

Science

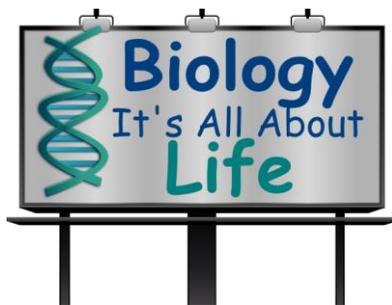
Science
Learning
Objectives



The national curriculum for science aims to ensure that all pupils:

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics (scientific/substantive knowledge)
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

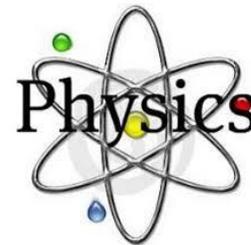
Biology involves the study of life and living organisms.



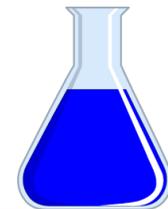
Chemistry is the study of matter, it's properties and how substances behave. It is part of everything in our lives as every material is made up of matter.



Physics is the study of the relationship of objects, forces and energy. It helps to describe the universe around us.



Working scientifically (disciplinary knowledge) is understanding the nature, processes and methods involved in a scientific enquiry. It is embedded within all scientific teaching.



Nursery

Science
Learning
Objectives



Physical Development

- ✓ Use a range of tools competently, safely and confidently

Understanding of the World

- ✓ Use all their senses in hands-on exploration of natural materials
- ✓ Explore collections of materials with similar and/or different properties
- ✓ Talk about what they see, using a wide range of vocabulary
- ✓ Explore how things work.
- ✓ Plant seeds and care for growing plants
- ✓ Understand the key features of the life cycle of a plant and an animal
- ✓ Begin to understand the need to respect and care for the natural environment and all living things
- ✓ Explore and talk about different forces they can feel
- ✓ Talk about differences between materials and changes they notice

Foundation

Science
Learning
Objectives



Understanding of the World

- ✓ Explore the natural world around them
- ✓ Describe what they see, hear and feel whilst outside
- ✓ Recognise some environments that are different to the one in which they live
- ✓ Understand the effect of changing seasons on the natural world around them

Physical

Development

- ✓ Use a range of tools competently, safely and confidently

Understanding of the World- Early Learning Goals

- ✓ Explore the natural world around them, making observations and drawing pictures of animals and plants
- ✓ Know some similarities and differences between the natural world around them and contrasting environments
- ✓ Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

Year 1

Science Learning Objectives



Animals including humans

- ✓ 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 is associated with each sense

Plants

- ✓ 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

Everyday materials

- ✓ Distinguish between an object and the material from which it is made
- ✓ 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 properties

Seasonal changes

- ✓ Observe changes across the four seasons
- ✓ Observe and describe the weather associated with the seasons and how day length varies

Working scientifically

- ✓ Ask simple questions and recognise they can be answered in different ways
- ✓ Observe closely, using simple equipment
- ✓ Perform simple tests
- ✓ Identify and classify
- ✓ Gather and record data to help in answering questions
- ✓ Use observations and ideas to suggest answers to questions

Year 2

Science Learning Objectives



Living things and their habitats

- ✓ 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 micro-habitats
- ✓ Describe how animals obtain their food from plants and other animals, using the idea of simple food chains, and identify and name different sources of food

Animals including humans

- ✓ 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

Plants

- ✓ 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

Uses of everyday materials

- ✓ 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 materials can be changed by squashing, bending, twisting and stretching

Working scientifically

- ✓ Ask simple questions and recognise they can be answered in different ways
- ✓ Observe closely, using simple equipment
- ✓ Perform simple tests
- ✓ Identify and classify
- ✓ Gather and record data to help in answering questions
- ✓ Use observations and ideas to suggest answers to questions

Year 3

Science Learning Objectives



Plants

- ✓ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
- ✓ Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- ✓ 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
- ✓ Investigate the way in which water is transported within plants

Animals including humans

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

Rocks

- ✓ Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- ✓ Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- ✓ Recognise that soils are made from rocks and organic matter

