

Year 5 – Forces

National Curriculum Objectives		Core Knowledge		Vocabulary	
<ul style="list-style-type: none"> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives. Identify the effects of air resistance, water resistance and friction, which act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 		Not a Core Knowledge unit Key knowledge required - <ul style="list-style-type: none"> Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. Friction is a force against motion caused by two surfaces rubbing against each other. Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. 		Friction, Gravity, Newton, Gears, Pulleys, force, push, pull, machine, brake, opposing, streamline, mechanism, lever, cog, Air resistance, Water resistance, motion, surface area, velocity, interaction	
				Key Scientists	Linked Texts
				Galileo Galilei (Gravity and Acceleration)	<i>The Enormous Turnip</i> (Katie Daynes)
		Isaac Newton (Gravitation)	<i>Leonardo's Dream</i> (Hans de Beer)		
		Archimedes of Syracuse (Levers)	<i>The Aerodynamics of Biscuits</i> (Clare Helen Welsh)		
Prior Learning		Key Questions		Future Learning	
<ul style="list-style-type: none"> Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2) Compare how things move on different surfaces. (Y3) Know how a simple pulley works and use making lifting an object simpler. (Y3) 		<ul style="list-style-type: none"> What actually is a force? How can a force act on an object? How can we see forces? How can we measure forces? How does the length of a piece of a paper helicopter's wings affect the time it takes to fall? How does the changing the shape of a piece of plasticine affect water resistance? How does adding holes to a parachute affect the time it takes to fall? How does the amount/depth of tread affect the friction between a shoe and a surface? How can we use levers to lift more? How do see-saws work? Can you create a pulley system to lift a given load? 		<ul style="list-style-type: none"> Forces as pushes or pulls, arising from the interaction between two objects. (KS3) Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3) Moment as the turning effect of a force. (KS3) Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3) Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3) 	
 Comparative & Fair tests	 Identify & Classify	 Observation over time	 Pattern Seeking	 Research	BIG Question: Assessment Opportunity
How does the angle of launch affect how far a paper rocket will go? How does the surface area of an object affect the time it takes to sink?	Can you label and name all the forces acting on the objects in each of these situations?	How long does a pendulum swing for before it stops?	Do all objects fall through water in the same way? How does surface area of parachute affect the time it takes to fall?	How do submarines sink if they are full of air?	How and why do objects move?

Year 5 – Chemistry: Basic Concepts

National Curriculum Objectives		Core Knowledge		Vocabulary	
<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 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. 		<p>ATOMS</p> <ul style="list-style-type: none"> All matter is made up of particles too small for the eye to see, called atoms Atoms are made up of even tinier particles: protons, neutrons, electrons. <p>PROPERTIES OF MATTER</p> <ul style="list-style-type: none"> Mass, volume, density, vacuum <p>ELEMENTS</p> <ul style="list-style-type: none"> Elements are the basic kinds of matter, of which there are a little more than one hundred. Familiar elements, such as gold, copper, aluminium, oxygen, iron Most things are made up of a combination of elements. <p>SOLUTIONS</p> <ul style="list-style-type: none"> A solution is formed when a substance (the solute) is dissolved in another substance (the solvent), Concentration and saturation (as demonstrated through simple experiments with crystallisation) 		<p>Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection.</p> <p>Substance, solution, compound, atoms, dissolve, reversable, transparent, sieving, filtering, evaporate, separating, soluble, insoluble, crystallisation,</p>	
				<p>Key Scientists</p> <p>Spencer Silver, Arthur Fry and Alan Amron (Post-It Notes)</p> <p>Ruth Benerito (Wrinkle-Free Cotton)</p>	<p>Linked Texts</p> <p><i>Itch (Simon Mayo)</i> <i>Astonishing Atoms & Matter Mayhem (Colin Stuart)</i> <i>On a Beam of Light : the Story of Albert Einstein (Jennifer Berne)</i></p>
				<p>Prior Learning</p> <p>Matter (Y3)</p> <ul style="list-style-type: none"> Everything is made of matter, and that all matter is made up of parts too small to see. Basic concept of atoms Names and common examples of three states of matter: <ul style="list-style-type: none"> Solid (for example, wood, rocks) Liquid (for example, water) Gas (for example, steam) Water as an example of changing states of matter of a single substance Units of measurement: Length & Volume Temperature: degrees Celsius 	
 <p>Comparative & Fair tests</p>	 <p>Identify & Classify</p>	 <p>Observation over time</p>	 <p>Pattern Seeking</p>	 <p>Research</p>	<p>BIG Question: Assessment Opportunity</p>
<p>How does the temperature of tea affect how long it takes for a sugar cube to dissolve? Which type of sugar dissolves the fastest?</p>	<p>Can you group these materials based on whether they are transparent or not?</p>	<p>How does a container of salt water change over time? How does a sugar cube change as it is put in a glass of water?</p>	<p>Do all stretchy materials stretch in the same way? How does temperature affect how much solute we can dissolve?</p>	<p>What are microplastics and why are they harming the planet?</p>	<p>How can we separate a mixture of water, iron filings, salt and sand?</p>

