



Year 9 Curriculum Overview

Rationale: The Year 9 curriculum is designed to give students an opportunity to build on key concepts from previous learning. Students will experience a range of modules including working scientifically, particles and matter, electricity and magnetism and cell level systems which will help them to develop their confidence to explore and investigate scientific concepts, which will allow them to build a mind-set that allows skills to be developed continuously.

**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>Y9 SCIENCE Autumn 1</p> <p>Working Scientifically 10 lessons</p>	<p>Developing the introduction to science investigations from KS3, students will continue to strengthen their skills and confidence with variables, planning experiments, drawing tables and graphs and evaluating results.</p> <p>All lessons have a practical context and are based around investigative experiments that allow students to gain hands-on experience in using simple apparatus, in addition to learning some of the skills which are important in scientific investigations. The lessons are based on general science.</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 exam-style questions often followed with a more detailed application based exam style question(s).</p> <p>All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</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</p>

			<p>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 PLC (Personnel Learning checklist) which students will engage with throughout 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.</p> <p>Useful websites: www.bbcbitessize.co.uk www.senecalearning.com https://www.physicsandmathstutor.com/ https://www.footprints-science.co.uk/ https://www.youtube.com/@Freesciencelessons</p>
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<p>B1 19 lessons in combined and 20 lesson in triple Science (including assessment and responding to feedback lessons)</p>	<p><u>Cell structures</u></p> <p>Students should be familiar from Y7, with cells as the fundamental unit of living organisms, and with the use of light microscopes to view cells. They should also be familiar with some sub-cellular structures, and the similarities and differences between plant and animal cells.</p> <p>Cells are the fundamental units of living organisms. Cells contain many subcellular structures that are essential for the functioning of the cell as a whole. Microscopy is used to examine cells and sub-cellular structures.</p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> • apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment • use prefixes and powers of ten for orders of magnitude • Use an appropriate number of significant figures • Use of light microscopes to view plant and animal cells <p><u>What happens in cells (and what do cells need)?</u></p> <p>Students should have a simple understanding of the double helix model of DNA and should be familiar with the idea of enzymes as biological catalysts. The structure of DNA affects what proteins are made in protein synthesis.</p> <p>Life processes depend on biological molecules whose structure is related to their function. Inside every cell is genetic material and this is used as a code to make proteins. Enzymes are important proteins in biology.</p>	<p>B1 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 exam-style questions often followed with a more detailed application based exam style question(s). All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</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 PLC (Personnel Learning checklist) which students will engage with throughout 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.</p>
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	<p><u>Skills developed:</u></p> <ul style="list-style-type: none"> • use scientific vocabulary, terminology and definitions • plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena • Investigation of enzyme controlled reactions <p><u>Respiration</u> Students should also have some underpinning knowledge of respiration and should be able to recall the word equation for respiration. Metabolic processes such as respiration are controlled by enzymes. Organic compounds are used as fuels in cellular respiration to allow the other chemical reactions necessary for life.</p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> • plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena • Testing for Biological molecules (food tests) <p><u>Photosynthesis</u> Students should also have some underpinning knowledge of photosynthesis and be able to recall the word equation for photosynthesis. Life processes depend on photosynthesis. Green plants and algae trap light from the Sun to fix carbon dioxide with hydrogen from water making organic compounds.</p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> • Plot two variables from experimental or other data • Use a scatter diagram to identify a correlation between two variables 		<p>Useful websites: www.bbcbitessize.co.uk www.senecalearning.com https://www.physicsandmathstutor.com/ https://www.footprints-science.co.uk/ https://www.youtube.com/@Freesciencelessons</p>
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<p>B2.1 7 lessons for both combined and triple Science (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> Investigation of photosynthesis experiments <p><u>Supplying the cell</u> Learners should be familiar with the role of diffusion in the movement of materials in and between cells. Cells transport many substances across their membranes by diffusion, osmosis and active transport. Stem cells are found in both plants and animals. These stem cells can divide, differentiate and become specialised to form tissues, organs and organ systems.</p> <p><u>Skills developed:</u></p> <ul style="list-style-type: none"> carry out experiments make and record observations and measurements using a range of apparatus and methods presenting observations using appropriate methods communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions Investigation into changes in mass of vegetable chips when placed in sucrose/salt concentrations of varying concentrations. 	<p>B2.1 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>Chemistry C1 10 lessons (including assessment and responding to feedback lessons)</p>	<p><u>The particle model</u> Students should be familiar from Year 7 with the particle model and its explanation of different states of matter. They will expand on their knowledge of the particle model and use it to explain observations during changes in state. Students will also be able to explain why different materials have different properties due to the particles themselves and how they are held together. Students should be familiar from Year 7 that elements are substances that are made up of only one type of atom and atoms of different</p>	<p>C1 end of topic assessment in the style of exam questions</p> <p>Written and verbal feedback</p>	<p>Homework is set weekly and contains a mixture of simple recall exam-style questions often followed with a more detailed application based exam style question(s). All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</p> <p>Optional homework tasks and Literacy resources:</p>

