

Year 8 Science	Emerging	Developing	Secure	Mastery
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Term 1				
P4 - Forces	<p>List types of force.</p> <p>Know that some forces push and some pull & identify forces acting on objects.</p> <p>Know that forces can lead to changes in shape.</p> <p>Know that forces can be balanced or unbalanced.</p> <p>Know that friction is a force.</p> <p>Recognise that streamlining helps objects move through air or water.</p> <p>Know the units that speed can be measured in.</p> <p>Collect data about time taken on a journey.</p>	<p>List types of force and represent forces using force diagrams.</p> <p>Use newton meters.</p> <p>Identify some situations where forces are balanced and recognise that unbalanced forces are needed for a change to take place.</p> <p>Recognise that friction is a force that slows objects down or stops them from moving.</p> <p>List examples where friction is useful and when it is unwanted.</p> <p>Recognise that drag forces slow things down and recognise that streamlining helps objects move through air or water.</p>	<p>Describe the size and direction of forces using force diagrams.</p> <p>Identify forces acting in pairs and apply an understanding of forces to explain how a force can cause a change in speed and direction.</p> <p>Explain that friction is a contact force opposing the direction of movement.</p> <p>Compare contrasting situations involving friction, explain how friction can be increased or reduced, explain air and water resistance, and explain how streamlining reduces such resistance.</p> <p>Explain the concept of speed and use understanding of speed to explain how the equation for speed is derived.</p>	<p>Explain the how, the size and direction of forces determines their effects.</p> <p>Identify different examples of forces and reaction.</p> <p>Predict the changes of speed and direction that different forces can cause.</p> <p>Provide a detailed explanation of friction between surfaces.</p> <p>Explain air and water resistance in terms of frictional drag, explain the forces on flying or falling objects, and explain streamlining using scientific vocabulary.</p> <p>Explain distance–time graphs for complex journeys, including where an object travels at</p>

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		<p>Explain how to find the speed of an object.</p> <p>Describe some features of distance– time graphs.</p>	<p>Analyse distance–time graphs to describe an object’s movement at different stages in a journey.</p>	<p>different speeds and accelerates at different rates.</p>
P5 - Magnetism	<p>Describe what a magnet does.</p> <p>Be able to use a permanent magnet.</p> <p>Understand that a stronger magnet can pick up more paper clips.</p> <p>State a use for a magnet.</p>	<p>Describe the attraction of unlike poles and repulsion of like poles.</p> <p>Show how a magnetic field can be represented.</p> <p>Describe differences between permanent and temporary magnets.</p> <p>Describe how to test the strength of a magnet and an electromagnet.</p> <p>Describe different applications of magnets and electromagnets.</p>	<p>Identify magnetic attraction and repulsion as non-contact forces.</p> <p>Explain how field lines indicate the direction and strength of forces.</p> <p>Describe and compare different methods to make permanent magnets.</p> <p>Design investigations to compare different methods of making magnets and testing the strength of electromagnets.</p> <p>Explain the advantages of using electromagnets.</p>	<p>Apply and evaluate the concept of magnetic fields in various contexts.</p> <p>Use the domain theory to explain how materials become magnetised and demagnetised.</p> <p>Use models and analogies to explain the factors affecting the strengths of magnets and electromagnets.</p> <p>Compare and contrast the use of magnets and electromagnets in different applications.</p>

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P6 - Waves	<p>Recognise that sound energy is transferred by waves.</p> <p>Know that sound can be reflected.</p> <p>Understand that energy travels in waves.</p> <p>Represent a ray of light as straight line on a labelled diagram.</p> <p>State the colours of the rainbow.</p>	<p>Recognise that sound energy is transferred by waves and describe how sound waves are made in different situations.</p> <p>Recognise that some materials are good at reflecting sound and others can absorb it.</p> <p>Recognise that light can be reflected by some materials and absorbed by others.</p> <p>Describe the ray model of light using the idea that light travels in straight lines.</p> <p>Describe the formation of a spectrum from white light.</p>	<p>Explain how longitudinal waves carry sound.</p> <p>Relate the terms frequency and amplitude to sounds.</p> <p>Describe how to measure the speed of sound, and how the speed of sound can be used in different applications to measure distances.</p> <p>Use the particle model to explain why sound cannot travel through a vacuum.</p> <p>Explain what is meant by reflection and absorption of sound.</p> <p>Explain how some materials absorb energy, and the differences between transparent, translucent and opaque materials.</p> <p>Explain the difference between reflection and refraction.</p>	<p>Interpret and devise wave diagrams to represent sounds of different wavelength and amplitude.</p> <p>Use calculations to measure the speed of sound and the distance of objects.</p> <p>Use the particle model to explain why the speed of sound is different in solids, liquids and gases, and how energy is transferred in the reflection and absorption of sound.</p> <p>Use diagrams to explain the difference between diffuse and specular reflection.</p> <p>Use ray diagrams to explain how a pinhole camera and the eye work.</p>