Year 5 – Human Body: Circulation

National Curriculum Objectives		Core Knowledge		Vocabulary	
<ul style="list-style-type: none"> 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>THE CIRCULATORY SYSTEM</p> <ul style="list-style-type: none"> Pioneering work of William Harvey Heart: four chambers (atrium/atria or atriums [plural] and ventricle/ventricles), aorta Blood & Blood vessels Filtering function of liver and spleen Fatty deposits can clog blood vessels and cause a heart attack. Blood types (four basic types: A, B, AB, O) and transfusions <p>THE RESPIRATORY SYSTEM</p> <ul style="list-style-type: none"> Process of taking in oxygen and getting rid of carbon dioxide Nose, throat, voice box, trachea (windpipe) Lungs, bronchi, bronchial tubes, diaphragm, ribs, alveoli (air sacs) Smoking: damage to lung tissue, lung cancer 		Oxygenated, deoxygenated, valve, exercise , respiration, circulatory system, heart, lungs , blood vessels, blood , artery, vein, alveoli, liver, spleen, digestive, transport, gas exchange, nutrients, water, oxygen, alcohol, drugs, tobacco, chambers, ventricle, aorta, trachea capillary, pulmonary, bronchial tubes	
				Key Scientists	Linked Texts
				Justus von Liebig (Theories of Nutrition and Metabolism)	Leonardo Da Vinci (Anatomy) Ernest Everett Just (Biologist)
Prior Learning		Key Questions		Future Learning	
<ul style="list-style-type: none"> Introduce the idea of body systems, and have children identify basic parts of the following body systems: Skeletal system: skeleton, bones, skull Muscular system: muscles Digestive system: mouth, stomach Circulatory system: heart and blood Nervous system: brain and nerves (Y2) Cells (Y3) The Digestive system (Y3) Muscular system (Y4) Skeletal system (Y4) Nervous system (Y4) 		<ul style="list-style-type: none"> Why do we need oxygen? How do we breathe? Do fish and plants breathe? Do all living things need oxygen? Are there ways to increase/decrease our lung capacity? Is lung capacity fixed? Why do we have blood? How does our heart work? How does size of muscle affect our pulse rate? How does exercise effect our pulse rate? How might the circulatory system of an elephant, a hummingbird, or a polar bear differ? 		<p>HUMAN GROWTH STAGES (Y6)</p> <ul style="list-style-type: none"> Puberty <p>THE REPRODUCTIVE SYSTEM (Y6)</p> <ul style="list-style-type: none"> Male & female reproductive systems Sexual reproduction: <p>THE ENDOCRINE SYSTEM (Y6)</p> <ul style="list-style-type: none"> Endocrine glands & hormones Pituitary gland Thyroid gland Pancreas: Adrenal glands: 	
 Comparative & Fair tests	 Identify & Classify	 Observation over time	 Pattern Seeking	 Research	BIG Question: Assessment Opportunity
How does the length of time we exercise for affect our heart rate? Can exercising regularly affect your lung capacity?	Which organs of the body make up the circulation system, and where are they found?	How does my heart rate change over the day? How much exercise do I do in a week?	Is there a pattern between what we eat for breakfast and how fast we can run?	How have our ideas about disease and medicine changed over time?	How do our choices affect how our bodies work? Why does my heart beat?

