	KS2	KS3	KS4
Energy		Year 7 7P2: Calculate the cost of using fuel in the home. Year 7 7P2 and Year 8 8P4: Identify changes and transfers in energy in a variety of contexts such as heating and simple machines Year 7 7P2: Compare the energy transferred in different situations.	 Year 9 10P1: Calculate the energy stored in different objects. Year 9 10P1: Define Power as the rate or transfer of energy Year 9 10P1 :Identify non-renewable and renewable energy sources and their benefits and drawbacks. Year 9 10P1:Calculate the efficiency of energy transfers and describe how this relates to conservation of energy
Waves	Identify objects that make sound Describe properties of sound such as pitch and loudness Understand that light travels in straight lines Recognise that some objects emit light whilst some reflect light into the eye	Year 7 7P1: Explain properties of waves using frequency and amplitude. Year 7 7P1: Describe how waves travel though different materials Year 7 7P1: Describe how waves interact with different materials Year 8 8P4: Identify different waves a longitudinal and transverse	 Year 11 P6: Describe how velocity, frequency and wavelengths of waves are related. Year 11 P6: Explain how the velocity of waves change when they interact with different media. 11 P6: Describe how waves including those in the Electromagnetic Spectrum can be used and relate this to their properties



KS2	KS3	KS4
Know forces as push and pull. Compare how objects move on different surfaces. Identify a variety of forces and how they affect the movement of objects	Year 7 7P2: Calculate the speed of objects Year 7 7P2: Draw force diagrams and identify balanced and unbalanced forces. Year 9 9P5: Define a moment as the turning effect of a force. Year 9 9P5: Describe how forces stretch or compress objects	 Year 10/11 P5: Calculate the force acting on an object in one or two dimensions Year 10/11 P5: Represent the motion of objects on a graph. Year 10/11 P5: Calculate acceleration Year 10/11 P5: Describe Hooke's Law for elastic objects Year 10/11 P5: Describe how the Work done on an object is determine from the Force on the object and the distance moved. Year 10/11 P5: Describe the factors that affect the braking and stopping distance of vehicles and the safety features of vehicles when their motion changes. Year 10/11 P5 (Triple): Calculate Moments and describe how the principles of moments are applied to simple gears and levers

Forces



KS2		KS3		KS4	
Notice that the magnetic force acts at a difference.		Year 7 7P1: Describe when magnets will attract or repel.		Year 11 P7: Describe the magnetic fields of permanent and induced magnets.	
Observe how magnets interact with some materials but not others		Year 7 7P1 and Year 8 8P3: Describe the magnetic field around a bar magnet and		Year 11 P7: Describe the magnetic effect of current and how it can be enhanced.	
Describe magnets as having 2 poles.		electromagnet. Year 7 7P1: Describe how the earth's		Year 11 P7: Describe how transformers are used in the national grid.	
Predict whether magnets with attract or repel each other		magnetic field can be used for navigation. Year 8 8P3: Describe electric current as a		Year 10 P2: Describe current, resistance and voltage relationships for different	
Identify common appliances that run on electricity		flow of charge Year 8P3: Describe Conductors and		circuit elements; including their graphical representations	
Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires,				Insulators in terms of resistance Year 8 8P3: Describe potential difference in terms if the energy supplied to components in series and parallel circuits. Year 8 8P3: Describe static electricity in	Year 10 P2: Describe quantitively the charge flowing as the product of current and time
bulbs, switches, and buzzers In a simple series circuit					
recognise some common conductors and insulators, and				terms if positive and negative charges.	
associate metals with being good conductors				Year 10 P2: Describe quantitatively how power transfer is related to p.d. and current, or current and resistance	



