



## Curriculum Map for Science Year 9

YEAR 9	Autumn 1		Autumn 2	
Topics	Cells 1 Teacher 1	Atoms Teacher 2	Cells 2 Teacher 1	Energy Teacher 2
<b>Substantive Knowledge - The Knowledge and Concepts Taught By The Teacher</b>	<ul style="list-style-type: none"> <li>Students will initially develop their understanding of the microscope and how technology has enabled us to see and whole new world.</li> <li>Students will then learn about various cells and be able to explain how each is unique and why.</li> <li>Following this they will then learn about the various forms of particle transport.</li> </ul>	<ul style="list-style-type: none"> <li>Students will be introduced to the current model of the atom and then learn about how Scientists have used various experiments to develop this.</li> <li>Students will then learn and apply various separation techniques to split mixtures and be able to correctly use keywords.</li> </ul>	<ul style="list-style-type: none"> <li>Students will learn the use, applications and ethical concerns of stem cells.</li> <li>Students will then learn the key stages of mitosis.</li> </ul>	<ul style="list-style-type: none"> <li>Students will develop knowledge of types of energy and apply them to various scenarios.</li> <li>Students will then learn and apply the major energy equations and learn how to manipulate them.</li> </ul>
<b>Disciplinary Knowledge - The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence</b>	<ul style="list-style-type: none"> <li>History of how the microscope was discovered.</li> </ul>	<ul style="list-style-type: none"> <li>History and theory of the atom.</li> </ul>	<ul style="list-style-type: none"> <li>History of Stem Cell research.</li> </ul>	<ul style="list-style-type: none"> <li>How calculations and theories of Potential Energy, Kinetic Energy and Conservation of Energy were devised.</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Operation of the Microscope</li> <li>Microscope Calculations</li> </ul>	<ul style="list-style-type: none"> <li>Isotope Calculations</li> <li>Practicals involving Separation Techniques</li> </ul>	<ul style="list-style-type: none"> <li>Evaluative Skills</li> <li>Ability to Consider Ethical, Moral and Social Issues</li> </ul>	<ul style="list-style-type: none"> <li>Converting Units</li> <li>Standard Form</li> <li>Rearranging Equations (Higher tier only)</li> </ul>
<b>Links To Prior Learning</b>	<ul style="list-style-type: none"> <li>Cells in Years 7 and 8.</li> <li>Basic structure and comparison of cells.</li> <li>Some types of transport.</li> </ul>	<ul style="list-style-type: none"> <li>Basic atom covered in Years 7 and 8 but no subatomic particles.</li> </ul>	<ul style="list-style-type: none"> <li>History and past of stem cells and how the science has evolved with changing laws.</li> </ul>	<ul style="list-style-type: none"> <li>History of calculations and how theories of conservation were devised.</li> </ul>

		<ul style="list-style-type: none"> <li>Separation techniques used in Years 7 and 8.</li> </ul>		
<b>Literacy/ Numeracy</b>	<ul style="list-style-type: none"> <li>Develop the written report with scientific writing.</li> <li>Cells Size Calcs</li> <li>Rearranging Equations</li> <li>Standard Form</li> </ul>	<ul style="list-style-type: none"> <li>Isotope Calculations</li> <li>Balancing Equations</li> <li>Writing Scientific Methods</li> </ul>	<ul style="list-style-type: none"> <li>Ability to write evaluations and consider pros and cons of a process.</li> <li>Mitosis Cell Cycle Calculations</li> </ul>	<ul style="list-style-type: none"> <li>Key Terms</li> <li>Energy Calculations</li> <li>Converting Units</li> <li>Standard Form</li> <li>Rearranging Equations</li> </ul>
<b>Cross Curricular</b>	<ul style="list-style-type: none"> <li>Microscope and Technology</li> </ul>	<ul style="list-style-type: none"> <li>Separation techniques in Food Technology.</li> </ul>	<ul style="list-style-type: none"> <li>Moral, social ethical issues of stem cell research.</li> </ul>	<ul style="list-style-type: none"> <li>Power of devices in Technology.</li> </ul>
<b>Assessment</b>	<ul style="list-style-type: none"> <li>Cells 1 assessment</li> </ul>	<ul style="list-style-type: none"> <li>Atoms 1 assessment</li> </ul>	<ul style="list-style-type: none"> <li>End of topic questions open books</li> </ul>	<ul style="list-style-type: none"> <li>End of topic open books questions</li> </ul>

<b>YEAR 9</b>	<b>Spring 1 &amp; 2</b>	<b>Spring 1 &amp; 2</b>
<b>Topics</b>	<b>Periodic Table - Teacher 1</b>	<b>Energy 2 and Energy 3 - Teacher 2</b>
<b>Substantive Knowledge - The Knowledge and Concepts</b>	<ul style="list-style-type: none"> <li>Students will learn about the history and development of the periodic table.</li> <li>Students will then delve into each group and explain patterns in reactivity.</li> </ul>	<ul style="list-style-type: none"> <li>Students will develop their knowledge of heat and transfer in systems and then explain how heat transfers can be reduced in homes.</li> <li>Finally, they will attempt to explain and evaluate the different types of energy generation methods.</li> </ul>
<b>Disciplinary Knowledge - The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence</b>	<ul style="list-style-type: none"> <li>History of the Periodic table and how different scientist contributed to different ideas to produce the final product.</li> </ul>	<ul style="list-style-type: none"> <li>History and development of new renewables resources to develop problem.</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Spot patterns and Trends</li> <li>Analyse Graphs</li> <li>Manage Risk and Hazard with Practical and Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>SHC Required Practical - Collect Data, Analyse and Calculate</li> </ul>
<b>Links To Prior Learning</b>	<ul style="list-style-type: none"> <li>Periodic table introduced in Years 7 and 8.</li> </ul>	<ul style="list-style-type: none"> <li>Renewable and Non-Renewable energy sources.</li> </ul>

