

Working Scientifically						
5 Types of Enquiry:						
Observing over time Noticing patterns Grouping and classifying Comparative and fair testing Research						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Spoken Language	The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum - cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.					
Reading & Spelling	At Key Stage 1: <ul style="list-style-type: none"> Read & spell scientific vocabulary at a level consistent with their increasing word reading & spelling knowledge. 					
Asking Questions	Pupils should be taught to: <ul style="list-style-type: none"> ask simple questions and recognise that they can be answered in different ways 		Pupils should be taught to: <ul style="list-style-type: none"> ask relevant questions and use different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests 		Pupils should be taught to: <ul style="list-style-type: none"> plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary 	
Measuring & recording	Pupils should be taught to: <ul style="list-style-type: none"> observe closely, using simple equipment (for example, hand lenses, egg timers) compare and decide how to sort and group things perform simple tests 		Pupils should be taught to: <ul style="list-style-type: none"> make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 		Pupils should be taught to: <ul style="list-style-type: none"> 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 (Y6), bar and line graphs 	

	<ul style="list-style-type: none"> gather and record data to help in answering questions 	<ul style="list-style-type: none"> gather, record, classify and present data in a variety of ways to help in answering questions 	
Concluding	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and classify use their observations and ideas to suggest answers to questions observe changes over time and begin to notice patterns and relationships. 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify differences, similarities or changes related to simple scientific ideas and processes report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions use straightforward scientific evidence to answer questions or to support their findings 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify scientific evidence that has been used to support or refute ideas or arguments report and present findings from enquiries, including conclusions, causal relationships, explanations of, and degree of trust in, results, in oral and written forms such as displays and other presentations.
Evaluating		<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> use test results to make predictions to set up further comparative and fair tests

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	<p>Summer 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify, and describe, the basic structure of a variety of common flowering plants including trees (root, stem, trunk, leaf, flower, blossom, fruit, bulb, seed, bud, petal, branch) observe the growth of flowers and vegetables they have planted 	<p>Summer 1 & 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plant and be introduced to the requirements of plants for germination, growth and survival. find out and describe how plants need water, light and a suitable temperature to grow and stay healthy <p>Vocabulary Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen, observe, grow, compare, record, temperature, predict, measure, diagram,</p>	<p>Summer 1 & 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves for nutrition and flowers for reproduction 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 			

	<p>. compare and contrast what they have found out</p> <p><u>Vocabulary</u> Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen</p> <p><u>Key questions</u> How do Plants grow? What do Plants need to grow? Do all plants need water? Are all plants green? Why do seeds look different? Can plants grow as big in the shade? What is the biggest/smallest/smelliest (etc.) tree/flower/plant on the planet?</p>	<p>germinate, warmth, sunlight.</p> <p><u>Key questions</u> Do cress produce seeds, how could we find out? Do all plants produce flowers and seeds? What is different between freshly cut and planted flowers? Do plants flower all year round? What are flowers for? What happens to a plant after it has produced seeds?</p>	<p>cycle of flowering plants, including pollination, seed formation and seed dispersal</p> <p><u>Vocabulary</u> Air, light, water, nutrients, soil, support, anchor, reproduction, pollination, dispersal, transportation, flower, energy, growth, seedling, carbon dioxide, oxygen, sugar, material, photosynthesis, chlorophyll</p> <p><u>Key questions</u> How do plants reproduce? Do all flowers look the same? How do insects know which flowers to pollinate? Why do flowers smell? What do seeds do? Can a plant live without its leaves? Do grass/trees make flowers? What conditions are perfect for a seed to grow? Where do weeds come from? How does the space between seeds affect how well them grow? Does seed size match plant size? Do plants take in water through their roots? How does water move through the plant?</p>			
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			How do plants make their food? How does light affect plant growth? How does a plant get carbon dioxide?			
Animals Including Humans	<p>Autumn 1: Pupils should be taught to:</p> <ul style="list-style-type: none"> • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals . describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) <p>Vocabulary Amphibians, birds, fish, mammals, reptiles, carnivores, herbivore, omnivore</p> <p>Key questions What do animals eat? Do all animals eat the same food? Do all animals hunt? Why are animals' different colours and patterns?</p>	<p>Autumn 1: Pupils should be taught to:</p> <ul style="list-style-type: none"> . notice that animals, including humans, have offspring which grow into adults . 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>Vocabulary Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade</p> <p>Key questions How long do should my pets live for? Do all animals grow and live the same way? Do bigger animals live longer? Why are we all different heights?</p>	<p>Autumn 1: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 <p>Vocabulary Nutrients, nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, vertebrates, invertebrates, muscles, contract, relax,</p> <p>Key questions Why do we need a skeleton? What types of skeleton are there? Are all skeletons the same? Can something survive without a skeleton?</p>	<p>Autumn 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> . describe the simple functions of the basic parts of the digestive system in humans . construct and interpret a variety of food chains, identifying producers, predators and prey . identify the different types of teeth in humans and their simple functions <p>Vocabulary Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer.</p> <p>Key questions What different types of food are there? Why do we need a variety of different foods? Do all organisms eat the same things? Why do some people need different diets?</p>	<p>Summer 1 & 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> . describe the changes as humans develop from birth to old age . describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird, and those common features (birth, growth, development, reproduction, death) <p>Vocabulary Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty, Hormone, Physical, Emotional, Sexual, Asexual, Pollination, Dispersal, reproduction, cell, fertilisation, pollination, male, female, pregnancy</p> <p>Key questions What do humans look like? How do humans change? Why do humans change? What is a life cycle? What types of life cycles are there? Are life cycles the same?</p>	<p>Autumn 1: Pupils should be taught to:</p> <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 (including pulse and clotting) • 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>Vocabulary Oxygenated, Deoxygenated, Valve, Exercise, Respiration Circulatory system, heart, lungs, blood vessels, blood, artery, vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco.</p> <p>Key questions Why do we need oxygen?</p>

