

# Science Curriculum (21/22)

## INTENT

<b>Rocks (including fossils)</b> <ul style="list-style-type: none"> <li>to compare and group different kinds of rocks on the basis of appearance and simple physical properties</li> <li>to describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>to recognise that soils are made from rocks and organic matter</li> </ul>	<b>The skeleton (animals, including humans)</b> <ul style="list-style-type: none"> <li>to identify that some animals have skeletons and muscles for support, protection and movement</li> </ul>	<b>Nutrition</b> <ul style="list-style-type: none"> <li>to identify that animals need the right nutrition and that this comes from what they eat</li> <li>to describe the main parts of the digestive system</li> </ul>	<b>Plants</b> <ul style="list-style-type: none"> <li>to name and describe functions of flowering plants</li> <li>to explore the requirements of plants for life</li> <li>to investigate how water is transported in plants</li> <li>to explore the part that flowers play in the life cycle</li> </ul>	<b>Forces and Magnets</b> <ul style="list-style-type: none"> <li>to compare how things move on different surfaces</li> <li>to notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</li> <li>to observe how magnets attract or repel each other</li> <li>to compare and group together materials on the basis of whether they are attracted to a magnet</li> <li>to describe magnets as having 2 poles</li> <li>to predict whether 2 magnets will attract or repel</li> </ul>	<b>Light and Shadow</b> <ul style="list-style-type: none"> <li>to recognise that they need light in order to see things</li> <li>to notice that light is reflected from surfaces</li> <li>to recognise that light from the sun can be dangerous</li> <li>to recognise that shadows are formed when the light from a light source is blocked by a solid object</li> <li>to find patterns in the way that size of shadows change</li> </ul>
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## Scientific Enquiry

<p>Observe rocks closely Classify rocks in a range of ways based on their appearance Devise a test to investigate the hardness of a range of rocks Devise a test to investigate how much water different rocks absorb Observe how rocks change over time e.g. gravestones or old building Research using secondary sources how fossils are formed Observe soils closely Classify soils in a range of ways based on their appearance Devise a test to investigate the water retention of soils Observe how soil can be separated through sedimentation Research the work of Mary Anning</p>	<p>Use secondary sources to research the parts and functions of the skeleton Investigate pattern seeking questions such as</p> <ul style="list-style-type: none"> <li>Can people with longer legs run faster?</li> <li>Can people with bigger hands catch a ball better?</li> </ul> <p>Compare, contrast and classify skeletons of different animals</p>	<p>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 they types of food that contain the 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? Plan a daily diet contain a good balance of nutrients Explore the nutrients contained in fast food</p>	<p>Observe what happens to plants over time when the leaves or roots are removed Observe the effect of putting cut white carnations or celery in coloured 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, different fertilisers, varying amount of space Spot flowers, seeds, berries and fruits outside throughout the year Observe flowers carefully to identify the pollen Observe flowers being visited by pollinators e.g. bees and butterflies in the summer Observe seeds being blown from the trees e.g. sycamore seeds Research different types of seed dispersal Classify seeds in a range of ways including by how they are dispersed Create a new species of flowering plant</p>	<p>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. Explore what materials are attracted to a magnet Classify materials according to whether they are magnetic Explore the way that magnets behave in relation to each other Use a marked magnet to find the unmarked poles on other types of magnets Explore how magnets work at a distance e.g. through the table, in water, jumping paper clip up off the table Devise an investigation to test the strength of magnets</p>	<p>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 Explore how shadows vary as the distance between a light source, 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>
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**Key Vocabulary**

<p><u>Rocks</u>  <i>Fossils, Soil, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent, organic matter, grains, sedimentary, igneous, metamorphic, sand, properties, appearance, non-absorbent, permeable, impermeable, rough, smooth, soft, hard, chalk, granite, clay, loam soil, limestone.</i>  <i>*Vocabulary in dark italics are new words.</i>  <i>** Vocabulary in light non-italics are previously taught words.</i></p>	<p><u>Animals including humans</u>  <i>Movement, Muscles, Bones, Skull, Nutrition, Skeletons, joints, collar bone, humerus, femur, sockets, ribs, spinal column, backbone,</i></p>	<p><u>Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, healthy, unhealthy, food, growth, exercise, balanced diet, fruit and vegetables,</u></p>	<p><u>Plants</u>  <i>Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, pollen, Pollination, Flower, leaf, petals, sepal, ovary, seeds, cross pollination, photosynthesis, deciduous, evergreen, trunk, roots, blossom, stem, vegetable, bulb, healthy, unhealthy, grow, absorb, attract, spread, nectar, contain</i></p>	<p><u>Forces and magnets</u>  <i>Magnet, Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull, magnetic force, open, surface, non-contact, North Pole, South Pole, iron, cobalt, steel, nickel, aluminium, horseshoe, bar or wand magnet, ball magnet</i></p>	<p><u>Light</u>  <i>Light, Shadows, Mirror, Reflective, Dark, Reflection</i></p>
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**Prior Learning**