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			Describe what happens when light waves are refracted. Explain how white light can be split into a continuous spectrum of colours, called the visible spectrum.	Use the concepts of reflection and absorption of light to explain why some materials (transparent, translucent and opaque) are coloured.
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Term 2

C4 – Types of Reaction	<p>Understand that decomposition means that a chemical breaks down.</p> <p>Understand that some chemical reactions produce heat. Identify whether a chemical reaction has taken place.</p> <p>Know that you have acids and alkalis in your house.</p> <p>Know that some chemicals change colour in acids and alkalis. Know that acids are opposite to alkalis.</p>	<p>Write word equations to represent the decomposition of metal carbonates.</p> <p>Describe what is meant by the terms exothermic and endothermic reactions, with examples.</p> <p>Describe what a catalyst is and give examples.</p> <p>Describe features of physical and chemical changes, recognising how mass is conserved.</p>	<p>Use observations from thermal decomposition reactions to make inferences about metal reactivity.</p> <p>Explain the energy changes taking place during an exothermic and an endothermic reaction. Interpret data to explain how a catalyst affects a reaction.</p> <p>Use ideas about particles to describe separation processes.</p> <p>Explain what all acids have in common and what all alkalis have in common. Explain what an indicator is and analyse results when using an indicator.</p>	<p>Write balanced symbol equations for the decomposition of metal carbonates.</p> <p>Use energy-level diagrams to compare the energy in the reactants and products of exothermic and endothermic reactions, explaining the energy changes in the particles.</p> <p>Explain how a catalyst works.</p>
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	<p>Understand that bubbles being produced show that a chemical reaction is taking place.</p> <p>Know that a fuel needs heat and oxygen to burn.</p>	<p>Identify some everyday substances that contain acids and alkalis.</p> <p>Give an example of an indicator and state why indicators are useful.</p> <p>Describe some examples of neutralisation.</p> <p>Summarise the reactants and products of complete combustion.</p>	<p>Describe the changes to indicators when acids and alkalis are mixed.</p> <p>Know that water is not an acid or alkali.</p> <p>Compare the reactants and products of complete and incomplete combustion.</p>	<p>Apply the particle model to explain physical and chemical changes, taking conservation of mass into account.</p> <p>Compare the effectiveness of different indicators.</p> <p>Explain the changes to indicators in terms of pH when acids and alkalis are mixed.</p> <p>Recognise that water is one product of neutralisation.</p> <p>Explain the Law of Conservation of Mass and how it can be proven.</p>
C5 – Earth's Resources	<p>Understand that metal ores are found in the earth's crust.</p> <p>Understand that carbon can be used to extract some metals.</p>	<p>Describe different ways to extract metal ores from the earth and describe the associated environmental issues.</p>	<p>Explain how metals are recycled and how this affects the environment.</p> <p>Describe the process of extracting iron from its ore in a blast furnace.</p>	<p>Evaluate the positive and negative aspects of metal mining and extraction.</p> <p>Explain, using an equation, the effects of acid rain.</p>

