

Detailed Science Breakdown

Science in EYFS & Year 1

In the first years of schooling, much of the science curriculum is based around real-life experiences for children. This includes everyday plants and animals, as well as finding out about different materials and the four seasons. There are likely to be lots of opportunities for exploring scientific ideas both in the classroom and the local surroundings.

Scientific Investigation

Children are encouraged to carry out their own observations and experiments to further their scientific understanding. In Year 1 this may include learning to:

- Ask scientific questions
- Carry out simple tests, and make observations
- Collect information to answer questions
- Group together objects according to their properties or behaviours

Plants and Animals

- Name a selection of common plants, including deciduous and evergreen trees
- Name the main parts of plants and trees, such as roots, stems, trunks and leaves
- Name a variety of common animals, including mammals, fish, birds, reptiles and amphibians
- Name some common animals which are carnivores, herbivores and omnivores
- Name the main parts of the human body, including those related to the five senses

Herbivores: animals which feed only on plants, e.g. rabbits. Carnivores: animals which feed on other animals, e.g. eagles. Omnivores: animals which eat both plants and animals, e.g. humans.

Deciduous trees are those which lose their leaves in autumn, whereas evergreen trees – as the name implies – are those which retain their green colour all year round.

Everyday Materials

- Recognise that objects are made of materials
- Name some everyday materials such as wood, metal, glass and plastic
- Describe some of the properties of materials, e.g. that wood is hard

- Group together items based on the materials they're made from, or their properties, for example by grouping heavy objects or shiny objects

Seasonal Change

- Observe changes across the four seasons
- Observe and describe how the day and weather changes with the seasons

Science in Year 2

Scientific Investigation

Children are encouraged to carry out their own observations and experiments to further their scientific understanding. In Year 2 this may include learning to:

- Use scientific apparatus to make observations, such as magnifying glasses
- Collect information about what they have seen
- Make links between observations and their scientific understanding

Living Things and their Habitats

- Compare the difference between things which are alive, which are dead, and which have never been alive
- Understand that different animals are suited to different habitats
- Identify some plants and animals in different habitats
- Describe how animals feed on other plants or animals

Habitats are simply the different types of places living things are found. This can range from the vast, such as oceans and rainforests, through to local features such as rock pools, or to the small, such as under a single log.

Plants

- Describe how seeds or bulbs grow into plants
- Understand that plants need water, light and a suitable temperature to grow

Animals including Humans

- Notice that all animals have offspring which grow into adults, including humans
- Know about the basic survival needs of animals, such as food, water and air

- Describe the importance of exercise, healthy diet and hygiene to humans

Everyday Materials

- Identify and compare the uses of different materials including wood, metal, plastic, glass, brick, rock, paper and cardboard
- Find out how some solid objects can be changed by squashing, bending or stretching

Science in Year 3

During Key Stage 2 (Years 3 to 6), the strands of science begin to become more recognisable as biology, chemistry and physics, although they will usually be grouped together in primary school. Children will continue to carry out their own experiments to find out about the world around them, and to test their own hypotheses about how things work.

Scientific Investigation

Investigation work should form part of the broader science curriculum. During Year 3, some of the skills your child might focus on include:

- Set up simple comparative tests, ensuring that they are carried out fairly
- Make systematic observations, using appropriate equipment and standard units
- Gather and record information to help to answer scientific questions
- Use results to draw simple conclusions or to raise further questions
- Use straightforward scientific evidence to answer questions

Plants

- Identify the basic functions of a plant's roots, stem/trunk, leaves and flowers
- Understand that plants need air, light, water, nutrients and room to grow
- Understand the role of flowers in the life cycle, including pollination and seed dispersal

Pollination is the act of reproduction in which pollen is transferred – usually to another plant – to make seeds. Seed dispersal is the distribution of seeds by actions such as sprinkling, through the wind, or by being eaten as part of a fruit.

Animals including Humans

- Know that animals get their nutrition from food, and need the right types and amounts of nutrition
- Identify that humans and some other animals have skeletons and muscles, and know their basic functions

Rocks

- Compare and group different types of rocks based on their appearance and properties
- Describe how fossils are formed
- Recognise that soils are made from rocks and organic material

At this level, rocks are often grouped into one of three categories: Igneous: rocks formed from magma under the Earth's surface, often after a volcano, or deep underground. Metamorphic: rocks formed under great heat or pressure under the Earth's surface, such as slate or marble. Sedimentary: rocks formed where sediment builds up in deposits under lakes or oceans.

Light

- Recognise that we need light to see things
- Notice that light is reflected from surfaces
- Know how shadows are formed, and identify how the size of a shadow changes

Forces and Magnets

- Notice that some forces need contact to act, but that magnetic forces can act at a distance
- Observe how magnets attract or repel each other, describing magnets as having two poles
- Compare and group objects according to whether or not they are magnetic

Science in Year 4

During Year 4, children begin to use more scientific vocabulary to describe objects and processes, such as describing solids, liquids and gases, or erosion. Vocabulary is a key part of any area of study, and particularly in science. Learning new words – and their spellings – can often be fun when they relate to experiments and science investigations.

