



Curriculum Map: Year 8 Subject: Science 21/22

Topic	Key Knowledge <i>What will all students KNOW by the end of the topic?</i>	Key Skills <i>What key skills will be learnt/developed by the end of the topic? What will all students be able to DO by the end of the topic?</i>	Assessment Opportunities <i>What are the key pieces of assessment? How will students be assessed?</i>
Electricity	<ul style="list-style-type: none"> • A current carrying wire creates a magnetic field. • How to make an electromagnet. • An electromagnet can be turned on and off. • A current carrying wire experiences a force when placed across a magnetic field. • A current carrying loop of wire will turn when placed in a magnetic field; this is the basis of the DC motor. • electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • differences in resistance between conducting and insulating components (quantitative). • Describe atom structure in terms of protons, neutrons and electrons and know the relative charges • separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects • the idea of electric field, forces acting across the space between objects not in contact. 	<ul style="list-style-type: none"> • Plan & carry out investigation of how to change the strength of an electromagnet. This will include: • Identifying independent, dependent and control variables. • Use models to explain scientific ideas 	<ul style="list-style-type: none"> • L3 – Series and Parallel SMH quiz • Resistance investigation
Forces	<ul style="list-style-type: none"> • force-extension linear relation; Hooke's Law as a special case 	<ul style="list-style-type: none"> • Apply mathematical concepts and calculate results. 	<ul style="list-style-type: none"> • Distance/time graph show my homework quiz

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	<ul style="list-style-type: none"> work done and energy changes on deformation atmospheric pressure, decreases with increase of height as weight of air above decreases with height pressure in liquids, increasing with depth; upthrust effects, floating and sinking pressure measured by ratio of force over area – acting normal to any surface. opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface. 	<ul style="list-style-type: none"> Use the equation: pressure = force (perpendicular to surface) ÷ area. Calculate pressure using the correct units. Explain situations where the same force will have a different effect because of different surface over which it is applied (e.g., stilettos & snowshoes). Explain why pressure increases with increases with depth in a liquid. Explain why atmospheric pressure decreases with increasing height. Plan & carry out investigation on how force affects extension of a spring 	<ul style="list-style-type: none"> Hooke's law investigation
Organisms (pathogens and immunity)	<ul style="list-style-type: none"> the structural adaptations of some unicellular organisms The role of the immune system in the body 	<ul style="list-style-type: none"> Plan & carry out investigation on the affects of hand washing on bacteria cultures Recall knowledge of how the immune system responds to infection Relate the structure of bacteria, fungi and viruses to that of a typical animal and plant cell Explain how vaccinations work 	<ul style="list-style-type: none"> L4 – growing bacterial cultures L5 – microorganisms and diseases homework questions End of topic SMH quiz
Earth	<ul style="list-style-type: none"> the carbon cycle the composition of the atmosphere the production of carbon dioxide by human activity and the impact on climate. 	<ul style="list-style-type: none"> Analyse data Evaluate the impact of human activity 	<ul style="list-style-type: none"> KO test
Matter	<ul style="list-style-type: none"> Diffusion in terms of Brownian motion and diffusion in liquids and gases. Energy changes during changes of state. simple techniques for separating mixtures: distillation and chromatography Identifying pure substances 	<ul style="list-style-type: none"> Recall key terminology. Complete a practical to determine the components of a pen through chromatography Relate the processes of evaporation and condensation to distillation Complete a practical and analyse data to see the differences between pure water and a mixture 	<ul style="list-style-type: none"> Pre- topic SMH quiz(?) L4 Distillation question Post-topic SMH quiz

