



Curriculum Content for science

Aims and Vision: Science is centred around children's curiosity about the world around them. It offers them the opportunity to discover, prove and disprove the answers to their scientific questions. Science at Springfield Junior School is fun and practical giving children stimulating and challenging experiences which help them secure and extend their scientific knowledge and vocabulary. We encourage the children to lead their own learning which in turn builds their confidence and enjoyment in this subject. We believe that these opportunities will ensure that our children are confident, life-long learners who will explore the world around them.

Working scientifically progression

Year 3	Year 4	Year 5	Year 6
<p>Plan</p> <ul style="list-style-type: none"> Set up simple comparative fair tests Ask relevant questions and use different types of scientific enquiry to answer them. 	<p>Plan</p> <ul style="list-style-type: none"> Set up simple comparative fair tests Ask relevant questions and use different types of scientific enquiry to answer them. 	<p>Plan</p> <ul style="list-style-type: none"> Use test results to make predictions to set up further comparative and fair tests. Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables. 	<p>Plan</p> <ul style="list-style-type: none"> Use test results to make predictions to set up further comparative and fair tests. Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables.
<p>Do</p> <ul style="list-style-type: none"> Gather, record, classify and present data in a variety of ways to help in answering questions. Make systematic and careful observations and, where appropriate, take accurate measurements, using standard units and a range of equipment, including thermometers and data loggers. Record findings using simple scientific language, drawings, labelled keys, bar charts and tables 	<p>Do</p> <ul style="list-style-type: none"> Gather, record, classify and present data in a variety of ways to help in answering questions. Make systematic and careful observations and, where appropriate, take accurate measurements, using standard units and a range of equipment, including thermometers and data loggers. Record findings using simple scientific language, drawings, labelled keys, bar charts and tables 	<p>Do</p> <ul style="list-style-type: none"> Take measurements, using a range of scientific equipment, 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 graph and appropriate scientific language. 	<p>Do</p> <ul style="list-style-type: none"> Take measurements, using a range of scientific equipment, 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. Find things out using a wide range of secondary sources of information.
<p>Review</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 results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward evidence to answer questions or to support his/ her findings. 	<p>Review</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 results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward evidence to answer questions or to support his/ her findings. 	<p>Review</p> <ul style="list-style-type: none"> Reports 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 been used to support or refute ideas or arguments. 	<p>Review</p> <ul style="list-style-type: none"> Reports 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 been used to support or refute ideas or arguments. Use appropriate scientific language and ideas from the national curriculum to explain, evaluate and communicate his/ her methods and findings.

	Topics/ Context	Skills	Knowledge (Key facts for recall)	Vocabulary to be learnt
Prior Learning Year 1	Plants	Pupils should be taught to use the following practical scientific methods, processes and skills: - asking simple questions and recognising that they can be answered in different ways	<ul style="list-style-type: none"> Plants have common parts but they vary between the different types of plants. Some trees keep their leaves all year whilst others drop their leaves during autumn and grow them again in spring. 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. 	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud.
	Animals including humans	- observing closely, using simple equipment	<ul style="list-style-type: none"> Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin covering e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. 	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves
	Everyday materials	- performing simple tests - identifying and classifying - using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions.	<ul style="list-style-type: none"> Everyday materials include wood, plastic, glass, metal, water, and rock. Objects are made from different materials. Materials have different properties. 	Wood, plastic, glass, metal, water, rock, brick, paper, fabrics, elastic, foil, hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof
	Seasonal changes		<ul style="list-style-type: none"> In the UK the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK it is usually colder and rainier in winter and hotter and dryer in the summer. The change in weather causes many other changes, some examples are numbers of minibeasts found outside, seed and plant growth, leaves on trees and type of clothes worn by people. 	Weather (sunny, rainy, windy, snowy etc.) , Seasons (winter, summer, spring, autumn), Sun, sunrise, sunset, Day length
Prior Learning Year 2	Plants	Pupils should be taught to use the following practical scientific methods, processes and skills: - asking simple questions and recognising that they can be answered in different ways	<ul style="list-style-type: none"> Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of the year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy. 	As for year 1 plus - light, shade, sun, warm, cool, water, grow, healthy.
	Animals including humans	- observing closely, using simple equipment - performing simple tests - identifying and classifying	<ul style="list-style-type: none"> In order to survive humans need water, food and air. Animals can produce offspring when they reach adulthood. It is important that humans exercise, eat the right amounts of food and have good hygiene. 	Offspring, adults, exercise, hygiene
	Uses of everyday material	- using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions.	<ul style="list-style-type: none"> The properties of materials (prior learning from Y1) make them suitable or unsuitable for particular purposes. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. More than one material may be suitable. A material can be suitable for different purposes. Some objects can be bent, stretched, squashed and twisted. This can be a property of the material or depend on how the material has been processed e.g. thickness 	Names of materials: wood. Plastic, glass, metal, water, rock, brick, paper, fabric, card, rubber; suitable/unsuitable, use/useful, hard/soft, stretchy/stiff, rigid/flexible, waterproof/absorbent, strong/weak, rough/smooth, transparent/opaque, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching.
	Living things and their habitats		<ul style="list-style-type: none"> Most living things live in habitats to which they are suited. Different habitats provide for the basic needs of different kinds of animals and plants. Plants and animals depend on each other to survive. Animals obtain food from plants and other animals. This is a food chain. 	

