Scheme of work

Entry Level Certificate Chemistry – Component 3: Elements, mixtures and compounds

This resource provides guidance for teaching component 3: Elements, mixtures and compounds from our new Entry level certificate science. It is based on the specification (5960).

The scheme of work is designed to be a flexible medium term plan for teaching content and development of the skills that will be assessed.

We have provided it in Word format to help you create your own teaching plan – you can edit and customise it according to your needs. This scheme of work is not exhaustive; it only suggests activities and resources you could find useful in your teaching.

3.3 Component 3 – Chemistry: Elements, mixtures and compounds

Spec ref.	Summary of the specification content	Learning outcomes *What most students should be able to do*	Suggested timing (hours)	Opportunities to develop Scientific Communication skills	Opportunities to develop and apply practical and enquiry skills	Resources
3.3.1 **O1**	Atoms and elements	Recall that all substances are made of atoms. Recall that an atom is the smallest part of an element. Describe the distribution of elements in the periodic table. Recall that elements in the same group of the periodic table have similar properties.	1	Use scientific vocabulary correctly. Periodic Table Bingo. Use AQA Teachit KS4: Periodic tables – for colouring or cut and paste to display metals/non-metals. Use AQA teachit KS3 Elements – what's that word?	Use the interactive site to research common elements: Periodic table videos	What is a polymer? What are atoms? Elements song BBC Bitesize- What is the periodic table? BBC Bitesize - Atoms BBC Bitesize - The periodic table
O2	Elements and compounds	Recall that when atoms combine with different atoms a compound is formed.	1	Write word equations for the reactions in this specification, including the reactions of metals and non-metals and the formation of oxides from non-metals.	Investigate the reaction when magnesium burns in oxygen (air) to produce magnesium oxide.	BBC Bitesize - Compounds

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		Recall that compounds can be made by metals combining with non-metals or by non-metals combining with other non-metals. Recognise simple compounds from their names. Write word equations for simple reactions.			Compare the properties of iron and sulfur with those of iron sulphide.	
3.3.2 **O3**	States of matter	Recall the three states of matter: solid, liquid and gas. Describe the changes between the three states using the terms melting, boiling, condensing and freezing. Explain the three states of matter using a simple particle model.	1	Use scientific vocabulary correctly. Take and record accurate measurements.	Investigate the changes in state from ice to steam.	BBC Bitesize - Changes of state BBC Bitesize - Particle models BBC Bitesize - States of matter activity
O4	Forms (allotropes) of carbon	Recall that diamond and graphite are both forms of carbon.	½	Use scientific vocabulary correctly.	Investigate the properties of graphite as a	

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		Recognise the difference in the structure of diamond and graphite. Explain that the different properties of diamond and graphite depend on the different structures.		Use Molymod structures to construct and describe the different forms of carbon. Research the different uses of graphite and diamond.	lubricant and for writing.	
3.3.3 **O5**	Mixtures	Recall that a mixture contains two or more substances which are not chemically combined. Identify the appropriate method to separate mixtures by filtration, distillation, crystallisation or chromatography.	2	Use scientific vocabulary correctly. Draw and/or label apparatus correctly. Use AQA Teachit KS3: Atoms, elements, compounds *and mixtures quiz* to consolidate O1 – O5	Use filtration to separate an insoluble substance from a mixture. Use distillation to produce pure water from either salt water or eg copper sulfate solution. Use crystallisation to produce a solid from a solution. TDA (Teacher-devised assignment) opportunity: Compare the time needed to filter mixtures of water	BBC Bitesize - Mixtures and compounds BBC Bitesize - Filtration and distillation

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					and calcium carbonate that has different particle sizes.	
O6	Chromatography	Describe how to separate mixtures by chromatography. Recognise that in paper chromatography, a solvent moves through the paper carrying different compounds different distances.	1	Use scientific vocabulary correctly. Measure R_f accurately and record results in an appropriate table.	TDA opportunity: Investigate the different colours in inks or food colours using paper chromatography.	
3.3.4 **O7**	Metals and ores	Recall that unreactive metals are found in the Earth as metals. Recall that most metals are found as compounds that need chemical reactions to extract the metal. Recall that metals less reactive than carbon can be extracted by heating the metal ore with carbon.	2	Use scientific vocabulary correctly. Limestone inquiry role play: Public inquiry resources Write a letter to eg school council to explain why drinks cans should be recycled in school.		BBC Bitesize - Properties and uses of gold BBC Bitesize - Metals

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		Describe an ore as a rock containing enough metal to make it economic to extract it. Recognise that large amounts of rock have to be quarried or mined to get metal ores. Recognise that we can reduce the effects of extracting metals by recycling. Describe some of the social, economic and environmental effects of mining and recycling metals.			Model smelting by extracting copper from malachite or lead from galena using carbon.	
O8	Properties of metals	Recall that metals have giant structures of atoms with strong bonds between the atoms so most metals have high melting points. Recall that metals are: • good conductors of electricity • good conductors of thermal energy.	1	Use scientific vocabulary correctly. Research the MP of common metals and present as a table using correct units.	Research everyday uses of copper and aluminium and relate these to the properties of the metals. TDA opportunity: Compare the properties such as conductivity or	BBC Bitesize - Atomic structure of metals

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		Recognise that the uses of a metal depend on its properties eg copper and aluminium.			density of some metals.	
O9	Alloys	Recall that most metals in everyday use are alloys because the pure metals are too soft for many uses eg iron, gold and aluminium. Recall that an alloy is produced by mixing small amount of other elements with the metal. Recall that steel is an alloy made by mixing carbon and other metals with iron.	1	Produce a poster of the metals and alloys used in our everyday lives.	Investigate the melting points of tin, lead and solder. TDA opportunity: Investigate the hardness of different alloys or steels.	BBC Bitesize - How is steel made

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3.3.5 **O10**		Recall that polymers are made from small molecules called monomers joined together in very long chains. Recognise that the use of polymers are related to their properties. Recall that polymers are not biodegradable (not broken down by microbes). Recognise that there are problems with the disposal of polymers.	1	Use scientific vocabulary correctly: the common names of poly(ethene), poly(propene), polystyrene and PVC are acceptable. Other polymer names are not required. Produce a poster to show modern uses of polymers and the materials they replaced in those roles.	Use Molymod (or paperclips) to model polymer formation from monomers. Research the changes in plastic bag usage in UK since the introduction of the charge. TDA opportunity: Compare the biodegradability of different polymers and other materials.	BBC Bitesize - How are plastics made? What is a polymer?