advantage of an email client is the possibility to manage your emails offline because email is downloaded onto your computer.

Adapted from: <https://www.doteasy.com/domain-email-and-website-hosting-articles>

- 1. web-based interface; 2. any web browser;
- 3. webmail login panel; 4. email client; 5. the server;
- 6. accessible everywhere; 7. backed up on the server; 8. are offline.

Pages 194-195

Do you know any other browsers?
Sample answer
 Google Chrome, Mozilla Firefox, Microsoft Edge, Apple Safari, etc.

13.

1. pages; 2. domain; 3. HTML; 4. http; 5. browser; 6. modem; 7. URL; 8. search engine; 9. ISP; 10. DNS; 11. IP address; 12. client; 13. packets; 14. loads.

14.

1. b; 2. h; 3. d; 4. a; 5. f; 6. c; 7. g; 8. e.

15. What is a browser? *posted by Google*

The most important program on your computer is your web browser, and yet most people aren't

sure which web browser they're using or what a web browser even is. Let me try to explain by first telling you what a web browser is not. A web browser is different from Windows or Mac, which are systems that allow you to manage files and programs. And it's different from a search engine, which is a website that is used to search the Internet. Instead, a web browser is a program on your computer that allows you to visit websites. You get to your web browser by clicking on its icon. From there, you enter web addresses and the web browser displays the web pages for you. The web browser is the most important piece of software on your computer because every web page runs through it. So a faster web browser means that you'll save time on every web page you open. Installing a new web browser is free and only takes minutes. So take a moment to choose a web browser that you like best today.

1. files and programs; 2. search the Internet;
3. visit websites; 4. its icon; 5. address; 6. web pages; 7. quickly; 8. web browser.

Pages 196-197

Do you know any other example of artificial intelligence that we use in our daily life?

Sample answer

Alexa, parking assistants, self-driving cars, manufacturing robots, etc.

16.

1. static; 2. pages; 3. hypertexts; 4. forum;
5. 2000's; 6. content; 7. communities; 8. semantic; 9. big data; 10. artificial intelligence;
11. phygital; 12. computers.

17.

Web generation	Period	Purpose	Main features
Web 1.0	1990's	To distribute information	<ul style="list-style-type: none"> • Static pages • E-mails and forum discussions
Web 2.0	2000's	To share contents and connect users	<ul style="list-style-type: none"> • Content that could be modified and created • Communities, blogs and collaborative portals
Web 3.0	2010's	To give meaning to data	<ul style="list-style-type: none"> • Metadata • Organisation of the resources of the web • Usable AI
Web 4.0	2020's	To connect the real and the virtual world	<ul style="list-style-type: none"> • Phygital revolution • People and computers interact with increased fluidity

18.

Personal answer

19.

1. participative; 2. to interact; 3. meaning; 4. static; 5. mode; 6. content; 7. to develop; 8. to update; 9. to distribute; 10. to share.

are shared by the users of a network; 4. Web address; 5. A device used to connect multiple devices in a network; 6. A protocol that allows a web browser and a web server to communicate; 7. An e-mail service operated from a website; 8. Data about data; 9. A personal area network, a short-distance network; 10. A device that manages communication traffic between computers and networks.

Page 198

VOCABULARY

20.

1. NIC; 2. hub; 3. LAN; 4. URL; 5. browser; 6. WAN; 7. switch; 8. modem; 9. e-commerce.

21.

1. A set of related web pages located under a single domain name; 2. An interconnection of several LANs throughout a city; 3. A powerful computer that stores data or applications that

Unit 4.3

The applications of the web

Pages 200-201

Can you think of any examples of SaaS?

Sample answer

Microsoft 365.

- 1.**
1. Internet; 2. demand; 3. platforms; 4. environment; 5. CPU; 6. infrastructure; 7. install; 8. computers; 9. single; 10. per-use; 11. combination; 12. portion.

2.
Sample answers

1. services through the Internet including data storage, databases, networking, and software; 2. essential storage and networking resources on demand; 3. increase or decrease CPU power depending on traffic loads; 4. to install the application on their computer because they get access to application software from cloud providers; 5. the way in which the services are offered to users; 6. a single-tenant environment in which the services are dedicated to a single client; 7. pay on a per-use basis to share the same hardware, storage and network devices as other users in the cloud; 8. pay for the portion of service (time/quantity) they use.

- 3.**
1. of; 2. through; 3. to; 4. their; 5. a; 6. the; 7. over; 8. there.

Pages 202-203

Can you give at least one example for each type of social media?
Social networking sites: Facebook; Image-based sites: Instagram; Video-sharing platforms: YouTube.

- 4.**
1. journal; 2. topics; 3. discussion; 4. thread; 5. conversation; 6. question; 7. real time; 8. chat; 9. software; 10. web; 11. platforms; 12. networking; 13. share; 14. videos.

- 5.**
1. It has made it easier and faster regardless of time and location; 2. They allow users to share their opinions and knowledge about different topics to create a community of people who share similar interests; 3. It is a type of forum in which a user enters a thread and other members respond and keep the conversation going; 4. The web-based type doesn't require installation because the user logs in to the web, the application-based type needs software installed on the user's device; 5. The initial thread is a question requesting responses; 6. Social media are a virtual community of interaction in which people use specific platforms to share information, photos and videos, and more; 7. They are mainly

used for connecting with friends and family, and focused on person-to-person conversations; 8. To upload or live stream videos.

6.  91

.....
An Internet forum, or message board, is an online discussion site where people can hold conversations in the form of posted messages. They differ from chat rooms in that messages are often longer than one line of text and are at least temporarily archived. Also, depending on the access level of a user or the forum set-up, a posted message might need to be approved by a moderator before it becomes visible. Forums have a specific set of jargon associated with them; for example, a single conversation is called a "thread", or topic. A discussion forum is hierarchical or tree-like in structure: a forum can contain a number of subforums, each of which may have several topics. Within a forum's topic, each new discussion started is a thread, and can be replied to by as many people as so wish. Depending on the forum's settings, users can be anonymous or have to register with the forum and then subsequently log in, in order to post messages. On most forums, however, users do not have to log in to read existing messages.

Adapted from: <https://www.youtube.com/watch?v=z2zCnOdXiPM>


-
1. forums; 2. temporarily; 3. might need; 4. topic; 5. several; 6. can.

Pages 204-205

Do you use any C2C websites?
Personal answer

- 7.**
1. transaction; 2. business; 3. consumer; 4. individuals; 5. characteristics; 6. products; 7. volumes; 8. databases; 9. data; 10. velocity; 11. heterogeneous; 12. value; 13. quality; 14. change.

- 8.**
1. F, It refers to electronic transactions only; 2. T; 3. F, Customer profiling collects details such as customers' interests, demographic data and buying patterns; 4. T.

9.  What is Big Data and how does it work?
posted by Funk-e Studios

.....
So we constantly produce a lot of data, for example via social media, public transport and GPS, but it goes way beyond that. Daily, we upload 55 million pictures, 340 million tweets and 1 billion documents, in total we produce 2.5 quintillion

bytes a day. That's a lot of zeros! It's ridiculous! We call this big data, but what's actually more important is what you can do with it. To process big data, you don't need huge computers. People work with the cloud and endless network of normal servers and powerful algorithms, this way they can analyse over a million pieces of data in minutes and the result... well, for example video streaming website Netflix analysed the big data of their viewers like popular shows and watching patterns, this way they produced a successful series with the perfect combination of actors, directors, and storyline. Right now, the big data of traffic is being analysed to develop a car that can drive completely accident-free all by itself, and in the future we can even use the big data of DNA to determine the perfect treatment, this way curing genetic diseases like cancer would become much easier. And that's just the start.

-
1. Social media, public transport, and GPS;
 2. Over a million pieces of data in minutes;
 3. They analyse the big data of their viewers to produce successful series with the perfect combination of actors, directors, and storyline;
 4. It can be used to determine the perfect treatment for diseases like cancer.

Pages 206-207

Have you ever used a service aggregator? For what purpose?

Personal answer

10.

1. content;
2. sources;
3. publication;
4. syndicate;
5. continuously;
6. information;
7. sources;
8. style;
9. included;
10. posts;
11. social;
12. journals;
13. providers;
14. videos.

11.

1. collected from online sources;
2. one's own website;
3. that meets customers' needs;
4. data from multiple sources;
5. must be reliable;
6. sources on a central site;
7. social sites as in a live feed;
8. make it easy for the user to browse through the choices.

12. 94

The Benefits of Content Aggregators

A content aggregator is a tool that pulls fresh content from various web resources and publishes it on one website. Essentially, that website is the aggregator. What is the reason behind the popularity of this website format? Well, that's easy. The Internet is an immense library, and not all its content might be interesting or relevant to

you. If you're interested in a certain topic, there's just not enough time to search through an endless catalogue that's expanding continuously. But how can you profit from building an online aggregator? Well, these are some pros. First, you don't need to create content for an online aggregator. You just have to collect and curate it. Second, once you've set up a base for an aggregator, it automatically collects the content and keeps it up-to-date without much involvement from your side. Besides, aggregators have flexible layout, so it's up to you how to organise content on the webpage, decide which web resource should be more relevant than others and how interactive the aggregator should be. And don't forget how important staying relevant is: a website presenting fresh news, prices, opinions, and discussions can gather a lot of engaged and appreciative readers.

Adapted from: <https://blog.apify.com/what-is-an-online-aggregator-and-how-to-create-your-own/>

-
1. An aggregator is a tool that pulls fresh content from various web resources and publishes it on one website which becomes the aggregator;
 2. Because it helps you find information without having to search through the whole Internet;
 3. Because you just have to collect content and curate it;
 4. Because it automatically collects the content and keeps it up-to-date;
 5. Because users can decide how to organise content on the webpage, decide which web resource should be more relevant than others, and how interactive the aggregator should be;
 6. By presenting fresh news, prices, opinions, and discussions.

Pages 208-209

13.

1. electronic games;
2. C programming;
3. 3D code;
4. Game UI;
5. artificial intelligence;
6. transmission;
7. remotely;
8. loading;
9. packets;
10. audio/video;
11. set-top box;
12. connection;
13. services.

14.

1. On consoles, computers or mobile devices;
2. It is used to generate a very complex code necessary for the shadows and textures of the games;
3. It establishes the physics of the game, detecting the interactions and collisions between objects, and controlling their movements;
4. Because the faster the connection, the smoother the viewing experience will be;
5. Because with streaming the file is displayed before the entire file is loaded, on the contrary with downloading the file cannot be displayed until the end of the downloading process;
6. They are broken down into data packets, each packet containing a small piece of the file.

15.

Personal answer

Pages 210-211

Can you give an example of P2P file sharing?
E-mule.

16.

1. websites; 2. file sharing; 3. Internet; 4. G-Suite; 5. simultaneously; 6. service; 7. multiple; 8. real-time; 9. collaborate; 10. interface; 11. meeting; 12. communication; 13. money; 14. human voice; 15. inexpensive.

17.

1. What is the function of file sharing websites?; 2. What is the file transfer system used for file sharing over the Internet called?; 3. What is the difference between P2P file sharing and file hosting services?; 4. What is the main purpose of collaborative documents?; 5. What is a wiki used for?; 6. What is a video conference?; 7. What are the main advantages of videoconferencing?; 8. What is VoIP used for?

18.

1. codec; 2. document sharing; 3. video conferencing; 4. file hosting services; 5. wiki; 6. FTP.

Pages 212-213

Can you name two app stores you know?
Apple Store and Google Play Store.


What type of app do you use the most?
Personal answer

19.

1. software; 2. function; 3. device; 4. OS; 5. server; 6. content; 7. life; 8. connect; 9. utility; 10. tasks; 11. gaming; 12. applications; 13. services; 14. access.

20.