Year 3 Topics/ Context	Linked to the Working Scientifically Skills	Knowledge (Key facts for recall)	Vocabulary to be learnt and understood
Animals including human	<ul style="list-style-type: none"> Classify food in a range of ways (Do) Use food labels to explore the nutritional content of a range of food items (Do) Use secondary sources to find out the types of food that contain the different nutrients (Do) Use food labels to answer enquiry questions e.g. how much fat do different types of pizza contain? How much sugar is in soft drinks? (Plan, review) Plan a daily diet contain a good balance of nutrients. (Plan) Explore the nutrients contained in fast food. (Do) Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing) (Do, review) Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls (Do) 	<ul style="list-style-type: none"> Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients that are needed by the body to stay healthy – carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars and water. A piece of food will often provide a range of nutrients. Humans have four types of teeth - incisors for cutting, canines for tearing, molars and premolars for grinding (chewing). 	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, mouth, teeth, saliva, incisor, canine, molar, premolars.
Plants	<ul style="list-style-type: none"> Observe what happens to plants over time when the leaves or roots are removed. (Do) Observe the effect of putting cut white carnations/ celery/paper towels in coloured water. (Do) Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. (Plan, do, review) Observe flowers carefully to identify the pollen. (Do) Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. (Do) Observe seeds being blown from the trees e.g. sycamore seeds. (Do) Research different types of seed dispersal. (Do)- balloon popping seed demo Classify seeds in a range of ways including by how they are dispersed. (Do) 	<ul style="list-style-type: none"> Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth. 	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal, conditions
Rocks	<ul style="list-style-type: none"> Observe rocks and soils closely. (Do) Classify rocks and soils in a range of ways based on their appearance. (Do) Devise a test to investigate the hardness of a range of rocks. (Plan, do, review) Devise a test to investigate how much water different rocks absorb. (Plan, do, review) Observe how rocks change over time e.g. gravestones or old building. (Do) Research using secondary sources how fossils are formed. (Do) Devise a test to investigate the water retention of soils. (Plan, do, 	<ul style="list-style-type: none"> Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock piece and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other 	Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil

	<p>review)</p> <ul style="list-style-type: none"> Observe how soil can be separated through sedimentation. (Do) 	<p>material. Over time the dissolving animal and plant matter is replaced by minerals from the water.</p>	
Light	<ul style="list-style-type: none"> Explain why different objects are more or less visible in different lighting and for different object surfaces e.g. shiny vs matt. (Do, review) Explain how shadows vary as the distance between a light source and an object is changed. (Do, review) 	<ul style="list-style-type: none"> We see objects because our eyes can sense light. Some objects, for example the sun, light bulbs and candles are sources of light. We can see light sources shining directly into our eyes but to see other objects, light from a source must first shine on the object and then be reflected into our eyes. Some objects are easier to see as they are more reflective or shiny than other objects. Objects are easier to see if there is more light. Dark is the absence of light. We cannot see anything in complete darkness. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface. If the light source and object move closer to each other, the shadow will become larger. 	<p>Light, Light source, Dark, Absence of light, Transparent, Translucent, Opaque, Shiny, Matt, Surface, Shadow, Reflect, Mirror, Sunlight, Dangerous</p>
Forces and magnets	<ul style="list-style-type: none"> Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. (Plan, do, review) Explore what materials are attracted to a magnet. (Do) Classify materials according to whether they are magnetic. (Do) Explore the way that magnets behave in relation to each other. (Do) Use a marked magnet to find the unmarked poles on other types of magnets. (Do) Explore how magnets work at a distance e.g. through the table, in water, jumping paper clip up off the table. (Do, review) Devise an investigation to test the strength of magnets. (Plan, do, review) 	<ul style="list-style-type: none"> A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles e.g. a north and south, are brought together they will pull together – attract. For some forces to act there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts. 	<p>Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole</p>

Year 4 Topics/ Context	Linked to the Working Scientifically Skills	Knowledge (Key facts for recall)	Vocabulary to be learnt
Animals including humans	<ul style="list-style-type: none"> Use secondary sources to research the parts and functions of the skeleton. (Do) Investigate pattern seeking questions such as: Can people with longer legs run faster? Can people with bigger hands catch a ball better? (Plan, do, review) Compare, contrast and classify skeletons of different animals. (Do) Research the function of the parts of the digestive system. (Do, review) Create a model of the digestive system using household objects. (Do) Use food chains to identify producers, predators and prey within a habitat. (Do, review) Use secondary sources to identify animals in a habitat and find out what they eat. (Do, review) 	<ul style="list-style-type: none"> Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Living things can be classified as producers, predators and prey according to their place in the food chain. Humans and some other animals have skeletons and muscles which help them move and provide protection and support. 	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, herbivore, carnivore, omnivore, producer, predator, prey, food chain, skeleton, bones, muscles, support, protect, skull, ribs, spine, muscles, joints
Electricity	<ul style="list-style-type: none"> Construct a range of circuits. (Do) Explore which materials can be used instead of wires to make a circuit. (Do, review) Classify the materials that were suitable/not suitable for wires. (Do, review) Explore how to connect a range of different switches and investigate how they function in different ways. (Do) Choose switches to add to circuits to solve particular problems such as a pressure switch for a burglar alarm. (Do) Apply their knowledge of conductors and insulators to design and make different types of switch. (Do) 	<ul style="list-style-type: none"> Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity. 	Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol N.B. Children in year 4 do not need to use standard symbols as this is taught in year 6
Sound	<ul style="list-style-type: none"> Make sounds with a range of objects such as musical instruments and other household objects. (Do) Use objects that change in feature to change pitch and volume such as length of guitar string, bottles of water or tuning forks. (Plan, do, review) Measure sounds over different distances and through different insulation materials. (Plan, do, review) 	<ul style="list-style-type: none"> A sound source vibrates to produce sound waves which travel through a medium from the source to our ears. Different mediums such as air or water or wood can carry sound but sound cannot travel through a vacuum (an area empty of matter). The sound waves cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the amount of energy of vibrations how well they travel through the medium. Therefore bigger vibrations cause louder sounds and sounds decrease in volume the further 	Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

