









# SCIENCE CURRICULUM MAP


## YEAR 8

<p><b>HALF TERM 1:</b></p> <p><b>CR4 – Acids and Alkalis</b></p> <ol style="list-style-type: none"> <li>1. Define acids and alkalis in terms of neutralisation reactions</li> <li>2. The PH Scale for measuring acidity/alkalinity; and indicators</li> <li>3. Reactions of acids with metals to produce a salt plus hydrogen</li> <li>4. Reactions of acids with alkali to produce a salt plus water.</li> <li>5. Energy changes on changes of state (qualitative)</li> <li>6. Exothermic and endothermic chemical reactions (qualitative)</li> </ol> <p><b>THB9 – Nutrition and Digestion</b></p> <ol style="list-style-type: none"> <li>1. Content of a healthy diet; carbohydrates, lipids, (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed.</li> <li>2. Calculations of energy requirements in a healthy daily diet</li> <li>3. The consequences of imbalances in the diet, including obesity, starvation, and deficiency disease</li> <li>4. The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply and biological catalysts)</li> <li>5. The importance of bacteria in the human digestive system</li> </ol>		<p><b>Supporting texts or wider reading</b></p> <p>CR4 – Acids and Bases – A short history. THB9 - Extract from Astro Science Journal for Teens – ‘Can we grow safe and nutritious food in space’?</p>
		<p><b>Opportunities for extended writing</b></p> <p>Why don't our buildings look the same? Extended writing task on the consequences of an unbalanced diet.</p>
		<p><b>Speak like an expert</b></p> <p>What effects do our nutrients have on our body? Be able to articulate why males need more calories daily than females. Discuss what happens in neutralisation reactions.</p>
<p><b>HALF TERM 2:</b></p> <p><b>BOE10 – Principles of Energy</b></p> <ol style="list-style-type: none"> <li>1. Energy as a quantity that can be calculated.</li> <li>2. Using physical process and mechanical, rather than energy, to explain the intermediate steps that bring about such changes.</li> <li>3. The total energy has the same value before and after a change.</li> <li>4. Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperature, changes in position in a field, in elastic distortions and chemical compositions.</li> <li>5. Other processes that involve energy transfer, changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.</li> </ol>		<p><b>Supporting texts or wider reading</b></p> <p>BOE10 - Extract from an article – Waste Energy: How can we make the most from our waste?  BBL3 - Extract from the National Library of Medicine - A short history of beer brewing</p>
		<p><b>Opportunities for extended writing</b></p> <p>Extended exam question the difference between aerobic and anaerobic respiration.</p>
		<p><b>Speak like an expert</b></p> <p>Discussion on the energy circus lesson, how energy can be stored in different ways, such as chemical energy in fuel and elastic potential energy in a stretched spring.</p>



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<p>6. Changes of energy stores that are unwanted; why these occur and how they can be reduced.</p> <p><b>BBL3 – Cellular respiration</b></p> <ol style="list-style-type: none"> <li>1. Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical process necessary for life</li> <li>2. A word summary for aerobic respiration</li> <li>3. The process of anaerobic respiration in humans and microorganisms, including, fermentation, and a word summary for anaerobic respiration</li> <li>4. The difference between aerobic and anaerobic respiration in terms of reactants, the products formed and the implications of the organisms</li> </ol>		<p><b>Links to careers, personal development and other subject areas.</b></p> <p>PE – Respiration and the type used in physical exercise.</p> <p>Technology – energy transfers, electricity and energy used.</p> <p>Careers focus – BOE10 - Sustainable energy</p> <p>Careers focus BBL3 – Sports Scientists</p> <p>Maths – Solving algebra equations</p> <p>PSHE - links to energy intake and expenditure – healthy diet and exercise.</p> <p>Cultural Capital - The history of brewing beer as a reading task.</p>
<p><b>HALF TERM 3:</b></p> <p><b>BOE12 – Energy in the Home</b></p> <ol style="list-style-type: none"> <li>1. Compare the power ratings of appliances in watts (W, kW)</li> <li>2. Compare the power ratings of appliances in watts (W, kW)</li> <li>3. Comparing amounts of energy transferred (J, kJ, kW hour)</li> <li>4. Domestic fuel bills, fuel use and costs</li> <li>5. The way in which energy is used within the home.</li> <li>6. Fuels that are used for energy in the home.</li> <li>7. Non-Fuel resources that are used to supply energy to the home.</li> </ol> <p><b>BBL4 – Plant Cells</b></p> <ol style="list-style-type: none"> <li>1. The function of the cell wall, vacuole and chloroplasts</li> <li>2. Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope</li> <li>3. The similarities and differences between plant and animal cells</li> <li>4. The role of leaf stomata in gas exchange in plants</li> <li>5. Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms</li> </ol>	<div data-bbox="817 869 906 958"></div> <div data-bbox="817 1032 906 1122"></div> <div data-bbox="817 1227 906 1317"></div> <div data-bbox="817 1400 906 1489"></div>	<p><b>Supporting texts or wider reading</b></p> <p>BOE12 – Energy in the home.</p> <p>BBL4 – Extract from Horrible Science: ‘Vicious Veg’</p> <p><b>Opportunities for extended writing</b></p> <p>Extended writing task on the ‘journey of a seed’ the different types of seed dispersal.</p> <p>Differences between finite and infinite resources.</p> <p><b>Speak like an expert</b></p> <p>Discussion as to what happens to energy, as it’s not created or destroyed.</p> <p>The similarities of Cells and different organelles.</p> <p><b>Links to careers, personal development and other subject areas.</b></p> <p>Technology – Using pressure in machines e.g. hammers and nails. Microscopes.</p> <p>Geography – Reproduction of plants and farming.</p> <p>Maths – Calculating power from appliances.</p> <p>Cultural Capital - The history of brewing beer as a reading task.</p> <p>Contextualisation - Context included linked to sports, baking and brewing.</p>
<p><b>HALF TERM 4:</b></p> <p><b>OEO05 – Electricity</b></p> <ol style="list-style-type: none"> <li>1. Electrical current measured in amperes, in circuits, series and parallel circuits, current and where branches meet and current flow of charge.</li> <li>2. potential difference, measured in volts, battery, and bulb ratings; resistance, measured in ohms, as the ratio of potential difference</li> </ol>	<div data-bbox="817 1816 906 1906"></div> <div data-bbox="817 2011 906 2101"></div>	<p><b>Supporting texts or wider reading</b></p> <p>OEO05 – Dolphin dimples detect electricity – By Stephen Ornes</p> <p>BOE13 - Tsunamis? – An extract from the NOAA website</p> <p><b>Opportunities for extended writing</b></p> <p>How electricity has changed the world.</p> <p>Extended writing task on how electricity is used and why it is important in our lives.</p>



