



Science Rationale

Through teaching science we aim to provide our pupils with the foundations to understand the world around them. At Priory Woods, science is about enabling our pupils to experience and observe phenomena in the natural and humanly-constructed world. They should be encouraged to be curious and ask questions about what they notice and observe and should be helped to develop their understanding of scientific ideas by using different types of enquiry to answer their own questions. Exploration is a vital part of pupil learning and the teaching and learning of science should be done through the use of first-hand practical experiences whenever possible.

In the EYFS and Lower School science is not taught as a specific subject but is a key part of the Knowledge and Understanding of the World area of the curriculum. It is also integral to many areas of daily exploration, learning and play. Alongside specific scientific knowledge and vocabulary pupils will develop the concept of 'working scientifically' appropriate to their developmental stage.

Science

PERFORMANCE INDICATORS

RANGE, CONTENT AND CURRICULUM OPPORTUNITIES

For EYFS provision also refer to *Development Matters Understanding The World: The World* development statements.

P1 - P3: Refer to Sensory Curriculum/Routes For Learning (RFL)

P4

- Explore objects and materials provided, changing some materials by physical means and observing the outcomes.
- Pupils communicate their awareness of changes in light, sound or movement.
- Imitate actions involving main body parts.
- Make sounds using their own bodies and imitate or copy sounds.
- Cause movement by a pushing or pulling action.
- Show interest in a wide range of living things, handling and observing them.
- Know that certain actions produce predictable results.

P5

- Take part in activities focused on the anticipation of and enquiry into specific environments.
- Match and group objects and materials in terms of simple features or properties.
- Indicate the before and after of material changes.
- Try out a range of equipment in familiar and relevant

In EYFS and Lower School pupils will be provided with opportunities to develop their scientific learning through:

- a topic based curriculum (Cornerstones)
- wow days
- a sensory curriculum/Routes For Learning (RFL)
- EQUALS schemes of work for KS1 & KS2
- areas of learning, both indoor and outdoor
- environmental visits
- special events, e.g. science days, farm bus, animal handling experiences, Living Eggs.

In Upper School pupils will be provided with opportunities to develop their scientific learning through:

- a topic based curriculum (Cornerstones)
- wow days
- a sensory curriculum/Routes For Learning (RFL)
- timetabled science lessons based on the EQUALS schemes of work for KS3 & KS4
- special events, e.g. science days, farm bus, animal handling experiences, Living Eggs.

situations.

- Respond to and answer simple scientific questions.
- Engage in experimentation with a range of equipment in familiar and relevant situations.

P6

- Explore objects and materials provided in an appropriate way.
- Recognise distinctive features of objects and know where they belong.
- Begin to make generalisations, connections and predictions from regular experience.
- Sort materials according to a given criteria when the contrast is obvious.
- Closely observe the changes that occur, for example, when materials are heated, cooled or mixed.
- Identify some appliances that use electricity.
- Show they know some sources of sound and light.

P7

- Actively join in scientific investigations.
- Understand the scientific use of simple vocabulary, such as before, after, bumpy, grow, eat, move and can communicate related ideas and observations using simple phrases.
- Sort materials reliably with given criteria.
- Demonstrate simple properties of light, sound and movement, for example, bright, noisy/quiet, fast/slow.
- Make simple records of their findings.
- Begin to make suggestions for planning and evaluating their

work.

P8

- Explore and observe similarities, differences, patterns and changes in features of objects, living things and events.
- Begin to make their own contributions to planning and evaluation and to recording their findings in different ways.
- Identify a range of common materials and know about some of their properties.
- Sort materials using simple criteria and communicate their observations of materials in terms of these properties.
- Make their own observations of changes of light, sound or movement that result from actions and can describe the changes when questioned directly.

Years 1 & 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

Year 1 Expectations

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

Year 2 Expectations

- 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.
- 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.
- 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.
- 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.

Years 3 & 4 - Working Scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking relevant questions and using different types of

scientific enquiries to answer them.

- Setting up simple practical enquiries, comparative and fair tests.
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identifying differences, similarities or changes related to simple scientific ideas and processes.
- Using straightforward scientific evidence to answer questions or to support their findings.

Year 3 Expectations

- 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

- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- 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
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- 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.
- 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 an opaque object
- Find patterns in the way that the size of shadows change.
- Compare how things move on different surfaces
- 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 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 poles are facing.

Year 4 Expectations

- 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
- Recognise that environments can change and that this can sometimes pose dangers to living things.
- 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.
- 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 research the temperature at which this happens in degrees Celsius ($^{\circ}\text{C}$)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with

temperature.

- Identify how sounds are made, associating some of them with something vibrating
- 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 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
- Recognise some common conductors and insulators, and associate metals with being good conductors.

Years 5 & 6 - Working Scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

<ul style="list-style-type: none"> • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Using test results to make predictions to set up further comparative and fair tests • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments. 	
<p>Year 5 Expectations</p> <ul style="list-style-type: none"> • 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. • Describe the changes as humans develop to old age. • 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 in liquid to form a 	

solution, and describe how to recover a substance from a solution

- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through 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.
- 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
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
- 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.

Year 6 Expectations

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics.
- 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.
- 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
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
- 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

- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
- 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
- Use recognised symbols when representing a simple circuit in a diagram.

Science APPENDIX

The Science Curriculum has been written with reference to the following documents and websites:

- ✚ Performance Indicators for Value Added Target Setting 4th Edition (PIVATS).
- ✚ P Scales 2014 <https://www.gov.uk/government/publications/p-scales-attainment-targets-for-pupils-with-sen>
- ✚ Development Matters. 2012.
http://www.lancsngfl.ac.uk/curriculum/early_years/download/file/Development%20Matters%20in%20the%20Early%20Years%20Foundation%20Stage1.pdf
- ✚ Cornerstones Curriculum
- ✚ EQUALS Schemes of work for Science (School shared resources)
- ✚ Priory Woods PMLD Curriculum map (School shared resources)
- ✚ Routes For Learning (RFL) map

