



2021-22 CURRICULUM MAP FOR SCIENCE







YEAR 8

<p>HALF TERM 1: Ready Steady Go (Purple text = skills)</p> <p>Key knowledge</p> <ol style="list-style-type: none"> 1. Respiration – Understand the two types of respiration. Aerobic respiration uses oxygen which naturally occurs within all living cells. Anaerobic respiration is what occurs without oxygen, glucose is broken down to form lactic acid. 2. Digestion – Different roles of each organ within the digestive system (Stomach breaks food down, small intestine absorbs nutrients, large intestine absorbs water). How the digestive enzymes work with the ‘lock and key’ method. 3. Work done – Understanding the work done calculation. Work done = force x distance 4. Speed, distance, time graphs – How to draw them using and describe their features. Horizontal line means at rest, sloping up line means acceleration. 5. Exercise graphs – The bodies response to exercise. Increased heart rate, glycogen stores in the muscles are converted to glucose for cellular respiration. How to draw exercise graphs that show heart beats per minute and breathing rate in breaths per minute. <p>Key skills</p> <ol style="list-style-type: none"> 1. Be able to plan and carry out a scientific experiment safely 2. Be able to make measurements accurately (mm, ml, s etc) 3. Make and record observations in a table (including appropriate table headings and units). 4. Be able to draw a bar chart and a line graph and draw a line of best fit. 		<p>Reading on how other organisms use respiration. What is Oxygen Debt?</p>
		<p>Writing plans for exercise graph experiments. Describing an experiment to test fitness levels of students.</p>
		<p>Explaining how different factors could effect the breathing and heart rates of people. Discussing how the liver is an organ of respiration.</p>
		<p>Maths – Graph drawing skills. Calculations in speed, distance and time. PE – Exercise and the effect on the body.</p>
<p>HALF TERM 2: What’s the matter?</p> <p>Matter</p> <ol style="list-style-type: none"> 1. The PT contains elements (elements are substances which are only made up of one type of atom, therefore is pure). 2. Mendeleev created the modern PT. 3. Elements are in groups based on similarities, usually in reactivity 4. Elements in periods show similarities in physical properties. 5. Pupil’s should be able to label the periodic table – metals on the left, non-metals on the right. 6. Group 1 – alkali metals, are very reactive. Examples are lithium, sodium and potassium. 7. Group 7 – non-metals called halogens. Examples include bromine, chlorine and fluorine. 8. Group 0 – non-metals, unreactive, called noble gases. 9. Compounds are substances made up of two or more elements strongly joined together. 10. A polymer is molecule made of thousands of smaller molecules in a repeating pattern. <p>Reactions</p> <ol style="list-style-type: none"> 1. Catalysts are substances that speed up chemical reactions but are unchanged at the end. 2. In an exothermic reaction energy is given out, usually as heat or light. 3. In an endothermic reaction energy is taken in, usually as heat. 		<p>Reading periodic table information. Reading on different types of reactions.</p>
		<p>Extended piece of writing on the history of the periodic table. Writing observations of reactions of alkali metals</p>
		<p>Comparing exo and endothermic reactions – researching and discussing common products that use these reactions – self warming drinks cans for example.</p>
		<p>History – History and timeline of the periodic table. Technology – Exo and endothermic reactions that take place in industry.</p>