<p><b>Year 1</b>          Everyday materials    <i>*See appendix 1 sheet for prior vocab</i></p>	<p><b>Year 2</b>  <b>Animals including humans</b>          Know that animals, including humans, have offspring which grow into adults          Know the basic stages in a life cycle for animals, including humans.          Find out and describe the basic needs of animals, including humans, for survival (water, food and air).    <b>Year 1</b>  <b>Animals including humans</b>          Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.          Identify and name a variety of common animals that are carnivores, herbivores and omnivores.    <i>*See appendix 1 sheet for prior vocab</i></p>	<p><b>Year 2</b>          Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.    <i>*See appendix 1 sheet for prior vocab</i></p>	<p><b>Year 2</b>          Observe and describe how seeds and bulbs grow into mature plants.          Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.  <b>Year 1</b>          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.          Identify and name the roots, trunk, branches and leaves of a tree.    <i>*See appendix 1 sheet for prior vocab</i></p>		
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<p><b>States of matter</b></p> <ul style="list-style-type: none"> <li>• <b>S, L, G Water cycle</b></li> <li>• to compare and group solids, liquids and gases</li> <li>• to 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)</li> <li>• to identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<p><b>Sound</b></p> <ul style="list-style-type: none"> <li>• to identify how sounds are made, associating some of them with something vibrating</li> <li>• to recognise that vibrations from sounds travel through a medium to the ear</li> <li>• to find patterns between the pitch of a sound and features of the object that produced it</li> <li>• to find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>• to recognise that sounds get fainter as the distance from the sound source increases</li> </ul>	<p><b>Human Body</b></p> <ul style="list-style-type: none"> <li>• <b>Digestion</b></li> <li>• <b>Teeth</b></li> <li>• to identify that animals need the right nutrition and that this comes from what they eat</li> <li>• to describe the main parts of the digestive system</li> <li>• to explore the different types of teeth in humans</li> </ul>	<p><b>Living things</b></p> <ul style="list-style-type: none"> <li>• <b>Classification keys</b></li> <li>• <b>Habitats</b></li> <li>• <b>Food chains</b></li> <li>• to recognise that living things can be grouped</li> <li>• to explore and use classification keys to help group, identify and name a variety of living things</li> <li>• to recognise that environments can change and that this can sometimes pose dangers to living things</li> <li>• to construct and interpret a variety of food chains</li> </ul>	<p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>• to identify common appliances that run on electricity</li> <li>• to construct a simple circuit, naming its basic parts</li> <li>• to identify whether a circuit is complete</li> <li>• to recognise some common conductors and insulators, and associate metals with being good conductors</li> </ul>
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**Scientific Enquiry**

<p>Observe closely and classify a range of solids Observe closely and classify a range of liquids 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 Classify materials according to whether they are solids, liquids and gases Observe a range of materials melting e.g. ice, chocolate, butter Investigate how to melt ice more quickly Observe the changes when making rocky road cakes or ice-cream Investigating melting point of different materials e.g. ice, margarine, butter and chocolate Explore freezing different liquids e.g. tomato ketchup, oil, shampoo Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration) Observe water evaporating and condensing e.g. on cups of icy water and hot water Set up investigations to explore changing the rate of evaporation Use secondary sources to find out about the water cycle</p>	<p>Classify sound sources Explore making sounds with a range of objects such as musical instruments and other household objects Explore how string telephones or ear gongs work Explore using objects that change in feature to change pitch and volume such as length of guitar string, bottles of water or tuning forks Measure sounds over different distances Measure sounds through different insulation materials</p>	<p>Research the function of the parts of the digestive system Create a model of the digestive system using household objects Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing) Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls 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</p>	<p>Observe plants and animals in different habitats throughout the year Compare and contrast the living things observed 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 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</p>	<p>Construct a range of circuits Explore which materials can be used instead of wires to make a circuit Classify the materials that were suitable/not suitable for wires Explore how to connect a range of different switches and investigate how they function in different ways Choose switches to add to circuits to solve particular problems such as a pressure switch for a burglar alarm Apply their knowledge of conductors and insulators to design and make different types of switch Make circuits that can be controlled as part of a D&amp;T project  N.B. Children should be given one component at a time to add to circuits.</p>
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**Key Vocabulary**