KS2	KS3	KS4
Some organs and some organ systems. Life cycles. Organisms need nutrition. Simple understanding of skeletal, muscular, digestive systems Food, drugs and lifestyle can cause harm to humans.	 Year 7 7B1: Cell structure and function. Year 7 7B1: Simple specialised cells. Year 7 7B1: Role of diffusion. Year 7 7B1: Fuller understanding of organisation hierarchy. Year 8 8B4 and 8B5: Fuller understanding of breathing, circulatory and digestive systems. Year 8 8B4: Healthy diets and effects of malnutrition. Year 8 8B4: Effects of recreational drug on humans. 	 Year 9 B1: Cell structure and how specialist function is connected to structure. Year 9 B1: Prokaryotic and eukaryotic cell differences. Year 10 B2: Enzymes and factors effecting enzymes. Year 10 B2: Breathing, circulatory and digestive systems linking structure to function. Year 10 B2: Carbohydrates, lipids and proteins and key biological molecules. Year 10 B2: Need for transport in all organisms. Year 10 B3: Communicable and non- communicable diseases. Year 10 B3: Homeostasis and endocrine system.



	KS2	KS3	KS4
Ecosystems	Food chains Habitats What plants need	Year 7 7B2: Food chains and webs. Year 7 7B2: Connect habitats to simple animal adaptations. Year 8 8B6: Simple photosynthesis and respiration with word equations. Year 8 8B6: Importance of photosynthesis. Year 8 8B6: Leaf structure including adaptations and function of stomata. Year 8 8B6: Differences between aerobic and anaerobic respiration. Year 7 7B2: Idea of maintaining biodiversity.	 Year 11 B7: Interactions within food chains and webs. Year 11 B7: Levels of organisation in ecosystems. Year 11 B7: Cycles in ecosystem. Year 11 B7: Wider understanding of animal adaptation. Year 10 B3: Photosynthesis and respiration including symbol equations and circumstances that affect it. Year 10 B3: Importance of respiration and photosynthesis. Year 11 B7: Importance of biodiversity. Year 11 B7: Negative and positive human interactions with ecosystems.



KS2		KS3		KS4	
Children look like their parents.	1	Year 7 7B2: Types of variations.		Year 11 B6: Genomes.	
Organisms vary.		Year 9 9B7: Idea of heredity		Year 11 B5: Role of hormones in the control	
Basic development of humans.		Year 9 9B7: Simple gene interactions		of reproduction.	
Reproduction in humans and		Year 9 9B7: Simple DNA model.		Year 11 B6: Single gene inheritance and	
plants.		Year 9 9B7: Continuous and discontinuous variation.		single gene crosses with dominant and recessive phenotypes	
Living things can be grouped.		Year 7 7B3: Reproduction from a structure		Year 11 B6: Sex determination in humans	
Know what fossils are and that			and function point of view.		Year 11 B6: The process of natural selection leading to evolution
animals have changed over time.		Year 7 7B3: Simple understanding of menstruation.		Year 11 B6: The evidence for evolution	
	Year 7 7B3: Reproduction in plants including seed dispersal and fruit formation	ľ	Year 11 B6: The importance of selective breeding of plants and animals in agriculture		
		Year 7 7B3: Contraception types.		Year 11 B6: The uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology.	



KS2	KS3	KS4
Compare, group together and give reasons for the use of everyday materials on the basis of their properties Describe the properties of solids, liquids and gases Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating	 Year 7 7C1 : Know that properties of solids, liquids and gases are related to the particles in them Year 7 7C1: Describe how to separate various mixtures Year 8 8C3: Describe elements and compounds in terms of the particles in them Year 8 8C3: Use chemical formulae to represent the particles in substances Year 8 8C3: Relate a material's use to its properties Year 9 9C5: Describe how useful materials are extracted from the Earth 	 ALL: Write balanced symbol and ionic equations Year 9 10C1: Describe the differences between atoms of different elements and how this affects their properties Year 10 C2: Relate bonding to different particle types and the forces between them Year 10 C2: Explain substances' physical properties in terms of their structure and bonding Year 11 C8: Describe the properties of pure substances and formulations Year 11 C8: Relate separation techniques to the properties of the constituent substances Year 11 C8: Describe techniques and results for identifying gases (Triple: and ions) Year 11 C10: (Triple) Describe the properties of ceramics, polymers and composites

