

Curriculum Map Year 8 - Science

	Topic	Key Knowledge <i>What will students know by the end of this topic?</i>	Key Skills <i>What skills will students have developed by the end of this topic?</i>	Assessment Opportunities <i>How will student progress be measured? What are the key assessment pieces?</i>
Half Term 1	Chemical Reactions 1.	- How to recognise elements, compounds and mixtures from particle diagrams and know that they are pure substances. - The difference between physical and chemical changes in terms of the combining and rearrangement of different atoms. - The theory of conservation of mass. - The difference between exothermic and endothermic reactions. - What happens when metals react with water. - What happens during combustion reactions and thermal decomposition reactions.	- 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. -	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.
	Breathing and Respiration	- Structure, functions and adaptations of the respiratory system. - How we breathe and the composition of inhaled and exhaled air. - The impact of exercise and asthma on the respiratory system. - The purpose of respiration. - The difference between aerobic and anaerobic respiration. - How anaerobic respiration in humans differs from the reaction in micro-organisms. -	- To write word equations for aerobic and anaerobic respiration. - Make links between breathing, circulation and respiration. - Apply theory to contextual examples. - Understanding of how models can be useful. - Be able to interpret observations – test for carbon dioxide. - Investigations to include the following skills: - Ask questions and develop a line of enquiry. - Write a method. - Variables. - Risk assessment. - Make and record observations in a table. - Evaluate the reliability of the method and suggest improvements. - Use data to draw conclusions with explanations. - Identify further questions that arise from the results. - Awareness of potential sources of systematic error.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz. Assessment 1: Plant Reproduction, Sound (from year 7) Core Skills

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			- Use of SI units. -	
Half Term 2	Waves 2: Light	- Some similarities and differences between light waves and sound waves. - Light is a transverse wave. - Light can travel through a vacuum at a speed of 300,000,000 m/s. - Light can be absorbed, reflected or transmitted at a surface. - The difference between diffuse scattering and specular reflection. - White light is made up of many colours. - How to make a spectrum. - Different colours of light have different frequencies. - Light transfers energy leading to chemical effects in film cameras. - Light transfers energy leading to electrical effects in modern cameras. - Light transfers energy to photosensitive material in the retina which results in electrical signals being sent to the brain.	- Complete own risk assessment. - Demonstrate experimentally that for a plane mirror, angle of reflection = angle of reflection. - Use ray diagrams to explain the reflection of light in a mirror. - Demonstrate experimentally that light can change direction when it passes from one material into another. - Use of a protractor. - Recognise how a convex lens can focus light using refraction. - Use ray diagrams to explain the pinhole camera. - Compare the ray diagram of a pinhole camera and the human eye. - Compare the ray diagram of a convex lens and focussing by the human eye. - Explain why some objects appear coloured in white light using ideas of absorption and diffuse reflection.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.
	Pure & Impure Substances	- The meaning of a pure substance and a mixture in terms of the particle model. - What a solution is, how they form and factors affecting how much solute will dissolve. - How to identify pure substances and how distillation can be used to purify water. - How to extract salt from rock salt. - What chromatography is and explain it using a simple model. - Know examples of ceramics, polymers and composites and the differences in their general properties. -	- Recall key terminology. - Make and record measurements for different solutions. - Developing their own line of enquiry. - Using a wider range of more complex laboratory apparatus when carrying out experiments and paying attention to health and safety. - Making and recording accurate observations. -	- Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.