<p><b>States of Matter (New learning vocab)</b>  <b>Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating</b>  <i>*Vocabulary in dark italics are new words.</i>  <i>** Vocabulary in light non-italics are previously taught words.</i></p>	<p><b>Sound</b>  <b>Volume, Vibration, Wave, Pitch, Tone, Speaker</b></p>	<p><i>Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain</i></p>	<p><b>Living things and their habitats</b>  <b>Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats</b></p>	<p><b>Electricity</b>  <b>Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators</b></p>
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**Prior Learning**

<p>Year 3 Rocks</p> <p>Year 2 Everyday materials and their uses</p> <p>Year 1 Everyday materials</p> <p><i>*See Appendix 1 sheet for prior vocabulary</i></p>		<p><b>Year 3</b>          Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.          Know how nutrients, water and oxygen are transported within animals and humans.          Know about the importance of a nutritious, balanced diet.          Identify that humans and some other animals have skeletons and muscles for support, protection and movement: Know about the skeletal and muscular system of a human.</p> <p><i>*See Appendix 1 sheet for prior vocabulary</i></p>	<p><b>Year 2</b>          Explore and compare the difference between things that are living, dead and things that have never been alive.          Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.          Identify and name a variety of plants and animals in their habitats, including micro habitats.          Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food.</p> <p><i>*See Appendix 1 sheet for prior vocabulary</i></p>	
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<p><b>Forces</b></p> <ul style="list-style-type: none"> <li>to explain effects of air/water resistance and friction</li> <li>to recognise that some mechanisms allow a smaller force to have a greater effect</li> </ul>	<p><b>Materials</b></p> <ul style="list-style-type: none"> <li><b>Planning Investigations</b></li> <li>to compare and group together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</li> <li>to know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>to use knowledge of solids, liquids and gases to separate mixtures, including through filtering, sieving and evaporating</li> <li>to give reasons, based on evidence from comparative and fair tests, for uses of everyday materials, including metals, wood and plastic</li> <li>to demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>to 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</li> </ul>	<p><b>Earth, Sun and Moon</b></p> <p>to describe the movement of the Earth and other planets relative to the sun in the solar system</p> <ul style="list-style-type: none"> <li>to describe the movement of the moon and Earth to describe the sun, Earth and moon as spherical</li> <li>to explain the process of day and night</li> <li>to explain that objects fall to Earth due to gravity</li> </ul>	<p><b>Living things</b></p> <ul style="list-style-type: none"> <li><b>Reproduction</b></li> <li><b>Life cycles</b></li> <li>to compare the life cycles of different animals</li> <li>to describe reproduction in plants and animals</li> <li>to name and describe functions of flowering plants</li> <li>to explore the requirements of plants for life</li> <li>to explore the part that flowers play in the life cycle</li> </ul>	<p><b>Human Body</b></p> <ul style="list-style-type: none"> <li><b>Birth to death</b></li> <li>to describe changes as humans develop to old age</li> </ul>
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**Scientific Enquiry**

<p>Investigate the effect of friction in a range of contexts e.g. trainers, bath mats, mats for a helter-skelter 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 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 Make a product that involves a lever, pulley or gear Create a timer that uses gravity to move a ball Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation</p>	<p>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 Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate Investigate rates of dissolving by carrying out comparative and fair test Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of</p>	<p>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. Use secondary sources to help make a model to show why day and night occur Make first-hand observations of how shadows caused by the Sun change through the day Make a sundial Research time zones 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</p>	<p>Use secondary sources and, where possible, first hand observations to find out about the life cycle of a range of animals 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 plant, potatoes 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</p>	
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rusting? What affects the amount of gas produced?  
Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton)

**Key Vocabulary**

**Forces**  
*Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys*  
\*Vocabulary in dark italics are new words.  
\*\* Vocabulary in light non-italics are previously taught words.

