



Year 8 Science Curriculum Overview

Rationale: The Year 8 Science curriculum is designed to give students an introduction to Science topics such as; Healthy Living, Electricity and Magnetism, and The Structure of the Earth. In Chemistry, students will continually use their practical skills to investigate different methods of separating mixtures. In Biology, students will explore different ecosystems and how animals interact with each other in the real world. Finally, in Physics students will be encouraged to be open-thinkers to discuss and debate solutions to the current Energy Crisis.

**Science units are taught on a rotation basis between each group*

Term/Length of Time	Outline	Assessment/Teacher Feedback Opportunities	Homework and Literacy resources
<p>Year 8 Biology</p> <p>8B1 10 lessons (including assessment and responding to feedback lessons)</p>	<p>Following on from Year 7, another organ system is studied in greater depth – the digestive system. Links are made to healthy eating and the wider choices around healthy lifestyles. Teaching and learning methods include video clips, animations, dissections, modelling the digestive system, research using the internet and practical investigations into qualitative food tests.</p> <p><u>Knowledge</u></p> <ul style="list-style-type: none"> • content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed • the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases • the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts) • the importance of bacteria in the human digestive system 	<p>8B1 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p>	<p>Homework is set weekly and contains a mixture of simple recall questions often followed with a more detailed application based question(s). All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher per module.</p> <p>Optional homework tasks and Literacy resources:</p> <p>SoL on science shared area, including PowerPoints,</p>

<p>8B2 12 lessons (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> the impact of smoking on the human gas exchange system the effects of recreational drugs (including substance misuse) on behaviour, health and life processes. <p><u>Skills</u></p> <ul style="list-style-type: none"> calculations of energy requirements in a healthy daily diet <p>Moving away from organ systems, students begin to study cellular processes – photosynthesis, and aerobic and anaerobic respiration (conceptually more difficult topics). Students investigate the adaptations of leaves as an organ adapted to carry out photosynthesis. Interdependence of organisms is studied by looking at food webs and chains within ecosystems. Teaching and learning methods include video clips, animations, demonstrations, fieldwork and practical investigations into factors affecting photosynthesis and adaptations of leaves for photosynthesis.</p> <p><u>Knowledge</u></p> <ul style="list-style-type: none"> the reactants in, and products of, photosynthesis, and a word summary for photosynthesis the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere the adaptations of leaves for photosynthesis the role of leaf stomata in gas exchange in plants 	<p>8B2 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p>	<p>details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, simple model making, reports, short answer questions, newspaper style write-ups as well as homework.</p> <p>The Sciences offer many opportunities to develop and extend students’ literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a keywords sheet which students will learn during the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics, so fact sheets are provided for each topic.</p>
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<p>8B3 10 lessons (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> • aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life • a word summary for aerobic respiration • the process of anaerobic respiration in humans and microorganisms, including fermentation, and a word summary for anaerobic respiration • the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism. • the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops <p><u>Skills</u></p> <ul style="list-style-type: none"> • Identifying the independent, dependent and control variables in an investigation into rate of photosynthesis, and recording data in a table and graph. • Using a microscope to view impressions of stomata • Calculations of number of stomata on upper and lower side of a leaf <p><u>Knowledge</u></p> <ul style="list-style-type: none"> • heredity as the process by which genetic information is transmitted from one generation to the next • a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model • differences between species • the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation 	<p>8B3 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p>	<p>Useful websites: www.bbcbitesize.co.uk www.senecalearning.com</p>
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	<ul style="list-style-type: none"> the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. <p><u>Skills</u></p> <ul style="list-style-type: none"> understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements 		
<p>Year 8 Chemistry</p> <p>8C1 The Periodic Table 8 lessons (including assessment and responding to feedback lessons)</p>	<p>Students will initially revisit their knowledge from Year 7 about elements and atoms but extend this to look at the way the Periodic Table is arranged – division into metals and non- metals, groups and periods. They will have the opportunity to observe and participate in practical work to collect data, analyse patterns and make predictions about the reactivity and properties of the elements found in Group 1, Group 7 and Group 0.</p>	<p>8C1 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module</p>	<p>Homework is set weekly and contains a mixture of simple recall questions often followed with a more detailed application based question(s).</p>

