



Year 1

Working scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- 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



Topic and objectives	Lesson ideas	Key Words	Misconceptions
<p>Plants</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees 	<p>Use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted.</p> <p><i>Ideas – plant flowers/vegetables and create a board to photograph their growth each week. Can children identify different seeds?</i></p> <p>They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).</p> <p>Work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees (Twinkl has a good one to make). Children could keep records of how plants have changed over time, for example, the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.</p> <p>Discuss what they think it means to be a scientist/Inventor?</p>	<p>Common Wild plants Garden plants Tree deciduous evergreen trunk branches leaf/leaves root plant leaf/leaves bud flower blossom petals root stem fruit vegetables bulb seed</p>	<ol style="list-style-type: none"> Misconception: Trees are not plants. Fact: Trees are plants. Misconception: Many flowering plants have been mistaken to be non-flowering plants due to inconspicuous flowers or infrequent flowering. Fact: Mosses and liverworts, ferns and conifers are non-flowering plants. Most other plants are flowering plants. Misconception: Non-green plant parts have no chloroplasts. Fact: Non-green plant parts do not have chlorophyll, but they may have chloroplasts which contain accessory pigments like carotene, which gives autumn leaves a yellow colour. Misconception: Minerals in the soil, water and carbon dioxide are food for plants. Fact: Plants make their own food. Minerals help in plant growth and health. Water and carbon dioxide are ingredients for photosynthesis. Misconception: Roots are organs for feeding. Fact: Roots absorb minerals and water for the plants. Minerals and water are not food for plants. Misconception: Leaves take in water; the main function of leaves is to capture rain, water or dew; water vapour moves into the leaf during photosynthesis. Fact: Roots take in water. The main function of leaves is to carry out photosynthesis. Misconception: Fertilisers are plant food. Fact: Fertilisers are not plant food. They supply minerals to the plants. Misconception: Plants carry out photosynthesis in the day and respiration at night. Fact: Plants carry out respiration all the time and photosynthesis when there is light. Misconception: Plants breathe in carbon dioxide and breathe out oxygen. Fact: Plants take in carbon dioxide in the day when photosynthesis takes place and gives out oxygen at night or in the dark when photosynthesis stops, as respiration continues to take place. Misconception: Respiration in plants occurs only in the cells of leaves, since only leaves have gas exchange pores. Fact: Respiration takes place in all plant cells. Misconception: Plants do not respire, or they only respire in the dark. Fact: Plants respire all the time.



<p>Animals, including humans</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	<p>Use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. Look at animals who are camouflaged into their surroundings.</p> <p><i>Ideas – RSPCA or pets at home to come in and explain how to take care of pets/animals,</i></p> <p>Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</p> <p><i>Ideas – ask a dental nurse to come in to demonstrate brushing teeth</i></p> <p>Work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.</p> <p>Famous Scientist – Mary Anning</p>	<p>common animals fish amphibians reptiles birds mammals pets</p> <p>Carnivores – Meat, cat, dog, lion, tiger, fox, shark, killer whale, eagle, hawk, snake, tyrannosaurus rex</p> <p>Herbivores – Plants, cow, hamster, guinea pig, tortoise, triceratops</p> <p>Omnivores – Badger, human, bear, chickens</p> <p>Head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth</p>	<p>Animals</p> <ol style="list-style-type: none"> Misconception: All ocean creatures are 'fish', e.g. whales, dolphins. Fact: Whales, dolphins, jellyfish and shellfish are not fish, but seahorses and sea dragons are fish! Misconception: All fishes lay eggs. Fact: Some fishes give birth to live young, e.g. guppy, molly, swordtail, most types of sharks Misconception: Differences between vertebrates and invertebrates Fact: Vertebrates are animals with backbones (vertebrae) or spinal column, e.g. birds, fishes, mammals, reptiles and amphibians; Invertebrates do not have backbones, e.g. insects, worms, molluscs Misconception: All mammals give birth to live young. Fact: Most mammals give birth to live young; The duck-billed platypus and spiny anteater are two mammals which lay eggs. Misconception: Spiders are insects; any tiny creepy crawlie is an insect. Fact: Spiders are not insects. They are arachnids, belonging to the same group as scorpions. They have four pairs of legs and two body segments. Insects have three pairs of legs and three body segments. Misconception: Turtles and penguins are amphibians. Fact: Turtles are reptiles and penguins are birds. Misconception: Only large land mammals are animals. Fact: There are many different types of animals such as worms, spiders, sea anemone and corals. Misconception: Only large animals are consumers. Fact: Small animals may be consumers, e.g. the black widow spider is a consumer. Misconception: Male animals are always bigger and stronger than females. Fact: That may generally be true for human beings, but it is not so for many animals, e.g. the queen ants and bees are much bigger than the males.
<p>Everyday materials</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> distinguish between an object and the material from which it is made 	<p>Children to be given the opportunity to explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties.</p> <p>Also explore and experiment with a wide variety of materials, not only those listed in the programme of</p>	<p>Materials Wood, plastic, glass, metal, water, rock, brick, paper, plastic, fabrics, elastic, foil</p> <p>Properties</p>	<p>Materials</p> <ol style="list-style-type: none"> Misconception: Plastic is not breakable Fact: Plastics can be broken. Different types of plastics have different properties. Some types of plastics can be broken more easily than others, e.g. the plastic used to make cling-wrap breaks more easily than the plastic used to make a plug cover. Misconception: Confusion about hardness and strength



