

# Science



## Year 9 Curriculum Map




## Year 9 – Autumn Term 1

### 9B - Plant Growth

### 9F - Reactivity

<b>Prior Learning</b>	<p><b>9B Plant Growth</b> From year 7 and year 8, pupils should be able describe how organisms and organism parts are adapted to their functions (7D) and interpret food webs (7D, 8D). Regular, in-lesson assessment will identify any gaps in knowledge and understanding.</p> <ul style="list-style-type: none"><li>• recall the processes of photosynthesis and aerobic respiration (8C, 8D)</li><li>• describe the concept of a limiting factor (8D)</li><li>• recall the main food groups and their uses (carbohydrates, fats, proteins) (8A)</li><li>• describe the importance of pollinators (8B)</li><li>• use the carbon cycle model (8D).</li></ul> <p><b>9F Reactivity</b> From year 7 and year 8, pupils should be able to:</p> <ul style="list-style-type: none"><li>• recall the meaning of thermal decomposition (7H)</li><li>• recall the difference between physical changes and chemical reactions (7H and 8F)</li><li>• describe the particle model (7G and 8I)</li><li>• explain the cause of gas pressure (7G and 8I)</li><li>• recall the fire triangle (8E)</li><li>• describe what happens in a combustion reaction (8E)</li><li>• use information on the reactions of metals to place them in an order of reactivity (8G)</li><li>• recall how some elements are found in their native state and how metals are extracted from ores (8H)</li></ul>
<b>What will I learn?</b>	<p><b>9B - Plant Growth</b> This unit looks at photosynthesis and aerobic respiration in plants in more detail, and then considers plant adaptations. The products we get from plants are then looked at, before studying farming methods and their problems.</p> <p><b>9F - Reactivity</b> This unit looks at metals through the theme of demolition. Physical changes and gas pressure are reviewed, and then the reactivity series and a chemical method of preventing rusting are covered. Exothermic and endothermic reactions are introduced, followed by displacement reactions. The method of extraction of a metal is related to its position in the reactivity series. Calculation of percentage change is related to oxidation and thermal decomposition reactions.</p>
<b>How will I be assessed?</b>	<p><b>9B - Plant Growth</b> Formative – recall 5 questions to identify gaps in knowledge and understanding low stakes quick quizzing, mid-topic assessment, homework tasks, verbally in class Summative – end of topic test.</p> <p><b>9F - Reactivity</b> Formative – recall 5 questions to identify gaps in knowledge and understanding low stakes quick quizzing, mid-topic assessment, homework tasks, verbally in class Summative – end of topic test.</p>
<b>Next Steps</b>	<p><b>9B - Plant Growth</b> B1 - Cells B4 - Bioenergetics B7 - Ecology</p> <p><b>9F - Reactivity</b> Year 9 - Chemistry transition unit C4 - Chemical changes</p>

<b>Opportunities for Independent Learning</b>	<p><b>9B - Plant Growth</b> BBC Bitesize <a href="#">Plant growth</a> BBC Teach <a href="#">Plant growth</a></p> <p><b>9F - Reactivity</b> BBC Bitesize <a href="#">Reactivity</a> <a href="#">Reactivity Video</a></p>
<b>Personal Development and CEIAG</b>	<p><b>9B - Plant Growth</b> Pupils will learn about mental health and physical health along with the benefits of a healthy diet. Explore career opportunities in Botany and crop production.</p> <p><b>9F - Reactivity</b> Pupils will learn about personal safety and risk assessment and explore career opportunities in the chemical industry and chemical engineering.</p>
<b>Enrichment Opportunities (Cultural Capital)</b>	<p><b>9B - Plant Growth</b> <a href="https://www.edenproject.com/">https://www.edenproject.com/</a> BBC iPlayer – Secret Life of Plants</p> <p><b>9F - Reactivity</b> <a href="#">Simple home experiments to try!</a> <a href="#">Virtual Lab Tour Manchester University</a></p>

	<p><b>Year 9 – Autumn Term 2</b> <b>9E - Making Materials</b> <b>9J - Forces, Fields and Electromagnets</b></p>
<b>Prior Learning</b>	<p><b>9E - Making Materials</b> From previous units, pupils should be able to:</p> <ul style="list-style-type: none"> <li>• use the particle model to explain observations about matter (7G)</li> <li>• explain what a landfill site is and some of the problems they cause (7G)</li> <li>• describe the difference between elements and compounds (7H)</li> <li>• describe examples of combustion and decomposition reactions (7H)</li> <li>• explain the advantages of recycling materials (7H)</li> <li>• describe how biomagnification of toxins can occur (7D &amp; 8D)</li> <li>• describe the difference between atoms, molecules and lattice structures (8F)</li> <li>• model chemical reactions using word and symbol equations (8G)</li> <li>• describe the sources and effects of the greenhouse gas carbon dioxide (8E)</li> <li>• explain how sulfur dioxide and nitrogen oxides help to cause acid rain (8E).</li> </ul> <p><b>9J - Forces, Fields and Electromagnets</b> From previous units, pupils should be able to:</p> <ul style="list-style-type: none"> <li>• recall what magnetic fields are and how magnets affect other magnets and magnetic materials (8L)</li> <li>• recall what causes a gravitational field, and how energy can be stored in gravitational fields (8L)</li> <li>• describe how current and voltage behave in series and parallel circuits (7J)</li> <li>• recall that resistance is a measure of how difficult it is for electricity to flow through a component (7J).</li> </ul>