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<p>Reactions</p>	<ul style="list-style-type: none"> • chemical reactions as the rearrangement of atoms • chemical symbols and formulae for elements and compounds • representing chemical reactions using formulae and using equations • combustion, thermal decomposition, oxidation and displacement reactions • exothermic and endothermic chemical reactions (qualitative). • the order of metals and carbon in the reactivity series • the use of carbon in obtaining metals from metal oxides • conservation of mass changes of state and chemical reactions • Metal oxides and non-metal oxides properties • Know examples of ceramics, polymers and composites and the differences in their general properties 	<ul style="list-style-type: none"> • Recall key terminology • Use the reactivity series to predict and explain whether reactions will occur or not. - Interpret observations and patterns in observations to draw conclusions. • Understand and use IUPAC chemical nomenclature (word & symbol equations). • Recall key terminology. • Using correct chemical nomenclature from the periodic table when writing word and symbol equations. • Using a wider range of more complex laboratory apparatus when carrying out experiments and paying attention to health & safety. • Making and recording accurate observations and using them to draw conclusions. • Apply knowledge of particles and the law of conservation of mass to contextual examples of chemical reactions. 	<ul style="list-style-type: none"> • Naming compounds test • Oxides practical write up • Knowledge organiser test
<p>Organisms (breathing)</p>	<ul style="list-style-type: none"> • the structure and functions of the gas exchange system in humans, including adaptations to function • the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume • the impact of exercise, asthma and smoking on the human gas exchange system • aerobic and anaerobic respiration in living organisms, including the breakdown of organic 	<ul style="list-style-type: none"> • To write word equations for aerobic and anaerobic respiration • Understanding of how models can be useful. • Be able to interpret observations – test for carbon dioxide 	<ul style="list-style-type: none"> • Affects of exercise • Smoking exam question • End of topic Homework quiz

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	<p>molecules to enable all the other chemical processes necessary for life</p> <ul style="list-style-type: none"> • a word summary for aerobic respiration • the process of anaerobic respiration in humans and microbes including fermentation a word summary for anaerobic respiration • the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism 		
Matter 2	<ul style="list-style-type: none"> • how patterns in reactions can be predicted with reference to the periodic table • the varying physical and chemical properties of different elements • a simple (Dalton) atomic model • differences between atoms, elements and compounds • chemical symbols and formulae for elements and compounds • Identify covalent, ionic and metallic bonding 	<ul style="list-style-type: none"> • Recall key terminology. • 	<ul style="list-style-type: none"> • Pre-topic quiz • Atomic structure • End of topic quiz
Organisms (Digestion)	<ul style="list-style-type: none"> • the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts) • the importance of bacteria in the human digestive system • the effects of recreational drugs (including substance misuse) on behaviour, health and life processes 	<ul style="list-style-type: none"> • Understanding of how models can be useful. • Recall key terminology 	<ul style="list-style-type: none"> • Pre-topic quiz • Comic strip • End of topic quiz
Genes	<ul style="list-style-type: none"> • heredity as the process by which genetic information is transmitted from one generation to the next 	<ul style="list-style-type: none"> • Evaluate the use of models to represent an idea or structure. 	<ul style="list-style-type: none"> • Punnet squares • Knowledge organiser test • End of topic quiz

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	<ul style="list-style-type: none"> • a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model • differences between species • 		
Organisms (plants)	<ul style="list-style-type: none"> • the reactants in, and products of, photosynthesis, and a word summary for photosynthesis • the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and 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 in the atmosphere • the adaptations of leaves for photosynthesis • plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots 	<ul style="list-style-type: none"> • To write a word equation for photosynthesis. • How to make links between other topics (Respiration and Ecology) 	<ul style="list-style-type: none"> • Virtual lab on photosynthesis • Farmers and fertilisers project • End of topic quiz
Energy	<ul style="list-style-type: none"> • comparing power ratings of appliances in watts (W, kW) • comparing amounts of energy transferred (J, kJ, kW hour) • domestic fuel bills, fuel use and costs • heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators 	<ul style="list-style-type: none"> • Identify good thermal conductors and insulators. • Explain why convection can happen in gases and liquids but not in solids 	<ul style="list-style-type: none"> • L3 Power quiz • L8 Applications task
Ecosystems	<ul style="list-style-type: none"> • the importance of plant reproduction through insect pollination in human food security 	<ul style="list-style-type: none"> • Recall key terminology. • 	<ul style="list-style-type: none"> • Not assessed

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<p>Waves</p>	<ul style="list-style-type: none">• frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound• sound needs a medium to travel, the speed of sound in air, in water, in solids• the similarities and differences between light waves and waves in matter• light waves travelling through a vacuum; speed of light• the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface• use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye• light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras• colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.	<ul style="list-style-type: none">• Demonstrate experimentally that light can change direction when it passes from one material into another.• Use of a protractor.• Use ray diagrams to explain the pinhole camera.• Compare the speed of sound in air, water and solids.	<ul style="list-style-type: none">• Properties of waves quiz• Reflection investigation• Knowledge test
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