



Year 2

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>Living things and their habitats</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> explore and compare the differences 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 microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food 	<p>Introduce to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. Raise and answer questions that help them to become familiar with the life processes that are common to all living things. Introduce the terms 'habitat' and 'microhabitat'. They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals. Compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.</p> <p>Work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. Describe how they decided where to place things, exploring questions like: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. Construct a simple food chain that includes humans (eg, grass, cow, human). Describe the conditions in different habitats and microhabitats (under log, on stony path, under bushes); and find out how the conditions affect the number and type(s) of plants and animals that live there.</p> <p>Scientist – Rachel Carson – Marine Pollution</p>	<p>alive, living, dead, never alive, habitats micro-habitats food food chain</p> <p>healthy logs, leaf, litter stony path under bushes shelter seashore woodland ocean rainforest conditions hot/warm/cold bright/shade/dark</p>	<p>Life cycles</p> <p>Misconception: The first stage of each life cycle is the egg; every life cycle begins with the egg; Labelling the 'egg' as the first stage. Fact: The stages in a life cycle are repeated and there is no first or last stage.</p> <p>Misconception: Eggs and seeds are non-living things. Fact: Eggs and seeds are living things.</p> <p>Misconception: A population higher on a food chain is a predator on all the organisms below it. Fact: A population higher on a food chain is a predator on only the organisms directly below it.</p> <p>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.</p>
<p>Plants</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> 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 	<p>Pupils should use the local environment throughout the year to observe how plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as the processes of reproduction and growth in plants.</p> <p>Note: seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.</p> <p>Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy. You could create a time lapse video over time to show the growth.</p>	<p>Following on from Year 1 Key words</p> <p>water light suitable temperature grow healthy germination reproduction</p>	<p>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.</p> <p>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.</p>



	<p>Ideas - Can you grow a beanstalk as tall as Jack's? Investigate which seeds grow the quickest.</p> <p>Captain Cook - Botany</p>		<p>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.</p> <p>Misconception: Roots are organs for feeding. Fact: Roots absorb minerals and water for the plants. Minerals and water are not food for plants.</p> <p>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.</p> <p>Misconception: Fertilisers are plant food. Fact: Fertilisers are not plant food. They supply minerals to the plants.</p>
<p>Animals, including humans Pupils should be taught to:</p> <ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<p>Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs.</p> <p>The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult.</p> <p>Work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.</p> <p>Ideas – Why do we need to be fit and healthy? Investigate the best way to keep fit. How could you teach your parents? Create a fitness routine.</p>	<p>offspring grow adults nutrition reproduce</p> <p>Survival Water, food, air, exercise, hygiene, egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep.</p> <p>baby, toddler, child, teenager, adult.</p>	<p>Misconception: Propagating of fruit trees – as the tree can be propagated by plant parts, e.g. stem cutting, therefore the fruit has no seed. Fact: Fruits produced by vegetative propagation do have seeds. Examples of fruits produced by vegetative propagation may be shown to pupils to show them that they produce seeds.</p> <p>Misconception: Babies are conceived in the stomach. Fact: Stomachs are for food, not babies! Fertilisation takes place naturally in the Fallopian tube (oviduct) of the female reproductive system and the fertilised egg, which develops into a ball of cells over time, develops in the uterus (womb) of the female to become a baby.</p> <p>Misconception: In human reproduction, a miniature baby is folded up inside the sperm or the egg and the other gamete (reproductive cell) triggers its development.</p>



	<p>Famous Scientist – Florence Nightingale – Pioneer of modern nursing</p>		<p>Fact: The sperm fertilises the egg when the nuclei of the sperm and egg fuse. The fertilised egg (zygote) develops into a ball of cells, which continue to divide and develop into specialised cells to form different organs and systems.</p>
<p>Uses of everyday materials</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching 	<p>Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials, for example</p> <p>Ideas – Invent a new product and consider the materials it would need to be made out of and why. Look at spoons – what materials can they be made out of/shouldn't be made out of. What is the silliest material to make a pillow out of?</p> <p>Work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.</p> <p>Famous scientists - John Dunlop (tyres), Charles Macintosh (waterproof materials) or John McAdam (tarmac)</p>	<p>Wood, metal, plastic, glass, brick, rock, paper, cardboard.</p> <p>Bending, squashing, twisting, stretching</p> <p>Waterproof</p> <p>Metal – coins, cans, cars, table, legs</p> <p>Wood – matches, floors, telegraph poles</p> <p>Spoons – plastic, wood, metal, glass</p>	<p>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.</p> <p>Misconception: Confusion about hardness and strength 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>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>Misconception: Biodegradable materials are not pollutants. Fact: Some biodegradable materials can release poisons into the soil or water.</p>