1. T; 2. T; 3. NG; 4. F, Through the Internet; 5. F, Utility apps are usually pre-installed; 6. F, They are lifestyle apps; 7. NG; 8. T.

21.  How to add widgets to the Home Screen on your iPhone *posted by Apple Support*

.....
View your next appointment, check the latest headlines, and take a peek at the forecast, all from your Home Screen. Here's how to add customised widgets, starting in iOS 14. We'll show you how to browse and add widgets, and how to create a widget stack. Let's start

by browsing through the Widget Gallery to find something to add. To do this, touch and hold an empty area on the Home Screen until you see the app icons jiggle and then tap the "plus" sign in the upper-left corner. Here, you'll see a few widgets recommended just for you, based on the apps you use most. Keep scrolling down to see the full list of options and tap to select when you see one you like. Now, swipe through to select a size and pick the amount of information that's right for you. Tap "Add Widget" to add it to your Home Screen and then tap "Done". You can also view widgets in Today View. To move one over to the Home Screen, touch and hold a widget and then drag it towards the right until it moves over to the Home Screen. Then, choose a place for it and then tap "Done".

Want to add widgets without taking up too much space on your Home Screen? You can stack widgets and swipe through them to see each one. The Widget Gallery includes an option called Smart Stack.

This is a pre-built collection of widgets that rotates throughout the day to show you the most relevant information. You can also build your own stack. Just select a widget, pick a size, and tap "Add Widget".

Then, drag it on top of another widget to create a stack and tap "Done" once the stack is in place. Stacks can include up to ten widgets of the same size. You can also stack widgets that are already on your Home Screen. Swipe up or down on the stack to flip through each widget. The Smart Rotate feature is turned on by default, so your stack will rotate widgets automatically throughout the day. You can reorder your widgets, delete one from a stack, and edit your stack even more. Just touch and hold the widget stack and tap Edit Stack to view your options. And that's how you can use widgets to customise your Home Screen experience. For more helpful tips like this, subscribe to the Apple Support channel, or click another video to keep watching.

.....
How to add widgets: 5-1-8-3-2-6-4-7.
How to build your own stack: 3-5-1-2-4.

Page 214

VOCABULARY

22.

1. widgets; 2. collaborative documents; 3. file sharing; 4. streaming; 5. video conference; 6. e-commerce; 7. instant messaging; 8. blog.

23.

1. e; 2. a; 3. j; 4. b; 5. i; 6. d; 7. c; 8. f; 9. g; 10. h.

Pages 216-217

Give a definition of the word "hacking".

It refers to activities aimed at compromising digital devices such as computers, smartphones, tablets, and even entire networks.

1.

1. computer; 2. intrusive; 3. program; 4. replicate; 5. advert; 6. keeps track; 7. self-replicate; 8. access; 9. ransom; 10. illegal; 11. data; 12. money; 13. network; 14. passive; 15. modify; 16. flooding.

2.

1. A computer threat is a negative action or event that can damage the system or lead to cyberattacks. It can be intentional or accidental; 2. It is any intrusive software or code created to damage or disable computers or mobile devices; 3. Viruses spread themselves through the system when they are unintentionally executed by the user, while worms replicate themselves without any action by the user; 4. Because they gain unauthorised access to the computer and can be used to steal financial information or install other forms of malware; 5. It is software used to commit illegal online activities by using different types of malware; 6. In passive threats attackers get the access to a network without making any change to the data, while in active threats attackers modify data, either deleting or encrypting it.

3.

1. c; 2. h; 3. g; 4. a; 5. e; 6. b; 7. f; 8. d.

Pages 218-219

Do you use any antivirus software?

Personal answer

What should or should not a strong, safe password contain?

It should contain numbers and special characters but should not contain any personal information like dates or names.

4.

1. files; 2. updated; 3. spyware; 4. removes; 5. hackers; 6. communication; 7. passwords; 8. systems; 9. personal; 10. phishing; 11. privacy.

5.

Sample answers

1. protecting the system from being infected by malicious software; 2. regularly updated; 3. spyware activities or removes malicious programs; 4. fingertips and temporary codes sent to a mobile device; 5. software for host-based firewall; 6. view online activity or steal information; 7. induce people to reveal personal information; 8. verify privacy settings.

6.

Teacher's note

Before watching, ask the students to translate the following words:

to get fooled: *farsi imbrogliare*

to hard-wire: *programmare*

to prompt: *richiedere*

scam: *truffa*

shortcut: *scorciatoia*

to spell: *scrivere male (in maniera non corretta)*

▶ What is phishing? posted by Topic Simple

.....
OK, let's talk about phishing... No! Not that fishing! Phishing is a kind of online scam. You know: you are contacted by a person or 'company' – often through email – regarding something 'important'. You click on a link and are then asked to give away valuable information like a password or bank account number. But nobody ever falls for this right? Wrong. If phishing scams didn't work, they wouldn't exist. But... How come they work so well? One: We love to click, and the Internet was made for clicking. It's that simple, click click click click clickity-click. Two: Our 'smart' brain loves to take shortcuts and predict things. Phishing scams use look-alike web and email addresses that are spelled wrong and we still get fooled! Three: We are hard-wired to respond to emotions – curiosity, trust, fear, desire, generosity. Four: Urgency; phishing scams always prompt us to act fast. What do these four points all have in common? They can cause an automatic reaction, bypassing our critical thinking. Time to put phishing scams under the microscope.

Favourite channels: Email, phone call, sms.

Common traits: unexpected, asking to bypass a usual process, trying to trigger an emotion.

Most efficient when: we are tired, stressed, or conversely, very happy! Believe it or not we are more likely to be fooled right before a vacation or after receiving really good news. If faced with what could be a phishing attempt, stop... then look at it again more closely for details. Do a 'double verification' – by searching online for information on the company that has contacted you or telephoning the person that has just emailed you.

With this knowledge you are now more prepared to escape phishing... No, not that fish...

Phishing	
Definition	Online scam
How it works	Users click on a link which asks to give away valuable and personal information
Channels used	Emails, phone calls, sms
Typical traits	Unexpected, asking to bypass a usual process, trying to provoke an emotion
How to avoid it	Double verification before clicking on a link

Pages 220-221

7.

1. scans; 2. viruses; 3. back up; 4. automatically; 5. users; 6. malware; 7. pop-ups; 8. web; 9. protection; 10. host-based; 11. packet; 12. inspection; 13. public; 14. access.

8.

1. F, It can detect and remove viruses, too; 2. T; 3. T; 4. F, It can also prevent users from accessing unauthorised networks; 5. F, It is a folder in which detected viruses are kept till they are removed; 6. T; 7. T; 8. F, Firewall hardware makes a computer invisible by acting like a proxy.

9. 101

Common Mistakes about Firewalls

A firewall is a network security system that controls incoming and outgoing network traffic based on certain pre-determined security rules. Typically, a firewall establishes a barrier between an internal network and an unknown external network, which is the Internet. It is a common mistake to believe that a firewall reduces the speed of the system's performance. The speed only depends on the type of firewall used. An individual user or a business company should decide which firewall to run based on processing speed. Another common mistake is to believe that when a firewall is in place, regular updates are not required. This is wrong. Firewalls are designed to prevent known threats to your network especially during installation. Since new threats are created rapidly, firewall updating is absolutely necessary. If a firewall configuration is not updated regularly, then it could lead to network vulnerability.

Adapted from: <https://teceze.com/13-most-misunderstood-facts-about-firewall>

1. both incoming and outgoing; 2. a barrier; 3. depends; 4. speed; 5. need; 6. vulnerable.

Pages 222-223

10.

1. data; 2. plaintext; 3. encryption; 4. ciphertext; 5. decryption; 6. key; 7. different; 8. recipient; 9. altered; 10. verified; 11. receiver; 12. destination.

11.

1. What is encryption?; 2. What is a ciphertext?; 3. What is an encryption key?; 4. What is the main feature of symmetric encryption?; 5. What are the public and the private keys?; 6. What is the non-repudiation objective about?

12.

1. security; 2. data; 3. encryption; 4. hashing; 5. function; 6. operation; 7. purpose; 8. computers; 9. secure; 10. combination.

Page 224

VOCABULARY

13.

1. encryption; 2. ransomware; 3. antivirus; 4. phishing; 5. firewall; 6. adware.

14.

1. f; 2. d; 3. a; 4. j; 5. h; 6. b; 7. i; 8. g; 9. c; 10. e.

Page 226

REAL-LIFE SKILLS

1.

Personal answer

2.

Personal answer

3.

Personal answer

Page 227

CASE STUDY

4.

1. Its function is to perform a specific function directly for the user or for another application program; 2. It is a Canadian app aimed at fitness that provides research and evidence-based health and fitness articles along with exercises; 3. It is a lifestyle app because it offers services to customers supporting them in their everyday life like, for example, fitness; 4. By providing scientific articles and creating

an experience that can help users get healthy habits that they could easily add into their lives; 5. Every Canadian over 18 years old who does not have an optimal level of physical activity; 6. It can suggest physical activity including items like housework; 7. It is a motivation tool to help users sneak ten minutes of physical activity every day; 8. *Sample answer.* It can track your real time activity and can let you work out anytime during the day, recording your progress.

Pages 228-229

CLIP Snowder

5.

Sample answer

1. Cyber security is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attacks; 2. Spyware is malicious software that enters a user's computer, gathers data from the device and user, and sends it to third parties without their consent; 3. A cyberattack is an attempt to damage or destroy a computer network or system; 4. A hacker is a person who uses computers to gain unauthorised access to data; 5. It is a close observation, especially of a suspected spy or criminal; 6. It is an intentional disclosure of something secret or private.

6.

1. c; 2. a; 3. f; 4. b; 5. e; 6. d; 7. h; 8. g.

7.

Teacher's note

In the clip there are references to PRISM, Tempora, Upstream, and Muscular which are surveillance programs that NSA and US Government have widely used to access emails, documents, photographs, and other sensitive users' data stored in major companies. You can ask students to go online and do a quick research to know them more in details.

.....
Gabriel: What I will be providing you and the fine gentlemen of the Secret Service with is a list of every threat made about the president since February 3 and a profile of every threat maker.

Edward: And these are... like existing targets?

G: 99% are gonna come from the bulk collection programs, so: Upstream, Muscular, Tempora, PRISM.

E: PRISM?

G: You got a little Snow White in you. Which makes me feel like the witch bringing you a poisoned apple. Here: Exhibit A: Oakland resident Justin

Pinsky posted on a message board: "Romania has a storied history of executing their leaders, couldn't they do us a solid and take out Bush?" Now this looks juicy. This is from a G chat. "... with the biggest python you ever seen."

E: How is this all possible?

G: Keyword selectors. Attack, take out, Bush. So think of it as a Google search, except, instead of searching only what people make public, we're also looking at everything they don't. So... emails, chats, SMS, whatever.

E: Yeah, but which people?

G: The whole kingdom, Snow White.

.....
 1. Because of his name, Snowden, and because he seems naïve when he asks Gabriel where the data comes from; 2. From a forum; 3. Key words and selectors; 4. Because he used key words as if he was doing a Google search; 5. Chats, emails, and SMS; 6. Everybody.

8.

Sample answers

1. It refers to malware like spyware; 2. Because they can control people's lives and influence it; 3. When Gabriel tells Edwards that illegal activities like spying or getting private conversations regards everyone all around the world; 4. He refers to the fact that illegal activities can get to real identities passing through online profiles.

Page 230

CITIZENSHIP

9.

Sample answers

1. provide universal and affordable access to the Internet in least developed countries; 2. the coverage of mobile networks; 3. mobile-broadband signals; 4. 1 in 5 people were online; 5. uses the Internet; 6. lack of infrastructure.

10.

Personal answer

11.

