GCSE Grade Booster:
A* Chemistry

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Contents

Experiment Boosters

Argument Boosters

Contents on CD

All of the Boosters are available on the CD.

Editable content

Editable Boosters are included for teachers and students to make their own tasks based on their examination specification. They are:

- Knowledge Booster 5: Create a Knowledge Booster
- Concept Booster 5a: Create a Concept Booster
- Experiment Booster 1a: Explaining Experiments
- Experiment Booster 1b: Explaining Experiments Support Sheet
- Experiment Booster 5: Understanding Graphs and Charts
- Argument Booster 5: Controversial Issues

Rationale

Confidence with the keywords in chemistry is essential to getting at least an A grade. Both the meaning of the word and the spelling of the word are important. Using activities to encourage the use of the keywords, their meaning and their spelling builds that confidence. These activities require the learner to decide on the keyword from the definition, or they can try defining the keywords themselves.

Activities

These activities all aim to engage learners with the keywords and their definitions, encouraging increased familiarity and confidence in these words. In addition, the activities encourage learners to ensure that they can spell these keywords.

Suggested approaches

- Begin with a starter activity to establish current understanding.
- Towards the end of the topic use the activities to consolidate, review or revise.
- Use the activities for independent study in class or as homework.

How to use the self-testers

These are designed so that the answers can be folded back. The learners then write their answers to the first 10 definitions. Stop, fold answers out and check them and their spellings. Give scores out of 10. Concentrate on learning the answers or spellings that were wrong.

At this point, it is best to move on to the next set of definitions. Go through the same process. Later, try the first set again and see if there is an improvement.

When supporting learners with this activity, concentrate on praising the improvement rather than the actual score out of 10.

How to use the diagrams

Labelling and defining the parts of diagrams are skills that will boost knowledge. Learners can be given unlabelled master copies to label or, alternatively, laminate the unlabelled master copies with the answer sheet on the reverse. Learners can use a non-permanent marker to label the diagrams and check answers. Wipe off and try again.

Extension activities

Self-testers

- Reverse the activity: look at the answers and write the definitions.
- Teachers make their own sets of questions or definitions and answers using the exam specification or, even better, learners make their own and swap with others.

Diagrams

Define each part of the diagram.

Students that achieve an A* grade can:

- use a wide range of keywords.
- spell all keywords correctly.
- explain in detail what the keywords mean.

Note: some of these words go beyond some GCSE specifications.

How to use the self-test questions

1 Read through the questions and answers.

2 Fold back the answers.

3 Answer each question by saying the answer and writing it down.

4 Check your answers, then check your spellings.

5 Repeat until you get most of the answers and spellings correct.

Atoms and bonding	Answer
1 The sub particle that orbits the nucleus of an atom.	1 electron
2 A bond that shares electrons between two atoms.	2 covalent bond
3 A bond caused by attraction between two oppositely charged ions.	3 ionic bond
4 The energy levels at which electrons orbit an atomic nucleus.	4 electron shell
5 The sub particle that has no charge.	5 neutron
6 Atoms with the same number of protons but differing numbers of neutrons; different forms of a single element.	6 isotope
7 An atom that has lost or gained electrons.	7 ion
8 The number of protons in a nucleus.	8 atomic number
9 The number of sub particles in a nucleus.	9 atomic mass
10 The sub particle that has a charge of +1.	10 proton

Oil chemistry	Answer
1 The breaking up of polymers.	1 cracking
2 The joining up of monomers.	2 polymerisation
3 The process used to separate crude oil into useful substances.	3 fractional distillation
4 A mixture of hydrocarbons extracted from the Earth.	4 crude oil
5 A hydrocarbon with no double bonds.	5 saturated molecule
6 A hydrocarbon with double bonds.	6 unsaturated molecule
7 The ability to be broken down by sunlight and bacteria.	7 biodegradable
8 Materials that are often made by polymerisation.	8 plastics
9 A single molecular unit that can be joined into a polymer.	9 monomer
10 The solution used to test for alkenes.	10 bromine water

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Chemistry Knowledge Booster 1: Chemicals and Reactions

