


Science Progression of Skills and Knowledge

	Year 3	Year 4	Year 5	Year 6
Plants:	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <ul style="list-style-type: none"> - Recognise that plants need light, water, warmth, healthy leaves, roots and stems in order to grow well. - Describe why healthy roots and a healthy stem are needed for plants to grow - Recognise that the leaves of a plant are associated with healthy growth and more specifically nutrition - Know that water travels from the roots up the stem. - Compare the roots of different plants (e.g. desert plants or rainforest trees) - Observe what happens to plants over time when the leaves or roots are removed. <p>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.</p> <ul style="list-style-type: none"> - Know that plants make their own food - Know that fertilisers contain minerals - Understand that plants absorb minerals from the soil. - Describe how changes to light and fertiliser affect plant growth - Explain that differences in plant growth are due to the amount of light and/or water - 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 <p>Investigate the way in which water is transported within plants.</p> <ul style="list-style-type: none"> - Describe how the stem has a role in support and nutrition (transport water) 			

	<ul style="list-style-type: none"> - Explain why healthy roots and a healthy stem are needed for plants to grow. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. - Describe why plants need flowers - Describe how pollen and seeds are dispersed. - Describe the processes of pollination, seed formation and seed dispersal. - Explain the role of bees and insects in pollination - Sequence pictures to show the life cycle of a plant. 			
Animals, including humans	<p>Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.</p> <ul style="list-style-type: none"> - Identify some foods needed for a healthy varied diet - Name the components of a healthy and varied diet - Describe how their diet is balanced - Describe the role of different food groups - Compare and contrast diets of animals including pets. - Describe an adequate and varied diet for humans, recognising that there are many ways of achieving this. - Classify food in a range of ways - Use food labels to explore the nutritional content of a range of food items - Use secondary sources to find out the types of food that contain different nutrients - 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? 	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <ul style="list-style-type: none"> - Identify a wide range of body parts including some internal organs (large intestine, small intestine, brain, lungs, heart, stomach, oesophagus) - Locate and name the different organs in the digestive system - Label the different parts of the digestive system - Describe the role of each organ in the digestive system - Can use diagrams or a model to describe the journey of food through the body explaining what happens in each part - Explain why food needs to be broken down Identify the different types of teeth in humans and their simple functions: - Name the different types of teeth - Describe the role of each type of teeth in digestion - Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing). - Recognise they need to take care of their teeth - Explain how they should look after their teeth and recognise why they need to do so. 	<p>Human Life Cycles (This could be taught with living things and their habitats)</p> <p>Describe the changes as humans develop to old age</p> <ul style="list-style-type: none"> - identify ways in which the appearance of humans changes as they get older - identify some characteristics that will not change with age - recognise stages in growth and development of humans including puberty 	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <ul style="list-style-type: none"> - Identify and name the parts of the circulatory system - Know that the heart is made of muscle - Describe what the heart and blood vessels do - Describe the different functions of the blood (e.g. transporting and protecting) - Know that the blood comes from the heart in arteries and returns to the heart in veins - Know that blood carries oxygen and other essential materials around the body - Explain how ideas about the circulatory system have changed over time 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 - State how to measure pulse rate - Recognise that pulse rate is a measure of how fast the heart is beating - Discover that during exercise the heart beats faster to take blood more rapidly to the muscles

- Plan a daily diet contain a good balance of nutrients and record and present findings
- Explore the nutrients contained in fast food

Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

- Know they have bones and muscles in their body
- State that they and other animals have skeletons
- Describe the main functions of their skeletons
- Identify animals that do not have an internal skeleton (invertebrates)
- Group animals with and without an internal skeleton
- Describe some advantages of having an internal skeleton over no skeleton or an exoskeleton
- Describe some observable characteristics of bones
- State that movement depends on both skeleton and muscles
- State that when one muscle contracts another relaxes
- Recognise that their skeletons grow as they grow
- Describe problems associated with broken bones or bones diseases
- Use secondary sources to research the parts and functions of the skeleton
- Investigate pattern-seeking questions such as; Can people with longer legs run faster? Can people with bigger hands catch a ball better?
- Compare, contrast and classify skeletons of different animals