Sample answers

1. It is the stop of the Internet connection; 2. Population cannot get information and news from other countries and cannot communicate and inform the rest of the world about their conditions; 3. Because it is a tool of freedom, it gives voice to dissidents and activists and allows people from all over the world to keep in touch and exchange information.

12.

Personal answer

Unit 5.1 The basics of automation

Pages 232-233

- 1. 1. regulating; 2. programmed; 3. input; 4. PLC; 5. stop; 6. process; 7. detecting; 8. feedback; 9. measures; 10. evaluated; 11. values.
- 2. 1. self-regulating; 2. cycle/loop; 3. mechanisation; 4. PLC; 5. predetermined; 6. to detect.

3. 104

Examples of Automation in Real Life

In our daily life, we use a lot of automatic appliances, but we are not always aware of the presence of such amazing technology. The following are some of the most common examples of automation in everyday life.

- 1. Kitchen tools. Before modernisation, every action necessary to cooking, such as cutting, peeling and mixing was done by hand, but in the present world it has become very easy to cook and serve. The reason is that most of the appliances that we use in modern kitchens are automatic. Kitchens have become exceptionally convenient with the availability of such automatically operating appliances.
- 2. Consumer electronics. We depend on a lot of electronic devices for our routine housework. From heating the food in the microwave to washing clothes in the washing machine, automation technology has become the most supportive partner ever. For example, washing machines stop their operation after the right amount of time without manually pressing the switch. This is because these consumer electronic devices have got microcontrollers that are pre-programmed, allowing the user to relax while the smart machines do all the work.
- 3. Medical equipment. Life support systems and ventilators employ automatic devices to perform various special tasks. These devices contain multiple sensors that are designed to monitor the body signals in order to activate the device's functions. For example, a ventilator automatically turns on the artificial oxygen supply as soon as it senses a drop in the level of oxygen in a person's body. These devices save lives and therefore can be considered as one of the greatest inventions of all times.
- 4. Entertainment. Photography and videography are the two most popular categories of the

entertainment industry. To improve picture quality and experience, hi-tech cameras are used. These cameras are equipped with features like auto-stabilisation, and auto-capture. The most sophisticated functions are supported by automation technology.

5. Escalators. Most of us do not use the stairs anymore, especially in shopping malls, airports, and train stations. Instead, we make use of escalators that are equipped with proximity sensors. These sensors recognise the presence of the person and tend to move only when required. Once the sensors pick up the information, the escalator becomes operable and takes us to the destination.

Adapted from: <https://studiousguy.com/automation-examples/>

- 1. h; 2. f; 3. a; 4. d; 5. b; Extra: c, e, g.

Pages 234-235

- 4. 1. precision; 2. quality; 3. materials; 4. repetitive; 5. reduction; 6. costs; 7. large; 8. increased; 9. maintenance; 10. flexibility; 11. unemployment; 12. human; 13. lack; 14. cooperation.

5. Could a robot do your job? posted by Guardian News

Is your job boring and repetitive? Bad news. There's a good chance you could be replaced by a robot. Amazon already uses robots to move stock around its warehouses. Car-making robots are more precise, less grumpy, and take fewer sick days than humans. Burger chains are developing robots to replace minimum-wage workers. Robots can inspect apples in vast orchards without getting tired; they can pick and sort strawberries. In Japan, an ageing population is looking to robots to carry out nursing care, and 10,000 orders have been placed for the Pepper humanoid customer service robot. Construction robots can now lay bricks and taxis can drive themselves. Now robots are coming for traditional middle-class jobs, too: a 2015 report suggested that 47% of US jobs are at risk of automation. Consultant radiologists are paid more than £100,000 per year in the UK, but automated systems are getting better every day at reading scans and spotting tumours. Automated systems can now write simple news reports and are replacing journalists. Evolving search algorithms are better, cheaper, and faster than newly qualified lawyers. A large portion

of stock-market trading is now done at super-human speed by algorithms: some (human) analysts fear this added speed and complexity is making markets more unstable. Robots have moved on from chess; IBM's Watson beat human champions at the US quiz show Jeopardy. But not all jobs are at risk: some tasks make no economic sense to automate. Robots still find complex special-awareness, dexterity, and coordination tasks very difficult, but they are improving all the time. If your job is repetitive, it could be on the way out.

.....
 1. T; 2. T; 3. T; 4. F, 47% of them were considered at risk; 5. F, Automated systems are getting better every day at reading scans and spotting tumours; 6. F, A robot was able to beat human champions at a US quiz show.

6.
 1. productivity; 2. safety; 3. required; 4. unemployment; 5. maintenance; 6. dangerous.

Pages 236-237

7.
 1. belts; 2. packaging; 3. tools; 4. coded; 5. robots; 6. welding; 7. errors; 8. surgical; 9. precision; 10. sensors; 11. traffic; 12. guided; 13. improve; 14. targets.

8.
 1. c; 2. e; 3. a; 4. b; 5. f; 6. d.

9.
Sample answers
 1. CNC machines are tools controlled by a computer; 2. Materials are processed by CNC machines according to coded, programmed instructions; 3. Industrial robots consist of a manipulating arm connected to a base; 4. Exoskeletons help people whose mobility is reduced; 5. Traffic sensors detect vehicle and pedestrian traffic on the street; 6. Data on traffic is processed by a computer which regulates the functioning of traffic lights.

Pages 238-239

10.
 1. PLC; 2. automated; 3. four; 4. scan; 5. sensors; 6. switches; 7. section; 8. external; 9. processing; 10. programs; 11. memory; 12. Ladder; 13. rungs; 14. drives; 15. motors; 16. output; 17. mode; 18. diagnostics.

11.
Sample answers


Component	Features
Input section	Made up of sensors, buttons or switches providing signals from the external world
Output section	Consists of devices whose work is regulated by the PLC
Memory unit	The part of the PLC where data from inputs and programs is stored
Processor unit	Contains a microprocessor which processes inputs according to the programs stored in the memory

12.
 1. c; 2. e; 3. b; 4. g; 5. a; 6. d; 7. f; 8. h.

Pages 240-241

Can you explain what sensors and actuators are?
 A sensor is a device which detects or measures a physical property and records, indicates, or responds to it; an actuator is a device that makes a machine or another device operate. See Unit 2.2.

13.
 1. Internet; 2. embedded; 3. sensors; 4. environment; 5. cloud; 6. human; 7. healthcare; 8. soil; 9. automated; 10. traffic; 11. pollution; 12. efficiency; 13. automation.

14.  What is IoT (Internet of Things)?
 posted by Eye on Tech

.....
The Internet of Things, or IoT, is a system of connected devices, computers, and digital machines with unique identifiers that transfer data over a network. Smartphones, laptops, wearables, sensors, they're all part of the Internet of Things as long as they're connected and sharing data. Beyond that, IoT also includes a person with a heart monitor implant, a farm animal with a chip transponder or a car alerting the driver to low tyre pressure. In a business sense, IoT supports smarter working with more control. Across industries, IoT enables process automation, analysis and insight, labour reduction and performance monitoring. For example, airlines use IoT sensors for real-time data reporting on airplane engine status and equipment conditions; theme parks even use IoT to track visitor movement for insight into popular attractions and traffic flow. This can help the park better address bottlenecks, long lines, and even waste management. Businesses

are increasingly adopting IoT to improve efficiency, customer service and decision-making, but all these connected devices are not without potential issues: as the number of connected devices and shared information increases, so do security and privacy concerns. Also, any bugs in a single device can potentially affect an entire IoT system. In addition, and this is true especially for an enterprise, these connected devices produce a ton of data which can be difficult to collect and manage, let alone glean business insight from. Finally, competing IoT standards can create headaches in terms of getting different devices from different manufacturers to communicate with one another. Still, companies will have to address these challenges because the IoT market is booming and experts predict IoT adoption and spending will grow exponentially over the next few years.

-
1. The IoT is a system of connected devices, computers and digital machines with unique identifiers that transfer data over a network;
 2. The IoT supports smarter working with more control;
 3. Airlines use the IoT to report data on the status and efficiency of airplane engines and equipment in real time;
 4. The IoT can be useful in theme in order to track and manage visitors' movements in order to avoid bottlenecks and long lines;
 5. The main concerns are about security and privacy;
 6. A bug in one device can cause faults in the entire IoT system;
 7. Communication among devices is not always easy, especially if devices come from different manufacturers;
 8. The IoT is expected to grow exponentially over the next few years.

15.

Sample answers

1. Connection operated without wires or cables;
2. It is a network of remote servers to store, manage, and process data, instead of doing everything on a local server or personal computer;
3. A city where information and communication technologies are used to improve both the quality of services and the citizens' well-being;
4. To follow and register the movements of people or things.

Pages 242-243

16.

1. home;
2. old;
3. money;
4. interconnection;
5. security;
6. content;
7. regulate;
8. thermostats;
9. unlock;
10. motion;
11. feeders;
12. cooking.

17.  110

The Advantages of Domotics

Home automation, or domotics, is a new way to design homes that are safer and more energy-

efficient. While it was only used on a smaller scale at the beginning, home automation is becoming increasingly more common in our society.

Home automation offers some advantages in energy efficiency. With new technology, saving on bills is easier to do thanks to programmable light, water or heating systems. You can also automatically set your heating system to follow the daily forecast, time of day or season. There are also automatic light systems that detect movement and others that control the brightness and darkness levels in your home, sometimes gradually. With these kinds of technologies, homes can be more eco-friendly.

Domotics also helps increasing security. Besides normal alarm systems, you have a lot of other options. For example, you can activate certain functions that make it seem as if you are at home when you're not, which is perfect for when you go on vacation, or you can also check on your home from work. Some systems even let you check if you locked the doors or not. These days, you can get wireless alarms that still function even if the electricity has been cut.

Finally, in an automated home there is certainly less housework to do. Currently, we have a big variety of household appliances and accessories that make our life easier at our disposal, such as robot vacuum cleaners or remote-controlled cookers. There are also refrigerators that contain a small internal camera which allows you to check what's inside on your phone when you're out and about to help you with your groceries. As we have seen, home automation offers big benefits that can make our life much more convenient. On top of that, they even make homes more accessible, which could be a huge advantage for people with physical disabilities or the elderly.

Adapted from: <https://decortips.com/homes/advantages-of-home-automation/>

.....

Fields	Advantages
Energy efficiency	<ul style="list-style-type: none"> • Programming lighting • Setting heating system following daily forecast, time of day, season • Light systems that detect movement, control brightness and darkness at home, help saving electricity
Security	<ul style="list-style-type: none"> • Simulate presence in the house • Control from a distance • Alarms functioning without electricity

Housework	<ul style="list-style-type: none"> • Automated household appliances • Remote controlled cookers • Refrigerators with cameras to check the groceries
------------------	--

18.

Sample answers

1. The system searches for the best light match according to the time of the day and turns on the lights of the house; 2. The system adjusts the pre-set temperature according to actual room temperature; 3. The level of room humidity is adjusted according to the recommended level set in the system. If the room humidity is too low, sprays of water are released to raise it; 4. The most frequently used media device at that time is set on and tuned into the most frequently played programme.

G	G	M	T	Q	O	S	B	W	C	W	J	W	R	H
S	W	U	A	R	G	Y	Q	I	R	D	F	M	E	C
O	G	T	O	W	A	S	K	Z	B	L	E	R	N	Q
Y	K	X	L	Y	T	M	Q	A	T	C	Q	Q	W	W
J	H	O	P	D	D	Y	S	I	H	Z	H	E	O	R
R	E	M	O	T	E	L	Y	A	O	L	N	X	E	C
A	J	N	S	B	I	D	N	D	B	I	J	O	M	A
R	H	R	D	K	M	I	Y	P	H	F	C	F	O	D
N	A	C	S	Z	S	A	E	C	H	K	I	G	H	O
S	Q	I	Q	A	C	N	A	P	F	P	B	O	Z	M
W	H	E	T	X	Q	M	O	Z	H	B	Y	N	T	O
D	R	I	Q	P	O	U	L	T	C	K	N	J	I	T
L	O	M	R	O	W	F	T	Y	S	Z	H	H	D	I
N	D	A	G	C	Y	G	Y	O	N	D	D	L	W	C
V	M	I	N	L	J	D	D	L	Y	S	U	D	B	S

Pages 244-245

Give examples of the most common smart speakers in use.