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<p>4. Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.</p> <p>5. Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating.</p> <p>6. Be able to write word equations for reactions.</p> <p>7. In a chemical reaction, new products are formed from the reactants. For example: fireworks, cooking.</p> <p>8. In a physical reaction, no new substances are formed. These reactions are reversible.</p>		
<p>HALF TERM 3: Disaster</p> <p>Rocks</p> <p>1. There are 3 groups of rocks: sedimentary, metamorphic and igneous.</p> <p>2. Igneous form from magma and have interlocking crystals, the size of the crystals depends on the speed of cooling (large crystals form slowly).</p> <p>3. Sedimentary rock form from particles of other rocks cemented together with minerals.</p> <p>4. Fossils are sometimes found in sedimentary rocks. Fossils are the remains of dead plants and animals preserved in rocks.</p> <p>5. Metamorphic rocks form through heat and pressure, changing sedimentary and igneous rocks. They are made of tiny crystal and often have layers.</p> <p>6. Identify examples of metamorphic, sedimentary and igneous rocks using descriptions.</p> <p>7. The rock cycle describes how rock are changed from one type into another and takes millions of years.</p> <p>8. There are 9 stages in the rock cycle – Weathering, Erosion, Transportation, Deposition, Burial, Heat/Pressure, Melting, Cooling and Exposure</p> <p>9. Earthquakes and volcanoes result from processes in the rock cycle.</p> <p>Pressure</p> <p>1. Pressure is how much force put on a certain area. (Pressure = force ÷ Area).</p> <p>2. Pressure is measured in newtons per metre squared or pascals. 1 newton/meter squared is 1 pascal.</p> <p>3. The weight of the atmosphere pushing against us is atmospheric pressure. The higher you are the lower the pressure.</p> <p>4. Pressure in liquids increases with depth.</p> <p>5. Pressure causes up thrust making things float.</p>		<p>Reading on natural disasters how and why they happen, examples around the world. Use of newspaper and internet articles.</p>
		<p>The story of a particle around the rock cycle using all 9 processes.</p>
		<p>Drama - newsreels on natural disasters, what happened the science behind it etc (group exercised filmed and assessed)</p>
		<p>Technology – Using pressure in machines e.g. hammers and nails. Geography – natural disasters, tectonic plates etc. Maths – Pressure calculations – pressure triangle and rearranging equations..</p>
<p>HALF TERM 4: Wired for sound</p> <p>Electricity</p> <p>1. Electric current is the flow of charge around the circuit. Potential difference pushes current around the circuit. Conductors allow electricity to pass through insulators do not.</p> <p>2. Circuit symbols and diagrams are used to draw and then make circuits.</p>		<p>How are rainbow formed – reading around the science of rainbows.</p>
		<p>How electricity has changed the world. Essay on how electricity is used and why it is important in our lives.</p>









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<p>3. Resistance is how easy electricity can flow. Resistance = $pd \div \text{current}$</p> <p>4. Ammeters and voltmeter can be used to measure current and pd – pupils should be able to use ammeters and volt meters in circuits.</p> <p>5. In series circuits the current has no choice of route, the current is the same anywhere and is not used up. The sum of the pd of the components is equal to the pd of the battery.</p> <p>6. In parallel circuit the current takes different routes. The ammeter reading in each route depend on the resistance of the component. Total current = sum of current on each branch. The pd across each component is the same as the battery.</p> <p>7. Charges can build up when object rub together – this is called static electricity because the charges don't move. The charges can either be positive or negative and attract oppositely charged objects.</p> <p>Light</p> <p>1. Light always travels in straight lines, travels in waves and does not need particles to travel.</p> <p>2. To see an object light is reflected off it. Mirrors do not scatter light, so reflects light off at the same angle. The law of reflection says that the angle of incidence = the angle of reflection.</p> <p>3. Refraction happened when light beds as it crosses a boundary. When light travels from a less dense medium to a denser medium it bends toward the normal.</p> <p>4. The eye and pin hole camera are devices that use light.</p> <p>5. White light can be split into a spectrum using a prism. Different colours have different frequencies.</p> <p>Sound</p> <p>1. Sound waves are longitudinal or pressure waves that need particles to travel through (they cannot travel through a vacuum).</p> <p>2. The spread of sound depends on the medium it is travelling through (link to particle theory).</p> <p>3. A CRO can be used to show frequency, amplitude and wavelength of a sound wave.</p> <p>4. Our ears are our organ of hearing. Different parts of the ear allow the signal to be passed on.</p> <p>5. Different people and animals have different auditory ranges (they can hear different frequencies of sound).</p> <p>6. Loud speakers and microphones help turn sound waves into electrical signals.</p> <p>7. Ultra sound is high frequency sound that we cannot hear but are useful for cleaning and medical uses.</p>		<p>Changing the pitch and amplitude of our vice to emphasize and express language using the ideas from sound</p>
		<p>Drama – theatre lighting and sound Technology – how electrical devices work Maths – Calculating resistance using the formula Resistance is $pd \div \text{current}$</p>
<p>HALF TERM 5: Planet Earth</p> <p>Evolution</p> <p>1. The theory of evolution by natural selection states that all species of living things have evolved from simple life forms.</p> <p>2. Lamarck's theory proposed that the way organisms behaved affected the features of their body, in a case of 'use it or lose it'.</p>		<p>Reading the key information on Charles Darwin and his journey to the Galapagos islands.</p>
		<p>Extended writing task on the predator and prey relationship. How humans effect the population size.</p> <p>A journey to the galapagos islands</p>