		<p>How and why do we grow and change?</p>	<p>What happens if we break a bone? How do we move? Are bones that are bigger, stronger? Why do we need joints? Why do muscles get tired? Can we 'break' muscles?</p>	<p>(weightlifter vs marathon runner) Why are teeth important? What happens to our food? What is our digestive system? How does our food turn into poo and wee?</p>	<p>What causes puberty? What changes do we go through during puberty?</p>	<p>How do we breathe? Do fish and plants breathe? Do all living things need oxygen? How does the size of a person's lungs affect their lung capacity? 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? Is the air you breathe out, the same as that you breathe in?</p>
<p>Living Things and their Habitats</p>		<p>Autumn 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> • explore and compare the difference between things that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other 		<p>Spring 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> . 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 	<p>Summer 1 & 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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, including humans) <p>Vocabulary Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager,</p>	<p>Autumn 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 <p>Vocabulary Variation Organisms Populations. Classification Characteristics Environment, flowering,</p>

		<ul style="list-style-type: none"> • identify and name a variety of plants and animals in their habitats, including micro-habitats • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain (e.g. grass, cow, human) and identify and name different sources of food <p><u>Vocabulary</u> habitats, micro-habitats, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade Living, dead, never alive, food, food chain</p> <p><u>Key questions</u> How are animals and plants 'adapted' to live in their habitats? Why do animals and plants like to live in different places? How do seasons affect our animals and plants? How do habitats change over our school year? How do animals eat? Do all animals eat the same thing? Which animals hunt, and which animals are hunted? Why? What animals live in our school environment? Which animals hibernate and why?</p>		<p>change and that this can sometimes pose dangers to living things</p> <p><u>Vocabulary</u> Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation.</p> <p><u>Key questions</u> What food chains and webs are there in our local habitat? How does energy move through the food chain? How does removal of one species from an environment, affect others? (keystone species) How does environmental change affect different organisms?</p> <p>What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers) How does human activity affect our environment?</p>	<p>Elderly, Growth, Development, Puberty, Hormone, Physical, Emotional, Sexual, Asexual, Pollination, Dispersal, reproduction, cell, fertilisation, pollination, male, female, pregnancy, young, mammal, metamorphosis, amphibian, insect, egg, embryo, bird, plant</p> <p><u>Key questions</u> What do humans look like? Do all animal embryos look the same? How do humans change? Why do humans change? What is a life cycle? What types of life cycles are there? Are life cycles the same? What causes puberty? What changes do we go through during puberty? Are there any patterns between vertebrate animals and their gestation periods?</p> <p>Do plants reproduce in the same ways as us? How do plants spread their seeds?</p>	<p>nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation. Classify, compare, bacteria, microorganism, organism, invertebrates, vertebrates, Linnaean.</p> <p><u>Key questions</u> Why do we need to classify living things? How do we classify? What are the difficulties with classification? (penguins, whales, platypus) How do animals change over time? Why does variation exist? What happens if animals of different species breed? (hybrids) What happens to house plants outside? What are microorganisms? How can we prevent the spread of disease? Why do animals and plants compete - and what for?</p>
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		Why do snails hibernate, but slugs don't?				
Light			<p><u>Autumn 2:</u> Pupils should be taught to:</p> <ul style="list-style-type: none"> • recognise that they need light in order to see things and that the dark is the absence of light • 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 <p><u>Vocabulary</u> Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent.</p> <p><u>Key questions</u> A coin is lost, what would be the best way to find it? (Turn the lights out and see it shine? Use a torch to see it reflect?)</p>			<p><u>Summer 1 & 2:</u> Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 (predict the size of shadows when the position of the light source changes) <p><u>Vocabulary</u> Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent. Reflect Absorb Emitted Scattered Refraction</p> <p><u>Key questions</u></p>