		<p>they have to travel.</p> <ul style="list-style-type: none"> •Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example smaller objects usually produce higher pitch sounds. 	
States of matter	<ul style="list-style-type: none"> • Observe closely and classify a range of solids and liquids. (Do) • Classify materials according to whether they are solids, liquids and gases. (Do) • Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind. (Do) • Observe a range of materials melting e.g. ice, chocolate and butter. (Do) • Investigate how to melt ice more quickly. (Plan, do, review) • Investigating melting point of different materials e.g. ice, margarine, butter and chocolate. (Do) • Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). (Do) • Observe water evaporating and condensing e.g. on cups of icy water and hot water. (Do) • Set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers. (Plan, do, review) • Use secondary sources to find out about the water cycle. (Do, review) 	<ul style="list-style-type: none"> • A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. • Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. •Melting is a state change from solid to liquid. •Freezing is a state change from liquid to solid. The freezing point of water is 0oC. •Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. •Water boils when it is heated to 100oC. •Evaporation is the same state change as boiling (liquid to gas) but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. •Condensation is the change back from a gas to a liquid caused by cooling. •Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle. 	<p>Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature and water cycle.</p>
Living things and their habitats	<ul style="list-style-type: none"> • Observe, compare and contrast plants and animals in different habitats throughout the year. (Do, review) • Use classification keys to name unknown living things. (Do) • Classify living things found in different habitats based on their features. (Do) • Create a simple identification key based on observable features. (Do) • Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. (Do, review) • Use secondary sources to find out about how environments may naturally change. (Do) • Use secondary sources to find out about human impact, both positive and negative, on environments. (Do) 	<ul style="list-style-type: none"> •Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. •Living things live in a habitat which provides an environment to which they are suited (year 2 learning). •These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way i.e. positive human impact, such as setting up nature reserves or in a bad way i.e. negative human impact, such as littering. •These environments also change with the seasons; different living things can be found in a habitat at different times of the year. 	<p>Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate</p>

Year 5 Topics/ Context	Linked to the Working Scientifically Skills	Knowledge (Key facts for recall)	Vocabulary to be learnt
Animals including humans	<ul style="list-style-type: none"> • Create a role play model for the circulatory system. (Do) • Carry out a range of pulse rate investigations. Fair test – effect of different activities on my pulse rate. Pattern seeking – exploring which groups of people may have higher or lower resting pulse rates. Observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate). Pattern seeking – exploring recovery rate for different groups of people. (Plan, do, review) • Learn about the impact of exercise, diet, drugs and lifestyle on the body. This is likely to be taught through direct instruction due to its sensitive nature. (Do, review) 	<ul style="list-style-type: none"> • The heart pumps blood in the blood vessels around to the lungs. • Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. • Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. • As they are used they produce carbon dioxide and other waste products. • Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. • Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. 	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle
Earth and space	<ul style="list-style-type: none"> • Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. (Do, review) • Use secondary sources to help make a model to show why day and night occur. (Do) • Make first-hand observations of how shadows caused by the Sun change through the day. (Do) • Research time zones. (Do) • Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel. (Do) 	<ul style="list-style-type: none"> • The sun is a star. It is at the centre of our solar system. • There are 8 planets (can name them). These travel around the sun in fixed orbits. • Earth takes 365 ¼ days to complete its orbit around the sun. • The earth rotates (spins) on its axis. • As earth rotates, half faces the sun (here it is day) and half is facing away from the sun (night). • As the earth rotates the sun appears to move across the sky. • The moon orbits the earth. It takes about 28 days to complete its orbit. • The sun, earth and moon are approximately spherical. 	Earth, Sun, Moon, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, spherical, Solar system, rotates, star, orbits, planets, axis
Materials	<ul style="list-style-type: none"> • Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. (Plan, do, review) • Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. (Do) • Investigate rates of dissolving by carrying out comparative and fair test. (Plan, do, review) • Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. (Do, review) • Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. (Do) • Carry out comparative and fair tests involving non-reversible changes e.g. what affects the rate of rusting? What affects the amount of gas 	<ul style="list-style-type: none"> • Materials have different uses depending on their properties and state (liquid, solid, gas). • Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. • Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. • Mixtures can be separated by filtering, sieving and evaporation. • Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible. 	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/non-reversible change, burning, rusting, new material

	<p>produced? (Plan, do, review)</p> <ul style="list-style-type: none"> Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton) (Do) 		
Forces	<ul style="list-style-type: none"> Investigate the effect of friction in a range of contexts e.g. trainers, bath mats, mats for a helter-skelter. (Plan, do, review) Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water. (Plan, do, review) Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. Explore how levers, pulleys and gears work. (Plan, do, review) Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. (Do) 	<ul style="list-style-type: none"> A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines. 	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears
Living things and their habitats	<ul style="list-style-type: none"> Use secondary sources and, where possible, first hand observations to find out about the life cycle of a range of animals. (Do, review) Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. (Do, review) Look for patterns between the size of an animal and its expected life span. (Do, review) Use secondary sources to find out about pollination. (Do) 	<ul style="list-style-type: none"> As part of their life cycle plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals including humans have offspring which grow into adults. In humans and some animals these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects. 	Life cycle, reproduce, sexual, asexual, fertilises, egg, live young, metamorphosis, plantlets, runners, bulbs, cuttings

