

Becoming Scientists at Five Islands Academy

A chronology of Science at FIA

Academy Curriculum Intent

It is our intention to establish the Science department as a beacon for adventurous learning in the Five Islands Academy. By fostering curiosity, and exploration through a rigorous curriculum design, students should be able to learn through exciting and engaging experiences throughout their Science lessons. We hope to embed a sense of scientific wonder at the world around them and a true sense of discovery of the science behind their everyday lives on Scilly. Problem solving, application of logic, reasoning and teamwork are all vital skills for our students to develop as scientists and as global citizens, allowing many employable skills to be honed and opening up a huge variety of existing and possible STEAM courses and careers.

Key Disciplinary Concepts developed to support:

- Scientific ideas
- Gaining knowledge
- Practical experience

Future discussions

- Physics/chemistry/ biology balance in KS1 and KS2
- Core practical to be scaled across to other phases as part of drop down days/thematic practicals.
- Discussion point- hierarchy of concepts? Spiral?
- KS1/2 key vocab to be evidenced in display/ topic books/knowledge organisers and discussion?

Balance	Consequence	Energy	Environment
C- Equations P- Forces B- Living things	C- Reactions. P- Forces-states of matter. B- Growing/homeostasis	C- Reactions P- Calculations- resources B- Respiration/photosynthesis	C-rocks/early atmosphere P-gravity- climate change B- Ecosystems/variation/adaptation
Evidence	Form	Function	Interaction
Observations/data collection/data presentation/ photograph	C-Atoms, elements, compounds and bonding	C- Uses of materials P-circuits/light/sound B-Cells. Organs systems	C-Atoms compounds P- Forces B- Food webs/adaptation

	P- bending and stretching/particle theory/kinetic theory B-Cell structure		
Models	Movement	Patterns	Transformation
C- Bonding models- elements and compounds P-Particle model/electricity B-cell division	C Rock/carbon/ water cycle P- Forces/electricity/ sound B- Muscular skeletal systems transport and exchange	C Balancing ionic equations/P table P Force diagrams/ equation triangles B Cause and effect	C Chemical reactions/rock cycle P-Energy transfers B- Mutation/growth/disease

Biology content in green

Chemistry content in red

Physics content in blue

EYFS				
Knowledge and understanding	Core concepts	Key vocab	Potential Maestro unit	Switched on Science Unit
Understanding the World: The World - Can talk about some of the things they have observed such as plants, animals, natural and found objects. •Talks about why things happen and how things work. •Developing an understanding of growth, decay and changes over time. •Shows care and concern for living things and the environment. •Look closely at similarities, differences, patterns and change.	Form Function Environment Patterns	Who What When Where Why How		
Knowledge and understanding	Core concepts	Key vocab	Potential Maestro unit	
COEL Playing and Exploring: Finding out and exploring •Showing curiosity about objects, events and people •Using senses to explore the world around them •Engaging in open-ended activity Taking a risk, engaging in new experiences, and learning by trial and error	Interaction Patterns Transformation Consequence	See Hear Smell Touch Taste change		

Key Stage 1					
Working Scientifically					
Knowledge and understanding	Core concepts	Key vocabulary developing use/ exposure to	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Beginning to ask simple questions and recognising that they can be answered in different ways.</p> <p>Beginning to observe more closely, using simple equipment.</p> <p>Beginning to perform simple tests.</p> <p>Beginning to identify and classify.</p> <p>Beginning to use their observations and ideas to suggest answers to questions.</p> <p>Beginning to gather and record simple data to help in answering questions.</p> <p>Asking simple questions and recognising that they can be answered in different ways.</p> <p>Observing closely, using simple equipment.</p> <p>Performing simple tests.</p> <p>Identifying and classifying.</p> <p>Using their observations and ideas to suggest answers to questions.</p> <p>Gathering and recording data to help in answering questions.</p>	<p>Interaction Consequence Evidence Patterns</p>	<p>Who? How? When? What? Where? Why? Prediction Conclusion Observation</p>	<p>How do you make bread? How do things move? What makes the loudest sound? Can water make music?</p>		
Habitats					
Knowledge	Core concepts	Key vocabulary developing use/ exposure to	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p>	<p>Environment Interaction Transformation on Balance</p>	<p>Live Dead Habitat Basic need Animal plant Micro habitat depend/ need</p>	<p>Beachcombers <i>How many arms does an octopus have?</i> <i>Will it degrade?</i></p>	<p>Unit 2a Living things and their habitats</p>	