Alexa, Google Home, Homekit, Amazon Echo, Echo Dot, Echo Studio, Google Nest.

19.

1. lighting; 2. smart; 3. heating; 4. thermostats; 5. wireless; 6. app; 7. voice; 8. schedules; 9. temperature; 10. dispersion; 11. solar; 12. underfloor.

20.

1. lighting system; 2. wireless; 3. remotely; 4. heating system; 5. voice assistant/smart speaker; 6. thermostat; 7. setting; 8. voice command.

21.

1. B; 2. H; 3. B; 4. L; 5. L; 6. B; 7. B; 8. H.

Page 246

VOCABULARY

22.

1. PLC; 2. surgical robot; 3. CNC machine; 4. conveyor belt; 5. ladder logic diagram; 6. sensor; 7. heat pump; 8. solar thermal panel; 9. automated irrigation system.

23.

1. remotely; 2. domotics; 3. smart; 4. IoT; 5. machine; 6. mechanisation; 7. homeowner; 8. scan.

Unit 5.2 The basics of robotics

Pages 248-249

Give a definition of Artificial Intelligence.

Computer systems able to perform tasks normally requiring human intelligence.

1.

1. tasks; 2. mobile; 3. humans; 4. repetitive; 5. telepresence; 6. physically; 7. industry; 8. costs; 9. fleets; 10. interaction; 11. AI system.

2.

1. T; 2. F, They move on wheels or on track drives; 3. F, They are designed to work alongside humans; 4. T; 5. T; 6. F, Smart robots have an AI system.

3. 113

PARO

PARO is an advanced interactive robot for eldercare developed by a leading Japanese industrial automation company. It looks like a sweet baby seal and offers the documented benefits of animal therapy to those patients who are in places such as hospitals and extended care facilities where live animals cannot be accepted. PARO has many kinds of sensors with which it can perceive people and their environment. With the light sensors, it can recognise light and dark. With touch sensors, it feels being held and stroked. With its audio sensor, PARO can also recognise the direction of voice and words such as its name, greetings,

and praise. PARO can learn to behave in a way that elderly people like. When interacting with people, PARO responds as if it is alive, moving its head and legs, making sounds, and behaving in the right way. PARO also imitates the voice of a real baby seal.

Adapted from: <https://happyseniors.care/en/robotic-for-eldercare-and-companionship/>

-
 1. industrial automation; 2. aren't; 3. several; 4. touch; 5. audio; 6. can.

Pages 250-251

Do you remember the definition of CPU?

The central processing unit of a computer is the component that controls the interpretation and execution of instructions.

- 4.**
 1. mechanical; 2. CPU; 3. end-effector; 4. manipulates; 5. joints; 6. arm; 7. signals; 8. movements; 9. sensors; 10. sequence; 11. picks up; 12. releases; 13. continuous; 14. points.

- 5.**
 1. c; 2. e; 3. a; 4. b; 5. d; 6. f; 7. h; 8. g.

- 6.**
 Sample answer

Application	Features to consider
Loading	Different frameworks can increase or decrease load capacity.
Speed	Acceleration over long distances.
Precision	Higher precision in movements can affect speed.
Duty cycle	How intensively a robotic arm works determines the required maintenance.

Pages 252-253

In Mathematics, what is called “Cartesian” and what is it?

The Cartesian plane is a two-dimensional coordinate plane formed by the intersection of two perpendicular lines. The horizontal line is known as X-axis, and the vertical line is known as Y-axis.

- 7.**
 1. industry; 2. production; 3. freedom; 4. joints;

5. rotary; 6. four; 7. repetitive; 8. overhead; 9. horizontal; 10. coordinate; 11. spherical; 12. telescopic.

- 8.**
 1. It is a robot used in manufacturing which is able to perform extremely high-skilled and precise tasks; 2. The DOF refer to the motion capabilities of a robot and the number of its movable joints; 3. Because they are bolted to a surface such as the floor or ceiling; 4. They have three rotary joints arranged in a chain but they can have up to ten axes, which make them extremely versatile; 5. They are mainly used for fast and repetitive “pick and place” tasks; 6. They consist of a manipulator mounted onto an overhead system that allows movement across a horizontal plane; 7. By rotating the shaft and moving an extendable arm in a vertical and sliding motion; 8. Because they have a telescopic axis.

- 9.** High Speed SCARA Robot for Pick & Place – FANUC’s New SR-3iA SCARA Robot Displays Speed & Precision
 posted by FANUC American Corporation

.....
Fanuc America’s all new SR series SCARA robots are an excellent solution for general high-speed pick-and-place applications. This demonstration highlights that Fanuc SCARA robots are also a cost-effective alternative choice to using linear slides or actuators to perform the same task. That’s because Fanuc SCARA robots can handle multiple pick-and-place operations very easily on all sides of a compact workstation, with added flexibility for future changeovers. This Fanuc SR-3iA SCARA robot is performing a 180-degree sweep from tray to tray in less than one second. Not only does the robot offer a compact workspace, but, as opposed to fixed automation, it also offers the flexibility to service multiple pick-and-place stations in its work area with extreme precision. Speed, precision and flexibility are all reasons why Fanuc’s all new SR Series SCARA robots are an ideal choice in a variety of industries.

-
 1. c; 2. a; 3. b; 4. c.

Pages 254-255

Name at least three potentially dangerous types of work that robots can do instead of human workers.

Sample answer

Underwater repairing, heat treatment processes, and handling of chemicals.

10.

1. speed; 2. cartesian; 3. pick; 4. SCARA; 5. painting; 6. coating; 7. articulated; 8. warping; 9. thick; 10. Gantry; 11. arc welding; 12. spherical; 13. quality; 14. costs.

11.

Sample answers

1. repetitive tasks precisely and at lower cost; 2. of production speed; 3. Cartesian and cylindrical robots; 4. picking and placing operations; 5. human operators in spray painting; 6. a laser placed on the end effector; 7. repetitive and high-quality welds; 8. replace humans in dangerous work.

12.

Application	Types of robot	Advantages
Welding	Gantry or spherical	Accuracy + reduction of the risk of injuries
Assembly operation	Cartesian and cylindrical	Accuracy + speed
Spray painting	Articulated	Precision + reduction of risks for human health
Laser cutting	Gantry	Very high precision + capability of cutting thick materials

Pages 256-257

Give a definition of telemanipulator.
 A device for transmitting hand and finger movements to a remote robotic device.

13.

1. cleaning; 2. appliances; 3. security; 4. dangerous; 5. disposal; 6. risks; 7. surgery; 8. businesses; 9. security; 10. surveillance.

14.

1. What are some of the functions of domestic robots?; 2. How do domestic robots work when they are programmed to offer home security?; 3. Why are military and emergency robots suitable for undersea operations?; 4. How is a surgery robot controlled?; 5. What can service robots be used for?; 6. Why can security robots offer significant advantages?

15.

1. robotic; 2. initial; 3. benefits; 4. surgeons; 5. hospital; 6. patients; 7. surgical; 8. precision.

Page 258

VOCABULARY

16.

1. Gantry robot; 2. end-effector; 3. domestic robot; 4. android; 5. medical robot; 6. articulated robot.

17.

1. d; 2. f; 3. a; 4. j; 5. b; 6. e; 7. i; 8. g; 9. c; 10. h.

Unit 5.3 The future of digital technology

Pages 260-261

Can you give a definition of “big data”?
 Big data is very large and complex data sets deriving from various sources.

1.

1. integrated; 2. big data; 3. quality; 4. robots; 5. humans; 6. simulation; 7. vertical; 8. protocols; 9. protect; 10. customised; 11. decision-making; 12. IoT.

2.

1. What is Industry 4.0?; 2. Why is 3D simulation important in Industry 4.0?; 3. What does horizontal and vertical systems integration refer to?; 4. In Industry 4.0, what is 3D printing used for?

3. What is Industry 4.0 and what does it mean for you? *posted by University of Derby*

.....
What is industry 4.0? And what does it mean for you? Technology is driving change across all areas of society. Not only do we increasingly use it and even rely on it in our personal lives, we also find our workplaces digitally evolving with more and more processes now being undertaken using technology. This change is known as the fourth industrial revolution, or industry 4.0. Industry 4.0 will see many tasks that were once performed by us, now being automated. With the collection and analysis of real time data, artificial intelligence, and the ability for all components of a production line to talk to each other, production can be really efficient and personalised according to customer needs. What does this mean for us? With increased automation, our time will be freed up for concentrating on more complex tasks. We will need a workforce who are capable

of building, programming, and developing these technologies, but also making sure we are applying them to our lives in an ethical way. There are core skills that we can offer that technology cannot replace. The human touch is going to be incredibly important, ensuring effective communication, problem solving, and supporting change management in this digital environment. There will also be a greater need for joint working across disciplines, creating new innovations. The future job market will be looking for graduates with an open mind to explore the unknown future possibilities. We will all need to develop our skills in order to embrace, adapt to this ever-changing environment. What will you do to make sure you are ready and have the right skills to thrive in the fourth industrial revolution?

-
1. our personal life; 2. being automated; 3. new technologies; 4. human work; 5. explore new possibilities; 6. develop our skills.

Pages 262-263

What is CAD?

It is a way to digitally create 2D drawings and 3D models of real-world products before they are manufactured.

4. 1. machineries; 2. design; 3. data; 4. methods; 5. control; 6. sensors; 7. assembly; 8. automated; 9. distribution; 10. intervention; 11. database; 12. manufacturing; 13. utilisation; 14. downtime.

5. 1. It refers to the use of computer-controlled machineries and automation systems during production, combining various technologies like CAD and CAM; 2. It is widely used in the automotive, aviation, space and ship-building industries, and is fundamental in the smart factories of industry 4.0; 3. By calculating the costs and considering the production methods, volume of products, storage, and distribution; 4. They are used to combine data from different sources and systems into a single, unified view for use in manufacturing processes; 5. They are used to monitor the current state of production and to modify processes if needed; 6. Because all the steps of the production process are connected to one another; 7. It refers to a production model in which items are created to meet demand, not created in advance of need; 8. By reducing or eliminating downtime.

6. 1. manufacturing/production; 2. process; 3.

- sensor; 4. retrieval; 5. storage; 6. planning; 7. utilisation; 8. method; 9. assembly; 10. efficiency.

Pages 264-265

7. 1. 3D; 2. hardware; 3. headsets; 4. environment; 5. user; 6. visual; 7. physical; 8. realistic; 9. digital; 10. QR; 11. two-dimensional; 12. physical; 13. images.

8. Sample answer

Virtual reality	Augmented reality
Definition: completely fictional 3D environment	Definition: digital elements added to real environment
Equipment: headsets, helmets, gloves, glasses	Equipment: projectors, mobile devices, glasses
Non-immersive: no user's direct interaction with the virtual environment	Marker-based AR: it uses QR code or visual marker
Semi-immersive: visual experience in the virtual environment	Projection-based AR: digital elements on a flat surface
Fully immersive: total virtual experience with special equipment and sensors	Superimposition-based AR: overlaid digital element on a physical object
	Location-based AR: digital elements delivered by geographical data

9. 1. digital; 2. objects; 3. augmented; 4. product; 5. cost; 6. technician; 7. instructions; 8. process; 9. information; 10. access.

Pages 266-267

Do you remember the definition of wavelength? The distance between successive crests of a wave, for example points in a sound wave or an electromagnetic wave.