<p>8C2 Separation Techniques 9 lessons (including assessment and responding to feedback lessons)</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • The varying physical and chemical properties of different elements • The principles underpinning the Mendeleev Periodic Table • The Periodic Table: periods and groups; metals and non-metal • How patterns in reactions can be predicted with reference to the Periodic Table • The properties of metals and non-metals • The chemical properties of metal and non-metal oxides with respect to acidity. <p>Skills</p> <ul style="list-style-type: none"> • Collecting data, analysing patterns and making predictions about Group 1, 7 and 0 • Using general scientific equipment • Collecting gas from a chemical reaction <p>Students will initially revisit their knowledge from Year 7 about compounds and mixtures but extend this to look at the way that pure substances can be identified by means of melting point and other separation techniques. There is a lot of opportunity for practical work within this module looking at various different method of separation (filtration, distillation, evaporation and chromatography)</p> <p>Knowledge</p> <ul style="list-style-type: none"> • The concept of a pure substances • Mixtures, including dissolving • Diffusion in terms of the particle model 	<p>through in-class activities and homework</p> <p>8C2 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework</p>	<p>All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher per module.</p> <p>Optional homework tasks and Literacy resources:</p> <p>SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, simple model making, reports, short answer questions, newspaper style write-ups as well as homework.</p> <p>The Sciences offer many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a keywords sheet which students will learn during the unit. Students will use texts to find out information for themselves,</p>
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<p>8C3 Metals and Acids 13 lessons (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> • Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography • The identification of pure substances. <p>Skills</p> <ul style="list-style-type: none"> • Practical techniques of distillation, filtration, evaporation and chromatography <p>Students will initially revisit their knowledge from Year 7 about acids and alkalis but extend this to look at the way acids react with various other materials and the products made. The unit goes on to look at other reactions and materials particularly the extraction and reactions of metals, and more recent developments in material science such as polymers and composites.</p> <p>Knowledge</p> <ul style="list-style-type: none"> • Reactions of acids with metals to produce a salt plus hydrogen • Reactions of acids with alkalis to produce a salt plus water • The order of metals and carbon in the reactivity series • The use of carbon in obtaining metals from metal oxides • Properties of ceramics, polymers and composites <p>Skills</p> <ul style="list-style-type: none"> • Testing for gases produced in a chemical reaction • Use of a Bunsen burner • Using practical observations to make deductions about the order of reactivity of metals • Collecting data and analysing results from scientific experiments 	<p>8C3 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework</p>	<p>using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics, so fact sheets are provided for each topic.</p> <p>Useful websites: www.bbcbitesize.co.uk www.senecalearning.com</p>
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<p>8C4 The Earth 10 lessons (including assessment and responding to feedback lessons)</p>	<p>Students will learn about the Earth and the atmosphere and move on to examine the different types of rocks and how they are formed in the rock cycle. Students will also link in with work from Biology about the carbon cycle and the effect on the environment.</p> <p>Knowledge</p> <ul style="list-style-type: none"> • The composition of the Earth • The structure of the Earth • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks • Earth as a source of limited resources and the efficacy of recycling • The carbon cycle • The composition of the atmosphere • The production of carbon dioxide by human activity and the impact on climate. <p>Skills</p> <ul style="list-style-type: none"> • Creating scientific models • Using a variety of resources to research and gather information 	<p>8C4 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework</p>	
<p>Year 8 Physics</p> <p>8P1 Electricity and Magnetism 11 lessons (including assessment and responding to feedback lessons)</p>	<p>Students learn about charge, potential difference, series and parallel circuits. Students also learn about magnets, magnetic fields, electromagnets and their uses. Students have hands-on experience of electrostatics, including a Van de Graaff generator, extensive investigations in building circuits, magnets, and electromagnets including motors. They investigate the factors affecting the strength of electromagnets.</p> <p>Knowledge</p>	<p>8P1 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework</p>	<p>Homework is set weekly and contains a mixture of simple recall questions often followed with a more detailed application based question(s). All homework is reviewed with at least one detailed FAR (Feedback, Action, Response)</p>