- Explain why dentists are concerned about the amount of sugar children have
- State that animals have different diets and may have different kinds of teeth
- Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls.
- Explain how fossilised teeth give us clues about an animals' diet
- Explain why humans do not have a full set of adult teeth at birth

- Make careful measurements of pulse rate
- Identify some of the harmful effects of smoking
- Recognise that care needs to be taken with medicines and that they can be dangerous
- Give several reasons why it is sometimes necessary to take medicines
- Identify some harmful effects of drugs
- Identify food as a fuel for the body
- Name the major food groups into which food is categorised and identify sources for each group
- Describe the main function of organs of the human body
- Explain the effect of diet on particular organs of the body/aspects of health
- Explain the effect of exercise on particular organs of the body/aspects of health
- Explain how ideas about smoking have changed over time
- Explain why advice on diet changes (e.g. butter vs. margarine, five a day, tax on sugary drinks)
- Predict what will happen to the heart during exercise.
- Construct and analyse the variables that make a fair test.
- Conduct a fair investigation on the effects of exercise on the heart.
- Use scientific equipment to track results and record data using tables and graphs.
- Analyse whole class data after investigation to compare and reflect on findings and draw conclusions.
- Use information acquired to write a scientific report on how the human circulatory system works.

<p>Materials:</p>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <ul style="list-style-type: none"> - Observe the characteristics of a variety of rocks - Name and describe the characteristics of several rocks - Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties - Devise tests to explore the properties of rocks and use data to rank the rocks - Classify rocks from the evidence of investigations - Explain that rocks are used for different purposes dependent on their physical properties - Explain why certain rocks are used for different purposes and why some rocks could be used for these jobs E.g. Marble – kitchen worktops or statues / Slate – roof tiles / Granite – walls. - Understand that there are rocks under the Earths’ surface. - Relate the simple physical properties of some rocks to their formation - Explain how a model (e.g. biscuits, chocolate bars) can be used to represent sedimentary, metamorphic and igneous rock. - Explain why we might find lots of the same rock types in one place <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <ul style="list-style-type: none"> - Identify fossils in rocks - Describe how Mary Anning discovered fossils - Explain why we do not see the soft parts of animals in the fossils - Present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, 	<p>Compare and group materials together according to whether they are solids, liquids or gases</p> <ul style="list-style-type: none"> - Name some solids and liquids - State that air is a gas - State some differences between solids, liquids and gases - Recognise everyday substances as mixtures of solids, liquids and/or gases - Recognise that air is a material and that it is one of a range of gases which have important uses. - Recognise that gases flow from place to place - Know that gases can be easily compressed - Compare simple solids and liquids (e.g. in terms of ease of squashing or pouring) - Make clear distinctions between the properties of solids, liquids and gases - Explain why granular solids have some of the properties associated with liquids - Explain why some substances are hard to classify as solids, liquids and gases (e.g. whipped cream, mousse, mayonnaise, muddy water, fizzy drinks, cornflour and water) <p>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)</p> <ul style="list-style-type: none"> - Observe what happens to a variety of materials when they are heated (e.g. chocolate, ice cream, butter, water) - Identify a wide range of contexts in which changes of state take place and describe a few examples where these changes occur - Recognise that for a substance to be detected by smell, some of it must be in the gas state - Compare the boiling point of different liquids - State that ice, water and steam are the same material - Identify the processes of melting, freezing, evaporation and condensation 	<p>Changes of materials</p> <p>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.</p> <ul style="list-style-type: none"> - Observe and explore the properties of materials (e.g. hardness, transparency, magnetism, electrical and thermal conductivity) - Identify some materials that are good thermal insulators and some everyday uses of these - Recognise that metals are both good thermal and good electrical conductors - Suggest why particular materials are used for different jobs depending on their properties. - Describe the properties of new materials (e.g. aerogel, silly putty, wrinkle-free cotton) - Explain why some materials are good thermal insulators <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <ul style="list-style-type: none"> - Recognise that salt or sugar dissolves in water but sand won’t - Name some materials that will and some that will not dissolve in water - Recognise that although it is not possible to see a dissolved solid it remains in the solution - Describe melting and dissolving and give everyday examples of each - Identify and explore factors that affect the rate at which a solid dissolves - Recognise that dissolving is a reversible change <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p>	
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	<p>chronological report, stop-go animation etc</p> <p>Recognise that soils are made from rocks and organic matter.</p> <ul style="list-style-type: none"> - Recognise that soil is a mixture of different materials and living things. - Recognise that soil contains dead plants and animals. - Recognise that there is rock under all surfaces and that soils come from rocks. - Identify plant/animal matter and rocks in samples of soil. - Devise a test to explore the water retention of soils. 	<ul style="list-style-type: none"> - Describe what happens to water when it heated and cooled - Describe how when ice melts it turns to liquid and how when water freezes it becomes ice - Describe how these processes can be reversed. <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> <ul style="list-style-type: none"> - Describe how liquids evaporate to form gases and how gases condense to form liquids - Sequence the changes that happen in the water cycle - Describe the water cycle in terms of these processes - Explain the relationship between liquids and solids in terms of melting and freezing - Know that temperature can affect the rate of evaporation or condensation - Describe the effect of temperature on evaporation - Explain how changing conditions affects processes such as evaporation and condensation - Identify a range of contexts in which changes takes place (e.g. evaporation of puddles in the school playground or from clothes on a washing line, condensation in the bathroom) - Explore the effect of salt on ice - Explain why salt is put on the roads in winter 	<ul style="list-style-type: none"> - Recognise that an undissolved solid can be separated from a liquid by filtering - Recognise that a solid can be recovered from a solution by evaporation - Describe the properties of mixtures which can be separated by filtration - Describe some methods that are used to separate simple mixtures - Explain that when solids dissolve they break up so small they can pass through the holes in the filter paper - Recognise that inks and dyes are often mixtures of different colours and these can be separated by chromatography - Explain why ink or dye moves up the paper in chromatography <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> <ul style="list-style-type: none"> - Recognise that some changes can be reversed and some cannot - Observe and explore a variety of chemical changes (e.g. burning) - Identify whether some changes are reversible or not - Classify some changes as reversible (e.g. dissolving) and others as irreversible (e.g. burning) - Recognise that irreversible changes often make new and useful materials - Recognise the hazards of burning materials - Describe what happens when acid and bicarbonate of soda are mixed - Explain that in some cases the new materials made are gases and identify some evidence for the production of gases (e.g. vigorous bubbling) 	
<p>Light and sound:</p>	<p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <ul style="list-style-type: none"> - Name a number of light sources, including the sun 	<p>Identify how sounds are made, associating some of them with something vibrating</p> <ul style="list-style-type: none"> - Recognise and describe many sounds and sound sources 		<p>Recognise that light appears to travel in straight lines</p> <ul style="list-style-type: none"> - Explore how light travels using torches and periscopes

