Curriculum progression map of knowledge and skills
Science

	Topic	Enquiry	Knowledge	Working scientifically
Year 6	**Evolution and Inheritance** Evolution, adapted, characteristic, common ancestor, diverge, evolutionary tree, extinction, fossils generation, habitat mutations, natural selection, offspring palaeontologist population, pentadactyl, limb variation Researching	Which plants are more/less likely to survive in different locations based on their colour? Colour seed experiment. 1, 2, 4, 5, 6, 7	• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • 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.	1: Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. 2: Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat reading when appropriate 3: Use test results to make predictions to set up further comparative and fair tests 4: Record data and results of increasing complexity using scientific diagrams and labels, classification keys, table, scatter graphs, bar and line graphs 5: Report and present 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 6: Identify scientific evidence that has been used to support or refute ideas or arguments.
	Light opaque, translucent, transparent, shadow, pupil, iris lens, eyelid reflection, refraction, convex, concave, kaleidoscope, Periscope, Rainbow, Prism, Source	Does the distance at which you place an object from the light source affect the size of the shadow produced? 1, 2, 3, 4, 5, 6, 7 Does light travel in straight lines? Looking around corners using mirrors. 1, 7 How does refraction work? Pencil in water at different angles. 1, 3, 6, 7 How is the colour white produced? Coloured spinners.	• 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	

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		objects that cast them.	**7: Conclude** Evaluate original hypothesis against observed evidence and reach appropriate conclusions. Identify causal relationships. Begin to identify how reliable the data is. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.
Heart & Circulation vessel heart pump vein capillary artery lungs oxygen carbon dioxide gaseous exchange respiration exercise pulse rate heart chambers heart valves stethoscope blood group muscle skeleton smoking Pattern seeking	Do taller people have larger lung capacities? Lung capacity balloon experiment. 1, 2, 4, 5, 6, 7 Impact of exercise on heart rate. 1, 2, 4, 5, 6, 7 Which recovery activities promote shorter heart rate recovery time after exercise? 1, 2, 4, 5, 6, 7	• 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 of the way their bodies function (see PSHE) • Describe the ways in which nutrients and water are transported within animals, including humans.	
Living Things and their Habitats Characteristics, Classify, Taxonomist, Key, Bacteria, Microorganism, Microscope, Species, Invertebrates, Vertebrates	Bread mould experiment??	• 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.	
Electricity buzzer, series, parallel, circuit, crocodile clips, wire, complete circuit, symbol, circuit diagram,	Brighter the bulb, longer/thicker the wire, more bulbs etc	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	

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	fuse, bright, dim filament, electromagnet, conductor, insulator, plug, mains electricity		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.	

Cherish Challenge

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Year 5	**Forces** Earth, gravity, air resistance, water, resistance, friction, levers, pulleys, gears,	Fair testing and comparative testing: Investigate friction as a force across different surfaces (using a newton/force meter) 1,2,3,4,5,6 Which size of parachute will have the most air resistance? 1,2,3,4,5,6 Out of a sphere, cube and cone which will have the least air resistance? 1,2,3,4,5,6 Understand mechanisms- levers, gears and pulleys- investigation using levers to understand where to place pivot depending on weights 1,2,3 Accurate/ precise measurements. Diagrans, create and analyse tables of data. **Researching and using secondary sources** Explore how scientific ideas have developed over time. Aristotle and Galileo.	• 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.	1: Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. 2: Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat reading when appropriate 3: Use test results to make predictions to set up further comparative and fair tests 4: Record data and results of increasing complexity using scientific diagrams and labels, classification keys, table, scatter graphs, bar and line graphs 5: Report and present 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 6: Identify scientific evidence that has been used to support or refute ideas or arguments. **Conclude** Evaluate original hypothesis against observed evidence and
	Properties and Changes of Materials hard, soft, rigid, flexible, waterproof, absorbent, reflective, non reflective, transparent, opaque, translucent, solubility,	**Observation over time-** thermal insulators (experiment using ice and insulators) 1,2,3,4,5,6,7 **Classifying and sorting-** recognise properties of different materials **Design fair/comparative tests** Design techniques for separating out mixtures- make predictions based on prior knowledge 2,3	• 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	

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	electrical and thermal conductivity, melting, states of matter, solid, liquid, gas, change state, dissolve, solution, soluble, insoluble, particle, mixture, filter, sieve, evaporation, residue	Absorbency enquiry – which material will be the most absorbent? 1,2,3,4,5,6,7 Understand & identify reversible and irrervsible changes	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. • 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.	reach appropriate conclusions. Identify causal relationships. Begin to identify how reliable the data is. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.
	Solar System planets, sun, solar system, moon, spherical, rotation, spin, planet names, orbit, revolve	**Researching and using second sources** – planet research 6 **Classifying and sorting** – compare and contrast planets 5 **Evaluate** diagrams/ models; solar system theories 6 **Evaluate** daylight hours/ seasons etc.: create data tables/ bar charts/ diagrams	• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night and the apparent	

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			movement of the sun across the sky.	
	Animals/ plants & habitats life cycle reproduction sexual	**Research –** physical changes during puberty/ review of differences in age 6 **Pattern seeking** – height of babies- boys & girls; gestation periods of different animals; review animals' life expectancies 6 **Classifying and sorting** - girls changes and boys changes Venn diagram . **Research** – developing questions 5	• Describe the changes as humans develop to old age.	
	Living Things and their Habitats life cycle, germination, pollination, seed formation, seed dispersal, pollen, stamen, stigma, plant, mammal, amphibian, insect, bird, fish, reptile, eggs, live young	**Making observations over time** – growing plants from cuttings, propagation, bulbs, seeds 4,5 **Researching and using second sources** –lifecycle research **6** **Classifying and sorting** compare and contrast lifecycles of different animals 5 **Scientist: Jane Goodall 6**	• Describe the difference 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.	