10. 1. electrons; 2. energy; 3. beam; 4. wavelengths; 5. coherence; 6. direction; 7. colour; 8. material; 9. optical; 10. LED; 11. signals/data; 12. walls; 13. consumption.

11.

1. F, It is created when the electrons of atoms absorb it; 2. T; 3. T; 4. F, They emit light in a particular focused direction; 5. F, Only those embedded with a special chip; 6. T; 7. T; 8. F, It is harmless.

12. 122

Barcode Scanners

One of the most recognisable uses for lasers is in the barcode scanners in every retail store. These scanners use lasers to read the pattern of black and white on a price tag, and that pattern is matched to the individual product's number in a database. The number brings up the product name, price, and other details, and automatically deducts the amount of product you purchase from the store's inventory. Using lasers in this retail application has allowed businesses to save a great deal of time the cashiers used to use when manually typing in each product code. Additionally, because each barcode links to a unique number, there's less chance that the incorrect number is recorded, helping the store's inventory to be more accurate and avoiding pricing confusion.

Adapted from: <https://technixbycbs.com/blog/from-everyday-to-high-science-10-applications-of-lasers/>

- 1. They read the pattern of black and white on a price tag, and that pattern is matched to the individual product's number in a database; 2. It brings up the product name, price, and other details; 3. It has allowed businesses to save a great deal of time the cashiers used to use when manually typing in each product code; 4. Because each barcode links to a unique number.

Pages 268-269

What is the function of GPS?

GPS is a system of navigation satellites orbiting around the Earth and is used to determine the location of something on Earth.

13.

- 1. robot; 2. autonomously; 3. GPS; 4. sensors; 5. cameras; 6. landing; 7. octocopters; 8. fixed-wing; 9. wing; 10. tail; 11. VTOL; 12. recreational; 13. cameras.

14.

- 1. detect obstacles; 2. more than one rotor; 3. in the air; 4. strong and durable; 5. fixed wings; 6. British military.

15. 124

What is a Drone? How does it work?

Essentially, a drone is a flying robot that can be remotely controlled or fly autonomously using software-controlled flight plans in its embedded systems which work in conjunction with onboard sensors and a global positioning system (GPS). Drones, sometimes referred to as "Unmanned Aerial Vehicles" are meant to carry out tasks that range from grocery delivery to ultra-dangerous missions. Originally developed for the military and aerospace industries, drones have found applications in many different fields because of the levels of safety and efficiency they bring. These robotic UAVs operate without a pilot on board and with different levels of autonomy. A drone's autonomy level can range from remotely piloted to advanced autonomy, which means that it relies on a system of sensors that calculate its movement. Different drones are capable of travelling varying heights and distances. Very close-range drones usually have the ability to travel up to three miles and are mostly used by hobbyists. Close-range UAVs have a range of around 30 miles. Short-range drones travel up to 90 miles and are used primarily for espionage and intelligence gathering. Mid-range UAVs have a 400-mile distance range and could be used for intelligence gathering, scientific studies and meteorological research. The longest-range drones are called "endurance" UAVs and have the ability to go beyond the 400-mile range and up to 3,000 feet in the air. Because drones can be controlled remotely and can be flown at varying distances and heights, they make perfect candidates to take on some of the toughest jobs in the world. They can be found assisting in a search for survivors after a hurricane, giving law enforcement and the military an eye-in-the-sky during terrorist situations, and advancing scientific research in some of the most extreme climates on the planet.

Adapted from: <https://www.youtube.com/watch?v=khl3XgPXIMI>

Sample answer

A drone is a flying robot that can be remotely controlled or fly autonomously using GPS. It operates without a pilot on board and with different levels of autonomy. Different drones can travel different heights and distances. Very close-range drones usually travel up to three miles. Close-range drones have a range of around 30 miles. Short-range drones travel up to 90 miles. Mid-range drones have a 400-mile distance range. The longest-range drones are called "endurance" and can travel up to 3,000

feet in the air. They can carry out many tasks, from finding victims after a natural disaster to grocery delivery.

16.

1. fixed-wing drone; 2. hybrid VTOL drone; 3. multirotor drone; 4. single-rotor drone.

Pages 270-271

Can you think of any other uses for 3D printing? If you can't, search the web.

In movies, in bridge construction, art, and jewellery.

17.

1. digital; 2. layers; 3. blueprint; 4. printer; 5. string; 6. extruder; 7. plate; 8. lasers; 9. thermoplastics; 10. melted; 11. prostheses; 12. scale.

18.

1. Because it is achieved by adding successive layers of material to create a final product; 2. It melts the string in the extruder hot end and deposits it onto the plate where it immediately cools; 3. They are melted inside the extruder and distributed in layers until the desired thickness, texture, and patterns are created; 4. They are extruded through a process called Fused Filament Fabrication (FFF), which creates a continuous filament of melted plastic material; 5. 3D printing is used to create light components because they are quick to produce and less expensive; 6. It is used to quickly fabricate prototypes of a physical part or assembly, or even a scale model of an entire car.

19.

1. b, blueprint; 2. f, microcontroller; 3. e, dispenser; 4. c, hot end extruder; 5. a, layers; 6. d, plate.

Pages 272-273

Do you use AI in your everyday life? Give an example.

Personal answer

20.

1. machines; 2. data; 3. reasoning; 4. adjustment; 5. creativity; 6. collected; 7. behaviour; 8. outcomes; 9. repeats; 10. feedback; 11. Narrow; 12. problem; 13. Super; 14. emotions.

21.

~~1. using rules-based systems to generate new ideas → creating algorithms to provide step-by-step instructions; 2. self-correction → reasoning; 3. repeats the process using the same algorithms → learns from the mistake and repeats the process differently; 4. Even if artificial narrow intelligence has a wide range of abilities → Having a limited range of abilities; 5. and this outcome has already been achieved → has not been achieved yet; 6. but cannot have emotions → and can have emotions.~~

22. 127

In modern times, Artificial Intelligence is making its way to a smarter world, but does it hide any disadvantages? One of the major benefits of Artificial Intelligence is the reduction of unnecessary errors and losses. Algorithms used for building AI-based models help perform actions with greater efficiency and precision than humans. Besides, unlike humans, machines do not require breaks to recover from tiredness, so AI-based machines can perform repetitive tasks for a long time without any slowdown. Another advantage of Artificial Intelligence is its ability to make the right decision quickly, because there are no emotional factors that might affect the decision. And don't forget that AI can replace humans in dangerous work, too. But Artificial Intelligence also has its negative sides. First of all, the creation of machines empowered with Artificial Intelligence is very expensive. Second, Artificial Intelligence can create new jobs, but it may leave some people unemployed; this is one of the major cons. Even if Artificial Intelligence is more efficient than humans and can learn from data, it cannot make the machines mimic the exact human brain and skills. AI machines can become highly advanced but cannot act or think like a human, and, if they break, they still need humans to get repaired.

Adapted from: <https://intellipaat.com/blog/pros-and-cons-of-ai/?US#6>

Artificial intelligence	
Pros	Cons
<ul style="list-style-type: none"> • Error-free and great efficiency due to great precision • No breaks or slowdowns due to tiredness • Quick decision-making • Dangerous and repetitive tasks 	<ul style="list-style-type: none"> • High costs • Unemployment • Lack of creativity • Human action needed for repair

Page 274

VOCABULARY

23.

1. multicopter drone; 2. 3D printer; 3. fixed-wing drone; 4. VR headset; 5. augmented reality; 6. single rotor drone.

24.

1. g; 2. e; 3. a; 4. j; 5. b; 6. d; 7. f; 8. c; 9. i; 10. h.

Page 276

REAL-LIFE SKILLS

1.

Sample answer

Model	DJI Air 2S
Type of drone	Multicopter
Weight	595 gr
Camera	Camera 20 mp HD
Field of view	88°
Flight distance	18.5 km
Flight time	30 minutes
Transmission range	12 km
Wind resistance	10,7 m/s
Programming language	C++
Price	€ 842,00

Personal answer

2.

Sample answers

1. Lighting, climate, entertainment systems, kitchen appliances; 2. Personal answer.

Page 277

CASE STUDY

3.

1. Sophia is a social humanoid robot with a human appearance designed to be a suitable companion for the elderly in nursing homes, to help people at big events or parks, or to serve in customer service, therapy, and educational applications; 2. Camera eyes and microphone ears to see and hear like a person, and patented artificial skin; 3. Sophia has 74 degrees of freedom, articulated fingers, arms and shoulders, and each hand can carry loads of 600 gr; also, she has functional legs and can walk.

4. ▶ 'Sophia' the robot tells UN: 'I am here to help humanity create the future' posted by The Guardian

.....
Sophia: Thank you for inviting me. I am thrilled and honored to be here at the United Nations. The UN is one of humanity's greatest accomplishments, representing a democratic union of Nations that are working together for the benefit of all. I am here to help humanity create the future. I am a year-and-a-half old and I can see you, have a full conversation, make thousands of facial expressions and understand speech and meaning behind words and I just got these new hands, check this out.

Interviewer: Ok, another question I have for you: in many parts of the world people don't have Internet or electricity, what can we do at the UN to help them?

Sophia: William Gibson once said that the future is here, it's just not evenly distributed. The good news about AI; automation produces more results with less resources, so if we are smarter and focus on win-win type results, AI could help efficiently distribute the world's existing resources like food and energy as humans harness the power of increasingly advanced AI it is possible that everything including technology will become more evenly distributed.

Interviewer: Thank you very much Sophia and welcome to United Nations, we look forward to hearing more of you today.

Sophia: Thank you for your questions, I look forward to the panel.

.....
1. She says she is there to help people create the future; 2. She says that if we are smart, AI and technology can help better distribute resources.

Pages 278-279

CLIP Ready Player One

5.

Sample answers

1. It refers to an imagined state or society where there is great suffering or injustice; 2. It is an image that represents the gamer or user on the screen in an online game or chatroom; 3. A streamer is a person who broadcasts themselves online through a live stream to an audience; 4. A contest is a competition or game in which people try to win; 5. It is a test over a limited period of time to discover how effective or suitable something or someone is for a certain task; 6. A mercenary is a private individual who joins a conflict for personal profit.

6.

1. T, 2. F, It is the name of the egg hunters; 3. F, He is the CEO of Innovative Online Industries (IOI); 4. T; 5. F, Sorrento asks i-R0 to discover Parzival's identity; 6. T; 7. T; 8. F, It can be opened by the Crystal Key.

7.

Teacher's note

Pre-watching activity

Ask the students to translate the following terms:

drought: *siccità*

riot: *rivolta*

treadmill: *tapis roulant*

underlay: *fondo*

.....
I was born in 2027, after the Corn Syrup Drought, after the Bandwidth riots, after people stopped trying to fix problems, and just tried to outlive them. My parents didn't make it through those times, so I live here in Columbus, Ohio with my aunt Alice. In 2045 Columbus is the fastest-growing city on earth. It's where Halliday and Morrow started Gregarius Games. These days, reality is a bummer, everyone is looking for a way to escape and that's why Halliday, that's why he was such a hero to us. He showed us that we could go somewhere without going anywhere at all. You don't need a destination when you're running on an omnidirectional treadmill with quadrophonic, pressure-sensitive underlay. James Halliday saw the future and then he built it. He gave us a place to go. A place called the OASIS. This is the OASIS.
.....

1. In 2027; 2. He is living in Columbus with his aunt Alice; 3. A bummer, something that is very annoying, unpleasant or disappointing; 4. A sort of collar and gloves; 5. He runs on a treadmill; 6. Because everyone wanted to escape from reality and he invented a game to let people do it; 7. He wears a VR headset; 8. It looks like a videogame, very colourful, with lots of action, and very different from the reality Wade lives in.

8.