<ul style="list-style-type: none"> - Describe and compare some light sources. - State that light sources are seen when light from them enters the eyes. Recognised that they need light in order to see things and that dark is the absence of light. - Recognise that they cannot see in the dark - Explore how different objects are more or less visible in different levels of lighting. - Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. - Explain that places are dark because there is no light and a light source is needed to help us see in such places. - Describe how nocturnal animals are adapted to use what little light there is or their others senses in the dark (e.g. cats, aye-aye, lemurs) Notice that light is reflected from surfaces - State that reflections can be seen in shiny surfaces - Make generalisations about shiny surfaces (e.g. smooth) - Demonstrate light travelling using a torch and record light bouncing off a mirror - Identify suitable reflective clothing for travelling in the dark - Explain that they cannot see shiny objects in the dark because there are no light sources. - Describe how Percy Shaw invented cat's eyes and explain their importance to road safety. Recognise that shadows are formed when a solid object blocks the light from a light source. - Recognised that when light is blocked a shadow is formed - Recognise that shadows are similar in shape to the objects forming them 	<ul style="list-style-type: none"> - State that they hears sounds through their ears - Recognise that when sounds are generated by objects, something moves or vibrates - Identify what is vibrating in a range of musical instruments - Group instruments independently by the way sounds are produced - Generalise that sounds are produced when objects vibrate - Describe how sounds are generated by specific objects - Suggest ways of producing sounds - Identify suitable materials to use for sound insulation Recognise that vibrations from sounds travel through a medium to the ear - Recognise that sounds travel through solids, water and air - Explore how sound travels through a variety of materials - Recognise that sound can be reflected from a surface which can cause an echo - Describe how some animals use echo-location Find patterns between the pitch of a sound and features of the object that produced it - Distinguish between pitch and volume (loudness) - Describe differences in pitch and volume - Know that altering vibrations alters the pitch or volume - Describe ways in which the pitch of a sound made by a particular instrument or vibrating object can be raised or lowered - Generalise the effects of changes on sound (e.g. the tighter the tension the higher the pitch) - Explore how to vary the pitch and volume of sounds from a variety of objects or instruments - Experiment with at least three different instruments to observe and explore volume and pitch - Make predictions and draw conclusions about the pitch and volume of sounds 		<ul style="list-style-type: none"> - Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. - Explore the uses of the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets 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 - Describe reflection as light 'bouncing off' objects - Knows and can explain that objects are seen because they give out or reflect light into the eye - Understand that in order to be seen, all non-luminous objects must reflect light - Diagrammatically represent light from sources and bouncing off reflective surfaces using arrows - Knows and can 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 - Draw diagrams to illustrate how light is travelling from the source to the eye - Know that, when sunlight passes through some objects, coloured light is produced (e.g. rainbows, soap bubbles and prisms) - Describe how curved mirrors distort a reflection 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 - Plan and conduct a test to investigate how light travels and explain/present the findings - Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light - Use mirrors, torches and protractors to demonstrate and record how light is
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	<ul style="list-style-type: none"> - Make observations of changes in shadows - Explain that shadows are formed when light from a source is blocked - Describe the difference in shadows cast by opaque, translucent and transparent materials - Explore how to make shadows of different shapes and sizes <p>Find patterns in the way that the size of shadows change.</p> <ul style="list-style-type: none"> - Use ideas about shadows to make predictions about the shadows formed by different objects or materials - Describe how the length of a shadow changes throughout the day as the sun moves across the sky - Explore how shadows vary as the distance between a light source and an object or surface is changed - Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground - Choose suitable materials to make shadow puppets - Create artwork using shadows 	<p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <ul style="list-style-type: none"> - Suggest how to change the loudness of the sounds produced by a range of musical instruments <p>Recognise that sounds get fainter as the distance from the sound source increases</p> <ul style="list-style-type: none"> - Describe what they observe when they move further away from a source of sound 		<p>reflected in a mirror and how we see ourselves in a mirror</p> <ul style="list-style-type: none"> - Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram. <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> <ul style="list-style-type: none"> - Describe a variety of ways of changing the size of the shadow produced by an object - Describe the relationship between the size of a shadow and the distance between the light source and an object - Diagrammatically represent the formation of shadows using arrow convention
<p>Forces:</p>	<p>Compare how things move on different surfaces.</p> <ul style="list-style-type: none"> - Observe and explore how friction affects the movement of objects - Describe some ways in which friction between solid surfaces can be increased or decreased - 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 - Record and report on findings from investigations, involving how things move on different surfaces - Give examples of objects moving differently on different surfaces <p>Notice that some forces need contact between two objects but magnetic forces can act at a distance.</p>		<p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <ul style="list-style-type: none"> - Identify weight as a force - Identify that force is measured in Newtons - Name simple forces such as gravity, friction and air resistance - Recognise that more than one force can act on an object - Draw force diagrams with arrows showing the direction of forces acting on an object - Observe and explore the effect of several forces on objects - Recognise that air resistance slows things down - Recognise that friction can be useful or not useful 	