Plants					
Knowledge	Core concepts	Key vocabulary developing use/ exposure to	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>Energy Form</p> <p>Movement</p> <p>Balance</p> <p>environment</p>	<p>Common, wild, deciduous, evergreen, seed, bulb, water, light, temperature</p>	<p>The enchanted Woodland</p> <p><i>Are all leaves the same? Do pine cones know it's raining? What's in a bud? How do leaves change?</i></p> <p>The Scented Garden</p> <p><i>What's on your wellies? Can seeds grow anywhere? How does grass grow?</i></p>	<p>Unit 1a - Plants</p> <p>Unit 2b - plants</p>	
Animals					
Knowledge	Core concepts	Key vocabulary developing use/ exposure to	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <p>Notice that animals, including humans, have offspring which grow into adults.</p>	<p>Movement</p> <p>Energy</p> <p>Balance</p> <p>Environment</p>	<p>Animal, fish, amphibian, reptile, bird, mammal</p> <p>Carnivore, omnivore</p> <p>Structure</p>	<p>Whose poo?</p> <p>Why do we have teeth?</p> <p>Why do we have two eyes? What can you remember?</p> <p>Superheroes</p>	<p>Unit 1b - animals including humans</p> <p>Unit 2c animals including humans</p>	

<p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>		<p>Sense Offspring</p> <p>Adult Survival Exercise Food Hygiene</p>	<p><i>What can our hands do? Can you be a superhero?</i></p> <p>Can you leap like a frog? What is camouflage for? What can worms sense? Why should I exercise? How do germs spread? How do plants grow in winter? Where do worms like to live?</p> <p>Wriggle and Crawl</p> <p><i>Do insects have a favourite colour? Do snails have noses? What is the life cycle of the ladybird? Where do snails live?</i></p>		
Materials					
Knowledge	Core concepts	Key vocabulary developing use/ exposure to	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their</p>	Models Evidence Form function	<p>Object, material</p> <p>Wood, plastic,</p>	<p>What keeps us dry? How does it feel? Do all balls bounce?</p>	<p>1c - everyday materials</p> <p>2d - uses of</p>	

<p>simple physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>		<p>glass, metal, water, rock Paper, cardboard</p> <p>Properties Solid</p>	<p>Why should I exercise? How do germs spread? Why do boats float? Which stuff is stickier? How is mud made? What shape is a bubble? Can you make a paper bridge?</p>	<p>everyday materials</p>	
Changes					
Knowledge	Core concepts	Key vocabulary developing use/ exposure to	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.</p>	Energy Transformati on environment	Change Season Weather Day length	<p>Splendid skies <i>How big is a raindrop? Does it snow in summer? How wild is the wind?</i></p>	<p>Unit 1d - seasonal changes</p>	

Key Stage 2					
Working Scientifically					
Knowledge	Core concepts	Key vocab Application of	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. identify differences, similarities or changes related to simple scientific ideas and processes.</p>	Models Consequence Patterns Interaction	Science Skills Conclusion Prediction	<p>Why does it flood?</p>		

<p>use straightforward scientific evidence to answer questions or to support their findings.</p> <p>report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>set up simple practical enquiries, comparative and fair tests.</p> <p>make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Use scientific evidence to answer questions or to support their findings.</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Ask relevant questions and using different types of scientific enquiries to answer them.</p> <p>Begin to identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>Report and represent findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identify scientific evidence that has been used to support or refute ideas or</p>	<p>evidence</p>	<p>Value</p> <p>Improvement</p> <p>Question</p> <p>Difference</p> <p>Similarities</p> <p>Changes</p> <p>Idea</p> <p>Process</p> <p>Evidence</p> <p>Results</p> <p>Diagram</p> <p>Comparative</p> <p>Fair test</p> <p>Observation</p> <p>Accurate</p> <p>Measurement</p> <p>Standard unit</p> <p>Thermometer</p> <p>Data logger</p> <p>Processes</p> <p>findings</p> <p>enquiries</p> <p>Gather</p> <p>Record</p> <p>Classify</p> <p>Present</p> <p>Classification</p> <p>Variable</p>			
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<p>arguments. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p>					
Plant, Animals and Habitats					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>PLANTS Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>HABITATS Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>ANIMALS Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.</p>	<p>Environment Interaction Form Movement</p>	<p>Flowering Root Stem Trunk Leaves Flower Life Growth Air Light Water Nutrient Soil Variation Transportation Life cycle Polnation Seed formation Seed dispersal Classification Environment Characteristics Similarities Differences</p>	<p>Are mushrooms really deadly? Do plants have legs? Predator The blue abyss. How do worms move? Is it safe to eat? What are flowers for? What is the juiciest fruit? What do owls eat? Why are trees tall? Are all sea creatures the same? Can worms sense danger? How does pollution affect habitats? What do squirrels eat? Beast creator How do worms</p>	<p>Unit 3a plants Unit 4a - living things and their habitats Unit 5a - living things and their habitats Unit 6a - living things and their habitats</p>	

