

Welcome to Bromley Hills Primary School



Bromley Hills Primary School

Science Policy

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School Vision

At Bromley Hills, we promote a positive culture of social and emotional well-being and mental health resilience for pupils, staff, and our community. We want our children to achieve their full potential; through an inspiring and engaging curriculum, embedding our pedagogy that learning is a change to long term memory, so that they are equipped with the necessary lifelong knowledge and mental health awareness to enable them to become confident and independent valued members of our local community and British society.

School Values

Throughout our curriculum, we weave in a golden thread of core values, values which we believe are essential in preparing children for the wider world, and our young learners develop and build upon these as they go through school. Our core values are:

- Respect
- Honesty
- Cooperation
- Caring
- Teamwork

School Ethos

It's 'Time to Shine' - together we will succeed and achieve.

The UN Convention on the Rights of the Child

Article 29 - Every child has the right to an education to help them use and develop their talents and abilities.

Statement of Intent

Learning is a change to long term memory. Our aim is to ensure that our students experience a wide breadth of study based on the national curriculum and have, by the end of each key stage, long-term memory of curriculum knowledge.

We aim to inspire in pupils a curiosity and fascination of the world through Biology, Chemistry and Physics. Teaching will equip children with scientific knowledge, methods, processes and uses of science so that they can explain what is occurring, predict how things will behave, and analyse causes.

Through the continued development of oracy skills, we will expand pupil's scientific vocabulary which will deepen as they progress through school. Through our science curriculum, we intend to inspire pupils to develop a fascination of science and an enquiring mind to answer their own questions.

Statement of Implementation

Science is taught through the 'Threshold Concept' of Working Scientifically. The threshold concept is delivered through the knowledge categories of Biology, Chemistry and Physics. Deliberate practise of these, whereby knowledge will be revisited, will enable a gradual deepening of their understanding.

Teachers will utilise investigations, purposeful experiences through visits and visitors, and a range of teaching styles in order to develop their understanding of science so that it is in their long-term memory.

Teachers will provide knowledge for children to use to plan investigations, make predictions, carry out observations, collect data and develop hypotheses, in order to deepen children's understanding.

Statement of Impact

Because learning is a change to long term memory it is impossible to see impact in the short term. However, we do use probabilistic assessment based on deliberate practise. This means that we look at the practices taking place to determine whether they are appropriate, related to our end of key stage goals. We use comparative judgements against Milestone statements as well as set POP tasks at both the start and end of a topic in order to compare students' work over time. We use lesson observations to see if the pedagogical style matches our depth expectations.

Impact is also measured through key questioning skills built into lessons, progress tests and child-led assessment against the objective (WAGBA), and summative assessments aimed at targeting next steps in learning.

Aims

At Bromley Hills we believe that Science is a body of knowledge built up through experimental testing of ideas. Science is also a practical way of finding reliable answers to questions we may ask about the world around us. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. We believe that a broad and balanced science education is the entitlement of all children, regardless of ethnic origin, gender, class, aptitude or disability.

Our aims in teaching science include the following:

- Preparing our children for life in an increasingly scientific and technological world today and in the future.
- Helping our children acquire a growing understanding of the nature, processes and methods of scientific ideas.
- Helping develop and extend our children's scientific concept of their world.
- Building on our children's natural curiosity and developing a scientific approach to problems.
- Encouraging open-mindedness, self-assessment, perseverance and developing the skills of investigation – including: observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating.
- Developing the use of scientific language, recording and techniques.
- Developing the use of computing in investigating and recording.
- Making links between science and other subjects.

Statutory Requirements

Statutory requirements for the teaching and learning of Science are laid out in, The National Curriculum in England Framework Document for Teaching, September 2014 and the Statutory framework for the Early Years Foundation Stage, January 2024 (update).

Science teaching at the Bromley Hills involves adapting and extending the curriculum to match all pupils' needs. Where possible, Science will be linked to class topics. Science will also be taught as discrete units and lessons where needed to ensure coverage. Due to the mixed year groups in our classes, Science units are taught on a two year rolling programme. This ensures progression between

year groups and guarantees topics are covered. Teachers plan to suit their children's interests, current events, their own teaching style, the use of any support staff and the resources available.

Equal Opportunities

Equality of opportunity at Bromley Hills Primary School is about providing fairness and excellence for all in order to promote the highest possible standards of achievement, and this ethos is incorporated into the planning and teaching of science.

The school aims are designed to ensure that we meet the needs of all, taking account of gender, ethnicity, culture, religion, language, sexual orientation, age, ability, disability and social circumstances. It is important that in this school we meet the diverse needs of pupils to ensure inclusion for all and that all pupils are prepared for full participation in a multi-ethnic society.

Science planning takes account of the diversity of backgrounds and needs of all pupils.