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	Know what gas is produced by combustion.	Describe the use of carbon in extracting iron from its ore. Describe how combustion contributes to acid rain.	Describe the effects of acid rain.	
Term 3				
B5 – Photosynthesis	<p>Understand that chemical reactions in the body release energy.</p> <p>Recognise that green plants need sunlight.</p> <p>Identify the part of a leaf cell that is responsible for absorbing the sun's light energy.</p> <p>Understand that the amount of light affects photosynthesis.</p>	<p>Describe the purpose of respiration.</p> <p>State that green plants need sunlight to grow and to make food.</p> <p>Describe how gases enter and leave a leaf and how light energy for photosynthesis is captured.</p> <p>Describe how levels of light, temperature and carbon dioxide affect the rate of photosynthesis.</p>	<p>Describe and explain aerobic respiration using a word equation.</p> <p>Identify water and carbon dioxide as the raw materials for photosynthesis, and glucose and oxygen as the products.</p> <p>Describe how cells in the leaf and root are adapted for their functions.</p> <p>Explain how levels of light, temperature and carbon dioxide affect the rate of photosynthesis.</p>	<p>Explain the role of respiration in building up complex molecules.</p> <p>Explain the chemical changes involved in photosynthesis and the roles of light and chlorophyll.</p> <p>Relate and explain how the structure of palisade, mesophyll and guard cells allows them to perform their function.</p> <p>Apply learning about the factors affecting photosynthesis to solve problems.</p>

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B6 - Genetics	<p>State a simple food chain.</p> <p>Identify a predator and its prey.</p> <p>Understand that species can become extinct.</p> <p>Know that genetic information is found in the nucleus of a cell.</p> <p>Know that offspring get half their genetic information from their Mum and half from their Dad.</p>	<p>Describe an example of a simple food web.</p> <p>Identify some ways in which organisms affect, and are affected by, their environment – for example through pollution or destruction of habitats.</p> <p>Describe chromosomes and their role in transferring heredity information to offspring.</p> <p>Identify natural and human-caused environmental changes that have caused some species to become extinct.</p>	<p>Explain how energy flows through a food web and explain factors that can affect food webs, such as loss of a species or toxin accumulation.</p> <p>Explain some ways in which organisms affect, and are affected by, their environment – for example, predator–prey relationships.</p> <p>Explain the relationship between chromosomes, genes and DNA.</p> <p>Explain why offspring of the same parents may look very different.</p> <p>Explain how the use of gene banks to preserve heredity material may prevent some endangered species from becoming extinct.</p>	<p>Explain the importance of predators in an environment and evaluate changes in a food web.</p> <p>Analyse and evaluate the factors affecting endangered species and recommend solutions.</p> <p>Explore the role of scientists in the discovery of DNA and evaluate the relative importance of their contributions.</p> <p>Analyse and evaluate the available evidence to explain why the dinosaurs suffered mass extinction.</p>
B7 – Body systems	<p>Describe the components of a healthy diet (food groups).</p> <p>Identify people that require more or less energy.</p>	<p>Recall the tests for starch and sugar.</p> <p>Suggest some foods that contain starch and sugar.</p>	<p>Recall the tests for protein and fats.</p> <p>Suggest several foods that contain proteins and fats.</p>	<p>Predict the observations of food tests for several foods for starch, sugar, protein and fats.</p>

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	<p>Identify some of the organs in the digestive system.</p> <p>Describe the role of the stomach and small intestine in digestion.</p> <p>Understand what is meant by the word 'drug'.</p> <p>Understand that smoking can make you ill.</p> <p>Understand that alcohol affects the body.</p>	<p>List groups of people who need different amounts of energy from food.</p> <p>Name some of the organs of the digestive system.</p> <p>Describe the role of the stomach and small intestine in digestion.</p> <p>Give examples of some different types of drugs.</p> <p>Identify parts of the body damaged by smoking.</p> <p>Describe some effects of alcohol on the body.</p>	<p>Compare the energy requirements of different people such as men and women, teenagers and the elderly, pregnant and non-pregnant women.</p> <p>Locate the organs of the digestive system on a diagram.</p> <p>Recall where physical digestion takes place and where chemical digestion takes place.</p> <p>Explain how teeth and saliva are adapted to digest food.</p> <p>Describe some adaptations of the organs of the digestive system.</p> <p>Describe the effects of different types of drugs on the body.</p> <p>Explain how the body is damaged by smoking and by passive smoking.</p>	<p>Explain the role of all of the components of a healthy diet.</p> <p>Explain why different groups of people have different energy requirements.</p> <p>Use data on packaging to plan how individuals could meet their energy requirements.</p> <p>Name the organs of the digestive system in the order that food passes through them.</p> <p>Explain how the structure of each of the organs of the digestive system supports its function.</p> <p>Explain the effects of different drugs on the body, including harmful effects.</p>

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			Describe and explain several effects of alcohol on the body.	Examine data about smoking and cancer and draw a conclusion about the correlation.