UNIT 1

EAT HEALTHY, STAY HEALTHY

A. HEALTHY EATING

1 *Tick the "food facts" you think make scientific sense.*

- ☐ "Fish is good for the brain", because it contains phosphorous which is supposed to improve memory.
- ☐ "Take vitamin C and it will prevent you from catching a cold".
- ☐ "Eat fruit between meals and not at meals".
- ☐ "Eat fruit with the peel on", because the peel is supposed to contain the greatest amounts of vitamins.
- ☐ "Cane sugar and honey are better for you than 'white poison' or refined sugar".
- ☐ "Eating red meat preferably only lightly cooked 'makes' red blood".
- ☐ "Lemon juice disinfects raw shellfish".
- ☐ "Yoghurt is a panacea".

FOOD AND HEALTH

A healthy balanced diet can be achieved by eating sufficient amounts of each of the following types of nutrients: protein, fat, carbohydrate, fibre, vitamins, minerals and water.

Protein is needed to build new body cells. Children and teenagers require protein so that they can grow. Adults need protein because it is used to repair and replace cells. Without protein we would not be able to replace cells like red blood cells that have a limited life. Cells that have worn out or are damaged could not be replaced. Our bodies are constructed from thousands of different proteins, each with a different job to do. Some proteins form an important part of the body's structure. For example, keratin is a tough hardwearing protein that makes up our skin, hair and nails. Other proteins called enzymes control the chemical reactions in our cells.

Fat provides a concentrated source of energy which can be stored easily in the body. We have special fat storage cells that form a layer beneath the skin surface. The subcutaneous fat is particularly useful in cold climates. A fat layer also surrounds certain organs such as kidneys and eyeballs. It cushions them against severe knocks and reduces the chance of damage. Fat is needed to build new cell membranes. Finally we need a certain amount of fat to provide us with the fat soluble vitamins A and D. There are two types of fat: saturated and unsaturated. Unsaturated fats contain a lot of double bonds in their chemical structure which make them more reactive. Many scientists believe that saturated fat (which does not have double bonds) is the main culprit in the diet responsible for heart disease. Red meat, cheese, butter and cream have large quantities of saturated fat. It seems that if we reduced our intake of saturated fat and switched to unsaturated fat, we could improve our health.

Carbohydrates include two very different food types: sugar and starch. Sugar has a limited value in the diet and can cause health problems. Starchy foods, sometimes called complex carbohydrates, such as rice, bread, pasta and potatoes, are important in the diet because they ▶

can provide a good source of fibre. Carbohydrates give us energy. Starchy foods are preferable to sugars as an energy source. Sugary foods such as sweets, cakes and jams can easily stick between the teeth. Bacteria grow on them and produce acid, causing tooth decay. Someone who includes a lot of sugar in their diet is more likely to be overweight (obese) and suffer health problems as a result.

Fibre is only found in plant food. Food from animals such as meat and dairy produce contains no fibre at all. The fibre in plants forms the tough cellulose cell walls. The highest quantities of fibre are found in the husks of cereal grains and the skin of fruits and vegetables. This is why brown rice and wholemeal flour have a higher amount of fibre than white flour and white rice. Although fibre does not give us energy or nutrients its bulk is very important. It gives the intestine wall muscles something solid to push against. This speeds up the passage of food through the body. Toxic waste products that are sometimes made by certain bacteria in the intestine are removed more rapidly. Fibre is also an important part of a slimming diet. It helps to fill the stomach and prevent hunger pangs without adding calories.

Vitamins are complex chemical substances that our cells cannot make themselves. We have to include them in our diet. They are only needed in tiny quantities but without them many chemical reactions in our cells could not take place. Someone whose diet lacks a particular vitamin will suffer from a deficiency disease. We can make sure that we have enough vitamins by eating a variety of different foods including fresh fruit and vegetables.

Minerals are simple chemicals needed for many of the body's activities. We only need small amounts of them to function properly, as with vitamins.

Water is essential for our survival. We would die within a few days if we did not have water, yet we can survive for several weeks without food. Water forms about 65% of our total mass. Our blood is about 90% water. Water in cells is the solvent that allows vital chemical reactions to take place.