Year 5 – Evolution

National Curriculum Objectives		Core Knowledge		Vocabulary							
<ul style="list-style-type: none"> Know about evolution and can explain what it is. Know how fossils can be used to find out about the past. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution - recognise that living things have changed over time and that fossils provide information. 		<ul style="list-style-type: none"> Animals have offspring that are of the same kind but often offspring have different appearances Animals and plants have adapted to suit the environment within which they live Adaptation may lead to evolution: Darwin's finches 		<p>Fossils, adaptation, evolution, characteristics, reproduction, competition, survival of the fittest, evidence, genetics, variation, inherited, environmental, mutation, offspring, adapt, evolution, organisms, genetic, Heredity,</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Key Scientists</th> <th style="width: 50%;">Linked Texts</th> </tr> </thead> <tbody> <tr> <td>Charles Darwin and Alfred Russel Wallace (Theory of Evolution by Natural Selection)</td> <td><i>Moth (Isobel Thomas)</i> <i>Darwin's On The Origin of Species (Sabina Radeva)</i> <i>Darwin's Rival (Christian Dorien)</i></td> </tr> <tr> <td>Jane Goodall (Chimpanzees)</td> <td><i>One Smart Fish (Christopher Wormell)</i></td> </tr> </tbody> </table>		Key Scientists	Linked Texts	Charles Darwin and Alfred Russel Wallace (Theory of Evolution by Natural Selection)	<i>Moth (Isobel Thomas)</i> <i>Darwin's On The Origin of Species (Sabina Radeva)</i> <i>Darwin's Rival (Christian Dorien)</i>	Jane Goodall (Chimpanzees)	<i>One Smart Fish (Christopher Wormell)</i>
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Prior Learning		Key Questions		Future Learning							
<ul style="list-style-type: none"> Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3) Living things can be divided into groups based upon their characteristics. (Y4) Environmental change affects different habitats differently. (Y4) Different organisms are affected differently by environmental change. (Y4) Different food chains occur in different habitats. (Y4) 		<ul style="list-style-type: none"> Why are we all different? What is variation, and why is it important? How did life begin on Earth? How do we change? What is evolution? What evidence is there for evolution? How does evolution happen? What reasons do animals become extinct? How did Darwin come up with the theory? Why was his theory not initially accepted? 		<ul style="list-style-type: none"> Differences between species. (KS3) Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3) A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3) The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3) Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3) 							
 Comparative & Fair tests	 Identify & Classify	 Observation over time	 Pattern Seeking	 Research	BIG Question: Assessment Opportunity						
What is the most common eye colour in our class?	Compare the skeletons of apes, humans, and Neanderthals – how are they similar, and how are they different? Can you classify these observations into evidence for & against the idea of evolution?	How has the skeleton of the horse changed over time?	Is there a pattern between the size and shape of a bird's beak and the food it will eat?	What happened when Charles Darwin visited the Galapagos islands? What ideas did American geneticist Barbara McClintock have about genes that won her a Nobel Prize?	What is evolution, how does it happen and how do scientists know?						

Year 5 – Electricity

National Curriculum Objectives		Core Knowledge		Vocabulary	
<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers 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 recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit 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 use recognised symbols when representing a simple circuit in a diagram. 		<ul style="list-style-type: none"> Through reading and observation, and experiment, examine the following: Electricity as the charge of electrons Static electricity Electric current Electric circuits, and experiments with simple circuits (battery, wire, light bulb, filament, switch, fuse) Closed circuit, open circuit, short circuit Conductors and insulators Electromagnets: how they work and common uses Using electricity safely 		<p>Electricity, neutrons, protons, electrons, nucleus, atom, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, conductor.</p> <p>Amperes, volts, positive and negative charge</p>	
				<p style="text-align: center;">Key Scientists</p> <p>Alessandro Volta (Electrical Battery)</p> <p>Nicola Tesla (Alternating Currents)</p> <p>Jagadish Chandra Bose (Involved in the invention of the radio)</p>	<p style="text-align: center;">Linked Texts</p> <p><i>You Wouldn't Want to Live without Electricity (Ian Graham)</i></p> <p><i>Charging About (Jacqui Bailey)</i></p> <p><i>Goodnight Mr Tom (Michelle Magorian)</i></p>
Prior Learning		Key Questions		Future Learning	
<ul style="list-style-type: none"> Static electricity (Y2) Basic parts of simple electric circuits (for example, batteries, wire, bulb or buzzer, switch) (Y2) Conductive and nonconductive materials (Y2) Safety rules for electricity (for example, never put your finger or anything metallic in an electrical outlet, never touch a switch or electrical appliance when your hands are wet or when you're in the bathtub, never put your finger in a lamp socket, etc.) (Y2) 		<ul style="list-style-type: none"> What is electricity? How does the voltage of a battery affect how much current is pushed? How does the length of time I leave the current flowing for affect the brightness of the bulb? How does number of bulbs affect the brightness of a bulb? Why are wires insulated in plastic? Does type of material make a difference? Does length of wire make a difference? What renewable ways can we generate electricity? How does current affect heat? What are the dangers of a short circuit? 		<p><i>Current electricity</i></p> <ul style="list-style-type: none"> electric current, measured in amperes, in circuits, series and parallel circuits (KS3) potential difference, measured in volts (KS3) differences in resistance between conducting and insulating components (KS3) <p><i>Static electricity</i></p> <ul style="list-style-type: none"> separation of positive or negative charges when objects are rubbed together (KS3) the idea of electric field, forces acting across the space between objects not in contact (KS3) 	
 Comparative & Fair tests	 Identify & Classify	 Observation over time	 Pattern Seeking	 Research	BIG Question: Assessment Opportunity
How does the voltage of the batteries in a circuit affect the brightness of the lamp? How does the voltage of the batteries in a circuit affect the volume of the buzzer?	How would you group electrical components and appliances based on what electricity makes them do?	How does brightness of bulb change as the battery runs out? How can we measure how quickly a battery is used up?	Does the temperature of a light bulb go up the longer it is on?	How has our understanding of electricity changed over time?	Can we vary the effects of electricity?