<p><b>What will I learn?</b></p>	<p><b>9E - Making Materials</b>  This unit looks at the manufacture, properties and uses of different types of materials. The first three topics introduce examples of ceramic, polymer and composite materials. In each case, the properties of these materials are linked to their uses. The unit continues by looking at some of the problems caused by synthetic materials and possible solutions to these problems. In the last topic, the importance of recycling materials is considered.</p> <p><b>9J - Forces, Fields and Electromagnets</b>  This unit starts by revising previous work on magnetic and gravitational fields, then introduces static electricity and the idea of an electric field. Work on current electricity is revised, and then extended to look at resistance calculations and at some uses of electromagnets.</p>
<p><b>How will I be assessed?</b></p>	<p><b>9E - Making Materials</b>  Formative – recall 5 questions to identify gaps in knowledge and understanding, low stakes quick quizzing, mid-topic assessment, homework tasks, verbally in class.  Summative – end of topic test.</p> <p><b>9J - Forces, Fields and Electromagnets</b>  Formative – recall 5 questions to identify gaps in knowledge and understanding, low stakes quick quizzing, mid-topic assessment, homework tasks, verbally in class.  Summative – end of topic test.</p>
<p><b>Next Steps</b></p>	<p><b>9E - Making Materials</b>  Year 9 - Chemistry transition unit  C1 - Fundamentals  C10 - Using resources</p> <p><b>9J - Forces, Fields and Electromagnets</b>  P7 - Magnetism and Electromagnetism</p>
<p><b>Opportunities for Independent Learning</b></p>	<p><b>9E - Making Materials</b>  <a href="#">BBC Bitesize Making Materials</a></p> <p><b>9J - Forces, Fields and Electromagnets</b>  <a href="#">BBC Bitesize Electromagnets</a></p>
<p><b>Personal Development and CEIAG</b></p>	<p><b>9E - Making Materials</b>  Pupils will learn about community and responsibility with aims to recycle and protect the environment. Explore career opportunities in the chemical industry and environmental careers.</p> <p><b>9J - Forces, Fields and Electromagnets</b>  Pupil will have the opportunity to explore media and digital literacy, and explore career opportunities in mechanical engineering.</p>
<p><b>Enrichment Opportunities (Cultural Capital)</b></p>	<p><b>9E - Making Materials</b>  Research the effects of single use plastic on the environment and suggest ways to decrease usage</p> <p><b>9J - Forces, Fields and Electromagnets</b>  Research ways in which electromagnets are used in everyday life  <a href="#">Maglev Train</a></p>




## Year 9 – Spring Term 1

### 9I - Forces and Motion

### 9A - Genetics and Evolution

<b>Prior Learning</b>	<p><b>9I - Forces and Motion</b> From previous units, pupils should be able to:</p> <ul style="list-style-type: none"><li>• identify forces on stationary and moving objects, and describe the effects of balanced and unbalanced forces on objects (7K)</li><li>• recall ways in which energy can be stored and transferred and identify energy stores and transfers in different situations (7I).</li></ul> <p><b>9A - Genetics and Evolution</b> From previous units, pupils should be able to:</p> <ul style="list-style-type: none"><li>• identify variation within and between species (7D)</li><li>• identify environmental and inherited causes of variation (7D, 8B)</li><li>• classify variation as being continuous or discontinuous (7D)</li><li>• explain how plants and animals are adapted to their habitats (7D, 8C)</li><li>• describe what an ecosystem is (7D)</li><li>• describe how organisms are classified (8B, 8D)</li><li>• recall what biodiversity and extinction are (8B).</li></ul>
<b>What will I learn?</b>	<p><b>9I - Forces and Motion</b> This unit starts by revising some aspects of forces and their effects, energy stores and transfers. It then looks at calculations of speed and relative speed and representing journeys on distance–time graphs. The final topics look at simple machines (levers, ramps and pulleys).</p> <p><b>9A Genetics and Evolution</b> This unit recaps ideas about the causes of variation and then looks at inherited variation in more detail. DNA is introduced before pupils consider how inherited genes can affect an organism’s survival. The unit ends with coverage of natural selection.</p>
<b>How will I be assessed?</b>	<p><b>9I - Forces and Motion</b> Formative – recall 5 questions to identify gaps in knowledge and understanding, low stakes quick quizzing, mid-topic assessment, homework tasks, verbally in class. Summative – end of topic test.</p> <p><b>9A - Genetics and Evolution</b> Formative – recall 5 questions to identify gaps in knowledge and understanding, low stakes quick quizzing, mid-topic assessment, homework tasks, verbally in class. Summative – end of topic test.</p>
<b>Next Steps</b>	<p><b>9I - Forces and Motion</b> Year 9 - Physics transition unit P5 Forces</p> <p><b>9A - Genetics and Evolution</b> Year 9 - Biology transition unit B6 - Inheritance, variation and evolution</p>
<b>Opportunities for Independent Learning</b>	<p><b>9I - Forces and Motion</b> <a href="#">BBC Bitesize Forces and Motion</a> Pupils have access to Seneca for practice questions in the forces section and the genetics section: <a href="https://senecalearning.com/en-GB/">https://senecalearning.com/en-GB/</a></p> <p><b>9A - Genetics and Evolution</b> <a href="#">BBC Bitesize Genetics and Evolution</a></p>