	<p>elements can combine to make compounds. Students will further their knowledge of this by looking at physical and chemical reactions.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> • Investigating physical and chemical reactions • Use models to solve problems, make predictions and to develop scientific explanations • Understand the power and limitations of science • Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects <p><u>Atomic Structure</u></p> <p>Students should be familiar from Year 7 that an atom is the smallest component of an element that gives an element its property. Students will expand their knowledge by explaining these properties by using models of atomic structure and look at how these models have changed over time. Current models suggest that atoms are made of smaller particles called protons, neutrons and electrons and students should know how these are arranged within an atom and how to calculate the number of these for different elements.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> • Recognise and use expressions in standard form • Understand how scientific methods and theories develop over time • Recognise the importance of peer review of results and of communicating results to a range of audiences 	<p>given throughout module through in-class activities and homework.</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 PLC (Personnel Learning checklist) which students will engage with throughout 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.</p> <p>Useful websites: www.bbcbitessize.co.uk www.senecalearning.com https://www.physicsandmathstutor.com/ https://www.footprints-science.co.uk/ https://www.youtube.com/@Freesciencelessons</p>
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<p>C2.1 13 lessons (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> • Use scientific vocabulary, terminology and definitions <p>Students should be familiar with separation techniques studied in Year 8. Students will expand their knowledge to study pure substances and mixtures. Chemically pure substances can be identified using melting point tests. Many useful materials that we use today are mixtures. There are many methods of separating mixtures including filtration, crystallisation, distillation and chromatographic techniques.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> • Investigate the process of distillation and chromatography • Plan experiments to make observations • Apply a knowledge of a range of techniques, instruments, apparatus and materials to select those appropriate to the experiment • Recognise and use expressions in decimal form • Make estimates of the results of simple calculations 	<p>C2.1 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>P1 12 lessons (including</p>	<p><u>The Particle Model</u></p>	<p>P1 end of topic assessment in</p>	<p>Homework is set weekly and contains a mixture of simple recall exam-style questions often followed</p>

<p>assessment and responding to feedback lessons)</p>	<p>Students should be familiar from Year 7 with the particle model and its explanation of different states of matter. They will expand on their knowledge of the particle model by learning about matter in its different forms, they must also be aware of subatomic particles, their relative charges, masses and positions inside the atom.</p> <p><u>Skills</u></p> <ul style="list-style-type: none"> • use models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts • use scientific theories and explanations to develop hypotheses • evaluate methods and suggest possible improvements and further investigations • interpreting observations and other data • use scientific vocabulary, terminology and definitions • communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions <p><u>Changes of State</u></p> <p>Pupils have learnt about states of matter in Year 7 and will expand their knowledge and understanding of the relationship between the states of matter helps. They will use the concept of energy to explain different types of everyday physical changes that we see around us. Pupils will be aware of the effect of temperature in the motion and spacing of particles and an understanding that energy can be stored internally by materials.</p> <p><u>Skills</u></p>	<p>the style of exam questions</p> <p>Written and verbal feedback given throughout module through in-class activities and homework.</p>	<p>with a more detailed application based exam style question(s). All homework is reviewed with at least one detailed FAR (Feedback, Action, Response) marked by the teacher approximately once every 2 weeks</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 PLC (Personnel Learning checklist) which students will engage with throughout 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.</p>
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<p>P3 12 lessons (including assessment and responding to feedback lessons)</p>	<ul style="list-style-type: none"> • presenting observations and other data using appropriate methods • evaluate methods and suggest possible improvements and further investigations • carrying out and representing mathematical and statistical analysis • identifying potential sources of random and systematic error • use an appropriate number of significant figures in calculation • Determine the specific heat capacity of a metal • Determine the densities of a variety of objects both solid and liquid <p><u>Electricity and Magnetism</u> Students should be familiar with electricity and magnetism from Year 8. Students will that electrical currents depend on the movement of charge and the interaction of electrostatic fields. Electrical current, potential difference and resistance are all discussed in this section. The relationship between them is considered and learners will investigate this using circuits. Having an understanding of how charge can be generated we can now consider the link between movement of charge and magnetism. To begin, pupils will investigate magnets and magnetic fields around magnets and current-carrying wires.</p> <p><u>Skills</u></p>	<p>P3 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.bbcbitessize.co.uk www.senecalearning.com https://www.physicsandmathstutor.com/ https://www.footprints-science.co.uk/ https://www.youtube.com/@Freesciencelessons</p>
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	<ul style="list-style-type: none"> • use models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts • use scientific theories and explanations to develop hypotheses • plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena • apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment • investigate the brightness of bulbs in series and parallel • investigate the I-V characteristics of circuit elements 			

Commitment, **O**ppportunity, **R**espect & **E**xcellence
for all and in all that we do