Scientific Investigation

Investigation work should form part of the broader science curriculum. During Year 4, some of the skills your child might focus on include:

- Carry out fair tests, using control tests where appropriate

- Take accurate measurements using a range of scientific equipment, including thermometers
- Organise and presenting data to help answer scientific questions
- Record findings using scientific vocabulary, diagrams, charts and tables
- Report on findings using oral and written explanations of results and conclusions

Living Things and their Habitats

- Use classification keys to group, identify and name a variety of living things
- Recognise that environments can change

A common example of classification is the grouping of vertebrates into fish, amphibians, reptiles, mammals and birds.

Animals including Humans

- Describe the basic functions of the parts of the digestive system, such as mouth, oesophagus, stomach and intestines
- Identify the different types of teeth in humans, and their functions
- Construct a variety of food chains to show producers, predators and prey

States of Matter

- Group materials as solids, liquids and gases
- Observe that some materials change state when heated or cooled
- Know the part of evaporation and condensation in the water cycle

The water cycle is the process of water being evaporated from the Earth's surface, and then condensing to form clouds and rain before falling back to Earth.

Sound

- Understand that sounds are caused by vibrations reaching the ear
- Find what affects the pitch and volume of a sound

Electricity

- Construct a simple electrical circuit using cells, wires, bulbs and switches
- Understand that a complete circuit is needed to power a lamp or buzzer
- Recognise some common conductors and insulators

Science in Year 5

As children get older, they begin to meet more abstract concepts in science – things which are not so easily tested in the classroom, such as the bodies of the solar system, or changes of state. They will continue to carry out experiments but may also use more secondary resources for research or investigation.

Scientific Investigation

Investigation work should form part of the broader science curriculum. During Year 5, some of the skills your child might focus on include:

- Plan different types of scientific investigation, including controlling variables
- Take measurements with increasing accuracy and precision
- Record data and results using diagrams, labels, keys, tables and graphs
- Use test results to make predictions and to set up more testing
- Identify the evidence that has been used to support or refute ideas

Living Things and their Habitats

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life processes of reproduction in some plants and animals

Life cycles include different stages for the main vertebrate groups, such as eggs, larvae and pupae. These can be seen in tadpoles and frogs, caterpillars and butterflies, and of course the chicken and the egg.

Animals including Humans

- Describe the changes as humans develop to old age, including puberty

Properties and Changes of Materials

- Compare the various properties of materials such as hardness, solubility and conductivity
- Use knowledge of solids, liquids and gases to separate mixtures and solutions through filtering or evaporation
- Know that dissolving, mixing and changes of state are reversible changes
- Know that some changes cannot be reversed, such as burning, rusting or chemical reactions

Earth and Space

- Describe the movement of the planets, including Earth, around the Sun
- Describe the movement of the Moon around the Earth
- Use these ideas to explain how day and night occur, and why the Sun appears to move across the sky

Since 2006, scientists have defined Pluto as only a dwarf planet. Consequently, children are now taught that there are only eight planets orbiting the Sun (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune), although many will also explain the history of Pluto's past.

Forces

- Explain that gravity is a force which acts on objects pulling them towards the Earth
- Identify the effects of air resistance, water resistance and friction
- Recognise that some mechanisms, such as levers, pulleys and gears, can be used to increase the work of a force

Science in Year 6

Again in Year 6, many of the scientific concepts that children meet are more abstract, such as the study of evolution, or the behaviour of light. There are still plenty of opportunities for investigation, and also to find out about the work of some great scientists of today and the past.

There are no statutory tests for students in Science at Key Stage 2, although a very small number of children from any given school may be selected to be part of the bi-annual science sample testing. This involves taking three short tests of about twenty-five minutes each. The results of these tests are not shared with parents or schools, but are used to get a sense of the national picture.

Scientific Investigation

Investigation work should form part of the broader science curriculum. During Year 6, some of the skills your child might focus on include:

- Plan a range of scientific investigations and managing the variables effectively
- Take precise measurements, and repeat tests where appropriate to improve the validity of the results
- Present results using tables, scatter graphs, line graphs and other diagrams
- Explain the conclusions drawn from results, including their limitations

Living Things and their Habitats

- Describe how living things are classified into groups, including micro-organisms
- Give reasons for the classification of plants and of animals according to their characteristics

At this age, invertebrate animals can be grouped into categories such as insects, spiders, snails and worms.

Animals including Humans

- Know the functions of the main parts of the circulatory system such as the heart, lungs, blood vessels and blood
- Describe how nutrients and water are transported within animals
- Recognise the impact of diet, exercise, drugs and lifestyle on the way bodies function

Evolution and Inheritance

- Recognise that fossils provide information about life on Earth millions of years ago
- Understand that offspring are not normally identical to their parents
- Identify that plants and animals are adapted to their environments, and that this adaptation leads to evolution over long periods of time

Evolution is not a planned process of adaptation, but rather the unintended result of more random changes which led to animals being better-suited to the environments in which they lived.

Light

- Recognise that light appears to travel in straight lines
- Understand that we see things because light is reflected off objects and into the eye
- Explain how shadows are formed

Electricity

- Compare the variation in performance of bulbs and buzzers by changing the number of cells in a circuit
- Use the recognised scientific symbols to draw a simple circuit diagram