How does distance from a light source affect how bright it looks?
How does being in darkness affect your sense of hearing?
What colour would be the best to make a safety jacket from?
How does the colour of a material affect how reflective it is?
What would be the best material to make a blind for a baby's room?
How does thickness of a material affect how much light can pass through it?
How many pieces of tracing paper are as translucent as a single piece of white paper?
How does the shape of a mirror affect how the light reflects?

How does the size of an object affect the size of a shadow?
How does the distance between the light and the object change the size of a shadow?
How does the distance between the object and the size of the screen affect the size of a shadow?
How would a solar eclipse be different if:
- The moon was a different size?
- The earth span faster or slower?
- The sun was larger or smaller?
- If the earth and moon were the same size but further away in the solar system?
How does the amount of aluminium foil scrunched affect how much light it scatters?
How does the amount of polishing affect how well a piece of metal scatters light?
How perfect are our mirrors? Do some scatter light more than others?
What happens to light when it is shone through water?
How is this affected by putting glitter, salt or talc in the water?
How does a periscope/microscope/telescope work?

Forces
and
Magnets

Spring 1:
Pupils should be
taught to:

- 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 on 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

Vocabulary

Force, push, pull, friction, surface, magnet, magnetic, magnetic field, pole, north, south, attract, repel, compass

Key questions

What are magnetic materials? How can we find out?

Autumn 1:
Pupils should be
taught to:

- 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
Year 5- patterns- water resistance- experiment- dropping different objects into water.
- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

Vocabulary

Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley.

Key questions

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 saltiness (salinity) of water

			<p>Can I make a magnetic material non-magnetic? How far away does a magnet have to be before it attracts a magnetic material? How far away can the magnetic attraction between two magnets be experienced? Is the repulsive force the same size? How is the magnetic attraction of repulsion force affected by putting materials between the magnets? Are bigger magnets stronger? How could you use magnets to measure the number of pages in a book?</p>		<p>affect the water resistance? 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 lit more? What is the most effective way to move an object? How do see-saws work? Can you create a pulley system to life a given load?</p>	
<p>Seasonal Change</p>	<p><u>Autumn 1, Spring 1, Summer 1:</u> Pupils should be taught to:</p> <ul style="list-style-type: none"> . observe changes across the four seasons . observe and describe weather associated with the seasons and how day length varies <p><u>Vocabulary</u> Seasons, spring, summer, autumn, winter, windy, sunny,</p>					

overcast, snow, rain,
temperature

Key questions

Why do more frequent days of rain saturate the ground?
How long does it take for the ground to dry after it has been raining?
Does more rain take longer to dry?
Do countries with higher temperatures have less rain?
How does rainfall and temperature change over time in our school grounds?
Which leaf is the strongest/best shade cover/best at directing water?
What do you notice about different leaves?
What purpose do leaves serve for a tree?
Why do you think leaves turn brown in Winter?
What colours can we find outside? Does this change across the seasons?
What effect does rain have on the environment?
What would happen if there was too much rain?
What would happen if there wasn't enough rain?