<p>8P2 Energy 11 lessons (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> • Recall what charge and potential difference is • Know how to build circuits • Know how current and pd behave in a series circuit and a parallel circuit • Explain what electrical resistance is • How magnets behave and what a magnetic field is • What electromagnets are and what affects their strength • Uses of electromagnets including maglev trains, motors and relays. <p>Skills</p> <ul style="list-style-type: none"> • Relating observed phenomena to abstract ideas • Modelling a means of explaining electric current • Correctly drawing circuit diagrams • Correctly connecting circuit components and taking measurements using ammeters and voltmeters. • Investigate how resistance effects current in a circuit • Investigating series and parallel circuits • Measuring resistance and carrying out resistance calculations • Observing magnets, taking measurements and plotting a magnetic field • Constructing and investigating an electromagnet, including taking measurements and displaying them <p>Students will learn of the different types of energy and how they can be transferred from one form into another, whilst conserving energy. Students will relate energy and temperature and investigate how energy can be transferred by conduction, convection and radiation. Students will discover energy sources, such as fossil fuels, calculate the power of electrical devices and investigate how forces can be multiplied by simple machines such as levers and gears.</p>	<p>8P2 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework</p>	<p>marked by the teacher per module.</p> <p>Optional homework tasks and Literacy resources:</p> <p>SoL on science shared area, including PowerPoints, details of practical investigations, worksheets, revision resources, a range of AFL (assessment for learning) activities, research based tasks, simple model making, reports, short answer questions, newspaper style write-ups as well as homework.</p> <p>The Sciences offer many opportunities to develop and extend students' literacy skills. There is a large amount of new, subject-specific vocabulary, and so each unit includes a keywords sheet which students will learn during the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary</p>
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<p>8P3 Motion and pressure 11 lessons (including assessment and responding to feedback lessons)</p>	<p>Knowledge</p> <ul style="list-style-type: none"> • Energy chemical energy is stored in food and fuels • Energy can be stored in different forms, such as kinetic energy and gravitational potential energy • The principle of conservation of energy • Temperature and how its related to energy • Energy transfers by conduction, convection and radiation • Energy sources such as fossil fuels and renewable energy sources • Calculate electrical power • Calculate work done and the effects on force when using simple machines <p>Skills</p> <ul style="list-style-type: none"> • Investigate the different stores of energy • Investigate the transfer of thermal energy • Research the benefits and drawbacks of using renewable and non-renewable sources • Calculate electrical power • Investigate force multiplying simple machines <p>Students learn about speed, motion graphs, force and turning forces. Students also have hands-on experience of investigating speed, forces and moment. They also carry out calculations involving speed, motion graphs and moments.</p> <p>Knowledge</p> <ul style="list-style-type: none"> • What speed is and how to calculate it • The features of distance/time graphs • What pressure is • The pressure equation. 	<p>8P3 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework</p>	<p>sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics, so fact sheets are provided for each topic.</p> <p>Useful websites: www.bbcbitesize.co.uk www.senecalearning.com</p>
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	<ul style="list-style-type: none"> • How is force related to pressure? • What is pressure like in solids? • What is pressure like in liquids? • What is pressure like in gases? • The effect of turning forces and moment about a pivot <p>Skills</p> <ul style="list-style-type: none"> • Calculating speed, distance or time • How to plot and use motion graphs (distance/time) • Calculating area and pressure • Relating observed phenomena to abstract ideas • Calculating pressure from force and area • Calculate the size of a turning force 		

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