Reactions	Answer
1 The breakdown of a molecule, often by heat.	1 decomposition
2 A reaction in which a particle gains electrons.	2 reduction
3 A reaction in which a particle loses electrons.	3 oxidation
4 A reaction between an acid and an alkali.	4 neutralisation
5 The reaction between a metal and a more reactive metal compound.	5 displacement
6 The substances that join together in a reaction.	6 reactants
7 The substances that are formed in a reaction.	7 products
8 A substance that increases the rate of reaction without reacting.	8 catalyst
9 Breaking up a substance using electricity.	9 electrolysis
10 A reaction that releases energy.	10 exothermic

Periodic Table	Answer
1 The horizontal rows in the Periodic Table.	1 period
2 The vertical columns in the Periodic Table.	2 group
3 The block of elements that consists of metals between Groups 2 and 3.	3 transition metals
4 Elements that are usually shiny and conduct electricity.	4 metals
5 The group of metals that react with water to form hydroxides.	5 alkali metals
6 The group of inert gases.	6 noble gases
7 The group of elements that exist in all different states, and that form salts.	7 halogens
8 The person responsible for the modern Periodic Table.	8 Mendeleev
9 The number of protons in an element.	9 atomic number
10 The reoccurring pattern of properties in elements in the Periodic Table.	10 periodicity

Chemical tests	Answer
1 Lit splint, squeaky pop.	1 hydrogen
2 Bleaches damp blue litmus paper.	2 chlorine gas
3 Cobalt chloride paper turns pink.	3 water vapour
4 Lime water goes cloudy.	4 carbon dioxide
5 Bromine water turns colourless.	5 alkenes
6 Lilac flame test.	6 potassium
7 Scarlet red flame test.	7 lithium
8 Pale blue precipitate forms with sodium hydroxide.	8 copper ions
9 Gas that turns damp red litmus paper blue.	9 ammonia
10 Sliver nitrate turns pale yellow.	10 iodide ions

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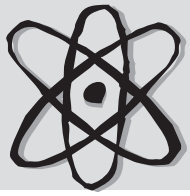

Students that achieve an A* grade can:

- use a wide range of keywords.
- spell all keywords correctly.
- explain simply what the keywords mean.

How to use the self-test questions

1 Read through the questions and answers.

2 Fold back the answers.

3 Answer each question by saying the answer and writing it down.

4 Check your answers, then check your spellings.

5 Repeat until you get most of the answers and spellings correct.

Carbon chemistry	Answer
1 A saturated hydrocarbon.	1 alkane
2 An unsaturated hydrocarbon.	2 alkene
3 Hydrocarbons with an OH group attached.	3 alcohols
4 Used as a perfume or flavour.	4 esters
5 A molecule that repels water.	5 hydrophobic
6 A molecule that attracts water.	6 hydrophilic
7 A substance that breaks up fats and oils.	7 emulsifier
8 Plant oils used to replace petrol.	8 biofuels
9 Plant oils that have been hardened using hydrogen.	9 margarine
10 A chain of C_{60} can form these.	10 nanotubes

Ion formulae	Answer
1 Hydrogen ion.	1 H^+
2 Hydroxide ion.	2 OH^-
3 Oxygen ion.	3 O^{2-}
4 Iron(III) ion.	4 Fe^{3+}
5 Aluminium ion.	5 Al^{3+}
6 Chloride ion.	6 Cl^-
7 Ammonium ion.	7 NH_4^+
8 Magnesium ion.	8 Mg^{2+}
9 Sulphate ion.	9 SO_4^{2-}
10 Carbonate ion.	10 CO_3^{2-}

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Common carbon molecules	Answer
1 Buckminsterfullerene.	1 C_{60}
2 The general formula for alkenes.	2 C_nH_{2n}
3 The general formula for alkanes.	3 C_nH_{2n+2}
4 Methane.	4 CH_4
5 Ethane.	5 C_2H_6
6 Propane.	6 C_3H_8
7 Ethene.	7 C_2H_4
8 Propene.	8 C_3H_6
9 Ethanol.	9 C_2H_5OH
10 Glucose.	10 $C_6H_{12}O_6$

Common compounds and state symbols	Answer
1 Water at room temperature and pressure.	1 H_2O (l)
2 Carbon dioxide at room temperature and pressure.	2 CO_2 (g)
3 Copper oxide at room temperature and pressure.	3 CuO (s)
4 Magnesium oxide at room temperature and pressure.	4 MgO (s)
5 Lithium hydroxide in solution at room temperature and pressure.	5 LiOH (aq)
6 Dilute hydrochloric acid.	6 HCl (aq)
7 Steam.	7 H_2O (g)
8 Hydrogen ions in solution.	8 H^+ (aq)
9 Chloride ions in solution.	9 Cl^- (aq)
10 Ammonia at room temperature and pressure.	10 NH_3 (g)