<p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement. Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>		<p>Microorganism Plant Animal Mammal Amphibian Insect Bird Life process Reproduction Nutrition Skeleton Muscle Protection Movement Function Digestive Teeth Food chain Producer Predator prey</p>	<p>reproduce? How clean are your hands? How many potatoes can you grow? Why do birds lay eggs? What is the lifecycle of a mealworm. Why is holly prickly? Where do wild plants grow best Why does milk go off? How do animals stay warm?</p>		
Humans and Evolution					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>HUMANS Describe the changes as humans develop to old age. Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.</p> <p>EVOLUTION</p>	<p>Evidence Movement Interaction Energy</p>	<p>Change Circulatory Function Heart Blood vessel Diet Exercise Drugs Lifestyle Nutrients</p>	<p>Burps bottoms and bile What are joints for? What is spit for? Do we slow down as we get older? Blood heart What's in blood? How does blood flow?</p>	<p>Unit 3b - animals, including humans</p> <p>Unit 4b - animals, including humans</p>	

<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>		<p>Water Animals Humans Fossils Living things Earth Offspring Adaptation Evolution</p>	<p>What can your heart rate tell? Darwins delights How have eyes evolved? How does inheritance work? ID Why are things classified</p>	<p>Unit 5b - animals, including humans</p> <p>Unit 6b - animals, including humans</p> <p>Unit 6c - evolution and inheritance</p>	
Rocks and Materials					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>ROCKS Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.</p> <p>MATERIALS Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes.</p>	<p>Evidence Form Transformation interaction</p>	<p>Compare Rocks Appearance Properties Fossils Rock Organic Hardness Solubility Transparency Conductivity Electrical thermal Magnet Dissolve Liquid Solution Solid Gas Filter Sieve Evaporating</p>	<p>What Tremors? How do fossils form? Rocks relics and rumbles What is sand? What is soil? Will it erupt? Why do planets have craters? Which materials conduct heat? Can you see through it?</p> <p>Are all liquids runny? Did the Romans use toilet roll? How does smell get up your nose? How do you clean dirty water Which materials</p>	<p>Unit 3c - rocks</p> <p>Unit 5c - properties and states of materials</p>	

			conduct heat? Can we slow cooling down?		
Light and Sound					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>SOUND Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. 5. Recognise that sounds get fainter as the distance from the sound source increases.</p> <p>LIGHT Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>	Models Energy Function interaction	Light and sound Vibrate Vibration Medium Pitch Frequency Pattern increase/decrease Light Shadow Opaque Translucent Transparent Mirror Lens Plain mirror	<p>What are sunglasses? Why do cats eyes glow at night? Can we track the Sun? Can fruit light a bulb? Can we see through it? Can you turn a light down? How have eyes evolved? How does light travel? What are reflections What colour is a shadow? Why do shadows change? Sound waves Can we block sound Can we change a sound? How far can sound travel?</p>	<p>Unit 3d - light Unit 4d - sound Unit 6d light</p>	
Magnets and forces					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on

					Science unit
<p>MAGNETS Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>FORCES Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	<p>Interaction Models Form Energy patterns</p>	<p>Magnets/ Forces Attract Repel North South Poles Magnets Magnetic field Gravity Force Newton Interact Contact force Non-contact force Mechanisms Gears Pulleys Ramsp Machines friction</p>	<p>Can you block magnetism? How mighty are magnets? What does friction do? Why did icarus fall from the sky? Why do magnets attract and repel What do pulleys do? How does the moon move? How do rockets lift off? How do levers help us? Why are zip wires so fast? Why does a compass always point north? Scream machine? Mighty metals What does friction How far can an arrow travel? What are catapults for?</p>	<p>Unit 3e - forces and magnet Unit 5e - forces</p>	

Electricity					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p> <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p> <p>Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p>	<p>Form</p> <p>Function</p> <p>Energy</p> <p>Models</p>	<p>Components</p> <p>Bulb</p> <p>Switch</p> <p>Buzzer</p> <p>Power Supply</p> <p>Cell</p> <p>Symbol</p> <p>bright /dim</p> <p>Circuit</p> <p>Diagram</p>	<p>How can you send a coded message?</p> <p>Can you make a circuit from play dough?</p> <p>How do plugs work?</p> <p>What conducts electricity?</p> <p>Can fruit light a bulb?</p>	<p>Unit 4e</p> <p>Unit 6e</p>	
Space					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>SPACE</p> <p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</p> <p>Describe the movement of the Moon relative to the Earth.</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	<p>Evidence</p> <p>Models</p> <p>Movement</p> <p>Energy</p>	<p>Space</p> <p>Gravity</p> <p>Orbit</p> <p>Sphere/spherica</p> <p>l</p> <p>Rotation</p> <p>Axis</p> <p>Planet(s)</p> <p>Comet</p> <p>Moon</p>	<p>Can we track the sun?</p> <p>How do we know the Earth is round?</p> <p>Star gazers</p>	<p>Unit 5d - earth and space</p>	

Chemical changes/states of matter					
Knowledge	Core concepts	Key vocab	Potential Maestro unit	Outstanding science unit	Switched on Science unit
<p>CHEMICAL CHANGE Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> <p>STATES OF MATTER Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>Transformation Interaction Models evidence</p>	<p>Change Reactant Product Material Property Physical change Chemical change Solid Liquid Gas Matter State (change of) Melt Evaporate Condense Freeze</p>	<p>Do dock leaves cure a sting? Do all solids dissolve? How do we make red? Potions</p>	<p>Unit 4c - states of matter</p>	

