

A WIDE-RANGING SCIENCE

1 Can you match the branches of chemistry and the subjects they cover before reading the passage A wide-ranging science?

a. General chemistry	<input type="checkbox"/>	1. Application of chemistry to different technologies
b. Inorganic chemistry	<input type="checkbox"/>	2. Application of chemistry to manufacturing processes
c. Organic chemistry	<input type="checkbox"/>	3. Application of mathematics and physics to chemistry
d. Analytical chemistry	<input type="checkbox"/>	4. Chemical processes in living things
e. Physical chemistry	<input type="checkbox"/>	5. Compounds of carbon
f. Nuclear chemistry	<input type="checkbox"/>	6. Compounds excluding those of carbon
g. Industrial chemistry	<input type="checkbox"/>	7. Determination of the composition of substances
h. Applied chemistry	<input type="checkbox"/>	8. Molecules and their transformation
i. Biochemistry	<input type="checkbox"/>	9. Radioactivity, fission and fusion of nuclei

Chemistry is a science concerned with the synthesis, structures, dynamics, properties and transformations of all types of materials – organic, inorganic and biological.

Organic chemistry is a **branch** of chemistry which **embraces** almost all compounds of carbon. Inorganic chemistry is generally considered to involve all substances except hydrocarbons and their derivatives, or all substances that are not compounds of carbon disulphide.

Organic and inorganic chemistry often **overlap**. For example, chemical bonding **applies** to both disciplines, electrochemistry and acid-base reactions have their organic counterparts, catalysts and coordination compounds may be either organic or inorganic.

Analytical chemistry is the subdivision of chemistry concerned with identification of materials (qualitative analysis) and with determination of the percentage composition of mixtures or the constituents of a pure compound (quantitative analysis). The gravimetric and volumetric (or “wet”) methods (precipitation, titration and solvent extraction) are still used for routine work and new titration methods have been introduced. However, faster and more accurate techniques (collectively called instrumental) have been developed in the last decades. Among these are infrared, ultraviolet, and x-ray spectroscopy, colorimetry, chromatography, separation of mixtures in ion exchange columns and radioactive tracer analysis. Optical and electron microscopy, mass spectrometry, microanalysis, Nuclear Magnetic Resonance (NMR) ►

GLOSSARY



to apply: to refer

branch: part

to embrace: to include


to overlap: to coincide

and Nuclear Quadrupole Resonance (NQR) spectroscopy all fall within the area of analytical chemistry. New and highly sophisticated techniques have been introduced in recent years, in many cases **replacing** traditional methods.

Physical chemistry is the application of the concepts and laws of physics to chemical phenomena **in order to** describe in quantitative terms a vast **amount** of qualitative information. **Although** physical chemistry is closely related to both inorganic and organic chemistry, it is considered a separate discipline

Nuclear chemistry is the division of chemistry **dealing with** changes in or transformations of the atomic nucleus. The reactions involving nuclei are usually accompanied by large energy changes that are **carried out** in nuclear reactors for electric power production and **manufacture** of radioactive isotopes for medical use.

Biochemistry is 'the chemistry of life'. It studies the structure and properties of molecules in living organisms and how these molecules are made, changed and broken down.



Organic chemistry is the chemistry of carbon compounds.
Biochemistry is the chemistry of carbon compounds that crawl.

2 Student A: *Using the prompts below, ask questions about the reading passage.* Student B: *answer Student A's questions.*

- a. What / chemistry / be concerned with?
- b. What substances / organic chemistry / study?
- c. What substances / inorganic chemistry / study?
- d. The division between organic and inorganic chemistry / be clearly cut?
- e. What analyses / analytical chemistry / deal with?
- f. What / qualitative analysis and quantitative analysis / consist in?
- g. You / some analytical 'wet methods' / can name?
- h. What / the advantages of instrumental methods over 'wet' methods / be?
- i. You / some instrumental methods / can name?
- j. What two sciences / be involved / in physical chemistry?
- k. What / nuclear chemistry / deal with?
- l. What / biochemistry / study?

GLOSSARY



although: even if

amount: quantity

to carry out: to execute

to deal with (dealt-dealt): to treat

in order to: with the purpose or intention of

manufacture: production

to replace: to substitute