<b>Personal Development and CEIAG</b>	<p><b>9I - Forces and Motion</b> Pupils will explore community responsibility by learning about the importance of road safety and not speeding. Explore career opportunities in mechanical engineering.</p> <p><b>9A - Genetics and Evolution</b> Pupils will learn about growing and changes. Explore careers opportunities in genetic engineering and health.</p>
<b>Enrichment Opportunities (Cultural Capital)</b>	<p><b>9I - Forces and Motion</b>  <a href="#">History of Sir Isaac Newton video clip</a>  <a href="#">Manchester Museum of Science and Industry</a>  <a href="#">Institute of Physics - Do try this at home!</a>  <a href="#">James Dyson Foundation challenges</a></p> <p><b>9A - Genetics and Evolution</b>  <a href="#">Stem Learning Genetic Modification</a></p>

	<h2>Year 9 – Spring Term 2 and Summer Term</h2> <h3>Biology, Chemistry and Physics</h3> <h3>Transition Units</h3>
<b>Prior Learning</b>	<p><b>Energy Transition unit</b>  7I - Energy  7J - Current electricity  8K - Energy transfers</p> <p><b>Cell Transition unit</b>  7A - Cells  8C - Breathing and Respiration  8D - Unicellular organisms</p> <p><b>Atoms Transition unit</b>  7H - Atoms  9E – Materials</p>
<b>What will I learn?</b>	<p><b>Energy Transition unit</b>  This unit looks at the difference in energy stores and energy transfers. It then studies the equations for Gravitational Potential Energy (GPE) and Kinetic Energy (KE).</p> <p><b>Cell Transition unit</b>  This unit studies compares plant cell to animal cells and finds out the function of the organelles. The differences between Prokaryotes and Eukaryotes are then studied before looking at the diverse types of microscopes.</p> <p><b>Atoms Transition unit</b>  This unit look at the structure of an atom to explore the subatomic particles and the electron arrangement. It then links this to an elements position in the periodic table.</p>
<b>How will I be assessed?</b>	<p>There will be formative assessments at the end of each unit and a summative assessment when all 9 lessons are complete</p>
<b>Next Steps</b>	<p><b>Energy Transition unit</b>  P1 – Energy KS4 Combined and Separate</p> <p><b>Cell Transition unit</b></p>

	<p>B1 - Cells KS4 Combined and Separate</p> <p><b>Atoms Transition unit</b></p> <p>C1 - Atoms KS4 Combined and Separate</p>
<b>Opportunities for Independent Learning</b>	<p>Pupils study the history of the microscope and compare light and electron scanning microscopes for homework</p>
<b>Personal Development and CEIAG</b>	<p><b>Energy Transition unit</b></p> <p>This unit explores the use of both renewable and non-renewable energy resources, climate change and global warming issues are also addressed. Potential for career pathways, both locally and nationally/internationally in the energy and fuel industry.</p> <p><b>Cell Transition unit</b></p> <p>In this topic you will develop an understanding of how modern technologies have helped scientific advancements e.g. microscopy. You will learn about everyday phenomena and develop an understanding of how all living things are built and operate. This topic has links with various careers such as biomedical science and microscopy</p> <p><a href="https://learn.genetics.utah.edu/content/cells/scale/">https://learn.genetics.utah.edu/content/cells/scale/</a></p> <p><b>Atoms Transition unit</b></p> <p>Through the study of the halogens, pupils will learn about fluorine and chlorine. Pupils will consider their use in our water supply to kill microbes and improve teeth enamel. Pupils may also debate whether inflating party balloons is an appropriate use of helium.</p> <p>Possible careers in these areas are nanoparticle scientist, forensic scientist, chemical analyst, aerodynamics, pharmacist and dentist.</p>
<b>Enrichment Opportunities (Cultural Capital)</b>	<p>The space race is studied for enrichment week, where the students get the opportunity in extended learning periods, to land an egg safely.</p>