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	Electricity & Magnetism 1 : Electricity	- How to use switches to control the current in series & parallel circuits. - The unit for current (ampere, Amps A). - Current is a flow of charge. - The unit for potential difference (volts, V). - The potential difference of batteries and power supplies is a measure of the amount they 'push' the charges around the circuit. - In an electric circuit energy is transferred from the chemical store of a battery by the moving charge, and by the moving charge to circuit components. - The unit for resistance (ohms, Ω). - The size of the current depends on the potential difference of the battery and the resistance of the components in the circuit. - Conducting materials have a high resistance and insulating materials have a low resistance. - How to separate positive and negative charges using friction. - Static electricity is caused by the transfer of electrons. - Objects with a positive or negative charge attract or repel other charged objects. - The electric field between two charges causes them to feel a force even when not in contact (non-contact force). -	- Build electric circuits from circuit diagrams. - Use models to describe current. - Deduce the current in parts of series and parallel circuits. - Calculate resistance from the formula: $\text{resistance} = \text{potential difference} \div \text{current}$ - Use models to describe resistance. - Interpret data and draw conclusions about good insulators and good conductors and their resistance. - Present reasoned explanations of static phenomena. -	- Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.
	Magnetism	- The magnetic field between two magnetic pole causes them to feel a force even when not in contact (non-contact force). - The effect of magnets on each other and other magnetic and non-magnetic objects. - How to represent magnetic fields using field lines (direction, spacing, do not cross). - The Earth has a magnetic field. - How a compass works to help navigation. - A current carrying wire creates a magnetic field.	- Apply the idea that 'like' poles will repel and 'unlike' poles will attract. - Plot the fields lines around a bar magnet using a plotting compass. - Plan & carry out investigation of how to change the strength of an electromagnet. This will include: -Identifying independent, dependent and control variables. - Use of key experimental words: -Repeatability.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions.

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		- 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. -	-	- Assessed task: Magnetism. - End of topic quiz. - Assessed task: Photosynthesis. Assessment 2: Chemical Reactions 1, Breathing and Respiration
Half Term 3	Chemical Reactions 2	- Know the order of metals and carbon in the reactivity series. - What a displacement reaction is. - The use of carbon in the extraction of some metals from metal oxides. - The purpose of catalysts.	- 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).	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.
	Pressure and Upthrust	- The equation: $\text{pressure} = \text{force (perpendicular to surface)} \div \text{area}.$ - How pressure changes with depth in a liquid. - Pressure is larger on the lower surface of an immersed object than on the upper surface resulting in an upward force on the object called upthrust. - An object will float if its overall density is less than the density of the liquid. - How atmospheric pressure changes with height.	- Apply mathematical concepts and calculate results. - Use the equation: $\text{pressure} = \text{force (perpendicular to surface)} \div \text{area}.$ - 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. - Use the idea of balanced and unbalanced forces to explain whether an object will float or sink.	- Pre-topic homework to encourage recall of ideas from F&M 1 & 2 including names of forces, balanced & unbalanced forces, and their effect on motion, Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions.

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			- Explain why atmospheric pressure decreases with increasing height.	End of topic quiz. Assessment 3: Light, Pure and Impure substances, Core skills
Half Term 4	Acids & Bases (Alkalis)	- How to test for acids and alkalis using litmus and universal indicator. - The pH scale and everyday examples of substances that are acidic, basic or alkaline. - Bases neutralise acids. - What happens when metals react with acids. - Metal oxides are basic. - Non-metal oxides are acidic. How acid rain is formed.	- Making and recording accurate observations. - Interpret observations and patterns in observations to draw conclusions. - Understand and use IUPAC chemical nomenclature (pH scale, word & symbol equations). - Develop a wider capability in writing and interpreting word and symbol equations to cover neutralisation reactions: - metal and acid. - metal oxide and acid.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.
	Alcohol and Drugs Independent Learning Project	- The definition of a 'drug' and how to classify different drugs. - Effects of different drugs on the body (include alcohol)	- Using internet / external resources to extract and interpret key information - Present information in suitable formats	- Apply learning to exam style questions - Exit quiz - Opportunities for students to 'go beyond' with this project Assessment 4 : Electricity, Chemical Reactions 2, Core skills

