

Subject Map KS3 Science 2 year pathway

	TERM					
	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Year 1	<p>In year 7, Students will learn about the different sciences as follows:</p> <p>Speed</p> <p>Students will learn about the concept of speed and use mathematical methods to determine the different variables in the speed equation. They will also apply this knowledge to explain speed limits, average speed cameras and phenomena such as lightning and thunder.</p> <p>Particle Model</p> <p>Students will learn about the particle theory and use it to describe and explain different forms of change of state. They will also use this knowledge to explain freezing and boiling points.</p>	<p>Separating Mixtures</p> <p>Students will explain how substances dissolve using the particle model. Use the solubility curve of a solute to explain observations about solutions. They will learn about solutes, solvents and solutions. Mixtures may be separated due to differences in their physical properties. Students will be able to Choose the most suitable technique to separate out a mixture of substances.</p> <p>Light</p> <p>Students will learn that when a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. Also, use ray diagrams to</p>	<p>Human Reproduction</p> <p>In this topic students will learn that the developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances. They will describe causes of low fertility in male and female reproductive systems. Sound Students will learn that</p> <p>Sound</p> <p>consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. The greater the amplitude of the waveform, the louder the sound. They will be able to explain observations where sound is reflected,</p>	<p>Elements</p> <p>Students will learn to name compounds using their chemical formulae. Compare the properties of elements with the properties of a compound formed from them. They will represent atoms, molecules and elements, mixtures and compounds using particle diagrams.</p> <p>Acids and Alkalis</p> <p>In this topic, students will learn that the pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids. Identify the best indicator to distinguish between solutions of different pH, using data provided.</p> <p>Current In this topic students will be able to explain what current is,</p>	<p>Voltage and Resistance</p> <p>In this topic students will learn to model voltage as an electrical push from the battery, or the amount of energy per unit of charge transferred through the electrical pathway. They will draw a circuit diagram to show how voltage can be measured in a simple circuit.</p> <p>Variation</p> <p>Students will learn that there is variation between individuals of the same species. Some variation is inherited, some is caused by the environment and some is a combination. Students will explain how characteristics of a species are adapted to particular environmental conditions.</p>	<p>Earth structure</p> <p>In this topic, students will learn about the structure of the earth, the three types of rocks and how they are connected. They Identify the causes of weathering and erosion and describe how they occur. Construct a labelled diagram to identify the processes of the rock cycle.</p> <p>Universe</p> <p>Students will learn about our solar system and the planets. They will explain why places on the Earth experience different daylight hours and amounts of sunlight during the year. Describe how space exploration and observations of stars are affected by the scale of the universe.</p> <p>Energy costs Students will learn about energy</p>