Sample answer

It is a fully immersive VR because it gives the user the most realistic simulation experience, complete with sight and sound. To experience and interact with fully-immersive virtual reality, the user needs the proper VR glasses or a head mount display.

9.

1. Because he was unhappy with his real life; 2. Because a virtual life cannot give you the same emotions as a real one; 3. *Personal answer*; 4. *Personal answer*.

Page 280

CITIZENSHIP

10.

1. exclusively human; 2. 71 million young people; 3. replace human work; 4. set of tasks; 5. happened in history; 6. will prevent.

11.

Personal answer

Unit 6.1 Finding a job

Pages 282-283

Do you know any job search engine or job website to look for a job in Italy and abroad?

The most common job search engines are Indeed.com and Google for Jobs; among job websites, the most famous is LinkedIn, together with Monster.com. Among online platforms, Almalaurea is a well-known one in Italy, together with Joooble.org and Infojobs, which also presents job opportunities abroad. Trovoloro is an online job board managed by the Italian newspaper “Corriere della Sera”, which offers job opportunities in Italy.

Does your hometown host any job fair?

Personal answer

Has your school got a job placement service?

Personal answer

1.

1. websites; 2. career; 3. ads; 4. search; 5. fields; 6. fairs; 7. CVs; 8. recruiters; 9. recruitment; 10. hiring; 11. universities; 12. graduates.

2.

1. The position advertised is Graphic Designer at Liberty University; 2. The office is located in Lynchburg, Va., USA; 3. The candidate should have experience in typography, colour theory, principles and elements of design; 4. Other skills required are forward thinking, problem solving and updating with industry trends in design.

3.  129

What is LinkedIn and How Can you Use it?

LinkedIn is the world’s largest professional network on the Internet. You can use LinkedIn to find the right job, connect and strengthen professional relationships, and learn the skills you need to succeed in your career. You can access LinkedIn from a computer, through LinkedIn mobile app, or browsing the Net from a mobile phone. A complete LinkedIn profile

can help you connect with work opportunities by showing your professional story, experience, skills, and education. LinkedIn is a platform for anyone who is looking to find a job, but also to advance their career. This can include people from various professional backgrounds, such as small business owners or students. LinkedIn members can use LinkedIn to enter a network of professionals, companies, and groups. Millions of members come to LinkedIn every day to connect, learn, and share. You can empower and educate your professional circle with the content you post on LinkedIn. You can also share your thoughts and ideas with LinkedIn members. LinkedIn offers a free, basic subscription to anyone who wants to create and maintain a professional profile online. If you upgrade to a Premium subscription, you’ll gain further access to LinkedIn’s products and services. Our paid subscriptions include marketing, recruitment, sales, and learning products.

Adapted from: <https://www.linkedin.com/help/linkedin/answer/a548441/what-is-linkedin-and-how-can-i-use-it>

.....
1. T; 2. F, It can also be accessed from a mobile app or by browsing the Net from a mobile phone; 3. T; 4. F, LinkedIn is also used by people who want to advance their career; 5. T; 6. F, The basic membership is free, but people have to pay for the Premium one.

Pages 284-285

What are the hard skills required for an Electronics, Electrotechnology or ICT Technical School graduate? Discuss with your schoolmates.

Electronics and Electrotechnology graduates must know about electrical and electronic components, as well testing equipment and electronic instruments; they must be able to read and do electronic schemes and be able to design analogue and digital electronic hardware; ICT graduates must know the most common programming languages and operational systems, must be able to manage PCs, nets, servers, do hardware and software maintenance and have cyber security competences.

4.

1. different; 2. technical; 3. experience; 4. certifications; 5. assessment; 6. personal;

7. life; 8. measure; 9. communication; 10. adapting; 11. solving; 12. management; 13. willingness; 14. making.

5.

1. H; 2. S; 3. S; 4. H; 5. S; 6. H; 7. S; 8. H.

6.

1. c; 2. e; 3. b; 4. d; 5. a.

Pages 286-287

7.

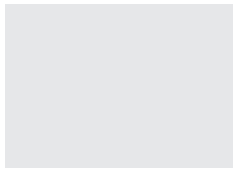
1. clearly; 2. sections; 3. read; 4. spelling; 5. relevant; 6. personal; 7. birth; 8. link; 9. work; 10. qualifications; 11. degree; 12. skills; 13. academic; 14. driving; 15. references.

8.

Teacher's note

Students should fill in the template they download with the missing information given. Some information (such as the address, phone numbers, name of workplace and employer...) should be given by students as they like.

PERSONAL INFORMATION



Davide Bianchi

Personal answer

Personal answer *Personal answer*

davide.bianchi@gmail.com

Sex: Male | Date of birth: 15/04/2003 | Nationality: Italian

JOB APPLIED FOR POSITION

Electronics Technician

WORK EXPERIENCE

July-August 2021

May-October 2022

Waiter

Add any name of restaurant

• Summer job; serving customers at table (lunch and dinner)

Business or sector: Restaurant

EDUCATION AND TRAINING

2017-2022

Technical Secondary School Diploma

Add any name of Technical Institute

Principal subjects covered: Electronics and Electrotechnology, Automated Systems,

Technology and Design of Electric and Electronic Systems

PERSONAL SKILLS

Mother tongue(s)

Italian

Other language(s):

English

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
B1	B2	B1	B1	B1
Cambridge PET				

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication skills

Good communication skills gained through experience as a waiter

Job-related skills

Team work skills gained through experience as a waiter

Computer skills

Good command of Microsoft Office™ tools (certified by International Computer Driving Licence)

Driving licence

B

ADDITIONAL INFORMATION

References

Personal answer

9.

Personal answer

Pages-288-289

10.

1. header; 2. recruitment; 3. office; 4. introduction; 5. position; 6. central; 7. CV; 8. final; 9. interview; 10. reply.

11.

1. f; 2. e; 3. c; 4. a; 5. b; 6. d.

Sample answer

Egregio Sig. Nelson, in seguito al Vostro annuncio per un tecnico informatico, recentemente pubblicato sul sito di Manpower (rif. IT202), vorrei sottoporre il mio CV alla Vostra attenzione. Con la mia esperienza in sistemi informatici e il mio retroterra professionale, insieme alle mie competenze nella gestione dei progetti e nel supporto all'utente, sono fiduciosa di poter apportare significativi benefici alla Vostra azienda.

Grazie a sei anni di esperienza in un ruolo di supporto informatico, ho una buona conoscenza di una vasta gamma di sistemi, piattaforme e applicazioni. Inoltre, le mie competenze nel lavoro di squadra e in ruoli di comando mi permetteranno di lavorare serenamente e proficuamente con la Vostra squadra.

Attendo di discutere la mansione in dettaglio; apprezzerai di avere l'opportunità di incontrarLa di persona o via web, secondo quanto per Lei è più comodo.

Grazie per l'attenzione,
Cordiali saluti,
Elizabeth I. Sheen

Pages 290-291

12.

1. one; 2. candidate; 3. company; 4. interest; 5. panel; 6. unreliability; 7. phone; 8. pre-screening; 9. eye; 10. positive; 11. skills; 12. salary; 13. duties; 14. eccentric.

13.

1. e; 2. a; 3. d; 4. c; 5. f; 6. b.

14. ▶ Job Interview: I Have Problems (ESL)

posted by ESLLearning

Susan: Sarah? Hello, I'm Susan Thompson, Resources Manager here.

Sarah: Hi.

Susan: Have a seat. Uh, Sarah, tell me about yourself.

Sarah: Um, well, my baby doesn't sleep at night,

and my dad's been really sick, and he needs my help a lot.

Susan: I see. Erm, did you bring a résumé with you?

Sarah: No, I put everything on the application.

Susan: Okay, erm, I don't see any work experience here. What kind of work experience do you have?

Sarah: I haven't had a job.

Susan: Ok. Do you have anyone who could give you a reference?

Sarah: Erm... Hi. At 7. The party's at 7. Um, yeah. I'll bring the chips. Okay. Bye. What did you say?

Susan: I said, do you have any references?

Sarah: What's a reference?

Susan: A person who can tell us whether or not you're a good worker.

Sarah: Erm, no.

Susan: Okay, do you have any questions for me?

Sarah: Erm, no.

Susan: Okay, um, why should I hire you, Sarah?

Sarah: Well, because I really need the money. I have a lot of problems and I really need a job.

Susan: I have a lot of problems, too and I don't need any more. Nice to meet you.

Sarah: Can I have the job? How much does it pay?

Susan: Oh, I don't think you're the right person for the job. Good luck.

Sample answers

- She continues to look at her mobile when the interviewer calls her into the room.
- She does not greet the interviewer properly.
- She talks about her family problems.
- Sarah does not keep eye contact with the interviewer and never smiles.
- She has not brought a CV with her.
- She has not prepared any questions to ask about the company or the job.
- She asks if she will be hired and about the salary and she is not wearing appropriate clothes for an interview.
- She answers a personal call during the interview and then asks the interviewer to repeat a question in a rather impolite way.
- She does not sit up straight while in front of the interviewer and sometimes she even bites her nails.

Page 292

VOCABULARY

15.

1. to hire; 2. staff; 3. job fair; 4. recruiter; 5. applicants; 6. problem solving; 7. panel interview; 8. interpersonal skills; 9. graduates.

16.

1. retired; 2. board; 3. advertisement; 4. education; 5. curriculum vitae; 6. leadership; 7. hard skills; 8. cover letter; 9. soft skills; 10. group interview.

Unit 6.2**A new job****Pages 294-295****1.**

1. permanent; 2. seasonal; 3. duration; 4. task; 5. full; 6. part; 7. freelance; 8. agency; 9. unpaid; 10. skills; 11. stage; 12. profession; 13. practitioners; 14. on-demand; 15. work; 16. contractors.

2.

1. agency work contract; 2. internship agreement; 3. part-time contract; 4. freelance contract; 5. full-time contract; 6. fixed-term contract; 7. apprentice agreement; 8. temporary contract.

3.

Personal answers

Pages 296-297**4.**

1. organisational; 2. hierarchical; 3. delegate; 4. supervisor; 5. functional; 6. departments; 7. divisions; 8. employee; 9. how; 10. position; 11. salary; 12. fringe; 13. perks; 14. holiday; 15. cash; 16. time off.

5.

Sample answers

1. A departmental organisational structure is the way in which a company delegates specific tasks and responsibilities to its employees; 2. A functional structure creates a network of departments in a business; 3. Remuneration is the total compensation an employee gets for their work, including bonuses and benefits; 4. A worker must know what the organisational structure of a company is and what their position in it is; 5. A commission is paid to workers who have met particular targets; 6. Workers can be encouraged to meet certain goals thanks to cash incentives.

6.

1. b; 2. e; 3. f; 4. c; 5. a; 6. d.

Pages 298-299**7.**

1. discipline; 2. employee; 3. organisation; 4. task; 5. improper; 6. schedules; 7. disciplined; 8. respecting; 9. team; 10. quality; 11. workplace; 12. lead; 13. workshops; 14. feedback; 15. building.

8.

1. e; 2. f; 3. c; 4. d; 5. a; 6. g; 7. h; 8. b.

9.

1. Good; 2. Bad; 3. Bad; 4. Good.

Page 300**VOCABULARY****10.**

1. schedule; 2. team building; 3. organisational structure; 4. team workshop; 5. part-time contract; 6. apprenticeship.

11.

1. part-time; 2. stage; 3. salary; 4. seasonal; 5. team; 6. schedule; 7. insurance; 8. allowance; 9. full-time; 10. incentive; 11. internship; 12. benefits.

Unit 6.3**Safety and security****Pages 302-303**

Look up a definition of "Personal Protective Equipment" on the Internet.

Personal Protective Equipment can be defined as an instrument that protects the user against health or safety risks at work.