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Year 4	**Animals inc humans** digestive system, nutrition, nutrients, canines, incisor, molar, pre-molar, saliva, tongue, oesophagus, stomach, small intestine, large intestine, rectum, anus carnivore, herbivore, omnivore, producer, consumer, predator, prey, food chain	Exploring the journey of food through the human digestive system. Classifying and sorting; Identify different types of teeth and their functions. **Observation over time;** Which liquids do the most damage to eggs? 1,3,4,5,6 Understand food chains and food webs. 5 Accurate/ precise measurements. Diagrams, create and analyse tables of data.	• 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.	
	States of Matter solid, liquid, gas, oxygen, change state,	Classifying and sorting; Identify solids, liquids and gases. 1,4		

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	ice, water, steam, water vapour, temperature, degrees Celsius, melt, freeze, solidify, melting point, boiling point, evaporation, condensation, water cycle, precipitation	Understand the changing states of materials. 1,2,3,5,6 **Observation over time**; Understand what causes evaporation. 1,2,3,4,5,6	• 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. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. ,	1: Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. 2: Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat reading when appropriate 3: Use test results to make predictions to set up further comparative and fair tests
	Sound vibration, travel, solid/liquid/gas, pitch, tune, volume, insulation	Recognise that sound is caused by vibrations. 1 Understand how trhe ear works. Investigate soundproofing. 1, 2 Find patterns between the pitch of a sound and feature of the object that made it. 1,2,3,4,5,6	• Identify how sounds are made, associating them with something vibrating. • Recognise that vibrations from sound 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. • Recognise that sounds get fainter as the distance	4: Record data and results of increasing complexity using scientific diagrams and labels, classification keys, table, scatter graphs, bar and line graphs 5: Report and present 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 Identify scientific evidence that has

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		from the sound source increases.	been used to support or refute ideas or arguments. **6: Conclude** Evaluate original hypothesis against observed evidence and reach appropriate conclusions. Identify causal relationships. Begin to identify how reliable the data is. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.
Electricity mains, plug, complete circuit, circuit diagram, symbol, components, cell, battery, positive/negative, wire, crocodile clip, bulb, bright/dim, switch, buzzer, motor, conductor, insulator	Compare appliances that use mains electricity or batteries. Create electrical circuits. 2 Understand what materials conduct electricity. 1,2,3,4,5 Recognise Insulators and conductors. 4	• Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switched and buzzers. • Identify whether or not a lamp with 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.	
Living things & their Habitats classification keys, environment, fish, mammals, amphibians, reptiles, birds, vertebrates, invertebrates		• 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.	

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			• Recognise that environments can change and that this can sometimes pose dangers to living things.	

Cherish Challenge

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Year 3	**Animals inc humans** nutrition, food groups, dairy, fat, sugar, carbohydrates, protein, vitamins and minerals, fibre, balanced diet, skeleton, muscles, protection, movement, vertebrate, invertebrate	**Compartive/fair testing** - Do those who have a longer femur jump further? 1,2,3,6 **Classifying and sorting** – food groups 5 **Classifying and sorting** – vertebrate and invertebrate 5	• 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. • Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	1: Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. 2: Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat reading when appropriate 3: Use test results to make predictions to set up further comparative and fair tests 4: Record data and results of increasing complexity using scientific diagrams and labels, classification keys, table, scatter graphs, bar and line graphs 5: Report and present 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
	Rocks and Soils fossils, crystals, texture, absorbent, permeable, impermeable, marble, chalk, granite, sandstone, slate, sandy, clay, chalky and peat soils	**Comparative/ fair testing** – test the hardness of and durability of rocks. 1,2,3,6 **Classifying and sorting** – different types of rocks. 5 **Comparative/ fair testing** - test how quickly water runs through different types of soil. 1,2,3,6 **Research** – Mary Anning. 5	• 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.	
	Plants leaf, flower, petal, fruit, root, seed, stem, nutrients, soil, growth, transported, life cycle, pollination, seed dispersal	**Making observation and comparative** – What does a plant need to grow? Children choose a variable to change (dark, water, warmth). 1,2,3,4,6 **Making observations over time** – carnations to see the transportation of water. 1,5	• 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	

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			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.	Identify scientific evidence that has been used to support or refute ideas or arguments. **6: Conclude** Evaluate original hypothesis against observed evidence and reach appropriate conclusions. Identify causal relationships. Begin to identify how reliable the data is. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.
	Forces & magnets push/pull, magnetic force, strength, attract, repel, magnetic material, metal, iron, steel, north and south pole	**Fair testing** – friction on different surfaces 1,2,3,4,6 **Fair testing** – Which magnet is the strongest? 1,2,3,4,5,6 **Observation** – How magnets attract and repel each other. 5 **Classifying and sorting** – Investiagting the pushes and pulls in the classroom. 5	• 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.	
	Light light source, reflect, shadow, block, direction,	**Classifying and sorting** – light sources 5 **Observation** – how light travels 5	• Recognise that they need light in order to see things and that dark is the absence of light.	

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	transparent, opaque, translucent	**Observation** – reflective surfaces 5 **Observation** – mirror games 5 **Pattern seeking and classification** – transparent, translucent, opaque materials 5. **Fair testing** – investigating how shadows change shape 1,2,3,4,5,6	• Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by a solid object. • Find patterns in the way that the size of shadows changes.	