Key Stage 3

Knowledge	Core concepts	Key vocabulary	Unit/Essential question	Pearson chapter
<p>identify the key processes of living things describe the functions of a range of plant and animal organs. prepare and observe slides using a microscope. classify cell types from their features. explain the respiratory system. explain the circulatory system. identify the purpose and features of the skeletal system. summarise how we move using scientific vocabulary. outline the importance of aerobic respiration. plan and investigate the effects of exercise on the body. Identify how drugs can affect the body. outline why anaerobic respiration is important. Practical skills use microscopes to view slides measure time, distance and volume accurately. plan and collect reliable data</p>	<p>Energy Function Form Movement</p>	<p>Superhuman Muscles Breathing Blood Skeleton Muscles Drugs Performance enhancing drugs (PEDs) MRS GREN Organs Tissues Microscopes Cells Organ systems Transplants Aerobic respiration Gas exchange system Getting oxygen Anaerobic respiration</p>	<p>7.1 How does Bolt bolt?</p>	
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Describe how fuels like food contain energy. Describe how energy is stored and transferred. Describe what a fuel is and where they come from. State different types of energy source Know what renewable and non-renewable energy sources are. Describe how climate change is being caused by greenhouse</p>	<p>Energy Balance Interaction transformation</p>	<p>Producing Power Energy Energy transfers Fuel transfers Energy resources Extreme environments Temperature changes</p>	<p>7 - 3 How do we power your phone?</p>	

<p>effect.</p> <p>Describe how energy is transferred to increase temperature.</p> <p>Describe what conduction is.</p> <p>Describe what Convection is.</p> <p>Draw and use a Sankey diagram</p> <p>State what combustion is</p> <p>Describe the three part to the fire triangle</p> <p>Practical Skills</p> <p>Test for the presence of CO₂</p> <p>Recording of temperature rise in water through energy transfer.</p>		<p>Controlling transfers</p> <p>Power and efficiency</p> <p>Paying for energy</p> <p>Keeping warm</p> <p>Engines</p> <p>Oxidation</p> <p>Fire safety</p> <p>Air pollution</p> <p>Global warming</p> <p>Climate change</p> <p>Reducing pollution</p>		
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Describe how sounds through a medium</p> <p>Describe how frequency and amplitude change sound.</p> <p>Describe how sound can be insulated</p> <p>Compare sound waves</p> <p>Use diagrams to describe how light travels</p> <p>Use scientific diagrams to describe reflection</p> <p>Use scientific diagrams to describe refraction</p> <p>Describe and explain the functions of the eye.</p> <p>Use models to describe atoms, elements and compounds</p> <p>Identify the difference between physical change and chemical reaction.</p> <p>Identify how elements are arranged</p> <p>Investigate physical and chemical properties of elements</p> <p>Practical Skills</p> <p>Use a Bunsen burner safely</p> <p>Use an enquiry process to formulate a conclusion</p>	<p>Models</p> <p>Evidence</p> <p>Energy transformation</p>	<p>Bright Sparks</p> <p>Atomic models</p> <p>Chemical</p> <p>Properties</p> <p>Mendeleev's table</p> <p>Physical trends</p> <p>Chemical trends</p> <p>Making sounds</p> <p>Detecting sounds</p> <p>Using sounds</p> <p>Comparing waves</p> <p>Reflection</p> <p>Refraction</p> <p>Cameras and eyes</p> <p>Colour</p> <p>Spectrum</p>	7.2 - How do fireworks work?	

Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Identify hazards and risks in the lab Identify solutions using indicators Identify solutions using the pH scale Explain neutralisation Recall examples of everyday neutralisation Practical skills-Prepare a salt sample Explain how we use nutrients from food Develop an understanding of balanced nutrition Explore digestion in animals Identify key factors in absorption Explain why air is a mixture Explain key differences between metals and non-metals Explain compounds and elements using models</p>	<p>Form Function Balance Evidence</p>	<p>Chemistry at home Hazards Indicators Acidity and alkalinity Neutralisation Neutralisation everyday Food and nutrients Nutrient use Balanced diets Digestion Absorption Air Mixture Earth's elements Making compounds reactions Problems with elements</p>	<p>7.4 Why do parrots eat chalk?</p>	
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>explain variations in organisms understand the nature of adaptation through inheritance outline how organisms adapt to environmental change explain feeding relationships and how they can change show how energy is transferred by organisms evaluate the use of pesticides justify how you would classify organisms explain differences in how organisms reproduce. outline the process of pollination in plants. Understand the process of germination and plant growth. Explore the structure and function of DNA Explore extinction and how organisms can survive Investigate how adaptations can impact on survival</p>	<p>Balance Energy Interaction environment</p>	<p>Jurassic World Variation Adaptations Effects of and on environment Transfers in food chains EXT-Nomads Classification and biodiversity Reproduction Pollination Fertilization and dispersal Germination and growth EXT-Animals using plants Environmental variation inherited variation</p>	<p>8.1 How could we create a Jurassic World?</p>	