<p>Materials</p>	<p>Spring 2: Everyday Materials Pupils should be taught to:</p> <ul style="list-style-type: none"> . 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, rock, brick, paper, fabric, elastic, foil. <p>Vocabulary Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, opaque,</p> <p>Key questions Plan to investigate a couple of classes of materials and properties in each topic so children get a depth of experience each topic and cover all the classes of materials over the key stage, for example:</p> <p>Buildings Which rocks are the least crumbly? Which materials absorb the most water? Which type of brick would be the easiest</p>	<p>Spring 1 & 2: Uses of Everyday Materials Pupils should be taught to:</p> <ul style="list-style-type: none"> . identify and compare the suitability of a variety of everyday materials for particular uses; including wood, metal, plastic, glass, brick, rock, paper and cardboard (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass) . find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching <p>Vocabulary Waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twisting, squashing, bending, matches, cans, spoons,</p> <p>Key questions It is recommended that materials be taught three times through KS1. Give a theme for each topic e.g. buildings, exploration, toys, the seaside.</p>	<p>Spring 2: Rocks Pupils should be taught to:</p> <ul style="list-style-type: none"> . 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>Vocabulary Rocks, igneous, metamorphic, sedimentary, anthropic, permeable, impermeable, chemical fossil, body fossil, trace fossil, Mary Anning, cast fossil, mould fossil, replacement fossil, extinct, organic matter, top soil, sub soil, base rock.</p> <p>Key questions How are the soils different? Which do you think has best drainage? Which is more likely to lead to flooding? How many soil types have we found? Where might you find more?</p>		<p>Autumn 2: Properties and Changes of Materials Pupils should be taught to:</p> <ul style="list-style-type: none"> . 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 . 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 . explain that some changes result in the formation of new materials, and that this 	
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	<p>to drag to make a pyramid? Which material would be the strongest to use as a floor tile?</p>	<p>Plan to investigate a couple of classes of materials and properties in each topic so children get a depth of experience each topic and cover all the classes of materials over the key stage</p> <p><u>Clothing & Materials</u> Which material could be used to make a waterproof hat for the teacher when she is on the playground at playtime? Which plastic would be flexible enough to make a belt? Which material could I wrap my ice egg / snowman in to stop it melting, or would it make it melt quicker? What could I wrap a chicken egg in to keep it warm when it is waiting to hatch? What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?</p>	<p>How might the soil be different in different countries? What rock is best for a kitchen chopping board? What might be the issues with various materials and what they have to withstand? What types of rocks are there? How do rocks change? What would grow best in your soil? Why do you think worms are important to the creation of soil? How can we use composting to make our own soil? Does it currently look like real soil? How long do you think this process will take and why? How are fossils created? Why do fossils help us find out about historical events? If you could fossilise an object what would it be?</p>		<p>Kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p> <p><u>Vocabulary</u> Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection, Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing Material, conductor, dissolve, insoluble, suspension, chemical, physical, irreversible, solution, reversable, separate, mixture, insulator, transparent, flexible, permeable, soluble, property, magnetic, hard.</p> <p><u>Key questions</u> What are mixtures? What does dissolve mean? Which of the following dissolve in water: sugar, bicarbonate of soda, oil, chocolate, coffees, dark vinegar and wax? How does the amount of water used affect how much sugar will dissolve in it?</p>	

					<p>Which sweets dissolve in water? How can we separate mixtures? How can we clean our dirty water?</p> <p>The key question we want children to interrogate is, "Have we made a new substance?"</p> <p>Wet clay, air-dried clay, fired clay. Flour and water, dough bread</p> <p>Add sugar to fizzy water; it fizzes up. Has a new substance been made? (No, the gas was dissolved in the water and adding sugar made it become undissolved)</p> <p>Add baking powder to vinegar, it fizzes up. Has a new substance been made? (Yes, the gas was not in the vinegar as it wasn't fizzy, so it must have been made)</p> <p>Add water to instant snow.</p> <p>Use lemon juice as an invisible ink, heating gently makes the ink visible. Is this a new substance?</p> <p>When water is added to jelly and it is set, is it a new substance.</p> <p>When materials are heated or mixed with other materials they sometimes can be made</p>	
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					to turn into new materials. The question is how would we know if it was a new material or the same material mixed differently?	
Evolution and Inheritance						<p>Spring 1: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 <p>Vocabulary Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, Variation, Inherited, Environmental, Mutation, Competition, Survival of the Fittest, Evidence,</p> <p>Key questions Why are we all different? What is variation, and why is it important?</p>