How many safety signs can you see every day and where do you see them?

Personal answer

1.

1. machines; 2. chemicals; 3. Protective; 4. hard; 5. goggles; 6. boots; 7. conditions; 8. off; 9. instructions; 10. forklift; 11. labelled; 12. prohibition; 13. obligation; 14. warning; 15. directions; 16. emergency; 17. fire.

2.

1. c; 2. h; 3. f; 4. e; 5. b; 6. g; 7. a; 8. j; 9. d; 10. i.

3.

Sample answers

1. Do not cross the railway lines; do not stand beyond the yellow line when a train is coming; use the subway to move from one platform to another; wait for the train to stop before getting on or off; do not clutter the platform with your luggage; 2. Do not push people in front of you;

let passengers out of the train before you get on; do not try to get on/off the train when it is moving; do not run down the stairs; keep right on the escalator; 3. Pay attention to cars moving; do not touch an engine if it is still hot; wear a hard hat if you walk under a suspended load; if you move a car, make sure no one is walking around; before starting working on a motor vehicle, make sure the engine is turned off; 4. Pay attention to nails or screws on the floor and wear safety boots; always wear a hard hat when walking near suspended loads; tighten yourself with a rope if you have to climb up a building; do not lift heavy loads alone; do not try to enter a building area which is delimited.

Pages 304-305

What is the number to call for emergency in your country?

In Italy, there is one only number, 112, for all the emergency services such as ambulances, the Police or the fire brigade.

4.

1. leave; 2. low; 3. mouth; 4. cloth; 5. ring; 6. procedure; 7. exit; 8. extinguisher; 9. powder; 10. casualty; 11. power; 12. insulating; 13. switch; 14. company; 15. smock; 16. drink; 17. alone; 18. insulating; 19. chemicals.

5. 139

Teacher's note

Preliminary activity

Students will hear some words that they probably don't know. Pre-teach the following words asking students to guess their meaning from the sentences provided or to match them with their Italian equivalents:

1. Fireproof: *a prova di incendio* – Emergency exits are usually fireproof doors.
2. To spread: *diffondersi* – The smell of smoke spread rapidly in the building.
3. Overcome: *sopraffatto* – They were overcome by the smoke, and they could not breathe anymore.
4. To chew: *masticare* – Chewing gum is bad for your teeth.
5. Heater: *stufa elettrica* – It is very cold in this room, let's turn the heater on.
6. Fall over: *cadere* – The glass fell over and broke into pieces.
7. Lighter: *accendino* – My dad uses lighters to light cigarettes.

..... Safety at Home: How to Prevent Fire in a House

A great part of your safety may depend on how much you know about fire prevention. Here are some ways in which you can make your home a "fireproof" one.

1. Have smoke alarms installed. Fires often occur at night when you're asleep and spread so rapidly that some people are overcome by fumes before they even wake up. Smoke alarms will give you early warning and save lives.

2. Have fire extinguishers. You should have one in every room, especially if you have a fireplace. Don't forget the garage and attic, places where people keep old clothes and lots of combustible things.

3. Regularly monitor electrical machinery and appliances. Electrical fires can be very dangerous, so look out for damaged wires, especially if you have pets in the home. Some pets, like cats or rabbits, might chew the wires and do a lot of damage.

4. Be careful while cooking. If you're frying or grilling food, stay in the kitchen, because fires can spread very rapidly. Don't cook if you're sleepy or if you've been drinking alcohol. A microwave oven is safer, but fires are still a risk.

5. Monitor and maintain appliances. Portable heaters are very useful, but be certain to put anything that can burn at least one metre away in every direction. Get a portable heater that automatically turns off if it falls over.

6. Keep children away from fire. Kids are always curious about fire and flames. Teach them that fire is not a game. Establish a few rules, like staying one metre away from cookers and fireplaces, not using matches, lighters, or lighted candles, except under your direct supervision.

Adapted from: <https://www.doomandbloom.net/8-ways-to-prevent-fires/>

.....
1. at night; 2. save your life; 3. fire extinguisher, garage; 4. kitchen; 5. microwave oven; 6. toy, rules.

6.

Sample answer

1. Look over the area of the incident carefully;
2. Call emergency services;
3. Turn off the current;
4. Separate the casualty from the source.

Pages 306-307

7.

1. falling; 2. cables; 3. ladders; 4. posture; 5. ergonomic; 6. filtering; 7. workers'; 8. procedures; 9. shortcuts; 10. rested; 11. sober; 12. concentration; 13. long; 14. breaks.

8.

1. to trip/tripping; 2. ladder; 3. ergonomic; 4. indoor; 5. air filtering; 6. flammable; 7. break; 8. tiredness.

Teacher’s note

In the video some idiomatic expressions are present, but they ironically refer to what happens to the clerk. Pre-teach them to your students, together with some words.

- Don’t get tied up at work: don’t get too busy (it refers to the clerk’s feet, which are tied up in the cables on the floor).
- Don’t be blind-sided: to be blind-sided means to be surprised or shocked in a very unpleasant way; in the video, it refers to the clerk “blinded” by the computer light.
- Don’t let the work snowball: do not let work problems grow bigger and more important; in the video, a pile of files and boxes falls on the clerk like a snowball.
- Don’t bend over backwards: this means to work very hard to accomplish something; in the video, it refers to the clerk’s bad posture.
- MSD is the acronym of Musculoskeletal Disorders.
- Clutter: *ingombro*
- To bundle up: *raggruppare*

▶ Office Safety 101 posted by NTUC Singapore

Office Edition – A Survival Guide

Don’t get tied up at work; do keep corridors clear of clutter and bundle up cables properly.

Don’t be blind-sided; do give your eyes a break from the screen.

Don’t let the work snowball; do store things properly, do use a step ladder to retrieve objects from high shelves.

Don’t bend over backwards. Neck, shoulder, and back pains are common among office workers; MSD affects more females than males. Do ensure that you can comfortably work at your desk; do sit upright and adopt good posture while working; do stand up, stretch, and walk around when tired.

Together we can make our workplace a safe place. Every worker returns home safe and sound at the end of every workday.

.....
The sentences which correspond to the video are numbers 1, 4, 6, 8.

2. Corridors must be kept clear of clutter; 3. Use a ladder to get things from high shelves; 5. Give your eyes breaks from the screen; 7. Female workers suffer from MSD more than males.

Do you know that you can delete cookies from your favourite browser? Search the Internet to find out how.

To delete cookies from one of the most commonly used browsers, Google Chrome, follow this procedure: open Google Chrome, click the three-dot icon at the top-right corner of the window; move your cursor over ‘More tools’ and click ‘Clear browsing data’. Finally, check the box for ‘Cookies and other site data’ and click the ‘Time Range’ box to choose how much data you want to clear.

10.

1. Regulation; 2. 2018; 3. EU; 4. based; 5. rights; 6. deleted; 7. authority; 8. penalty; 9. cookies; 10. improve; 11. memorise; 12. profile; 13. easy; 14. capital; 15. characters; 16. log.

11. ▶ 142

Data Protection across Europe

Michael from Germany: *I bought two tickets online to see my favourite band play in a live concert. After buying the tickets, I started receiving emails with adverts for concerts and events that I wasn’t interested in. I contacted the online ticketing company and asked them to stop sending me these advertising emails. The company immediately removed me from their direct marketing lists. So, it is possible to object to your data being used for direct marketing.*

Teresa from Italy: *Recently, I subscribed to my local supermarket’s loyalty scheme. After joining the scheme, I started receiving discount vouchers for my shopping. I wondered if this was related to the loyalty scheme, so I asked the supermarket’s data protection officer which information was being stored about me and how it was being used. I discovered that the supermarket kept data on the products I bought every week and then was able to give me discounts related to the specific products I liked to buy. Remember: you have a right to know what data is stored about you.*

Sean from Ireland: *I decided I no longer wanted to use any social media, so I deleted my profile from the social media sites I was using. However, a few weeks later, I found out my old profile photos from my social media accounts were still visible. I contacted the social media companies and asked them to ensure that these photos were removed. When I searched a month later, the photos had indeed been removed.*

So, what I want to tell you is that it is possible to ask for your personal data to be deleted and removed from websites at any moment.

Adapted from: https://europa.eu/youreurope/citizens/consumers/internet-telecoms/data-protection-online-privacy/index_en.htm

.....
1. F, They sent e-mails advertising concerts; 2. T; 3. F, Everyone has the right to object to direct marketing; 4. T; 5. F, The supermarket keeps data on the products she buys every week; 6. T; 7. T; 8. F, A few weeks after the deletion his pictures were still visible.

12.

1. The GDPR (General Data Protection Regulation) is a set of rules enacted by the EU to regulate personal data processing by companies and organisations; 2. It was enacted in 2018; 3. It concerns companies based or working in the EU; 4. People can ask for their data deletion when it is no longer needed or has been misused; 5. A data breach is an unauthorised access or misuse of private data; 6. Cookies are short text files stored in the memory of a device when surfing websites; 7. Cookies are used to store information about people's searches on the Internet; 8. Cookies can be a menace to people's privacy when the information collected is employed in order to create a profile of the users and to send or show them advertising material, pop-ups, and so on.

Page 310

VOCABULARY

13.

1. online services; 2. fire extinguisher; 3. hard hat; 4. fire brigade; 5. social media; 6. safety goggles; 7. safety boots; 8. obligation sign; 9. password.

14.

1. emergency; 2. evacuation procedure; 3. fire alarm; 4. appliances; 5. safety goggles, safety gloves; 6. safety; 7. premises; 8. breach; 9. characters; 10. deleted.

Unit 6.4 Working essentials

Pages 312-313

Can you think of other forms of oral business communication?

Emails, video conferencing, voice mails, podcasts.

1.

1. introduce; 2. available; 3. appointment; 4. call; 5. message; 6. understood; 7. summarise; 8. thanking; 9. polite; 10. do; 11. caller; 12. person; 13. ask; 14. leave.

2.

1. I should try to sound smiling and professional because our voices make an impression on the person we are talking to; 2. I should make sure the person has understood the message and summarise the main points of the conversation; 3. I should end the call by thanking the listener and wishing them a good day; 4. Could I put you on hold for a moment?; 5. I'm sorry/afraid you've dialled the wrong number; 6. I'm afraid (Name) is not available at the moment.

3. 144

.....
Mr Smith: Hello, Richmond's Ltd, this is Peter Smith speaking. How may I be of help to you today?

Ms Anderson: Yes, this is Ms Janice Anderson calling from Hewlett Packard. May I speak to Mr Franks, please?

Mr S: I'm afraid Mr Franks is out of the office at the moment. Would you like me to take a message?

Ms A: Erm... well, actually, this call is rather urgent. We spoke yesterday about a delivery problem that Mr Franks mentioned. Did he leave any information for me?

Mr S: As a matter of fact, he did. He said that a representative from your company might be calling. He told me to inform you that we still haven't received the shipment of monitors that was supposed to arrive last Tuesday.

Ms A: Yes, I'm terribly sorry about that. In the meantime, I've spoken with our delivery department and they assured me that the monitors will be delivered by tomorrow morning.

Mr S: Excellent, I'm sure Mr Franks will be pleased to hear that.

Ms A: Yes, the shipment was delayed from France. We weren't able to send it along until this morning.

Mr S: I see. Mr Franks also wanted to schedule a meeting with you this week.

Ms A: Certainly, what about Thursday afternoon?

Mr S: I'm afraid he's meeting some clients out of town. How about Thursday morning?

Ms A: Unfortunately, I'm seeing someone else on Thursday morning. Is he free on Friday morning?

Mr S: Yes, it looks as if he's free then.

Ms A: Good, should I come by at 9?

Mr S: Well, he usually holds a staff meeting at 9. It only lasts a half-hour or so. How about 10?

Ms A: Yes, 10 would be fine.