(from Stone-Andrews-Williams, *Examining GCSE – Science*, Stanley Thornes Ltd)

2 *Answer these questions about* Food and health.

a. What nutrients must be present in a healthy diet?
b. What is protein needed for?
c. What is fat used for?
d. What makes unsaturated fat more reactive than saturated fat?
e. What foods contain large quantities of saturated fat?
f. Why should we reduce our intake of saturated fat?
g. Why is it important to include starchy foods in a healthy diet?
h. What is the nutritional value of carbohydrates?
i. Why is it important to eat fibre?
j. Why do we have to include vitamins in our diet?
k. What are minerals needed for?
l. What is the percentage of water in our bodies?

3 *Ask suitable questions to these answers.*

a. Everybody needs it for the building and the replacement of body tissues.
b. It is a protein which makes up our skin, hair and nails.
c. Because it gives the body extra insulation to protect it from freezing temperatures.
d. They include sugars and starch.

e. Because they stick between the teeth where they favour the growth of bacteria.

f. In plant food only.

g. Because it fills the stomach preventing hunger pangs.

h. They are contained mainly in fresh fruit and vegetables.

i. It is the solvent which allows biochemical reactions in our body cells to take place.

4 *Match words in list* A *with words in list* B *into meaningful compounds / pairs to complete the definitions.*

A: balanced, blood, deficiency, eye, hard, heart, hunger, over, red, slimming, subcutaneous, tooth. waste, whole

B: ball, cell, decay, diet (2), disease (2), fat, meal, meat, pangs, products, wearing, weight

a. A ..... is a food regime which includes all the required nutrients in the right proportions.

b. A ..... is a microscopic unit which makes up the red liquid flowing through the body of humans and animals.

c. ..... means 'able to stand much use'.

d. ..... is a greasy substance found under the skin in animal bodies.

e. The ..... is the round part of the eye within the eyelids and socket.

f. ..... is an illness affecting the muscular organ that pumps blood through the body

g. ..... includes beef, lamb and mutton.

h. ..... is colloquial for dental caries.

i. Being ..... means being too fat.

j. ..... is flour made from the whole grain of wheat, including the husks.

k. ..... are refuse.

l. ..... is a food regime followed to lose weight.

m. ..... are sharp feelings of pain caused by lack of food.

n. ..... is an illness caused by a lack of a sufficient quantity of vitamins or other nutrients in the diet.

B. HOW TO READ FOOD LABELS

5 *Read* The Nutrition Facts Label *and put these bits of information in the order they are presented.*

a. ☐ Check calories!
b. ☐ Eat "at least"…!
c. ☐ Eat "less than"…!
d. ☐ Get enough of these nutrients!
e. ☐ Limit these nutrients!
f. ☐ Start here!

THE NUTRITION FACTS LABEL

The information in the main or top section can vary with each food product; it contains product-specific information (serving size, calories, and nutrient information). The bottom contains a footnote with Daily Values (DVs) which provides recommended dietary information for important nutrients, including fats, sodium and fibre.
The first place to start when you look at the Nutrition Facts label is the serving size and the number of servings in the package. Serving sizes are standardized to make it easier to compare similar foods; they are provided in familiar units, such as cups or pieces, followed by the metric amount, e.g. the number of grams. Pay attention to the serving size on the food package since it influences the number of calories
Calories provide a measure of how much energy you get from a serving of this food. Remember that: 40 calories is low, 100 calories is moderate, 400 calories or more is high. Eating too many calories per day is linked to overweight and obesity.
Health experts recommend that you keep your intake of saturated fat, *trans* fat and cholesterol as low as possible as part of a nutritionally balanced diet.
Eating enough of dietary fibre, vitamin A, vitamin C, calcium, and iron can improve your health and help reduce the risk of some diseases and conditions. For example, getting enough calcium may reduce the risk of osteoporosis. Eating a diet high in dietary fibre promotes healthy bowel function. A diet rich in fruits, vegetables, and grain products that contain dietary fibre, particularly soluble fibre, and low in saturated fat and cholesterol may reduce the risk of heart disease. You can use the Nutrition Facts label not only to help limit those nutrients you want to cut back on but also to increase those nutrients you need to consume in greater amounts.
'Upper limit' means it is recommended that you stay below the Daily Value nutrient amounts listed per day. 'Lower limit' means it is recommended that you eat "at least" the indicated amount of that nutrient per day.

6 *Answer these questions about* The Nutrition Facts Label.

a. What does the information in the main section of a food label contain?
b. What information does the footnote usually provide?
c. Why and how are serving sizes standardized?
d. What information do 'calories' provide?
e. What happens if a person eats too many calories?
f. What food substances must be limited in a balanced diet?
g. Can you give some examples of food substances which may reduce the risk of diseases?