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## YEAR 8

<ol style="list-style-type: none"> <li>differences in resistance between conducting and insulating components (quantitative)</li> <li>separation of positive or negative charges when objects are rubbed together; transfer of electrons, forces between charged objects</li> <li>The idea of electric field, forces acting across the space between objects not in contact</li> </ol>		<p>How humans have a different auditory range to animals.</p>
<p><b>BOE13 – Waves</b></p>		<p><b>Speak like an expert</b></p> <p>Changing the pitch and amplitude of our voice to emphasize and express language using the ideas from sound</p>
<ol style="list-style-type: none"> <li>Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and or cancel-superposition.</li> <li>Frequencies of sound waves, measured in Hertz; echoes, reflection and absorption of sound.</li> <li>Sound needs a medium to travel, the speed of sound in air, in water, in solids.</li> <li>Sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphones diaphragm and the ear drum; sound waves are longitudinal.</li> <li>The auditory range of humans and animals.</li> <li>Pressure waves transferring energy; use for cleaning and physiotherapy by ultrasound; waves transferring information for conservation to electrical signals by microphone.</li> </ol>		<p><b>Links to careers, personal development and other subject areas.</b></p> <p>Drama – theatre lighting and sound Technology – how electrical devices work Maths – Calculating resistance using the formula Resistance is <math>pd \div \text{current}</math> Careers focus – Agricultural scientist</p>
<p><b>HALF TERM 5:</b></p>		<p><b>Supporting texts or wider reading</b></p>
<p><b>OE006 – Forces and motion</b></p>		<p>OE006 – Forces and motion IOL12 – Photosynthesis - Pre reading on the different ways of seed dispersal.</p>
<ol style="list-style-type: none"> <li>Speed and the quantitative relationships between average speed, distance and time</li> <li>The representation of a journey on distance on a distance-time graph</li> <li>Relative motion; trains and cars passing each other.</li> <li>Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative) resolving forces with multiple forces acting in parallel.</li> <li>Change depending on direction of force and its size.</li> </ol>		<p><b>Opportunities for extended writing</b></p> <p>Extended writing task on the guided reading task. The journey of 'seed'.</p>
		<p><b>Speak like an expert</b></p> <p>Discussion of relative motion of how when two objects are travelling in the same direction, the relative motion of those objects can be determined</p>
<p><b>IOL12 – Photosynthesis</b></p>		
<ol style="list-style-type: none"> <li>The reactants in, and products of, photosynthesis, and a word summary for photosynthesis</li> <li>The dependence of almost all life on earth on the ability of photosynthesis organisms, such as 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</li> <li>The adaptations of leaves for photosynthesis</li> <li>Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil, via their roots.</li> </ol>		<p><b>Links to careers, personal development and other subject areas.</b></p> <p>Maths – Quantitative investigation of some dispersal mechanism Calculating the rate of photosynthesis.</p> <p>Careers focus - Maths – Links with Hooke's Law in physics.</p>



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## YEAR 8

5. Reproduction in plants including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanism		
<b>HALF TERM 6:</b>  <b><u>BOM9– The periodic table</u></b>  1. The principles underpinning the Mendeleev periodic table. 2. The periodic table; periods and groups; metals and non-metals 3. How patterns in reactions can be predicted with reference to the periodic table 4. The properties of metals and non-metals 5. The chemical properties of metal and non-metal oxides with respect of acidity  <b><u>OEOO7 – Applying forces</u></b>  1. Forces: associated with deforming objects; stretching and squashing -springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water 2. Force extension linear relation; Hooke's Law as a special case 3. Moment the turning effect of a force (DEFINE and calculate) 4. Work done and energy changes on deformation (describe only) 5. Simple machines give bigger force but at the expense of smaller movement (and vice versa); products of force and displacement unchanged move "into moment"	      	<p><b>Supporting texts or wider reading</b></p> <p>BOM9 -"From Stone to Phone" Modern day Cobalt Slavery in the Congo. OEOO7- Elephants Burial</p> <p><b>Opportunities for extended writing</b></p> <p>How the periodic table has developed over time.</p> <p><b>Speak like an expert</b></p> <p>Present a short case study or news snippet highlighting a successful collaborative effort to address a global challenge.</p> <p><b>Links to careers, personal development and other subject areas.</b></p> <p>Careers focus – BOM9 – Organisation. OEOO7 – Automotive Maths - Construct and interpret Bar charts 7F: Calculate means 7K: Solve Algebraic equations 8A: Change the subject of a formula</p>