<ul style="list-style-type: none"> - Give examples of forces in everyday life - Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table Observes how magnets attract or repel each other and attract some materials and not others. - Explore what materials are attracted to a magnet - Explore the way that magnets behave in relation to each other - Classify materials as magnetic or non-magnetic - Describe what happens when some materials are put near a magnet Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic behaviours - Describe the difference between a magnet and a magnetic material - Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic Describe magnets as having two poles. - Recall that magnets have a north and a south pole. - Describe the direction of forces between magnets - Name a range of types of magnets and show how the poles attract and repel - Draw diagrams using arrows to show the attraction and repulsion between the poles of magnets Predict whether two magnets will attract or repel each other, depending on which poles are facing. - Describe some everyday use of magnets - Explain that a compass works by lining up with the Earth's magnetic field - Describe how lodestone was found to be a naturally occurring magnet and was used as the first compass for navigation. 		<ul style="list-style-type: none"> - Understand that air resistance is the frictional force of air on objects moving through it - Describe some of the factors that increase friction between solid surfaces and increase air and water resistance - Describe situation in which frictional forces are helpful as well as those in which frictional forces are unhelpful - Compare the tread on bicycle tires according to how much friction they need - Identify streamlined objects and describe why they have been designed in this way (e.g. cycling helmets, formula 1 cars, dolphins) Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object - Describe some situations in which there is more than one force acting on an object - Describe and explain the motion of some familiar objects in terms of several forces acting on them - Identify forces on an object as either balance or unbalanced - Use the terms 'balanced' and 'unbalanced' when describing several forces on an object - Explain that balanced forces on an object cause it to remain stationary or travel at the same speed - Explain that unbalanced forces on an object cause it to speed up, change shape or slow down Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect - Describe how levers, pulleys and gears are used in everyday life (e.g. describe how having gears can make it easier to pedal a bike, how a bottle opener makes it easier to open a bottle lid) - Explain how introducing gears onto bikes has changed cycling 	
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<p>Living things and their habitats</p>		<p>Classification and Interdependence (This includes food chains statement from animals including humans) Construct and interpret a variety of food chains, identifying producers, predators and prey</p> <ul style="list-style-type: none"> - Knows which organisms are producers, predators and prey and apply to the construction and interpretation of food chains - Use food chains to identify producers, predators and prey within a habitat. - Use secondary sources to identify animals in a habitat and find out what they eat. - Can create food chains based on research <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <ul style="list-style-type: none"> - Use classification keys to name unknown living things. - Classify living things found in different habitats based on their features. - Create a simple identification key based on observable features. <p>Recognise that living things can be grouped in a variety of ways</p> <ul style="list-style-type: none"> - Explore ways of grouping living things including animals and plants (flowering and non-flowering) - Recognise that animals can be grouped into vertebrates and invertebrates - Describe some of the characteristics of the vertebrate (fish, mammals, amphibians, reptiles, and birds) - Group animals into vertebrate (fish, mammals, amphibians, reptiles and birds) and invertebrates groups (snails, slugs, spiders, worms and insects) - Explain why some animals are hard to classify (e.g. platypus, echidna, bat, flightless birds) 	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <ul style="list-style-type: none"> - Sequence the life cycles of a variety of plants and animals - Recognise the similarities in the life cycles of plants, animals and humans - Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles - Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. <p>Describe the life process of reproduction in same plants and animals.</p> <ul style="list-style-type: none"> - Name the parts of a flower - Describe the functions of some parts of a flower - Describe the main functions of parts of a plant involved in reproduction - Describe the processes of sexual and asexual reproduction in plants - Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways - Name the parts of the human reproductive system, - Compare methods of seed dispersal - Know that most animals reproduce by sexual by sexual reproduction - Compare internal and external fertilisation in animals - Explain that living things need to reproduce if the species is to survive - Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. - Look for patterns between the size of an animal and its expected life span. - Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. 	<p>Classification 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> <ul style="list-style-type: none"> - Recognise that there is a wide variety of living things - Plants can be divided broadly into two main groups – flowering plants and non-flowering plants - Living things can be formally grouped according to characteristics - Animals can be divided into two main groups – vertebrates and invertebrates - Each group has common characteristics - Understand why classification is important - Identify vertebrates and invertebrates - Name and describe the five vertebrate groups - Describe early ideas about classification (e.g. Aristotle) - Understand there are living things that are too small to be seen and these can affect our lives - Recognise that there are many micro-organisms, some which can be used in food production - Describe how micro-organisms feed, grow and reproduce like other organisms - Describe evidence, from investigations, that yeast is living - Explain how micro-organisms can move from one food source to another or from one animal to another - Compare the rate of reproduction in microorganisms to other animals - Describe how the development of the microscope has contributed to our understanding of microorganisms - Describe how ideas about hygiene have changed over time (e.g. Semmelweis) <p>Give reasons for classifying plants and animals based on specific characteristics</p>
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		<p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <ul style="list-style-type: none"> - Knows and can name living things in a range of habitats. - Knows and can relate the key adaptation features of an organism to the known features of its habitat. - Knows and can give examples of how an environment may change both naturally and due to human impact. - Explain why it is necessary to use a reasonably large sample when investigating the preferences of small invertebrates - Explain that different organisms are found in different habitats because of differences in environmental factors - Describe how humans have negatively affected environments (e.g. pollution, deforestation, introduction of invasive species - Observe plants and animals in different habitats throughout the year - Compare and contrast the living things observed - Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. - Use secondary sources to find out about how environments may naturally change. - Use secondary sources to find out about human impact, both positive and negative, on environments. 	<ul style="list-style-type: none"> - Take cuttings from a range of plants e.g. African violet, mint. - Plant bulbs and then harvest to see how they multiply. - Use secondary sources to find out about pollination. 	<ul style="list-style-type: none"> - Devise own ways to classify organisms and objects - Classify plants and animals and record conclusions from the use of classification keys - Use information about the characteristics of an unknown animal or plant to assign it to a group - Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important - Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system <p>EVOLUTION AND INHERITANCE</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <ul style="list-style-type: none"> - Recognise variation in different species (e.g. dogs, horses) - Recognise that offspring have some of the features of their parents - Explain that animals which are better adapted to an environment are more likely to survive, reproduce and pass on characteristics to their offspring meaning the animals species will gradually change and evolve (giraffe with the tallest neck could reach more leaves to feed on) - Identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <ul style="list-style-type: none"> - Recognise that animals have to compete for food - Describe how animals avoid predators (e.g. speed, camouflage) - Describe how animals and plants are adapted to their environments
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				<ul style="list-style-type: none"> - Explain how being well adapted to an environment means an organism is more likely to survive - Describe the story of the peppered moth and how this provides evidence for natural selection - Explain how antibiotic resistant bacteria provide evidence for natural selection - Explain why we can see evidence for natural selection in fast reproducing organisms like bacteria (e.g. antibiotic resistant bacteria and pesticide resistant insects) - Explain how the introduction of a new species to isolated environment can effect native species (e.g. Dodo, Kakapo or Stephen's island wren) - Compare the ideas of Charles Darwin and Alfred Wallace on evolution. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago - Explain why we do not have a complete fossil record - Make observations of fossils to identify living things that lived on Earth millions of years ago - Research the work of Mary Anning and how this provided evidence of evolution
<p>Electricity:</p>		<p>Identify common appliances that run on electricity</p> <ul style="list-style-type: none"> - Identify mains operated and battery-operated devices - Describe some of the dangers associated with mains electricity <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <ul style="list-style-type: none"> - Name some of the components of a simple electrical circuit - Know that batteries are sources of electricity - Recognise that for a circuit to work it must be complete 		<p>Use recognised symbols when representing a simple circuit in a diagram</p> <ul style="list-style-type: none"> - Construct some working series circuits with specified components - Recognise conventional circuit symbols - Draw circuit diagrams and construct circuits from diagrams using conventional symbols <p>Associate the brightness of a lamp or the volume of buzzer with the number and voltage of cells used in the circuit</p> <ul style="list-style-type: none"> - Know that the 'amount' of electricity (voltage) depends on the number of batteries