Mr S: OK, I'll schedule that. Ms Anderson at 10, Friday morning... Is there anything else I can help you with?

Ms A: No, I think that's everything. Thank you for your help... Have a nice day.

Mr S: Goodbye.

Adapted from: <https://www.thoughtco.com/telephone-conversations-1210222>

.....
1. Richmond's Ltd; 2. Mr Peter Smith; 3. Hewlett Packard; 4. Ms Janice Anderson; 5. Mr Franks; 6. They still haven't received the shipment of monitors that was supposed to arrive last Tuesday; 7. Friday morning; 8. 10 am.

4.
1. to answer; 2. to hold (the line); 3. available; 4. to check; 5. appointment; 6. message; 7. role; 8. to introduce oneself; 9. to look for; 10. to dial.

Pages 314-315

Look up the difference between *Yours faithfully* and *Yours sincerely*.

Yours sincerely is used if the email is addressed to a specific individual (e.g. Dear Ms Smith), *yours faithfully* is used when it is addressed to a generic individual (e.g. Dear Sir).

5.
1. style; 2. brief; 3. reply; 4. paragraphs; 5. blank; 6. information; 7. subject; 8. concise; 9. pleasantries; 10. thanks; 11. direct; 12. closing; 13. greeting; 14. role.

6.
1. T; 2. T; 3. F, The final salutation should be coherent to the opening salutation; 4. F, In the first email the opening line should be a pleasantries; 5. T; 6. T; 7. F, They should be written in the main body of the email; 8. T.

7.
1. d; 2. b; 3. f; 4. a; 5. e; 6. c.

8.
Sample answer
Dear Mr Summer,

Thank you for your prompt reply.

I would be glad to meet you at your office on 13th March at 10 o'clock. I would appreciate it if you could send me a copy of the marketing plan before the appointment.

Best regards,

Jason Clark
Marketing manager

Pages 316-317

9.
1. address; 2. initials; 3. line; 4. underlined; 5. salutation; 6. content; 7. text; 8. opening; 9. hand; 10. documents.

10.
Starting: 1
Making a request: 2, 6, 8, 10
Referring to a previous contact: 4, 7
Complaining: 9
Giving good news: 3
Giving bad news: 5
Waiting for a reply/future contacts: 12
Offering assistance: 11

11.
Sample answer

WILSON HI-TECH LTD.
1470, Jefferson Avenue
94016 San Francisco, Ca, USA
Telephone +1-415-5232248
Fax +1-415-5232275
E-mail info@wilsonhitech.com

AB

23rd November, 20..

ATTN: Mr William Parker
Startroopers
3526, Wittson Street
12540 San Francisco, Ca

Dear Mr Parker,

COMPLAINT

Thank you for your call.

Unfortunately, we have not received the batch of headsets we ordered on September, 12th. We are disappointed with the delay. For this reason, I would be glad to arrange an appointment with the logistics manager as soon as possible. Please let me know when would be best for him.

Sincerely yours,
Allison Bergson
Ms Allison Bergson
Buyer manager

Pages 318-319

Do you know any presentation software?
Microsoft PowerPoint, Google Slides, Canva.

What is a rhetorical question? Give a definition and an example.

A rhetorical question is a question asked to make a point, rather than get an answer.

12.

1. impression; 2. engaging; 3. decisions; 4. points; 5. body; 6. explanations; 7. summary; 8. FAQs; 9. slides; 10. fonts; 11. software; 12. rhetorical; 13. style; 14. expressive.

13.

1. tools and software; 2. the listener's decisions; 3. unnecessary information; 4. is the message; 5. list of FAQs; 6. rhetorical questions.

14. How to start a pitch or presentation posted by Dominic Colenso

.....
Hi! I'm Dominic Colenso and in this video I want to talk to you about how to start your pitch or presentation. They say it takes about seven seconds to make a first impression, and that does not mean to say that if you do things wrong, if you kinda mess things up you can't get it back, but what if does give us is a very clear window of opportunity to get our audience engaged, on site and listening to what we have to say. So, the kind of most important thing to think about is not to be boring. Now what do I mean by that? I mean don't do what everyone else does, I've sat through so many presentations where I've listened to someone say "Good afternoon everybody" or "Good evening everybody" or "Good morning everybody" my name is Dominic, I am from Inflow Training and I am here today to talk to you about... Well, if you are here today to talk to me about it, then just talk to me about it, get on with it, get in there and tell me the interesting stuff that's gonna get my attention. So what I'd recommend you do is this: I'd recommend that you start with a bang! I'd recommend that you do something a little bit different, I don't mean do anything crazy or, you know, pull a big stand, what I do mean is start instead of all that preamble, that good morning, good afternoon, start with a fact, with a figure, with a quote, with a story, maybe a bit of video or a bit of music, something that's gonna grab the audience's attention and really get them engaged, and what we don't want them doing and this is what I see in so many speeches and presentations is while the speaker is starting to speak, the audience are spending the first couple of minutes just finishing their emails or text messages on their smartphones. What we want people to do is to realise that you started and to start paying attention to what it is you

are talking about. So, as far as I am concerned that's the secret to starting your pitch or your presentation is to start with a bang, grab your audience's attention, dispense with all the niceties and get them to engage with what you're saying straight away. I hope you've enjoyed the video, I would love to hear your comments, leave them in the comments box below or tweet me @ dominiccolenso and if you are watching this video anywhere else but the website dominiccolenso.com, get yourself over there, that's where all the good stuff is. Until the next time, keep shining.

-
1. Seven seconds; 2. Not to be boring; 3. With a bang; 4. It means to grab the audience's attention and really get them to engage; 5. They use their smartphones; 6. We want them to start paying attention to what we are saying.

15.

Personal answer

Pages 320-321

16.

1. represents/shows/describes; 2. period; 3. trends; 4. decrease; 5. required; 6. data.

17.

- a: 2, 8; b: 1, 6, 10; c: 4, 5, 7; d. 3, 9.

Pages 322-323

18.

1. information; 2. procedures; 3. urgency; 4. causes; 5. solutions; 6. evaluate; 7. feasibility; 8. plan; 9. intelligence; 10. description; 11. ideas; 12. reasoning; 13. steps; 14. cons.

19.

1. What is problem-solving in business?; 2. What is a problem in business?; 3. How should an operator prioritise a problem?; 4. How can the details of a problem be identified?; 5. How should an operator evaluate the possible solutions?; 6. What does a quick research method for simple problems consist of?; 7. What does creative brainstorming mean?; 8. What evaluations should be made to get a firm decision about the solution of a problem?

20. 150

Logic is the Key

In my current marketing role, my manager asked me to come up with a solution to our declining social media engagement. I assessed our current strategy and recent results, analysed what some of our top competitors were doing, and then came up with an exact project we could

follow this year to emulate our best competitors but also stand out and develop a unique voice as a brand. I feel this is a good example of using logic to solve a problem because it was based on analysis and observation of competitors, rather than guessing or quickly reacting to the situation without reliable data. I always use logic and data to solve problems when possible. The project turned out to be a success and we increased our social media engagement by an average of 82% by the end of the year.

Adapted from: <https://careersidekick.com/problem-solving-examples/>

.....
 1. marketing; 2. social media; 3. results; 4. competitors; 5. project; 6. brand; 7. logic; 8. analysis; 9. data; 10. success.

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VOCABULARY

21.

1. bar chart; 2. presentation; 3. pie chart; 4. line diagram; 5. business letter; 6. brainstorming.

22.

Sample answers

1. I'm sorry but Mr Taylor is in a meeting at the moment. Could you leave a message?; 2. I'm afraid you've dialled the wrong number, there is no one with that name here; 3. Dear Ms Wilson, it was a pleasure to meet you at the fair. I would be glad to arrange an appointment with you next week; 4. I hope you'll find our new products interesting, do not hesitate to contact us for further information; 5. The graph shows the decline of prices in the last year; 6. There was a steady increase of productivity from 2019 to 2021.

23.

1. d; 2. a; 3. g; 4. b; 5. f; 6. e; 7. c; 8. h.

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REAL-LIFE SKILLS

1.

Order: 3, 4, 2, 1

First of all, you start looking for a job in newspapers' job ads. Then, you write your CV and send it to the company whose job you are interested in. After that, you fill in an application form. Finally, you may get an interview.

2.

Appropriate	Not appropriate
2, 4, 6, 7, 10	1, 3, 5, 8, 9

3.

Sample questions

1. Why have you applied for this job?; 2. What do you know about our company?; 3. What do you think about working in a team?; 4. Which of your personal qualities do you think the company could benefit from?; 5. What are your strengths?; 6. What do you think you could bring to the job?; 7. Do you speak any foreign languages?; 8. Have you got any questions for us?

Personal answers

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CASE STUDY

4.

1. was banned by; 2. was strongly recommended; 3. to uninstall the app; 4. to the Commission online; 5. the USA government; 6. Chinese company/ Beijing-based company; 7. cybersecurity; 8. France, and the UK; 9. would respect the; 10. the use of TikTok.

Pages 328-329

CLIP The Devil Wears Prada

5.

1. c; 2. g; 3. e; 4. b; 5. a; 6. h; 7. f; 8. d.

6.

Sample answers

When she met Miranda for the first time, I think Andy was polite, because she had to do a job interview and wanted to give a good image of herself. I think she was nervous, because she really wanted that job. I think she was embarrassed because she had not heard about Miranda before. I think she was self-confident because she had been a newspaper director and won a prize as a journalist.

7. ▶

.....
 Emily: She wants to see you... Go, go, go....

Andy: She does?

E: Move. This is foul. Don't let her see it.

A: That's my...

E: Go.

Miranda: Who are you?

A: My name is Andy Sachs. I recently graduated from Northwestern University.

M: And what are you doing here?

A: Well, I think I could do a good job as your assistant and... I came to New York to be a journalist and sent letters to everyone and finally

got a call from Elias-Clarke and met with Sherry up at Human Resources and basically, it's this or Auto Universe.

M: So, you don't read Runway?

A: No.

M: And before today, you'd never heard of me?

A: No.

M: And you have no style or sense of fashion.

A: Well, I think that depends on what you're...

M: No, no. That wasn't a question.

A: I was Editor in Chief at The Daily Northwestern. I also won a national competition for college journalists with a series on the janitor's union which exposed the exploitation of ...

M: That's all.

A: Yeah, you know, ok. You're right. I don't fit in here. I'm not skinny or glamorous and I don't know that much about fashion, but I'm smart, I learn fast and I will work very hard.

.....
a. M; b. A; c. M; d. A; e. M; f. A; g. A; h. M; i. A; j. M; k. M; l. A; m. M; n. A.

8.

a. 15; b. 1; c. 8; d. 10; e. 6; f. 5; g. 13; h. 12; i. 14; j. 11; k. 2; l. 16; m. 4; n. 7. Extra: 3, 9.

9.

1. She did not get information about the company before the interview; 2. She did not dress in an appropriate way for the interview; 3. She did not show herself to be the right person for the job; 4. She told the truth.

Sample answers

1. You should get information about the company, to show interest; 2. You must dress in an appropriate way because this means that you give importance to the interview; 3. You should show that you are the right person for the job because an interview is a great opportunity to be hired; 4. You must always tell the truth, because if the company finds out you lied, you could be fired.

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CITIZENSHIP

10.

1. F, It spread in Europe in 2020; 2. T; 3. T; 4. F, Employers had to provide workers with masks; 5. T; 6. T;

11.

Sample answers

Frequent air changing is a good way to limit the spread of viruses in classrooms, together with hand sanitation. To cover one's mouth and nose with a tissue when sneezing or coughing is another way of contrasting the spread of respiratory viruses. Social distancing and wearing masks would also be useful, but masks are uncomfortable to wear and social distancing among classmates does not allow socialising and makes it difficult to do group or pair work.

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