**Properties and changes of materials**  
Hardness, *Solubility*, seiving  
Transparency, translucent, opaque,  
*Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing, viscosity*

**Earth and Space**  
Earth, Sun, Moon, *Axis, Rotation*, Day, Night, *Phases of the Moon, star, constellation, orbit,*

Life cycle, *reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings*

**Animals including humans**  
Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, *Elderly, Growth, Development, Puberty*

**Prior Learning**

**Year 3**  
Compare how things move on different surfaces.  
Know how a simple pulley works and use making lifting an object simpler  
Notice that some forces need contact between two objects, but magnetic forces can act at a distance.  
Observe how magnets attract and repel each other and attract some materials and not others.  
Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.  
Describe magnets as having two poles.  
Predict whether two magnets with attract or repel each other, depending on which poles are facing.  
  
\*See Appendix 1 sheet for prior vocabulary

**Year 4**  
**States of matter**  
Compare and group materials together, according to whether they are solids, liquids or gases.  
Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.  
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.  
  
\*See appendix 1 sheet for prior vocab

**Year 4**  
Recognise that living things can be grouped in a variety of ways.  
Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.  
Know and label the features of a river  
Recognise that environments can change and that this can sometimes pose danger to living things.  
**Year 3**  
Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.  
Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.  
Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant.  
Know the way in which water is transported within plants.

\*See Appendix 1 sheet for prior vocabulary

<p><b>Living things</b></p> <ul style="list-style-type: none"> <li>• <b>Classification</b></li> <li>• <b>Micro organisms</b></li> </ul> <ul style="list-style-type: none"> <li>• to give reasons for classifying plants and animals</li> <li>• to construct and interpret a variety of food chains</li> <li>• to identify and name a variety of animals including fish, amphibians, reptiles, birds and mammals</li> <li>• to identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> </ul>	<p><b>Evolution and adaptation</b></p> <ul style="list-style-type: none"> <li>• to recognise that living things change over time and that fossils provide information about this</li> <li>• to identify how animals and plants are adapted to suit their environment in different ways</li> </ul>	<p><b>Human Body</b></p> <ul style="list-style-type: none"> <li>• <b>Nutrition</b></li> <li>• <b>Staying healthy</b></li> <li>• <b>Circulatory system</b></li> </ul> <ul style="list-style-type: none"> <li>• to explain the human circulatory system in detail and impact of diet, exercise, drugs and lifestyle</li> <li>• to describe how nutrients are transported in the body</li> </ul>	<p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>• to associate lamp brightness or volume of a buzzer with the number/voltage of cells in the circuit</li> <li>• to use recognised symbols in a simple circuit diagram</li> </ul>	<p><b>Light and how we see</b></p> <ul style="list-style-type: none"> <li>• to recognise that light travels in straight lines</li> <li>• to explain that we see things because light travels from light sources to our eyes (or via reflections)</li> <li>• to explain why shadows have the same shape as the objects that cast them</li> </ul>	<p><b>Sound</b></p> <p><b>Revision topics</b></p> <ul style="list-style-type: none"> <li>• to find patterns between the pitch of a sound and features of the object that produced it</li> <li>• to find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>• to recognise that sounds get fainter as the distance from the sound source increases</li> </ul>
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**Scientific Enquiry**

<p>Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important Use first hand observation to identify characteristics shared by the animals in a group Use secondary sources to research the characteristics of animals that belong to a group Use information about the characteristics of an unknown animal or plant to assign it to a group Classify plants and animals presenting this in a range of ways – Venn diagrams, Carroll diagrams and keys Create an imaginary animal which has features from one or more groups</p>	<p>Design a new plant or animal to live in a particular habitat Use models to demonstrate evolution e.g. Darwin’s finches bird beak activity Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution Make observations of fossils to identify living things that lived on Earth millions of years ago 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 Compare the ideas of Charles Darwin and Alfred Wallace on evolution Research the work of Mary Anning and how this provided evidence of evolution</p>	<p>Create a role play model for the circulatory system Carry out a range of pulse rate investigations</p> <ul style="list-style-type: none"> <li>• Fair test – effect of different activities on my pulse rate</li> <li>• Pattern seeking – exploring which groups of people may have higher or lower resting pulse rates</li> <li>• Observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate)</li> <li>• Pattern seeking – exploring recovery rate for different groups of people</li> </ul> <p>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</p>	<p>Explain how a circuit operates to achieve particular operations, such as control the light for a torch with different brightnesses or make a motor go faster or slower Make circuits to solve particular problems such as a quiet and a loud burglar alarm Carry out fair tests exploring changes in circuits Make circuits that can be controlled as part of a D&amp;T project</p>	<p><b>Light and how we see</b></p> <p>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</p> <p>Explore the uses of the behaviour of light, reflection and shadows such as in periscope design, rear view mirrors and shadow puppets.</p>	
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**Key Vocabulary**