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Half Term 5	Inheritance and Genetics	- Definition of 'species'. - The difference between continuous/discontinuous variation and genetic/environmental variation. - How to model chromosomes, genes and DNA. - The role of Watson, Crick, Wilkins and Franklin in the DNA model. - How genetic information is passed from one generation to the next. - How variation leads to competition between organisms. - The process of natural selection. - The causes of extinction. - Why it is important to maintain biodiversity. - The role of gene banks.	- Evaluate the use of models to represent an idea or structure. - How to build a timeline of how theories develop over time. - Explain the importance of publishing results and peer review. - Carry out scientific enquiry: - Make and record observations. - Present observations in table and graph. - Use data to draw conclusion with explanation. - Use SI units. -	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz. -
	Photosynthesis (To be completed in Half term 6)	- The reactants, products and word equation for photosynthesis. - The importance of the process in producing carbohydrates. - How to test for the presence of starch and oxygen. - The role of the leaves, stomata and roots. - How photosynthesis helps to maintain levels of oxygen and carbon dioxide in the atmosphere.	- To write a word equation for photosynthesis. - How to make links between other topics (Respiration and Ecology). - Understand that scientific theories develop as earlier explanations are modified to take account of new evidence. - Investigations to include the following: - Accuracy, Precision, Repeatability, Reproducibility. - Make prediction. - Risk assessment. - Variables. - Write method. - Make and record observations. - Calculate mean values. - Use data to draw conclusions. - Present observations in graph. - Interpret observations and provide explanations in relation to predictions. - Sources of random error. - Evaluate reliability of method and suggest improvements.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz. - Assessment 5: Examination on all topics so far up to acids and bases

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Half Term 6	Pivots and Levers and their links with the human body	- A moment is a turning effect of a force. - The size of the turning effect depends on the size of the force and on its (perpendicular) distance from the pivot. - Structure and function of the skeleton. - The role of joints and their location. - Muscles and their function. - The force involved in using muscles.	- Take accurate measurements of extension as a force is applied. - Plot a line graph to show Hooke's law. - Describe the linear relationship between force and extension. - Use of key experimental words: -Systematic (zero) error. -Accuracy. -Precision. -Reproducibility. -Random (parallax) error. - Draw own results table. - Apply mathematical concepts & calculate results. - How models can be used to show forces involved in using muscles. - Calculation of moment = force x perpendicular distance. - Use and derive simple equations. - Use of SI units. - Calculate results. - Present observations in table and graph. - Use data to draw conclusions with explanations.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.
	Planet Earth	- The basic structure of the Earth. - How sedimentary, igneous and metamorphic rocks are formed including examples of each type. - The two different types of igneous rocks. - The rock cycle and its use in explaining how rocks (over long periods of time) can turn into other types of rocks. - Earth's resources are limited including which ones are most limited. - Advantages, disadvantages and efficacy of recycling. - Composition of the Earth's atmosphere. - How CO₂ levels are leading to climate change. -	- How models can be used to represent an idea or structure. - Understanding of how theories develop over time. - Making accurate observations. - Application of the ideas within the rock cycle. - Know the importance of publishing results and peer review. -	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz.

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	Space Physics	- Mass is a measure of the amount of matter an object or substance is comprised of. - Weight is due to gravity acting at distance on Earth and in space. - Earth's gravitational field strength is approximately 10 N/kg. - The gravitational field between two objects causes them to feel a force even when not in contact (non-contact force). - The force due to gravity keeps the moon orbiting the Earth and the Earth orbiting the Sun. - Gravitation field strength is different on different planets and stars. - Our sun is a star. - Our galaxy contains other stars. - Our galaxy is one of billions of galaxies. - Ideas about the nature of the solar system have changed over time.	- Use the equation: weight = mass x gravitational field strength. - Apply mathematical concepts and calculate results. - Calculate weight on different planets using the formula: weight = mass x gravitational field strength. - Use a light year as a unit of astronomical distance. - Explain how the Earth's tilt causes seasons. - Explain why seasons are different in the northern and southern hemispheres. - Describe how day length varies at different times of year.	- Pre-topic homework to assess prior knowledge from KS2. - Starter tasks to review prior learning. - Revision homework tasks to reinforce keywords and definitions. - End of topic quiz. Assessment 6: Photosynthesis and inheritance