Common compounds	Answer
1 Sulfuric acid.	1 H_2SO_4
2 Hydrochloric acid.	2 HCl
3 Sodium chloride.	3 NaCl
4 Sodium hydroxide	4 NaOH
5 Ammonia.	5 NH_3
6 Sodium carbonate.	6 Na_2CO_3
7 Sodium hydrogen carbonate.	7 $NaHCO_3$
8 Iron(III) hydroxide.	8 $Fe(OH)_3$
9 Iron(II) nitrate.	9 $Fe(NO_3)_2$
10 Hydrated copper sulfate.	10 $CuSO_4.5H_2O$

FOLD

Students that achieve an A* grade can:

- use a wide range of diagrams.
- explain the difference between similar words and definitions.

How to use the diagrams

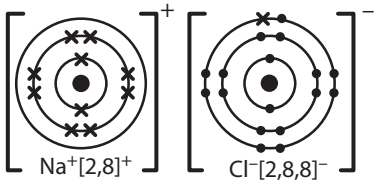
1 Draw the diagrams.

2 Check your answers against the answer sheet.

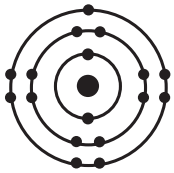
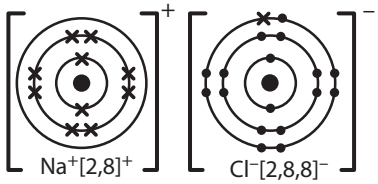
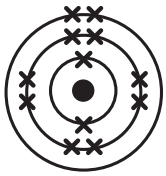
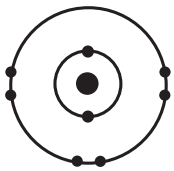
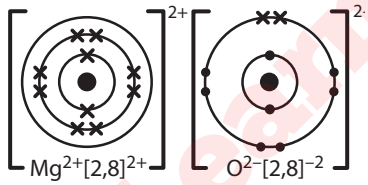
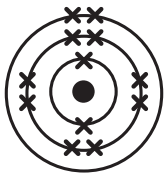
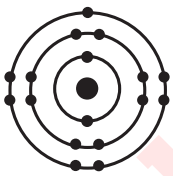
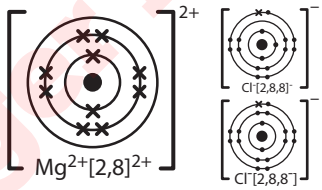
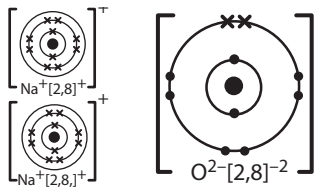
3 Repeat until you feel confident.

Ionic bonding: transferring electrons

Draw dot and cross diagrams for the following ions and ionic compounds. The first example is done for you.

Ionic compound	Metal atom(s)	Non-metal atom(s)	Ionic compound
Sodium chloride	 Na[2,8,1]	 Cl[2,8,7]	 $Na^+[2,8]^+$ $Cl^-[2,8,8]^-$
Magnesium oxide			
Magnesium chloride			
Sodium oxide			

Chemistry Knowledge Booster 3b: Ionic Bonding – Answers

Ionic compound	Metal atom(s)	Non-metal atom(s)	Ionic compound
Sodium chloride	 Na[2,8,1]	 Cl[2,8,7]	 $Na^{+}[2,8]^{+}$ $Cl^{-}[2,8,8]^{-}$
Magnesium oxide	 Mg[2,8,2]	 O[2,6]	 $Mg^{2+}[2,8]^{2+}$ $O^{2-}[2,8]^{-2}$
Magnesium chloride	 Mg[2,8,2]	 Cl[2,8,7]	 $Mg^{2+}[2,8]^{2+}$ $Cl^{-}[2,8,8]^{-}$ $Cl^{-}[2,8,8]^{-}$
Sodium oxide	 Na[2,8,1]	 O[2,6]	 $Na^{+}[2,8]^{+}$ $Na^{+}[2,8,]^{+}$ $O^{2-}[2,8]^{-2}$