<p><u>Living things and their habitats</u> <i>Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects</i> *Vocabulary in dark italics are new words.</p>	<p><i>Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils</i></p>	<p><u>Animals including humans</u> <i>Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration</i></p>	<p><u>Electricity</u> <i>Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, electrical Conductors, electrical Insulators, Amps, Volts, Cell</i></p>	<p><u>Light</u> <i>Refraction, Reflection, Light, Spectrum, Rainbow, Colour,</i></p>	
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\*\* Vocabulary in light non-italics are previously taught words.

**Prior Learning**

**Year 5**  
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.  
Describe the life process of reproduction in some plants and animals.

**Year 4**  
Recognise that living things can be grouped in a variety of ways.  
Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.  
Know and label the features of a river  
Recognise that environments can change and that this can sometimes pose danger to living things.

\*See Appendix 1 sheet for prior vocabulary

**Year 4**  
Describe the simple functions of the basic parts of the digestive system in humans.  
Identify the different types of teeth in humans and their simple functions.

Construct and interpret a variety of food chains, identifying producers, predators and prey.

**Year 5**  
Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird.  
Know the differences between different life cycles.  
Know the process of reproduction in plants.  
Know the process of reproduction in animals.

**Year 3**  
Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.  
Know how nutrients, water and oxygen are transported within animals and humans. Know about the importance of a nutritious, balanced diet.  
Identify that humans and some other animals have skeletons and muscles for support, protection and movement: Know about the skeletal and muscular system of a human

For prior vocab see appendix 1 sheet.

\*See Appendix 1 sheet for prior vocabulary

**Year 3**  
Recognise that they need light in order to see things and that dark is the absence of light.  
Notice that light is reflected from surfaces.  
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.  
Recognise that shadows are formed when the light from a light source is blocked by a solid object.  
Find patterns in the way that the sizes of shadows change.

\*See Appendix 1 sheet for prior vocabulary

**TEXT**  
**GREEN - LIVING THINGS**  
**BLUE - MATERIALS**  
**RED - THE WORLD AND BEYOND**



### **Curriculum Approach**

The objectives for Science in KS2 are clearly set out for each year group in the National Curriculum. Working Scientifically is integrated into all lessons following the objectives set out in our long term plan. An enquiry based approach is used with a clear emphasis on practically developing curiosity as well as Scientific knowledge, understanding and skills. We emphasise vocabulary within all science lessons using a 3 tier vocabulary approach which is revisited regularly to enable understanding and retention. Pre-cueing of vocabulary is regular focus for our EAL pupils. Aspirations are prioritised within Science with a 'What's the Point?' approach. Our children learn about links with a range of careers linked with the topic being studied.

E.g. Yr 3 Skeletons, nutrition and Muscles: dietician, radiologist, archaeologist, chef, doctor, physiotherapist, sport scientist, surgeon, vet, etc  
Links with other subjects are planned for and maximised on There is an expectation that Reading For Learning is planned for and occurs during Guided Reading. Eg. Year 5 - space Year 3 - healthy eating.

### **Teaching Approach**

All pupils have a two hour weekly Science session. A range of teaching approaches are used for different reasons but our prioritise approach is that Science should be practical, engaging and enquiry based. Consolidation of vocabulary is a priority and approaches are used to make learn child led, purposeful, fun and challenging.

These approaches include:

- Use of concept cartoons to identify misconceptions and challenge thinking
- Use of discovery dogs to set context or challenge thinking
- Games to promote vocabulary development e.g. chatterboxes, Blockbusters, Bingo
- Songs to promote learning
- Drama to reinforce and show learning
- Promotes learning in other subjects e.g. maths (measuring scaling, reading scales, positive and negative numbers with thermometer use); mummification of tomatoes - links with History (Egyptians);
- Interwoven scientific enquiry games to support skill development
- Outdoor learning where possible
- Linking Science to stories
- Use of technology e.g. visualisers and dataloggers
- Trips and visitors to reinforce and deepen learning
- Develop critical thinking through different strategies e.g. I see, I think, I wonder, Flat Chats, Silent Debate, etc

