

(Science Starlings) - (Paper 1 Further Science (Finishing off) and Paper 3 Further Science)

Key Stage/Year	Key Stage 4 / Year 11
Approximate Number of Lessons and Term	10 Lessons plus one lesson for revision, one lesson for the assessment and one lesson for feedback.
Qualification/Exam (if applicable)	Entry Level Certificate in Further Science

Consideration of prior learning	Students have studied Entry Level Science in Year 10 and so should have a good understanding of the basic concepts. However there are large gaps in knowledge of some students due to absence from lessons and some concepts will be entirely new to all students.
How will learners' knowledge, skills and understanding be checked at the start of the unit?	Q&A group discussion on key concepts from Key Stage 3 such as the periodic table being grouped into metals and non-metals; can students recall the structure of an atom, what is an atom, a proton and a neutron?

How will learners' knowledge, skills and understanding be checked at the end of the unit?	Students will have a revision at the end of the topic to assess their understanding of the topic covered. After feedback and revision, students will then sit the entry level certificate in further science.
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Learning Outcome	Approx. No. of Lessons	Potential Activities	Behaviour/Safety/Personal Development/SMSC Opportunities
2A.1 Recall that some elements are classified as alkali metals (group 1), halogens (group 7) or noble gases (group 0), based on their position in the periodic table	1	If we have the chemicals, do a demo of lithium, sodium and potassium in water and introduce the reactivity series and also try to obtain bromine, iodine and chlorine to look at different colours and states at room temperature. Look at properties such as shiny or dull and smooth or hard.	COSHH - we are members of COSHH and have the cupboards to store the chemicals and ensure safe disposal. All students wear goggles and demos to be carried out behind a screen.
2A.2 Recall that alkali metals a are soft b have relatively low melting points		If chemicals cannot be ordered, look at YouTube videos.	
2A.3 Describe the reactions of lithium, sodium and potassium with water		Challenge: write a simple word equation and illustrate what the reactants are and what the products are.	
2A.4 Describe the pattern in reactivity of the alkali metals, lithium, sodium and potassium, with water; and use this pattern to predict the reactivity of other alkali metals			
2A.5 Recall the colours and physical states of chlorine, bromine and iodine at room temperature	1	Demo to test for Chlorine if equipment is available otherwise use YouTube. Simulations from PHeT can also be used.	As above with addition of using the fume cupboard due to risk of chlorine gas.

2A.6 Describe the pattern in the physical properties of the halogens, chlorine, bromine and iodine, and use this pattern to predict the physical properties of other halogens		Challenge: Investigate what the halogens are and how halides are formed.	
2A.7 Describe the chemical test for chlorine			
2A.8 Describe the reactions of the halogens, chlorine, bromine and iodine, with metals to form metal halides, and use this pattern to predict the reactions of other halogens			
2A.9 Explain why the noble gases are chemically inert, compared with the other elements, in terms of the arrangement of their electrons	1	Use of text books and presentations plus PhET simulation.	Risk of small pieces and choking hazard from the kit.
2A.10 Describe how the uses of noble gases depend on their inertness, low density and/or non-flammability		Use the atomic structure kits to illustrate the electron configuration. Challenge: investigate the uses of the noble gases.	
2A.11 Recall that changes in heat energy accompany the following changes: a salts dissolving in water b neutralisation reactions c combustion and that, when these reactions take place,	1	If possible, do demos showing ammonium chloride and water and sodium hydroxide and hydrochloric acid as examples as these are in the textbook. If it is not appropriate then look at reactions via YouTube. Use a worksheet to write simple word equations for each reaction and a definition for an	Follow COSHH rules for storage and disposal of chemicals. Remember to put all demos behind a screen and all students to wear safety goggles.

temperature changes can be measured to reflect the heat changes		endothermic and an exothermic reaction.	
2A.12 Describe an exothermic change or reaction as one in which heat energy is given out		Challenge: identify whether a reaction is endothermic or exothermic by the graph drawn or even calculate the energy involved in the reaction.	
2A.13 Describe an endothermic change or reaction as one in which heat energy is taken in			
2A.14 Explain how reactions occur when particles collide and that rates of reaction are increased when the frequency of collisions is increased	1		Use PHet simulation to show how changes in volume and temperature or concentration affect the pressure of the gas. Define what pressure is using words.
2A.15 Interpret graphs of mass, volume or concentration of reactant or product against time		Challenge: Interpret graphs of mass, volume or concentration of reactant or product against time	
2A.16 Explain the effects on rates of reaction of changes in temperature, concentration, surface area in terms of frequency of collisions between particles			
2A.17 Describe a catalyst as a substance that speeds up the rate of a reaction without altering the products of the reaction, without undergoing a permanent change itself	1	Investigate different types of catalysts and their uses. Explain that we also have catalysts in our body. Emphasis that catalysts are not used up in a reaction.	

2A.18 Recall that enzymes are biological catalysts			
2A.19 Describe the benefits of the conservation of animal species, including: a preserving the natural habitat b increasing biodiversity c promoting wildlife tourism (an economic benefit)	1	Use case studies in books and students can create a poster / mind map illustrating each one. Include a section in fish farming and the importance of indigenous versus non-indigenous species. Challenge: Students can investigate a case study of their own.	
2A.20 Recall the benefits of reforestation, including: a providing a habitat for organisms b increasing biodiversity c reducing the effects of climate change			
2A.21 Describe the importance of the carbon cycle, including: a carbon dioxide entering the atmosphere through respiration or combustion b carbon dioxide leaving the atmosphere through photosynthesis c the role of microorganisms as decomposers	1	Students fill in two diagrams; carbon cycle and nitrogen cycle. This can be done on their own via BBC Bitesize or using presentations from lessons. Worksheets are differentiated.	

Possible Adaptations for Higher and Lower Achievers	See challenges for higher achieving students. Worksheets are all differentiated. Some experiments will be limited to demos due to sensory needs of students. Focus on key word
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	definitions and simple word equations for lower ability students. Use of extra staff during practicals if possible to allow students to access them.
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