

WESTFIELD PRIMARY

Science Policy

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This Policy was written by Eloise Carey November 2024



INTRODUCTION

All children are curious about their environment and Science makes a valuable contribution to their knowledge and understanding of the world.

Science at Westfield Primary School involves the encouragement, promotion and development of children's interest and knowledge of the world around them, how things work and why things are the way they are. We encourage the children to question things, challenge themselves and think of ways to investigate and solve problems in a safe, caring environment.

AIMS

These aims are intended for all pupils in school; how they are implemented will be dependent upon the age and ability of the pupils.

- To develop knowledge and understanding of important scientific ideas, processes and skills and to relate these to everyday experiences.
- To learn about ways of thinking and of finding out about and communicating ideas using scientific vocabulary.
- To use a range of scientific enquiry to allow them to observe, make and test predictions and finally to draw and report reasonable conclusions.

OBJECTIVES

Science is taught to all pupils, following guidance in the National Curriculum Programmes of Study. For each year group under the new 2014 curriculum, topics are given covering the 3 main areas of science: biology, chemistry and physics. Within that, teachers are provided with notes and guidance to allow us to link in the skills of working scientifically with the body of knowledge surrounding each topic. It is expected that children are provided with experience of a range of enquiry and investigation styles during their time in KS1 and 2.

CURRICULUM ORGANISATION

The programmes of study for science are set out year-by-year for Key Stages 1 and 2; teachers will base their planning on these. Each year group teaches topics which ensure progression through the key stages. The content is in accordance with the requirements of the Science National Curriculum. Knowledge organisers have been developed to support children's learning during each topic.

Pupils may be taught as a whole class, work in a group or individually. The groups may be of matched or mixed abilities. Children with a particular educational need will be supported as appropriate. Safety will be a main feature of lessons to encourage the children to approach their science learning with full understanding of how to keep themselves and those around them safe from harm.

Key Stage 1:

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own

questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.

Pupils are taught about:

Year 1

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 physical properties.

Seasonal changes

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

Animals including humans

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores.

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.

Scientists and inventors

- To describe the simple physical properties of a variety of everyday materials.
- To use observations to suggest answers to questions.
- To describe and compare the structure of a variety of common animals.
- To identify and classify animals.
- To identify and name a variety of common wild and garden plants.
- To gather and record data to help in answering questions.
- To observe and describe weather associated with the seasons.
- To describe and compare the structure of a variety of common animals, including pets.
- To perform simple tests.
- To compare a variety of everyday materials on the basis of their simple properties.
- To say which part of the body is associated with each sense.
- To use their senses to identify and compare different smells.

Year 2

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 some materials can be changed by squashing, bending, twisting and stretching.

Animals including humans

- Find out about and describe the basic needs of animals including humans for survival (water, food, air).
- Notice that animals, including humans, have offspring which grows into adults.
- Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.

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 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.

The environment

- 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.
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.

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.

Scientist and inventors

- 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.
- 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.

Lower Key Stage 2 - years 3 and 4

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes

over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Pupils are taught about:

Year 3

Plants

- 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.

Rocks and soils

- 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.

Lights

- 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.

Forces and magnets

- 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.

Animals including humans

- Identifying that animal, including humans, need the right types and amounts of nutrition, and that they cannot make their own food; they get nutrition from what they eat.
- Identifying that humans and some other animals have skeleton and muscles for support, protection and movement.

Scientists and Inventors

- To identify differences, similarities or changes related to simple scientific ideas and processes.
- To 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.
- To identify changes related to scientific ideas.
- To identify that humans have skeletons for support, protection and movement.
- 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.
- 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.

- To notice that light is reflected from surfaces.
- To ask relevant questions and use evidence from scientific enquiries to answer them and support findings.
- To gather, record, classify and present data in a variety of ways to help in answering questions.

Year 4

Living things and their habitats

- 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.

Animals, including humans

- 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.

States of matter

- 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 (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Sound

- 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.

Electricity

- 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.

Scientists and Inventors

- Recognise that environments can change and that this can sometimes pose dangers to living things.
- Set up simple practical enquiries and report on findings from enquiries.
- Recognise that vibrations from sounds travel through a medium to the ear.
- Report on findings, including oral and written presentations and displays.
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
- Compare and group materials together according to whether they are solids, liquids or gases.
- Identify changes relating to simple scientific ideas and processes.
- 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 (°C).
- Take accurate measurements using standard units and a range of equipment, including thermometers.
- Identify the different types of teeth in humans and their functions.