		DNA Gene and extinction Natural selection Recreating animals.		
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
Describe why seasons occur Identify the shape and direction of magnetic fields. Explain how gravity affects objects. Describe what objects exist in our Solar System. Describe how to separate substances. Investigate factors which affect solubility. Explain how to evaporate a solution. Describe the method for chromatography. Describe distillation. Explain how to prepare potable water Identify types of rock and how they were created. Describe the effects of weathering on rocks Explain how we extract and use resources from Earth.	Movement Transformation Patterns interaction	Gathering evidence Seasons Magnetic Earth Gravity Beyond the Solar System Studying space Rocks and their uses Igneous and metamorphic Weathering and erosion Sedimentary rocks Materials in the Earth Mixtures and separation Mixtures Solutions Evaporation Chromatography Distillation Safe drinking water	8.2 What observations would we make on Mars?	
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
Describe properties of solids, liquids and gases. Explain Brownian Motion. Describe the effects of changing pressure. Explain process of diffusion. Recall properties of metals. Explain corrosion as a chemical reaction. Investigate reactions between metals and water. Investigate reactions between metal and acids.	Evidence Models Consequence Function	Manipulating materials Solids liquids and gases Particles Brownian motion Diffusion Air pressure Metal properties Corrosion	8.3 How should the Scillonian 4 be different?	

<p>Explain the difference between pure metals and alloys. Investigate how we use polymers in everyday life. Explore how we use composite materials. Evaluate how we use materials. Explore the impacts of recycling.</p>		<p>Metals and water Metals and acids Pure metals and alloys Ceramics Polymers Composite materials Problems with new materials Recycling</p>		
<p>Knowledge</p>	<p>Core concepts</p>	<p>Key vocab</p>	<p>Unit/Essential question</p>	<p>Pearson chapter</p>
<p>Identify common forces and where they occur Explain how springs work using scientific language Explore the impacts of friction Explain applications of high and low pressure Identify balanced and unbalanced forces Explore changes of state Investigate why some objects float Explore factors which affect drag Describe forces in transport Identify common energy stores and transfers Calculate the speed of moving objects Use graphs to interpret motion Summarise the use of levers and pulleys</p>	<p>Energy Interaction Balance Movement</p>	<p>The Forces in Fast Different forces Springs Friction Pressure Balanced and unbalanced forces Particle model Changing state Pressure in fluids Floating and sinking Drag Forces and movement Speed Equations and graphs Turning forces and moments Mighty machines</p>	<p>8.4 How can we get to the mainland faster?</p>	
<p>Knowledge</p>	<p>Core concepts</p>	<p>Key vocab</p>	<p>Unit/Essential question</p>	<p>Pearson chapter</p>

<p>investigate materials which conduct or insulate electricity Understand and create models to explain electricity Investigate differences between series and parallel circuits Investigate ways current can be affected Explain how to use electricity safely Distinguish between chemical and physical changes based on practical investigations Understand energy changes in chemical reactions Calculate percentage loss or gain of products from chemical reactions summarise what happens during a displacement reaction explain why different methods are needed to extract different metals explore magnetic and gravitational fields explore how static electricity occurs plan an investigation into how resistance in a circuit can be changed Explain how electromagnets work</p>	<p>Energy Models Function evidence</p>	<p>Science (non) fiction Switches and current Models for circuits Series and parallel circuits Changing the current Using electricity A world without electricity (What would we do without it?) Types of explosion Reactivity Energy and reactions Percentage loss and gain Displacement Extracting metals Force fields Static electricity Current electricity Resistance Electromagnets Humans in space</p>	<p>9.1 Where is the science in Science Fiction?</p>	
<p>Knowledge</p>	<p>Core concepts</p>	<p>Key vocab</p>	<p>Unit/Essential question</p>	<p>Pearson chapter</p>
<p>GCSE content</p> <p>Use and prepare microscope slides. Identify the form and functions of a variety of cells. Explain how enzymes function. Investigate the factors which affect enzyme activity. Explain how substances are transported. Explore how concentration affects the rate of diffusion and osmosis. Describe the processes involved in cell division. Explain how our nerves are adapted to sense stimuli. Explain the importance of alleles. Explain inheritance using Punnett squares Outline the key differences between inherited and environmental variation.</p>	<p>Function Form Models Balance</p>	<p>Biology basics Microscopes Plant and animal cells using microscopes Specialized cells Inside bacteria Enzymes and nutrition Testing food Core practical- testing food Enzyme action Enzyme activity Core practical- pH and enzymes Transporting substances Osmosis in potatoes Mitosis Growth in animals Growth in plants Stem cells The brain The brain and spinal cord problems</p>	<p>9.2 What is the secret to life? (Possible retitle to 'What are you really made of? 2023)</p>	<p>CB1 Key concepts in biology CB2 Cells and control CB3 Genetics</p>