Forces and magnets

- ✓ Notice that some forces need contact between two objects but magnetic forces can act at a distance
- ✓ Observe how magnets attract or repel each other and attract some materials and not others
- ✓ Compare how things move on different surfaces
- ✓ 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 will attract or repel each other, depending on which way poles are facing

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 size of shadows change
- ✓ Recognise that they need light in order to see things and that dark is the absence of light

Year 3

Science Learning Objectives



Working scientifically

- ✓ Ask relevant questions and use different types of scientific enquiries to answer them
- ✓ Set up simple practical enquiries, comparative and fair tests
- ✓ Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- ✓ Gather, record, classify and present data in a variety of ways to help answer questions
- ✓ Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- ✓ Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- ✓ Identify differences, similarities or changes related to simple scientific ideas and processes
- ✓ Use straightforward scientific evidence to answer questions or to support findings

Year 4

Science Learning Objectives



Animals including humans

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

Living things and their habitats

- ✓ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- ✓ Recognise that environments can change and that this can sometimes pose dangers to living things
- ✓ Recognise that living things can be grouped in a variety of ways

States of matter

- ✓ Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
- ✓ Compare and group materials together, according to whether they are solids, liquids or gases
- ✓ Observe that some materials change state when they are heated or cooled, and measure or record the temperature at which this happens in degrees Celsius (°C)

Electricity

- ✓ Recognise some common conductors and insulators, and associate metals with being good conductors
- ✓ Identify common appliances that run on electricity
- ✓ Construct a simple series electrical circuit identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- ✓ 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
- ✓ Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit

Sound

- ✓ Recognise that vibrations from sounds travel through a medium to the ear
- ✓ Find patterns between the pitch of a sound and features of the object that produced it
- ✓ Find patterns between the volume of a sound and the strength of the vibrations that produced it
- ✓ Recognise that sounds get fainter as the distance from the sound source increases
- ✓ Identify how sounds are made, associating some of them with something vibrating

Year 4

Science Learning Objectives



Working scientifically

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- ✓ Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- ✓ Gather, record, classify and present data in a variety of ways to help answer questions
- ✓ Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
- ✓ Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- ✓ Identify differences, similarities or changes related to simple scientific ideas and processes
- ✓ Use straightforward scientific evidence to answer questions or to support findings

Year 5

Science Learning Objectives



Animals including humans

- ✓ Describe the changes as humans develop to old age

Living things and their habitats

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

Earth and space

- ✓ Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
- ✓ Describe the movement of the Earth and other planets, relative to the Sun in the solar system
- ✓ Describe the movement of the Moon relative to the Earth
- ✓ Describe the Sun, Earth and Moon as approximately spherical bodies

Forces

- ✓ Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- ✓ Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- ✓ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

Properties and changes of materials

- ✓ Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including filtering, sieving and evaporating
- ✓ Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- ✓ Demonstrate that dissolving, mixing and changes of state are reversible changes
- ✓ 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
- ✓ 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
- ✓ Know that some materials will dissolve into liquid to form a solution and describe how to recover a substance from a solution

Year 5

Science Learning Objectives



Working scientifically

- ✓ Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- ✓ Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate
- ✓ Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- ✓ Report and present findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- ✓ Use test results to make predictions to set up further comparative and fair tests
- ✓ Identify scientific evidence that has been used to support or refute ideas or arguments

Year 6

Science Learning Objectives



Animals including humans

- ✓ Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- ✓ 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

Living things and their habitats

- ✓ 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
- ✓ Give reasons for classifying plants and animals based on specific characteristics

Light

- ✓ Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
- ✓ Recognise that light appears to travel in straight lines
- ✓ 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
- ✓ 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

Evolution and inheritance

- ✓ Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to 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
- ✓ Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents

Electricity

- ✓ Use recognised symbols when representing a simple circuit in a diagram
- ✓ Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- ✓ 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

Year 6

Science Learning Objectives



Working scientifically

- ✓ Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- ✓ Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate
- ✓ Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- ✓ Report and present findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- ✓ Use test results to make predictions to set up further comparative and fair tests
- ✓ Identify scientific evidence that has been used to support or refute ideas or arguments