This will be monitored through:

- classroom observation;
- a purposeful examination of policies, guidelines and schemes;
- talking to pupils and colleagues;
- appropriate use of standardised tests;
- displays;
- children's work;
- listening;

Science, as with each area of the curriculum is planned to incorporate the principles of equality and to promote positive attitudes to diversity. In this way we aim, as do all subjects, to contribute to the spiritual, moral, social and cultural development of all pupils.

The National Curriculum

The national curriculum will be followed for all science teaching.

During Reception, in accordance with the 'Statutory framework for the early years foundation stage', focus will be put on the seven early learning goals (ELGs), with the scientific aspect of pupils' work relating to the objectives set out within the framework. The ELGs cover:

1. Communication and language: listening, attention and understanding; and speaking.
2. Personal, social and emotional development: self-regulation, managing self, and building relationships.
3. Physical development: gross motor skills and fine motor skills.
4. Literacy: comprehension, word reading, and writing.
5. Mathematics: number and numerical patterns.
6. Understanding the world: past and present; people, culture and communities; and the natural world.
7. Expressive arts and design: creating with materials; and being imaginative and expressive.

During Years 1 and 2, pupils will be taught:

Working scientifically

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

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.

Animals, including humans (Year 1)

- 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, i.e. 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.

Everyday materials (Year 1)

- 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.

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.

Plants (Year 2)

- 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.

Animals, including humans (Year 2)

- 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, i.e. water, food and air.
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Uses of everyday materials (Year 2)

- 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.

During Years 3 and 4, pupils will be taught:

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 and 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.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Use straightforward scientific evidence to answer questions or to support their findings.

Plants (Year 3)

- Identify and describe the functions of different parts of flowering plants, i.e. roots, stem or trunk, leaves, and flowers.
- Explore the requirements of plants for life and growth, i.e. air, light, water, nutrients from soil, and room to grow, and how requirements 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.

Animals, including humans (Year 3)

- 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.

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.

Light

- 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.

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 (Year 4)

- 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 ($^{\circ}\text{C}$).
- 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 a lamp will light in a simple series circuit, based on whether 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 a lamp lights in a simple series circuit.
- Recognise some common conductors and insulators, and associate metals with being good conductors.

During Years 5 and 6, pupils will be taught:

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 when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships, and explanations of the results and the degree of trust in them, in oral and written forms such as displays and other presentations.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

Living things and their habitats (Year 5)

- 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.

Living things and their habitats (Year 6)

- 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.

Animals, including humans (Year 6)

- 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 or off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.

The Contribution of Science to teaching in other curriculum areas

English

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study in Literacy are of a scientific nature. The children develop oral skills in science lessons through discussions (for example of the environment) and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. The children use weights and measures and learn to use and apply number. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They use numbers in many of their answers and conclusions.

Computing

Children use ICT in science lessons where appropriate. They use it to support their work in science by learning how to find, select, and analyse information on the Internet and on CD-ROMs. Children use ICT to record, present and interpret data and to review, modify and evaluate their work and improve its presentation.

Citizen and Health Education

Science makes a significant contribution to the teaching of PSICHE. The subject matter lends itself to raising matters of citizenship, spiritualisation and social welfare. For example, children study the way people recycle material and how environments are changed for better or worse. Also, children benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions, e.g. evolution. They organize campaigns on matters of concern to them, such as helping the poor or homeless. Science promotes the concept of positive citizenship and, where appropriate, the school health advisor informs children on matters involving Health, hygiene and Sex Education.

Spiritual, moral, social and cultural development

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of science, children have the opportunity to discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

Assessment and Recording

We assess children's work in science by making informal judgements as we observe them during lessons. On completion of a piece of work, the teacher marks the work and comments as necessary.

Children are assessed at the start of a topic, and again at the end, with the same test. This provides another way in which attainment can be assessed. At the end of a unit of work the teacher assesses the children's achievement to National Curriculum levels of attainment and Chris Quigley's Milestones. The results of these are recorded by the teacher and taken into account as the basis for assessing the progress of each child at the end of the year and we pass this information on to the next teacher.

Summative judgements are made at the end of each term based on observations, written work, POP tasks/assessment tests and submitted via the online O Track program to the assessment co-ordinator (Deputy). The Deputy then distributes the overview to the subject leader. A written report is provided for parents, half way through the year and again at the end of the year. This will state the current level of attainment for the individual child and a statement about their learning attitude towards Science.

Children are formally assessed in science at the end of Key Stage 2 as part of the statutory data. We report the results of these tests to parents along with the teacher assessments, which we make whilst observing the work of children throughout the year. They are also submitted to the STA.

Resources

We have sufficient resources for all science teaching units in the school. We keep these in a central store.

Monitoring and Review

It is the responsibility of the science co-ordinator to monitor the standards of children's work and the quality of teaching in science. The science co-ordinator is also responsible for supporting colleagues in the teaching of science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The science co-ordinator holds meetings with science ambassadors to remain informed on current student opinions about the science curriculum throughout school.