		The nervous system The eye Neurotransmission speeds Sexual and asexual reproduction Meiosis DNA DNA extraction		
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>GCSE content</p> <p>Explain the structure of atoms. Explain and predict sub atomic particles. Describe what an isotope is. Describe how the periodic table works. State and predict electronic configuration Explain how ionic bonds form Describe typical properties of ionic compounds Explain how covalent bonds form Describe typical properties of covalent compounds Explore allotropes of carbon Identify trends properties of Group 1 metals Identify trends properties of Group 7 Describe physical and chemical properties of the Noble gases</p>	<p>Models Movement Interaction transformation</p>	<p>Organising everything in the Universe</p> <p>Structure of an atom Atomic number and mass number Isotopes Elements and the periodic table Atomic number and the periodic table Electronic configuration and the periodic table ionic bonds ionic lattices Properties of ionic compounds Covalent bonds Molecular compounds Allotropes of carbon Properties of metals Bonding models Group 1 Group 7 Halogen reactivity Group 0</p>	<p>9.3 How do we organise everything?</p>	<p>CC3 Atomic structure CC4 The periodic table CC13 Groups in the periodic table CC5 Ionic bonding CC6 Covalent bonding CC7 Types of substance</p>

Key Stage 4				
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Define and describe scalar and vector quantities. Create graphs using travel data. Calculate acceleration. Present and interpret velocity time graphs. Investigate resultant forces. Explain Newton's 1st Law. Explain Newton's 2nd Law. Explain Newton's 3rd Law. Understand the difference between mass and weight. Investigate how acceleration affects objects. Describe the factors that affect stopping distances of vehicles. Explore non-contact forces. Investigate how forces affect a spring. Explain how pressure affects fluids.</p>	<p>Energy Balance Movement Consequence</p>	<p>What Newton Knew Vectors and scalars Distance time graphs Acceleration Velocity time graphs Resultant forces Newton's 1st Law Masses and weight Newton's 2nd Law investigating acceleration Newton's 3rd Law Momentum Stopping distance Braking distance and energy Crash hazards Work and power Objects affecting each other Vector diagrams Bending and stretching investigating springs Extension and energy transfers Pressure in fluids Pressure and upthrust</p>	<p>9.4 What would Newton know now?</p>	<p>CP1 Motion CP2 Forces and motion CP7 Energy-Forces doing work CP8 Forces and their effects CP13 Forces and matter</p>
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Identify substances from their pH. CP-Describe how to prepare soluble salt samples. CP-Investigate neutralization reactions. Explain what happens during neutralisation. Describe general reactions between metals, acids and carbonates. Investigate solubility and the formation of precipitates. Calculate empirical formula. Explain and apply the law that mass is conserved. Understand and calculate the number of moles in a reaction. Develop methods for investigating rates of reaction.</p>	<p>Transformation Movement Models Patterns</p>	<p>Reacting to Reactions Acids, alkalis and indicators Looking at acids Bases and salts Preparing copper sulphate Alkalis and balancing equations. investigating neutralization Alkalis and neutralization Reactions of acids with metals and carbonates Solubility</p>	<p>10.1 How do reactions differ?</p>	<p>CC8 Acids and alkalis CC9 Calculations involving masses CC14 Rates of reaction CC15 Heat energy changes in</p>

<p>CP-investigate factors which affect rates of reaction. Explain the use of a catalyst. Compare endothermic and exothermic reactions. Understand and apply reaction profile diagrams.</p>		<p>Masses and empirical formulae Conservation of mass Moles Rates of reaction Factors affecting reactions rates investigating reaction rates Catalysts and activation energy Exothermic and endothermic reactions Energy changes in reactions</p>		<p>chemical reactions</p>
<p>Knowledge</p>	<p>Core concepts</p>	<p>Key vocab</p>	<p>Unit/Essential question</p>	<p>Pearson chapter</p>
<p>Explain how energy is stored and transferred. Describe energy efficiency using diagrams and calculations. Calculate GPE and KE. Explain issues of generating power from non-renewable sources. Understand how current and voltage behave in different circuits. Calculate resistance in series and parallel circuits Calculate power in electrical circuits Describe how energy is transferred in electrical circuits Explain characteristics of magnetic fields Investigate how electromagnets work Explain how to calculate magnetic forces Describe how transformers work Describe how magnetic fields are used to generate KE Describe how the National Grid works</p>	<p>Models Energy Consequence Function</p>	<p>Supplying Energy Energy stores and transfers Energy efficiency Keeping warm Stored energies Nonrenewable resources Renewable resources Electric circuits Current and potential difference Current, charge and energy Resistance More about resistance Core Practical-Investigating resistance. Transferring energy Power Transferring energy by electricity Charges and static electricity Dangers and uses of static electricity Electric fields Magnets and magnetic fields Electromagnetism Magnetic forces Electromagnetic induction The National Grid Transformers Transformers and energy</p>	<p>10.2 What are the problems with power?</p>	<p>CP3 Conservation of energy CP9 Electricity and circuits CP10 Magnetism and the motor effect CP11 Electromagnetic induction</p>

Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Outline the key concepts of evolution. Classify organisms by their characteristics. Describe how humans manipulate variation. Evaluate methods of genetic engineering. Outline the fundamentals of photosynthesis. Investigate factors which affect photosynthesis. Explain transpiration and translocation. Describe factors affecting ecosystems Investigate relationships between organisms and their environment. Describe how biotic and abiotic impact on ecosystems Explain how humans can impact biodiversity Describe the water/carbon/nitrogen cycle Explain how the composition of Earth's atmosphere has changed over time.</p>	<p>Balance Evidence Environment Movement</p>	<p>Life on Earth Evidence for human evolution Darwin's theory Development of Darwin's theory Classification Breeds and varieties Tissue cultures Protein synthesis Genetic variants and phenotypes Mendel Alleles Inheritance Multiple and missing alleles Gene mutation Variation Genes in agriculture and medicine GM and agriculture Fertilizers and biological control Photosynthesis Factors which affect photosynthesis Core practical-Light intensity and photosynthesis Absorbing water and mineral ions Transpiration and translocation Plant adaptations Plant hormones Uses of plant hormones Ecosystems Energy transfer Abiotic factors and communities Core practical- Quadrats and transects Biotic factors and communities Assessing pollution Parasitism and mutualism Biodiversity and humans Preserving biodiversity Food security Water cycle Carbon cycle Nitrogen cycle Rates of decomposition</p>	<p>10.3 What would Darwin do with a dodo?</p>	<p>CB4 Natural selection and genetic modification. CB6 Plant structures and their functions CB9 Ecosystems and their material cycles. CC17 Earth and atmospheric science</p>

Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Identify the differences between communicable and non-communicable diseases. Describe the causes and effects of these diseases. Look for correlations and cause in health data. Outline the dangers of pathogens. Describe ways the body defends itself. Evaluate the use of antibiotics. Explain adaptations of blood cells. Describe how the heart works effectively. Explain aerobic and anaerobic respiration. Investigate factors which affect respiration. Explain the role of hormones in the body Describe the stages of the menstrual cycle Explain the importance of homeostasis Understand the causes and impacts of type 1 and type 2 diabetes.</p>	<p>Consequence Interaction Transformation Balance</p>	<p>Balanced Bodies and Defending Ourselves Health and disease Non-communicable disease Cardiovascular disease Pathogens Spreading pathogens Virus life cycles Plant defences Plant diseases Physical and chemical barriers The immune system Antibiotics antibiotics Monoclonal antibodies Efficient transport and exchange Factors affecting diffusion The circulatory system The heart Cellular respiration respiration rates Hormones Hormonal control of metabolic rate The menstrual cycle Hormones and the menstrual cycle Control of blood glucose Type 2 diabetes Thermoregulation Osmoregulation The kidneys</p>	<p>10.4 How could we survive a Zombie apocalypse?</p>	<p>CB5 Health, disease and development of medicines CB7 Animal coordination , Control and homeostasis CB8 Exchange and transport in animals.</p>

Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Explain 3 states of matter using models. Explain the processes of filtration and crystallisation. Summarise method of chromatography. Explain how distillation is used in industry. Investigate methods of water purification. Explain process and products of electrolysis. Investigate the reactivity of ions. Compare and contrast methods of extraction from ores. Model and organise fractions of crude oil. Compare types of combustion and link to pollution. Calculate densities of objects. Calculate energy transfers in physical changes. Explore links between heat and pressure Investigate energy transfers when water changes state.</p>	<p>Transformation Function Consequence Models</p>	<p>Separating Stuff States of matter Mixtures Filtration and crystallization Paper chromatography Distillation investigating inks Drinking water Electrolysis Electrolysis of copper sulfate Products of electrolysis Reactivity Ores Oxidation and reduction life cycle assessment and recycling Dynamic equilibrium Hydrocarbons in crude oil and natural gas Fractional distillation of crude oil The alkaline homologous series Complete and incomplete combustion Combustible fuels and pollution Breaking down hydrocarbons Particles and density Investigating densities Energy and changes of state Energy calculations Investigating water Gas temperature and pressure</p>	<p>11.1 How do we separate the substances we need?</p>	<p>CC1 States of matter CC2 Separating and purifying substances CC10 Electrolytic processes CC11 Obtaining and using metals CC12 Reversible reactions CP12 Particle model CC16 Fuels</p>