						<p>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? Polar Bears habitat is rapidly changing, what possible futures do they face and can we predict which is most likely? How did Darwin come up with his theory? Why was his theory not initially accepted?</p>
States of Matter				<p>Spring 1: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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>Vocabulary</p>		

Solid, liquid, gas,
particles, state,
materials, properties,
matter, melt, freeze,
water, ice,
temperature, process,
condensation,
evaporation, water
vapour, energy,
precipitation,
collection,

Key questions

How does the amount
of water added to flour
affect its state?
How does the amount
of detergent added to
water affect how
slippery it is?
How does the
temperature affect
how viscous a liquid is
(use cooking oil)?
Place a peach in a glass
of lemonade and watch
it spin. Why does it
behave that way and
can you prove it?
How does the material
sprinkled on ice and
snow affect how quickly
it melts?
What chocolate would
be best to smuggle?
How does the type of
chocolate affect its
melting temperature?
What is the melting
temperature of ice and
how does it compare
with the freezing
temperature of water?
Is the melting
temperature of wax

				the same as its freezing temperature?		
Earth and Space					<p><u>Spring 1 & 2:</u> Pupils should be taught to:</p> <ul style="list-style-type: none"> • describe the movement of the Earth, and other planets, relative to the Sun • 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 movement of the sun across the sky <p>Vocabulary: Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.</p> <p><u>Key questions</u> How does temperature/size/day length/year length change as you get closer/further to the sun?</p>	

					<p>How does distance from a light source affect how much light hits an object? Does having more moons result in more light hitting a planet? How could you test this? How does speed/size of a meteorite affect the size of the moon crater formed? If the moon became heavier as a result of meteorite collisions what would happen to its position relative to Earth? If the mass of the Earth is 80x that of the moon, why is the gravity at the Earth's surface only 6x greater than at the surface of the moon? Why do we have day/night/months/years/seasons? Why does day length change? Why does shadow size change over the course of a day?</p>	
Sound				<p>Autumn 1: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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

- recognise that sounds get fainter as the distance from the sound source increases

Vocabulary

Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave.

Key questions

How can you change the volume of a sound?

How does the size of an ear trumpet affect the volume of sound detected?

How does the type of material affect how well it blocks a sound?

How does thickness of material affect how well it blocks a sound?

Which materials vibrate better and produce louder sounds?

Can we identify any patterns?

Which materials make the best string telephone components?

(tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic - predict and test)

				<p>How does length of the tube (when making a straw oboe) affect the pitch and volume? Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water?</p>		
Electricity				<p>Summer 1 & 2: Pupils should be taught to:</p> <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 <p>Vocabulary Electricity, electric current, appliances,</p>		<p>Spring 2: Pupils should be taught to:</p> <ul style="list-style-type: none"> • 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 <p>Vocabulary 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>Key questions Do all batteries push as hard as each other?</p>

				<p>mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.</p> <p>Key questions What would life be like without electricity? What sorts of things use/need electricity? What electricity do I use? In which ways can we 'get' electricity? (mains/plugs/batteries /wireless) How do we make electricity? How do batteries work? How quickly can batteries run out? Does this make a difference depending on number of components? How does the number of batteries added to the circuit affect a device? What materials can carry electricity? (conductors/insulators)</p>		<p>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? Are all types of wires as good as conducting electricity? Why are wires insulated in plastic? Does type of material make a difference?</p> <p>Does length of wire make a difference? Does the type of circuit affect how the components work/long the battery lasts? What renewable ways can we generate electricity? How does current affect heat? What are the dangers of a short circuit?</p>
<p>Foundation Stage:</p> <p>Refer to DFE Statutory Framework for early years foundation stage: (published March 2021/effective September 2021)</p> <p>https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974907/EY_FS_framework_-_March_2021.pdf</p>						