<b>Literacy/ Numeracy</b>	<ul style="list-style-type: none"> <li>Analysing trends in groups.</li> <li>Electron structures.</li> <li>Comprehension of texts regarding theory of periodic table.</li> <li>Writing to explain prove and disprove theories with scientific evidence.</li> </ul>	<ul style="list-style-type: none"> <li>Data- analysis and calculations with renewable energy sources.</li> <li>Ability to articulate and debate which energy resources is best for a set area.</li> <li>Project writing- write like a scientist.</li> </ul>
<b>Cross Curricular</b>	<ul style="list-style-type: none"> <li>Metals and uses of Technology in Technology and Product Design.</li> </ul>	<ul style="list-style-type: none"> <li>Renewable energy in Geography.</li> </ul>
<b>Assessment</b>	<ul style="list-style-type: none"> <li>Assessment – Atoms &amp; Periodic Table</li> </ul>	<ul style="list-style-type: none"> <li>Assessment - Energy</li> </ul>

<b>YEAR 9</b>	<b>Summer 1</b>		<b>Summer 2</b>	
<b>Topics</b>	<b>Bioenergetics Teacher 1</b>	<b>Waves Teacher 2</b>	<b>Bonding Teacher 1</b>	<b>Energy Changes Teacher 2</b>
<b>Substantive Knowledge - The Knowledge and Concepts Taught By The Teacher</b>	<ul style="list-style-type: none"> <li>Students will develop their knowledge of two key biochemical processes, explaining word equations and how these processes can be manipulated to ensure maximum output or not.</li> </ul>	<ul style="list-style-type: none"> <li>Students will learn about the various types of waves and how each is unique.</li> <li>Students will then learn about the uses and dangers of each type of wave on the electromagnetic spectrum.</li> </ul>	<ul style="list-style-type: none"> <li>Students will learn about the different types of bonding and then compare and contrast each of their properties.</li> </ul>	<ul style="list-style-type: none"> <li>Students will learn about the 2 main types of reaction and how they use energy from their surroundings to allow bonds to broken or made.</li> </ul>
<b>Disciplinary Knowledge - The Knowledge Scientists Need So They Can Collect, Understand and Evaluate Scientific Evidence</b>	<ul style="list-style-type: none"> <li>Development of photosynthesis experiment.</li> </ul>	<ul style="list-style-type: none"> <li>History of discovery of waves and Electromagnetism.</li> <li>Specification and how it was discovered.</li> </ul>	<ul style="list-style-type: none"> <li>Theories of the different types of bonding and research to prove it.</li> </ul>	<ul style="list-style-type: none"> <li>History of certain reactions in chemistry.</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Photosynthesis RP- ability to collect data, make observation and spot patterns.</li> </ul>	<ul style="list-style-type: none"> <li>Waves Practicals</li> <li>Standard Form</li> <li>Wave Calculations</li> </ul>	<ul style="list-style-type: none"> <li>Bonding Diagrams</li> <li>Patterns in Compounds</li> <li>Test for Gases Practical</li> </ul>	<ul style="list-style-type: none"> <li>Reaction Profile Graphs</li> <li>Energy Change Reaction Profiles</li> </ul>

<b>Links To Prior Learning</b>	<ul style="list-style-type: none"> <li>Ecosystems in Year 7</li> </ul>	<ul style="list-style-type: none"> <li>Waves in Year 8</li> </ul>	<ul style="list-style-type: none"> <li>Compounds introduced in Year 7 in the Matter topic.</li> </ul>	<ul style="list-style-type: none"> <li>New content but energy transfer and reactions are learnt in Years 7 and 8</li> </ul>
<b>Literacy/ Numeracy</b>	<ul style="list-style-type: none"> <li>Calculating rates and analysing graphs.</li> <li>Explaining a concept using data to support.</li> <li>Converting lines of best fit in graphs to articulated points.</li> </ul>	<ul style="list-style-type: none"> <li>Standard Form.</li> <li>Wave Calculations.</li> <li>Keywords, experiment write ups, introduction of prefixes in Science.</li> </ul>	<ul style="list-style-type: none"> <li>Patterns in compounds as seen in graphs and tables.</li> <li>Converting diagrams into articulate points.</li> </ul>	<ul style="list-style-type: none"> <li>Bond energy graphs.</li> <li>Prefixes in Science and of keywords.</li> </ul>
<b>Cross Curricular</b>	<ul style="list-style-type: none"> <li>Geography - Growth of Plants</li> <li>PE- Respiration and Energy</li> <li>Food Technology - Wine and Bread Making</li> </ul>	<ul style="list-style-type: none"> <li>Photography - Uses of Light etc.</li> <li>Sound - Music and Sound Waves.</li> </ul>	<ul style="list-style-type: none"> <li>Metals and Uses of Technology in Technology and Product Design.</li> </ul>	<ul style="list-style-type: none"> <li>Combustion, LED &amp; LDR-technology.</li> <li>PE- Application of Ice Packs Versus Heat Packs</li> </ul>
<b>Assessment</b>	<ul style="list-style-type: none"> <li>Bioenergetics Assessment</li> </ul>	<ul style="list-style-type: none"> <li>Waves Assessment</li> </ul>	<ul style="list-style-type: none"> <li>Bonding and Structure Assessment</li> </ul>	<ul style="list-style-type: none"> <li>Energy Change Assessment</li> </ul>