	<p>Cells</p> <p>In this topic, students will explore the organelles in plant and animal cells and learn about the functions of these organelles. They will also learn about specialised cells and be able to apply the knowledge to link structure and function.</p> <p>Gravity</p> <p>In this topic, students will use various common processes to explain the differences between mass and weight and explore how mass and weight differ on various celestial bodies.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Understanding Scientific Modelling • Application of scientific concepts • Identifying flaw in modelling • 	<p>describe how light passes through lenses and transparent materials.</p> <p>Movement</p> <p>In this topic, students will explore how the skeletal system and muscular system in a chicken wing work together to cause movement. Also, explain why antagonistic pairs of muscles create movement when one contracts and the other relaxes.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Analysing pattern • Draw conclusions • Construct explanations 	<p>transmitted or absorbed by different media.</p> <p>Plant Reproduction</p> <p>Students will learn main steps that take place when a plant reproduces successfully. Identify parts of the flower and link their structure to their function. They will explain why seed dispersal is important to survival of the parent plant and its offspring.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Understanding Scientific Modelling • Application of scientific concepts • Identifying flaw in modelling 	<p>describe how current changes in series and parallel circuits when components are changed. They will describe the effects of electric field around a charged object and the field strength.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Understanding Scientific Modelling • Application of scientific concepts • Identifying flaw in modelling 	<p>Interdependence</p> <p>In this topic, students will learn about organisms in a food web and how they depend on each other for nutrients. Students will combine food chain to form a food web. They will explain effects of environmental changes and toxic materials on a species' population.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Understanding Scientific Modelling • Application of scientific concepts • Identifying flaws in modelling. • Draw conclusions • Construct explanations • Justify opinions. 	<p>transfer and how we pay for our domestic electricity. They will explain the advantages and disadvantages of different energy resources. Also, learn to represent the energy transfers from a renewable or non-renewable resource to an electrical device in the home.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Understanding Scientific Modelling • Application of scientific concepts • Identifying flaws in modelling. • Draw conclusions • Construct explanations
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<p>Year 2</p>	<p>Space physics</p> <p>Students will learn about space, galaxy, stars, orbits and exoplanets. They will describe how space exploration and observations of stars are affected by the scale of the universe.</p> <p>Acids and Alkalis</p> <p>In this topic, students will learn about indicators and how mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water. They will explain how neutralisation reactions are used in a range of situations. Describe a method for how to make a neutral solution from an acid and alkali. Required Practical Making and using red cabbage indicator Practical skills and investigations. Light I Students will learn to make a Pinhole camera</p>	<p>Digestion</p> <p>In this topic, students will learn about the different food nutrients and their functions. They will learn about the organs of digestive system and describe the events that take place in order to turn a meal into simple food molecules inside a cell. Required Practical Visking tubing, starch, amylase</p> <p>Pure and Impure substances</p> <p>Students will learn that a pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Students will learn about chromatography and its applications. Use evidence from chromatography to identify unknown substances in mixtures. Required Practical Chromatography of colours Magnets and</p>	<p>Respiration</p> <p>In this topic, students will learn to describe respiration as a chemical reaction, describe the difference between aerobic and anaerobic respiration using word equation. They should learn how specific activities involve aerobic or anaerobic respiration.</p> <p>The Atmosphere</p> <p>In this topic, students will learn about the different gases in the atmosphere and their composition. Also, they will learn about climate change and human factors that can contribute to climate change.</p> <p>Light II Students will learn about the Spectrum of light, prisms and white light. Students will investigate the absorption and reflection of light using colour filters. Required</p>	<p>Human as organisms</p> <p>In this topic students will learn about the structure and functions of the human skeleton, to include support, protection, movement and making blood cells. They will also learn about reproduction in humans, including the structure and function of the male and female reproductive systems, menstrual cycle Required Practical Dissection of organ (Heart)</p> <p>Periodic table</p> <p>Students will learn about the Periodic table, the principles underpinning the Mendeleev periodic table, the periods and groups and describe the reaction of an unfamiliar Group 1 or 7 element. Required Practical reactivity of group 1 Required Practical Halogens</p> <p>Photosynthesis</p>	<p>Photosynthesis</p> <p>To consolidate on the topic of photosynthesis students will carry out Required Practical Rate of photosynthesis in different colour of light Practical skills 4 and investigations</p> <p>Forces and Motion</p> <p>In this topic, students will learn that when the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line. Students will be able to describe factors which affect the size of frictional and drag forces. Describe how materials behave as they are stretched or squashed. Required Practical Work done.</p> <p>Energy changes</p> <p>In this topic students will describe how the energy of an object depends on its speed, temperature, height or whether it is stretched</p>	<p>Energy changes</p> <p>Students will calculate the useful energy and the amount dissipated, given values of input and output energy. Explain how energy is dissipated in a range of situations.</p> <p>Materials</p> <p>In this topic students will learn that metals can be arranged as a reactivity series in order of how readily they react with other substances. Students will be able to describe an oxidation, displacement, or metal-acid reaction with a word equation. Place an unfamiliar metal into the reactivity series based on information about its reactions. Required Practical Extracting copper with carbon.</p> <p>Health In this topic students will learn about the effects of recreational drugs (including substance</p>
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	<p>as part of the Required Practical. They will learn about refraction of light, describe how lenses may be used to correct vision and explain observations where coloured lights are mixed or objects are viewed in different lights.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Devise questions • Test hypothesis • Collect data • Estimate risk 	<p>Electromagnets Students will learn about electromagnets, what causes magnetic field and also investigate ways of varying the strength of an electromagnet. They should be able to explain the choice of electromagnets or permanent magnets for a device in terms of their properties. Required Practical Making a compass Practical skills and Investigation 2</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Plan variables • Test hypothesis • Critique claims • Communicate ideas 	<p>Practical Diffuse and Specular reflection Practical skills and investigations 3</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Analyse patterns • Communicate ideas • Justify opinions • Test hypothesis 	<p>In this topic students will learn how plant and algae make their food by photosynthesis. Use word equation to describe photosynthesis and show how the rate of photosynthesis is affected by changing conditions.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Analyse patterns • Communicate ideas • Justify opinions • Test hypothesis • Review theories • Discuss limitations 	<p>or compressed. When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy. Also, show how energy is transferred between energy stores in a range of real-life examples. Required Practical dropping asteroids and measuring craters Practical skills and investigations 5.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Analyse patterns • Communicate ideas • Collect data 	<p>misuse) on behaviour, health and life processes.</p> <p>Threshold Concepts:</p> <ul style="list-style-type: none"> • Communicate ideas • Discuss limitations • Examine consequences
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Assessment

The teacher will use summary assessment to inform their planning, support individuals and adapt lessons accordingly for their class. We will assess ongoing progress through questioning in class and assessment tasks in the classroom. Intervention will be targeted where it is needed. There will be a half termly written paper which will assess students' ability to apply the knowledge and skills they have studied in that half-term. The papers will also include questions based on previous units to test how deeply embedded the learning and understanding is i.e. cumulative assessment. The papers will include questions to assess the quality of written communication in science as well as numeracy skills.