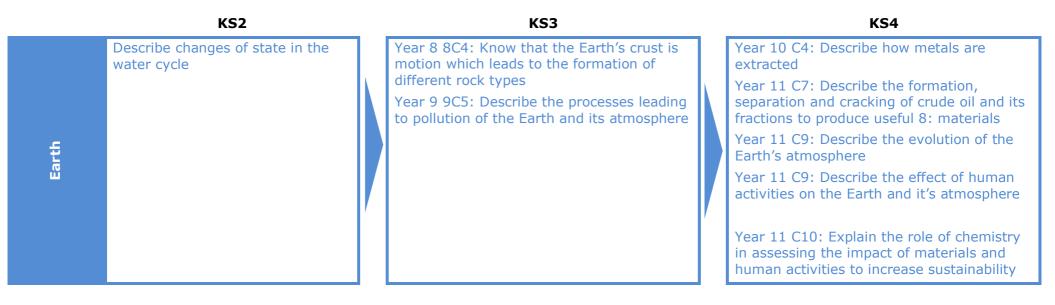


Matter

Explore ch to reverse rusting an example, of soda

KS2		KS3	KS4
changes that are difficult se, for example, burning,		Year 7 7C2: Describe the properties and reactions of metals and acids	Year 9 10C1: Describe the reactions of different elements
and other reactions, for , vinegar with bicarbonate		Year 8 8C3: Describe the products of various reactions and how products can be isolated and tested	Year 10 C4: Describe the products of a range of chemical reactions including electrolysis
		Year 9 9C5: Describe chemical reactions in terms of the particles involved	Year 10 C3: Apply the idea of conservation of mass to chemical calculations
		Year 9 9C5: Describe substances' effects on the environment	Year 10 C3: Perform calculations using he concept of the mole (HT only)
			Year 10 C5: Describe and explain energy changes when reactions occur
			Year 11 C6: Use kinetic and collision theory to explain reaction rate and equilibrium
			Year 11 C7 (chem): Describe the reactions of a variety of organic compounds
			Year 11 C9:Describe the chemical reactions occurring in the atmosphere
			Year 11 C10 (triple): Describe rusting and ammonia production







Working Scientifically

Analyse	Read a pictogram or bar graph. Say if your results fit the pattern you are given.	Calculate a mean. Spot an anomaly. Describe a graph. Spot easy mistakes in your experiment. Draw a table. Begin to pick the correct graph to draw.	Remove an anomaly from a mean. Explain a graph with scientific back up. Spot mistakes in experiments and decide how to fix them. Know which graph to draw and justify your choice.
P Communicate	Use simple scientific language. Present your ideas simply in an oral or in written form.	Use good English to explain your ideas. (SPAG) Begin to use scientific vocabulary. Write for your age group. Use a diagram to help. Begin to use evidence to back up ideas.	Use the correct scientific vocabulary. Write for varying age groups. Decide if a diagram helps or not. Use good evidence to back up your ideas.



Working Scientifically	Mapping of the Key I KS2	deas in Science – Where am I and KS3	where am I going? KS4
Inquire	Set up simple experiments given a method. Record simple result. Know what a "fair test" is. Make simple prediction with support.	Prepare a simple table for an experiment. Carry out a method for an experiment with multiple steps. Begin to plan experiments. Understand what variables there are.	 Prepare a table for multiple observation from an experiment. Accurately carry out an experiment. Plan out an experiment that will provide valid results. Suggest a hypothesis. Know how to control variables.
Order Solve	Identify if evidence supports or contradicts your ideas.	Spot dangers in the lab. Describe how a new scientific discovery would affect you. Know that science has consequence Spot obvious bias and know why it is an issue. Know that theories change.	Spot hazards and risks in experiments. Discuss the consequences of scientific discoveries. Explain why you think a source may be bias. Know of a specific theory that has changed and know why.