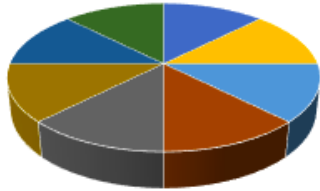
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Explain the difference between longitudinal and transverse waves. Explain how to measure the velocity of waves. Collect data to measure wave speed. Explain refraction of waves. Investigate refraction of light Investigate the EMS Describe how we use parts of the EMS Describe the dangers of using EM waves Recall properties of subatomic particles Describe 3 forms of radiation Explain how medical science uses radiation Complete nuclear equations Calculate and explain half- life Explore the dangers of using radiation</p>	<p>Models Interaction Movement function</p>	<p>Light, Waves and Gamma Rays Describing waves Wave speeds Core practical- Investigating waves Refraction Waves crossing boundaries Ears and hearing Ultrasound Infrasound Electromagnetic waves Core practical-Investigating refraction Electromagnetic spectrum Using long wavelengths Using short wavelengths EM radiation dangers Atomic models Inside atoms Electrons and orbits Background radiation Types of radiation Radioactive decay Half life Dangers of radioactivity</p>	<p>11.2 How do we use waves and radiation?</p>	<p>CP4 Waves CP5 Light and the electromagnetic spectrum. CP6 Radioactivity</p>

Separate Science content *in addition to all KS4 content*

Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>understand the structure and function of the eye. draw accurate diagrams of the refraction of light. describe, in detail, how lenses affect light rays. plan an investigation to understand radiation and temperature. explain ways in which humans apply radiation science. explain medical uses of radiation evaluate how humans use nuclear energy explain the process of nuclear fission explain the process of nuclear fusion describe the factors affecting orbits describe the possible life cycles of stars outline our understanding of 'Red Shift' evaluate different theories about the origins of the universe.</p>	<p>Energy Transformation Evidence models</p>	<p>The eye Ray diagrams Colour Lenses Radiation and temperature Core practical-Investigating radiation Using radioactivity Radioactivity in medicine Nuclear energy Nuclear fission Nuclear fusion The Solar System Gravity and orbits Life cycle of stars Red shift Origins of the universe.</p>	<p>SS10.1 How do we see the stars?</p>	<p>Light and the electromagnetic spectrum Radioactivity Astronomy</p>
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
<p>Describe properties of transition metals Understand and explain reaction yields. Explain and calculate the atom economy. Calculate concentrations of solutions Carry out titrations mathematically and practically. Select a range of practical equipment to perform titrations. Describe and calculate volumes Outline ammonia production Explain equilibrium in industrial reactions Make conclusions from flame tests</p>	<p>Interaction Function Evidence balance</p>	<p>Transition metals Corrosion Electroplating Alloying Uses of metals and their alloys Yields Atom economy Concentrations Titrations and calculations Core practical acid and alkali titration Molar volume of gases Fertilizers and the Haber process Factors affecting equilibrium</p>	<p>SS10.2 How do chemists analyse unknown substances?</p>	<p>SC14, SC15, SC16, SC25 Quantitative analysis Dynamic equilibria Calculations involving gases Chemical cells and fuel cells Qualitative analysis</p>

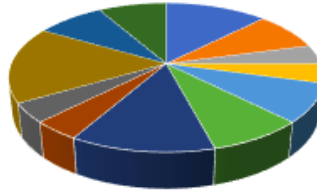
Use precipitate reactions to identify ions		Flame tests and photometry Tests for positive ions Tests for negative ions Core practical-identifying ions		
Knowledge	Core concepts	Key vocab	Unit/Essential question	Pearson chapter
Identify substances from structures and formulas. Identify hydrocarbons from reactions. Explain how ethanol can be produced. Investigate the combustion of different alcohols. Explain how polymerization works Evaluate the use of polymers Justify the use of different materials Explore why composite materials are chosen Explore the implications of using nanoparticles	Balance Patterns Function Transformation	Alkanes and alkenes Reactions of alkanes and alkenes Ethanol production Alcohols Core practical- the combustion of alcohols Carboxylic acids Addition polymerization Polymer properties and uses Condensation polymerization Problems with polymers Choosing materials Composite materials Nanoparticles	SS10.4 What do we get from crude oil now and in the future?	Hydrocarbons Alcohols and carboxylic acids Polymers Properties of matter, including nanoparticles

EYFS Science



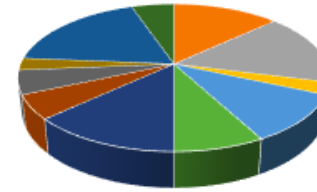
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- Consequence
- Form
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- Energy
- Function
- Patterns
- Environment
- Interaction
- Transformation

KS1 Science



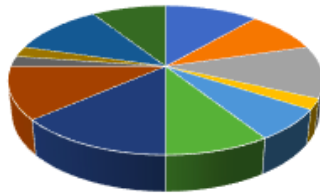
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KS2 Science



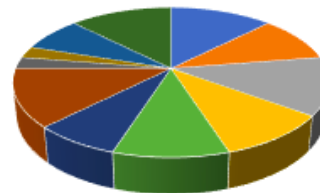
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KS3 Science



- Balance
- Evidence
- Models
- Consequence
- Form
- Movement
- Energy
- Function
- Patterns
- Environment
- Interaction
- Transformation

KS4 Science



- Balance
- Evidence
- Models
- Consequence
- Form
- Movement
- Energy
- Function
- Patterns
- Environment
- Interaction
- Transformation