		<ul style="list-style-type: none"> - Construct a working circuit - Make drawings of simple working circuits - Make circuits from drawings provided 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 - Be methodical in tracing faults in simple circuits - Explain why some circuits work and others do not Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit - Describe the effect of making and breaking one of the contacts on a circuit - Describe how switches work - Construct a home-made switch Recognise some common conductors and insulators, and associate metals with being good conductors - Identify materials as conductors or insulators - Construct simple circuits and use them to test whether materials are electrical conductors or insulators - Relate knowledge about metals and non-metals to their use in electrical appliances - Describe the use of conductors and insulators in components including connecting wires - Identify playdough and graphite as non-metal conductors and explain why this is unusual <p>N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.</p>		<ul style="list-style-type: none"> - Understand that the brightness of a bulb, or the volume of a buzzer, correlates with the voltage of cells used in the circuit - Explore how to change the brightness of bulbs and the volume of a buzzer - Describe ways of changing the brightness of a bulb in a circuit or the volume of a buzzer - Compare different circuits (e.g. for brightness of bulb) - Recall that the amount of electricity is measured in voltage 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 - Explore the thickness of a wire in a circuit - Describe the differences between wires usually used for circuits and fuse wires - Describe what would happen if all the lights in a home were connected the same circuit and one broke - Explain the current in circuits using simple models and analogies (e.g. piped water, bicycle chain, children and sweets) - Plan and select resources for a fair scientific enquiry, deciding which variables to control. - Record results from an experiment using tables and graphs - Evaluate and explain their investigation, results and conclusions.
<p>Earth and space</p>			<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <ul style="list-style-type: none"> - Identify and name the components of the solar system (i.e. Sun, Moon, Earth and other planets) - Locate the Sun, Earth and other planets in the solar system 	