- Use scientific evidence from comparative tests to support their findings.

Upper key stage 2 - years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Pupils are taught about:

Year 5

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 process of reproduction in some plants and animals.

Animals, including humans

- describe the changes as humans develop to old age

Properties and changes of materials

- 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.

Earth and space

- 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.

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.

Year 6

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.

Evolution and inheritance

- 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.

Light

- 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.

Electricity

- 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 has many links to other areas of the curriculum including:

- English - reporting, information texts, predicting and explaining, scientific vocabulary
- Maths - showing results in graphs and measurements, measuring and observing over time
- Music - vibration and pitch.
- Computing - using as a tool for research, data logging, simulating, data handling, and to develop word processing skills.
- PE - using exercise to show changes in the body and to investigate forces.
- DT - to manufacture and refine projects eg musical instruments, food technology.

This list is by no means exhaustive and teachers are encouraged to make links wherever possible to other curriculum areas to show children the relevance of science in everyday life.

Outside agencies may be brought in to enhance the delivery of Science (e.g. Mobile Planetarium) or visits made to museums and galleries etc. (e.g. Zoo, Sea Life Centre).

It is important that children's success in Science is acknowledged and celebrated. This can be done through displays in classrooms and in communal areas, during Celebration Assembly and via the school website.

LEARNING AND TEACHING

All lessons have clear learning objectives which are shared and reviewed with the pupils effectively. A variety of strategies, including questioning, discussion, concept mapping and marking, are used to assess progress. The information is used to identify what is taught next. Activities inspire the pupils to experiment and investigate the world around them and to help them raise their own questions such as "Why...?", "How...?" and "What happens if...?". Activities develop the skills of enquiry, observation, locating sources of information, selecting appropriate equipment and using it safely, measuring and checking results, making comparisons and communicating results and findings. Lessons make effective links with other curriculum areas and subjects, especially literacy, numeracy and computing. Activities are challenging, motivating and extend pupils' learning. Pupils have frequent opportunities to develop their skills in, and take responsibility for, planning investigative work, selecting relevant resources, making decisions about sources of information, carrying out activities safely and deciding on the best form of communicating their findings.

ASSESSMENT

Assessment is an ongoing process, using observations of children working, discussions and marking of children's work. Using these methods, future lessons are tailored carefully to the learning needs of the children in the class. 'Rising Stars' or similar materials may be used in mini-plenaries during the lesson or plenaries at the end of the lesson to give a 'snap shot' of the understanding for a particular area of Science. Progress and attainment in all classes is recorded formally on ScholarPack every half term for Science. Parents are informed of their child's end of year achievements in the Annual Report.

EARLY YEARS FOUNDATION STAGE

Science is included as an aspect of 'Understanding of the World'. Pupils are provided with a broad range of opportunities and experience through which they may work towards Early Learning Goal 14:

The World: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.

RESOURCES

Resources are kept in a central store, in the Maths and Science cupboard, on the first floor. It is the responsibility of each adult to keep the resources neat and tidy and to inform the co-ordinator if any resources need replacing.

Resources are labelled, with new resources purchased on a needs basis. The co-ordinator should be informed in advance if a particular resource is needed to support learning and teaching.

SAFE PRACTICE

Safe practice must be promoted at all times. Teachers must also take into account all relevant Health and Safety issues. Please refer to schools' health and safety policy and specific risk assessments. Particular attention must be given to avoiding the use of anything that aggravates individual pupils' allergies.

PARENTS AND CARERS

Parents and carers have an important role to play in helping their pupils learn about science. Their role is enhanced by the use of science displays around the school to raise their interest and the interest of their children in the subject. The importance of science relative to other subjects will be explained to parents when their children join the school and teachers should take the opportunity of reinforcing this appropriately during interviews with parents.

THE ROLE OF THE CO-ORDINATOR

The Leader should:

- Take a lead in policy development.
- Monitor the effectiveness of the teaching and learning of Science as well as the quality of work produced by the children.
- Support colleagues, including induction of teachers new to the school.
- Attend network meetings to keep up to date and advise colleagues appropriately.
- Liaise with other teaching staff regarding opportunities for children to participate in activities outside schools (e.g. AG&T Science days).