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<p>3. Darwin's theory of evolution looking at species and how they can show a wide range of variation for each characteristic.</p> <p>4. Alfred Wallace developed clear theories on the role of geographic isolation in the formation of species.</p> <p>5. Speciation – how two groups of the same species can become separated, and eventually they become so different they are no longer able to interbreed successfully.</p> <p>Ecosystems</p> <p>1. Understand what is meant by key terms, population, community, and biodiversity and why does it matter, what is the human population growth and how it can affect population size of organisms. The difference between abiotic and biotic factors and how these can affect communities.</p> <ul style="list-style-type: none"> • Community – a group of interdependent living organisms in an ecosystem • Abiotic – Non-living factors, that can include temperature. • Biotic – Living factors that affect organisms such as new pathogens. <p>2. Competition – the process by which living organisms compete for limited resources.</p>		<p>Group work and presentation on Charles Darwin and his theory of Evolution,</p> <p>How Darwin faced criticisms.</p>
		<p>History – Charles Darwin and the link to the local area.</p> <p>RE – Link with religious beliefs and Darwins theory.</p> <p>Maths – predator and prey graphs</p>
<p>HALF TERM 6: Planet Earth (Purple text = skills)</p> <p>Photosynthesis</p> <p>1. The equation of photosynthesis is Carbon dioxide + water = glucose and oxygen.</p> <p>2. Leaves are adapted to photosynthesize, and the process can speed up or slow down the rate of photosynthesis.</p> <p>3. Testing for gases – Collecting bubbles of Oxygen (re lights a glowing splint)</p> <p>4. Photosynthesis is an endothermic reaction as it needs an input of energy from the environment.</p> <p>5. Light, temperature and carbon dioxide concentration are all limiting factors that affect the rate of photosynthesis.</p> <p>Toxins</p> <p>1. Toxins such as pesticides or pollution from human activity can be absorbed by plants and have an impact on a food chain.</p> <p>2. Toxins remain in the tissue of animals, the closer the animal is to the top of the food chain the higher level of toxins present.</p> <p>Feeding relationships</p> <p>1. A community is connected by feeding relationships. What are the primary consumers, secondary consumers and the tertiary consumers within a community?</p> <p>2. Producers are always plants.</p> <p>3. The animals that eat the producers are known as primary consumers.</p> <p>4. Primary consumers are eaten by animals known as secondary consumers.</p> <p>5. Tertiary consumers digest other animals, so their diet is high in fat and protein.</p>		<p>Reading on carbon footprint and what we can actively do to reduce this.</p>
		<p>Extended writing task on 'what would the be like without plants'</p> <p>Writing experiments for the required photosynthesis practical.</p>
		<p>Group discussions on how food chains and webs are affected when species go extinct.</p>
		<p>Maths – Graph drawing to show the rate of photosynthesis. Predator and prey populations showing typical rises and falls.</p>