C. FOOD PRESERVATION

7 *The guidelines in* The Good Food Handling Guide *below don't make much sense because they have been mismatched. Try to make them meaningful by joining the 'heads' (in capital letters) and 'tails' (in italics) correctly.*

THE GOOD FOOD HANDLING GUIDE	
1. WHEN YOU'VE BOUGHT CHILLED OR FROZEN FOOD	*a. keep them cool.*
2. KEEP HOT FOOD HOT	*b. and cooked food apart.*
3. IN THE FRIDGE STORE RAW MEAT	*c. beyond its 'use by' or 'best before' date.*
4. KEEP RAW FOOD	*d. and cold food cold.*
5. WASH CHOPPING BOARDS, KNIVES AND OTHER EQUIPMENT	*e. in their place.*
6. COOL LEFTOVERS QUICKLY AND	*f. get them home quickly.*
7. DON'T KEEP FOOD	*g. below food that's not going to be cooked before it's eaten.*
8. KEEP ALL FOOD	*h. after they've been used for raw food.*
9. KEEP PETS	*i. covered.*

PREVENTING THE RAVAGES OF TIME

Most foods are natural culture for microorganisms. The diet of modern civilized peoples consists very largely of perishable foods, that is, foods that are susceptible to deterioration by the activities of bacteria, yeasts and moulds. Collectively, these organisms have a wide variety of metabolic activities, and consequently, they affect foods in different ways.

Microorganisms contaminating foods may be saprophytic and non-pathogenic, yet they may cause chemical changes that render the food unfit for human consumption; or they may be pathogenic and cause serious infections or poisoning when eaten. The major foodstuffs are composed of proteins, carbohydrates, and fats, all of which may be regarded as substrates in terms of microbial deterioration of foods. Certain organisms alter or destroy constituents of food by oxidation reaction, for example the vitamin C content of foods can be destroyed by this type of reaction. Plant and animal tissues themselves contain certain enzymes that bring about chemical transformation in the foodstuffs. ▶

Foods can be preserved by a wide variety of methods, some of which date back to antiquity. All methods of food preservation are based upon one or more of the following principles: 1) prevention or removal of contamination, 2) inhibition of microbial growth and metabolism, and 3) destruction of microorganisms.

Heat is widely used to destroy organisms present in food products and to preserve food products in cans, jars, or other types of packages that restrict entrance of microorganisms after processing. Steam under pressure, or autoclaving, is the most effective method, since it can be relied upon to kill all vegetative and spore forms. Successful food preservation by heat requires a thorough knowledge of the heat-resistance of microorganisms, particularly spores.

Some foods are pasteurized, however, since this treatment does not kill all the microorganisms, it may be necessary to store these products at low temperatures.

Boiling of foods kills vegetative cells but cannot be relied upon to destroy spores. At the same time, not all foods can be preserved by high-temperature treatment without impairing their palatability or nutritional value.

Temperatures approaching 0°C and lower impose a static condition upon microorganisms. Frozen foods are now widely used because, when properly processed and stored, they retain the palatability and nutritional properties of natural products. Quick-freeze methods, using temperatures of –32°C or lower, are considered most satisfactory because smaller crystals of ice are formed and cell structures in the food are not disrupted. Before freezing, produce is steamed sufficiently to inactivate natural enzymes that would alter the product even at low temperatures. Freezing of foods, no matter how low the temperature, cannot be relied upon to destroy organisms.

Dried foods have been used for centuries. Removal of water by natural drying in sun and air or with heat applied by artificial methods constitutes dehydration. The growth and multiplication of microorganisms are prevented by the lack of moisture and in some instances by the resulting increase in osmotic pressure. The preservative effect of desiccation is due mainly to a microbe-static condition imposed by lack of moisture but the microorganisms are not necessarily killed. The antimicrobial condition imposed by increased osmotic pressure is related in principle to inhibition by desiccation. Yeasts and moulds are relatively resistant to osmotic changes, but processes of food preservation based on this principle are nevertheless very useful. Jellies and jams are rarely affected by bacterial action because of high sugar content. Condensed milk owes its resistance to microbes in part to increased concentration of lactose and supplemental sucrose. Similar results are obtained by “curing” meats and other foods in brines composed of high concentration of salts.

Foods prepared by fermentation processes owe their preservative quality in part to the lactic acid produced by microorganisms. The smoking of meats imparts a degree of preservation because of the formation of cresols and other compounds which come in contact with the meat surface and penetrate sufficiently to exert a bactericidal effect.