## Trips and Visitors

We welcome visitors into our school to reinforce, introduce or deepen learning. Visitors related to Scientific learning include:

- Health Representatives - digestion (Yr 4) Life cycles (Yr 5)
- Keele University - space (yr 5)
- Science assembly - Mad Science - resulting in after school club (whole school)

Visits link a range of objectives from different subjects (some Science related). For example links with our differentiated text; Charlie & the Chocolate Factory; History topic - Mayans and properties and changes of materials in Science. Other visits include Safe & Sound event for year 6 (relates to healthy body, mind and drugs and alcohol)

Enquiry type	Discovery dogs	Name
Observe over time		Adventurer Dog
Identify and classify		Explorer Dog
Pattern seeking		Detective
Research		Globetrotter
Fair Testing		Judgement

Enquiry types - All enquiry types are covered in each year. The discovery dogs match each enquiry type and are used to challenge thinking, provide a context for learning in a child friendly format.

## Famous Scientists

Year 3	
Wilhelm Conrad Rontgen	Developed X ray machine (nutrition, skeletons, etc)
Mary Anning (Fossils)	Rocks
	Plants
John Dunlop (inventor of the tyre)	Forces and Magnets
	Light
Year 4	
David Attenborough (nature)	Habitats
	Digestion
	States of Matter
Eddison	Electricity
Alexander Graham Bell (telephone)	Sound
Year 5	
Ruth Benerito (wrinkle free cotton) Spencer Silver (post it notes)	Materials
Ptolemy (astronomer) Copernicus (first model of the universe)	Space
Isaac Newton (gravity)	Forces
	Habitats
Oscar Hertwig (reproduction)	Lifecycles
Year 6	
Jane Goodhall (primatologist) Charles Darwin (evolution) Alfred Wallace (evolution)	Evolution
Carl Linnaeus (classification)	Classification
William Harvey (described blood circulation system)	Circulatory System
Alhazan (modern optics)	Light
Tesla	Electricity

### Famous Scientists

Our children learn about scientists within each topic area in all year groups as shown:

## Assessment

Within Science, assessment takes place for a range of differing reasons. We use 'Teacher Assessment in Primary Science' (TAPS) which aims to develop, support for a valid, reliable and manageable system of primary science assessment which will have a positive impact on children's learning.

### **Assessment For Learning**

The teaching sequence is determined by the teachers' use of weekly AfL and triangulation of Science evidence and their professional judgement to identify and act upon the needs of the class. The approach is flexible to allow more time to act upon the cohorts needs if necessary. If more time is needed in a given area e.g. vocabulary development teachers will adapt the advised sequence.

### **Formative Assessment**

At the start of the topic, the teacher considers prior knowledge that pupils should hold - linking this back to the last time the pupils were taught in this area. As mobility is high in our school context this is imperative to enable children to learn as prior knowledge provides the anchor for future learning opportunities. If there are gaps in attainment then teachers build this into the planning cycle.

A range of evidence is triangulated in order to assign a teacher assessment in Science.

### **Summative tests**

NSI half termly Science Tests

### **Other Science assessment evidence**

Post it notes with pupil comments

TAPS based evidence from pupils within working scientifically objectives

Pupil diagrams, recordings and other work

Actions within investigative work

Conversations and comments

Assessment records indicate pupil development in skills and knowledge from previous progression unit and the end of the one being currently taught. This enables teachers to assess retention and act on it in current planning.

### **Recording of Attainment**

Spreadsheets enable knowledge and skill development to be recorded by teachers half termly. Teachers can then check prior learning within a concept and use professional judgement in how to adapt teaching to this.

## Yearly Science Topic Overview

	<b>Autumn 1</b>	<b>Autumn 2</b>	<b>Spring 1</b>	<b>Spring 2</b>	<b>Summer 1</b>	<b>Summer 2</b>
<b>Year 3</b>	Rocks	Forces and magnets	Animals including humans	Light	Plants (functions of)	Plants (reproduction)
<b>Year 4</b>	Animals including humans	Living things and their habitats	Sound	Electricity	States of matter	
<b>Year 5</b>	Forces	Earth and Space	Properties of materials	Living things and their habitats	Animals including Humans	Sound - Catch up.
<b>Year 6</b>	Animals including humans	Light	Living things and their habitats	Evolution	Electricity	