This policy should be read alongside the AG&T policy, SEND policy, Equal Opportunities Policy, Healthy and Safety Policy and Homework Policy.

Westfield Primary School Science curriculum map

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	Seasonal change	Light and dark	Materials	Animals including humans	Living things and their habitats	Living things/ Plants
Year 1	Everyday materials	Seasonal change	Animals including humans	Seasonal change- spring and summer	Plants	Scientists and inventors
Year 2	Everyday materials	Animals including humans	Living things and their habitats	The environment	Plants	Scientists and inventors
Year 3	Rocks and soils	Forces and magnets	Animals including humans	Plants	Light	Scientists and inventors
Year 4	Electricity	Sound	Animals including humans	Living things and their habitats	States of matter	Scientists and inventors
Year 5	Properties of materials	Living things and their habitats	Earth and space	Earth and space	Forces	Animals including humans
Year 6	Light	Electricity	Animals including humans	Living things and their habitats	Evolution and inheritance	Child led investigations/ science fair

Animals including Humans—Year 6

Previous Learning:

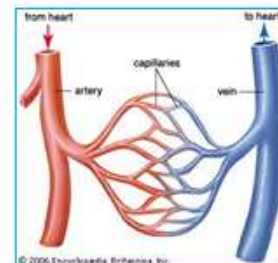
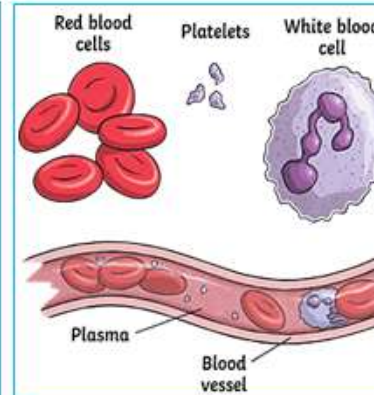
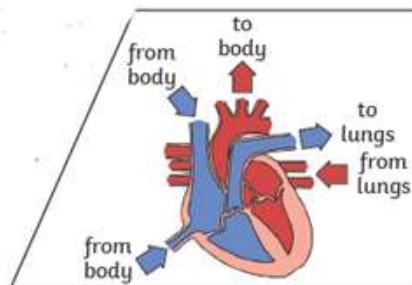
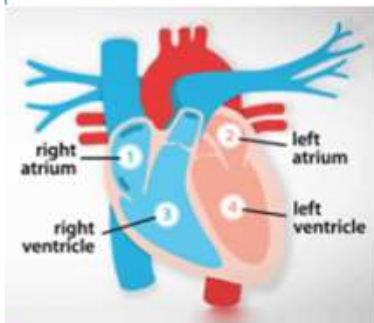
In Year 2, you described the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. In Year 3, you identified that animals, including humans, need the right types and amount of nutrition. In Year 4, you described the simple functions of the basic parts of the digestive system in humans. You also identified the different types of teeth in humans and their simple functions.

Drugs, alcohol and smoking have negative effects on the body. A healthy diet involves eating the right types of nutrients in the right amounts.

Platelets help you stop bleeding when you get hurt. The liquid part of blood contains water and protein. This is called plasma. Plasma is liquid. The other parts of your blood are solid.

The heart pumps blood to the lungs to get oxygen. It then pumps this oxygenated blood around the body.

Mammals have hearts with four chambers. Notice how the blood that has come from the body is deoxygenated, and the blood that has come from the lungs is oxygenated again. The blood isn't actually red and blue.



Capillaries are the smallest blood vessels in the body and it is here that the exchange of water, nutrients, oxygen and carbon dioxide takes place.

Future learning:

In secondary school, you will explore the consequences of imbalances in human diets and the effects of recreational drugs on behaviour, health and life choices.

Key vocabulary	Definitions
heart	An organ which constantly pumps blood around the circulatory system.
pulse rate	The pulse is the number of heartbeats per minute.
blood vessels	The tube-like structures that carry blood through the tissues and organs.
circulatory system	A system which includes the heart, veins, arteries and blood transporting substances around the body.
nutrients	Substances that animals need to stay alive and healthy.
drugs	A substance containing natural or man-made chemicals that has an effect on your body when it enters your system.
oxygenated blood	Oxygenated blood has more oxygen. It is pumped from the heart to the rest of the body.
deoxygenated blood	Deoxygenated blood is blood where most of the oxygen has already been transferred to the rest of the body.