Ultraviolet radiation is used to reduce surface contamination of some foods.

Food may also be preserved by ionizing radiation. The dose of radiation may be adjusted to sterilize or to reduce the microbial population, producing a condition equivalent to pasteurization.

(from: Pelczar-Reid, *Microbiology*, McGraw-Hill)

8 *Join 'heads'* (a-i) *and 'tails'* (1-9) *into a short summary of* Preventing the ravages of time.

a. Most foods we eat are perishable .....
b. Both pathogenic and non-pathogenic microorganisms .....
c. Proteins, carbohydrates and fats .....
d. To be successful in preserving food, heat treatment .....
e. Pasteurization does not kill all microorganisms in food .....
f. Freezing retains the palatability and nutritional value of foods .....
g. Dehydration, that is the removal of water from foods, ...
h. High concentrations of salt and sugar .....
i. Some foods contain chemicals .....

1. ..... arrest the metabolic activities of microorganisms by increasing osmotic pressure.
2. ..... but it does not destroy microorganisms, it just slows their growth down.
3. ..... does not necessarily kill microorganisms but it prevents their growth and multiplication.
4. ..... may make food unfit for human consumption.
5. ..... must kill all bacteria and all spores as well.
6. ..... serve as a good medium for the growth of certain microorganisms in food.
7. ..... that is they may be deteriorated by the activities of bacteria.
8. ..... therefore also pasteurized foods must be stored at low temperatures.
9. ..... which act as preservatives.

9 *Match verbs* a-j *and synonyms* 1-10. *Tip: copy the pairs in your indexed book.*

a. affect	☐	**1.** approximate
b. approach	☐	**2.** avoid
c. bring about	☐	**3.** cause
d. impart	☐	**4.** damage
e. impair	☐	**5.** give
f. prevent	☐	**6.** limit
g. rely	☐	**7.** make
h. render	☐	**8.** modify
i. restrict	☐	**9.** remove
j. withdraw	☐	**10.** trust

D. FOOD ADDITIVES

LOOKS GOOD, TASTES GOOD

Chemicals have been added to food for most of human history to add flavouring or lengthen the time the food could be kept. Sodium chloride (common salt) was one of the earliest additives. When added to meat it would make it last through the winter without spoiling. Nowadays the range of food additives is enormous. It is estimated that 3500 food additives are in use. About 500 of these additives have been given an 'E' number. This shows they have been approved by the EEC.

Some food additives occur naturally, for example the green colouring chlorophyll (E140) is extracted from plant leaves. Most additives are made artificially in the laboratory.

Some chemicals have very little flavour by themselves but will bring out the flavour of foods to which they are added. Monosodium glutamate (MSG: E621) is a flavour enhancer commonly used in Chinese cooking. It is also added to a wide range of processed foods.

The bright colours of many foods such as tinned peas, orange squash and fish fingers are due to special chemical colourings. These additives were originally introduced to improve the appearance of the food. Recently manufacturers have brought out new brands that are free from artificial colouring. This is because many people became worried about possible side-effects.

Certain foods consist of a number of ingredients that do not normally mix, for example oil and vinegar in salad cream. Emulsifiers such as stearyl tartrate (E483) help the two ingredients to mix together. Stabilizers stop them from separating.

Some chemicals are added to many dried foods to slow down oxidation which might alter the substances that give the food its flavour. They therefore stop foods 'going off'. Biscuits have added anti-oxidants so that they can be kept on shop shelves for long periods.

Chemicals are commonly added to food to prevent the growth of microbes. Benzoic acid (E120) is a common preservative. It also occurs naturally in certain foods such as cranberries. This probably explains why they keep so well.

The distinctive flavours in many manufactured foods are produced by artificial flavourings. Caramel (E150) is a flavouring added to foods such as pickled onions, cola drinks, biscuits and scotch eggs. Many artificial flavourings produced by food chemists are copies of natural flavours. For example a 'cheese flavour' biscuit contains no cheese at all. All the flavour is artificial. If the label says 'cheese flavoured' it means that the biscuit does contain some real cheese.

(from Stone-Andrews-Williams, *Examining GCSE – Science*, Stanley Thornes Ltd)

10 *In which order are these food additives dealt with in* Food additives?