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| | | | <ul style="list-style-type: none">- Recognise that the Earth and other planets orbit the sun- Recall that the Earth takes one year to orbit the Sun- Recall the Earth rotates on its axis and this takes one day- Use simple models to explain effects that are caused by the movement of the Earth <p>Describe the movement of the Moon relative to the Earth</p> <ul style="list-style-type: none">- Recognise that the moon orbits the Earth- Explain that gravity is a force of attraction and it is what holds the planets in orbit around the Sun and the Moon in orbit around the Earth- Explain that the changes in the appearance of the Moon over a period of 28 days arise from the Moon orbiting the Earth once every 28 days <p>Describe the Sun, Earth and Moon as approximately spherical bodies</p> <ul style="list-style-type: none">- Recognise that the Earth, Sun and Moon are spherical and support this with some evidence <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p> <ul style="list-style-type: none">- Recognise that it is daylight in the part of the Earth facing the Sun- Recall that a shadow from the Sun changes over the course of a day- Explore and describe how a shadow from the Sun changes over the course of a day- Explain in terms of the rotation of the Earth why shadows change and the Sun appears to move across the sky during the course of the day.- Explain why it is night time in Australia when it is day time in England,- Explain how ideas about the solar system have changed over time. | |
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WORKING SCIENTIFICALLY SKILLS