Year 5 – Geology and Meteorology

National Curriculum Objectives		Core Knowledge		Vocabulary							
<ul style="list-style-type: none"> Not linked to NC 		<ul style="list-style-type: none"> The Earth's Layers: Crust, mantle, core (outer core and inner core). Movement of tectonic plates: earthquakes & volcanoes How mountains are formed: Folded mountains, fault-block mountains, dome-shaped mountains Rocks: Formation and characteristics of metamorphic, igneous, and sedimentary rock Weathering & erosion: Physical and chemical weathering. Weathering and erosion by water, wind and glaciers. The formation of soil: topsoil, subsoil, bedrock Meteorology: The water cycle (review from Year 3): evaporation, condensation, precipitation Clouds: cirrus, stratus, cumulus (review from Year 3) The atmosphere. Troposphere, stratosphere, mesosphere, thermosphere, exosphere. Air movement: wind direction and speed, prevailing winds, air pressure, low and high pressure, air masses. Weather and climate: Cold and warm fronts: thunderheads, lightning and electric charge, thunder, tornadoes, hurricanes. 		Crust, mantle, core, tectonic plates, fault lines, magma, lava, active, dormant, extinct, continental drift Fold, fault-block, dome-shaped, metamorphic, igneous, sedimentary , weathering, erosion, topsoil, subsoil, bedrock Evaporation, condensation, precipitation, cirrus, Prevailing winds, air pressure, cold & warm front, thunderheads, lightning and electric charge, thunder, tornadoes, hurricanes Composition stratus, cumulus Troposphere, stratosphere, mesosphere, thermosphere, exosphere		<table border="1"> <thead> <tr> <th>Key Scientists</th> <th>Linked Texts</th> </tr> </thead> <tbody> <tr> <td>James Hutton – father of modern geology Richard Fiske - volcanologist</td> <td><i>The Street Beneath my Feet – Yuval Zommer (Earth's layers)</i> <i>Mountains of the World – Deiter Braun</i> <i>Everest – Alexandra Stewart & Joe Todd Stanton (mountains)</i> <i>The Rhythm of the Rain – Graham Baker Smith (Water Cycle)</i></td> </tr> </tbody> </table>		Key Scientists	Linked Texts	James Hutton – father of modern geology Richard Fiske - volcanologist	<i>The Street Beneath my Feet – Yuval Zommer (Earth's layers)</i> <i>Mountains of the World – Deiter Braun</i> <i>Everest – Alexandra Stewart & Joe Todd Stanton (mountains)</i> <i>The Rhythm of the Rain – Graham Baker Smith (Water Cycle)</i>
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Prior Learning		Key Questions		Future Learning							
In Year 3, children learn about the different types of rocks and how they are formed. In Year 4, children learn about the earth, sun and moon and how the earth's rotation causes day and night, and how the orbit around the sun causes the seasons		<ul style="list-style-type: none"> What is a mountain and how are mountains formed? How does climate change and human activity impact on the mountain environment? How are volcanoes formed? What does a volcano look like inside? What is a biome? how are animals and plants are adapted to suit their environment in different ways? What is the role of the water cycle in a biome? 		<ul style="list-style-type: none"> the composition of the Earth (KS3) the structure of the Earth(KS3) the rock cycle and the formation of igneous, sedimentary and metamorphic rocks (KS3) Earth as a source of limited resources and the efficacy of recycling the composition of the atmosphere (KS3) the production of carbon dioxide by human activity and the impact on climate (KS3) 							
 Comparative & Fair tests	 Identify & Classify	 Observation over time	 Pattern Seeking	 Research	BIG Question: Assessment Opportunity						
Volcano – how can we change the size of the explosion (changing amounts of ingredients)	How can plants and animals be classified according to their biomes?	How does the hardness of rocks affect erosion?	How has the climate changes over the last x years? https://www.metlink.org/resources-for-year-6-post-sats/	How are different rocks created? https://www.geol Soc.org.uk/LessonPlanChocolateRock	What impact are humans having on the earth?						