- ☐ Antioxidants
- ☐ Colourings
- ☐ Emulsifiers and stabilizers
- ☐ Flavour enhancers
- ☐ Flavourings
- ☐ Preservatives

11 *Answer these questions about* Food additives.

a. What does the "E" in the "E"number of an additive mean? • **b.** What does MSG stand for? What is it used for? • **c.** Why are most artificial colourings no longer used? • **d.** What are emulsifiers used for? • **e.** What are stabilizers used for? • **f.** What is the function of antioxidants? • **g.** Why are chemical preservatives added to food? • **h.** What is the function of artificial flavourings? • **i.** What is the difference between a "… flavour" and a "… flavoured" food?

E. FOOD BIOTECHNOLOGY

ARE FOODS MADE USING BIOTECHNOLOGY SAFE TO EAT?

The short answer is yes. Scientists around the world have conducted multiple studies on genetically modified food and found that the food is just as safe – or perhaps even safer – than food grown with more conventional processes. There are many reasons for this.

The first is that while scientists have been modifying plant genes for years, they usually focus on a few specific genes in order to get a particular result. Plants have tens of thousands of genes. The genetically modified product won't be dramatically different from its natural counterpart. It may have a few features that the natural version doesn't have but otherwise will remain identical.

Some people worry that genetic modification, which introduces genes from one species into an entirely different species, could create new allergens. In fact, it may turn out that the reverse is true. Depending on the food, scientists might be able to remove or inhibit the proteins that act as allergens for some people. This isn't true for every food -- in some cases the protein may be a vital component of the food in question. But genetic modification may make some hypoallergenic foods possible.

Another concern is that some of the genetic markers scientists use could lead to developing bacteria with a built-in resistance to antibiotics. Scientists use antibiotic gene markers to link genes for the desired trait – for example, a higher crop yield – to resistance to a specific antibody. By exposing a modified plant's cells to antibiotics, a scientist can confirm whether or not the genetic modification was successful. But what if that resistance could be passed on to bacteria? It's possible that bacteria in the soil around a plant with antibiotic resistance could pick up the DNA. That bacteria could, in theory, pass this feature to other types of bacteria harmful to humans. So far, however, scientists have been unable to transfer antibiotic resistance genes from plants to bacteria.

It's possible that the foods that come from biotechnology are not only safe to eat, they're actually safer than their natural counterparts. That's because after aggressive testing and analysis, scientists know far more about the genetic composition of modified foods than we do about foods grown in a more traditional fashion. While the controversy around genetically modified food is far from resolved, it appears that you shouldn't worry if the ear of corn you're about to enjoy got its start in a laboratory.

(by Jonathan Strickland - howstuffworks.com)

12 *Among the words underlined in* Are foods made using biotechnology safe to eat? *choose those which complete the descriptions below.*

a. ..... are genes or DNA sequences having a known location on a chromosome.

b. ..... are segments of DNA which are the basic biological units of heredity.

c. ..... are substances that trigger an allergic reaction if inhaled, swallowed or touched.

d. ..... are types of medications that destroy or slow down the growth of microorganisms.

e. ..... is the hereditary material in humans and almost all other organisms.

f. ..... means 'inherent endurance'.

g. A ..... is genetically engineered plant or animal which has had foreign genes inserted into its genetic code.

h. A ..... is not related to the ear that we hear with. It is the top of the corn stalk which holds the seeds.

13 *Match verbs* a-h *with verbs* 1-8 *into pairs of synonyms. Tip: copy the pairs in your indexed book.*

a.	focus	☐	**1.** bother
b.	get	☐	**2.** collect
c.	inhibit	☐	**3.** concentrate
d.	pass on	☐	**4.** eliminate
e.	pick up	☐	**5.** obtain
f.	remove	☐	**6.** prevent
g.	turn out	☐	**7.** result
h.	worry	☐	**8.** transmit

14 *Choose the right meaning of these adverbs as they are used in* Are foods made using biotechnology safe to eat?

a.	dramatically:	**1.** significantly	**2.** theatrically
b.	otherwise:	**1.** apart from that	**2.** if not
c.	so far:	**1.** so distant	**2.** up to now
d.	actually:	**1.** even	**2.** presently
e.	far more:	**1.** more distant	**2.** much more

15 *Match nouns* a-e *with nouns* 1-5 *into pairs of synonyms. Tip: copy the pairs in your indexed book.*

a.	concern	☐	**1.** characteristic
b.	controversy	☐	**2.** debate
c.	counterpart	☐	**3.** equivalent
d.	feature	☐	**4.** opposite
e.	reverse	☐	**5.** worry

16 *Make your point! Which of the concerns mentioned in* Are foods made using biotechnology safe to eat? *do you share, if any? Why? Have you been comforted by what the passage says?*