Year 6 Topics/ Context	Linked to the Working Scientifically Skills	Knowledge (Key facts for recall)	Vocabulary to be learnt
Light	<ul style="list-style-type: none"> Observe objects in different lighting conditions – using light from sources that can be moved, reflected and blocked in different ways. (Do) Observe shadows of different objects as the object and the light source are moved so that the distance between them and their distance from the surface where the light is falling changes. (Do) Predict or explain some uses or behaviours of light, reflection and shadows such as periscope design, shadow puppets, bending of light in water. (Do, review) 	<ul style="list-style-type: none"> Light appears to travel in straight lines and we see objects when light from them goes into our eyes. The light may come directly from light sources but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object and the size of the shadow is larger when the light source and object move closer to each other as more of the light is blocked. 	Straight lines, Light rays. (Y3 vocabulary - Light, Light source, Dark, Absence of light, Transparent, Translucent, Opaque, Shiny, Matt, Surface, Shadow, Reflect, Mirror, Sunlight, Dangerous)
Electricity	<ul style="list-style-type: none"> Explain how a circuit operates to achieve particular operations, such as control the light for a torch with different brightness or make a motor go faster or slower. (Plan, do, review) Make circuits to solve particular problems such as a quiet and a loud burglar alarm. (Do, review) Carry out fair tests exploring changes in circuits. (Plan, do, review) 	<ul style="list-style-type: none"> Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. Use recognised circuit symbols to draw simple circuit diagrams. 	Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage NB Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words cells and batteries are now used interchangeably
Evolution	<ul style="list-style-type: none"> Use models to demonstrate evolution e.g. Darwin’s finches bird beak activity. (Do) Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution. (Do, review) Make observations of fossils to identify living things that lived on Earth millions of years ago. (Do) Identify features in animals and plants that are passed on to offspring. Explore this process by considering the artificial breeding of animals or plants e.g. dogs. (Do, review) Compare the ideas of Charles Darwin and Alfred Wallace on evolution. (Do, review) Research the work of Mary Anning and how this provided evidence of evolution. (Do, review) 	<ul style="list-style-type: none"> All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time these inherited characteristics become more dominant within the population. Over a very long period of time these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. 	Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils

		<ul style="list-style-type: none"> • More recently scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics. 	
Living things and their habitats	<ul style="list-style-type: none"> • Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. (Do) • Identify characteristics shared by the animals in a group. (Do) • Use secondary sources to research the characteristics of animals that belong to a group. (Do) • Use information about the characteristics of an unknown animal or plant to assign it to a group. (Do, review) • Classify plants and animals presenting this in a range of ways – Venn diagrams, Carroll diagrams and keys. (Do) 	<ul style="list-style-type: none"> • Living things can be formally grouped according to characteristics. • Plants and animals are two main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. • Plants can make their own food whereas animals cannot. • Animals can be divided into two main groups – those that have backbones (vertebrates) and those that do not (invertebrates). • Vertebrates can be divided into five small groups – fish, amphibians, reptiles, birds and mammals. • Each group has common characteristics. Invertebrates can be divided into a number of groups including insects, spiders, snails and worms. • Plants can be divided broadly into two main groups – flowering plants and non-flowering plants. 	Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering
Animals including humans	This unit is likely to be taught through direct instruction due to its sensitive nature.	<ul style="list-style-type: none"> • When babies are young they grow rapidly. • They are very dependent on their parents. • As they develop they learn many skills. • At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. <p>This needs to be taught alongside PSHE Useful guidance can be obtained at: http://www.ase.org.uk/news/aseviews/teaching-about-puberty/ http://www.ase.org.uk/documents/2016-joint-statement-on-reproduction/</p>	Puberty, the vocabulary to describe a range of sexual characteristics