	Lower Key Stage 2	Upper Key Stage 2
Asking questions and recognising that they can be answered in different ways	<ul style="list-style-type: none"> • Asks relevant questions and using different types of scientific enquiries to answer them • Explains the purpose of a variety of scientific and technological developments 	<ul style="list-style-type: none"> • Uses their scientific experiences to explore ideas and raise different types of questions • Talks about how scientific ideas have developed over time • Recognises the applications of specific scientific ideas
Making observations and taking measurements	<p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <ul style="list-style-type: none"> • The children make systematic and careful observations. • They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. 	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <ul style="list-style-type: none"> • The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. • During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data
Engaging in practical enquiry to answer questions	<p>Setting up simple practical enquiries, comparative and fair tests</p> <ul style="list-style-type: none"> • The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. • They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <ul style="list-style-type: none"> • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.
Recording and presenting evidence	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>

	<p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <ul style="list-style-type: none"> • The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. • Children are supported to present the same data in different ways in order to help with answering the question. 	<ul style="list-style-type: none"> • The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. • Children present the same data in different ways in order to help with answering the question.
Answering questions and concluding	<p>Using straightforward scientific evidence to answer questions or to support their findings</p> <ul style="list-style-type: none"> • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. 	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments</p> <ul style="list-style-type: none"> • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. • They talk about how their scientific ideas change due to new evidence that they have gathered. • They talk about how new discoveries change scientific understanding.
Evaluating and raising further questions and predictions	<p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <ul style="list-style-type: none"> • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. 	<p>Using test results to make predictions to set up further comparative and fair tests</p> <ul style="list-style-type: none"> • Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.
Communicating their findings	<p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <ul style="list-style-type: none"> • They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary. 	<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <ul style="list-style-type: none"> • They communicate their findings to an audience using relevant scientific language and illustrations.