<ul style="list-style-type: none"> identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties 	<p>study, but including for example: brick, paper, fabrics, elastic, foil.</p> <p>Pupils might work scientifically by: performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ... for lining a dog basket? ... for curtains? ... for a bookshelf? ... for a gymnast's leotard?'</p> <p>Investigate and group materials depending upon which will float or sink.</p> <p>Build sandcastles and think about which amount of water mixed with sand creates the best sand castle.</p> <p>Investigate which material would be better to build a house for the 3 Little Pigs. Talk about making it fair by ensuring the amount of puff each time is the same (use a squeeze bottle???) Extend by spraying water – Which keeps the pigs dry?</p> <p>Famous Scientist – Chester Greenwood - Earmuffs</p>	<p>hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; Opaque/transparent.</p>	<p>Fact: The differences between the common usage and the scientific definitions of the terms 'hardness' and 'strength' should be emphasised to pupils. In science, hardness refers to the ability of a material to withstand scratching and strength refers to the ability of a material to support a heavy load without breaking or tearing. Thus, a piece of chalk which is conventionally considered to be hard is not considered hard in the scientific sense. It can easily be scratched.</p> <p>3. Misconception: Heat insulators are non-conductors. Fact: Matter which are heat insulators do conduct heat, albeit poorly. Thus, it is more appropriate to call them poor conductors of heat rather than non-conductors. Vacuum, which does not have particles (atoms, molecules or ions) to pass on heat can be considered to be a non-conductor. However, in reality, it is difficult to obtain a true vacuum</p>
<p>Seasonal changes</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies 	<p>Pupils should observe and talk about changes in the weather and the seasons. <i>Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.</i></p> <p>Children need to work scientifically by: making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.</p> <p>Ideas – Investigate how much rain falls over a period of time.</p> <p>Compare UK weather to Cape Town. Draw what the weather is like here and there. Ask Dryden to take and send photographs of the weather and compare to weather here.</p> <p>Create own weather broadcast outlining the weather and Britain locating on a map and in Cape Town.</p>	<p>Days of the Week Months of the Year Seasons</p> <p>Weather Snow, rain, ice, sun, thunder, lightning,</p>	<p>1. Misconception: The phenomenon of day and night is caused by the movement of the Earth around the Sun or the movement of the Sun around the Earth. Fact: Day and night is caused by the rotation of the Earth about its axis.</p>



	<p>Create a snowstorm in a bag (plastic bag with a straw attached and sealed at the bottom. Put some polystyrene balls inside and draw a winter scene on the front in pen).</p> <p>Look at what clouds are made out of and at cloud formations.</p> <p>Think about different extreme weathers – floods, hurricanes, tornados.</p>		
--	---	--	--