



Science Policy

JULY 2020

Oasis Academy Putney Primary School

Science Policy

School Vision

Together we learn, grow and achieve.

Intent

Science at Oasis Academy Putney provides children with the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils will be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils will be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They will be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

Teaching of science at Oasis Academy Putney aims to make sure that every child:

- Is engaged as a learner and links concepts to practical experience
- develops scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develops 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
- is equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Objectives

Every child should leave Oasis Academy Putney:

- Able to ask and answer scientific questions
- Having had the opportunity to plan and carry out fair scientific investigations, using equipment including computers
- With the knowledge and understanding of the life processes of living things
- With the knowledge and understanding of the physical processes of materials, electricity, light, sound and natural forces
- With knowledge about materials and their properties
- Having had the opportunity to evaluate evidence and present their conclusions clearly and accurately

Teaching and Learning

To provide adequate time for developing scientific knowledge, skills and understanding, each teacher will provide regular Science lessons. These may vary in length based on the objectives being explored. Teachers will base their planning on the programmes of study for their relevant year groups and will identify the most appropriate teaching strategy to suit the purpose of each particular learning situation. Some units may be best taught as a discrete piece of learning whilst other units may work best as an integrated part of the topic for the term. There are a

variety of ways in which the teaching and learning may be effective. It should always be made clear that science is being taught even when it is integrated in to a topic.

Our school aims to encourage learning through investigation, with an emphasis on first-hand experience. Science lessons have no imposed formal structure but should typically contain some of the following elements: discussion; whole class, group or individual learning; practical, investigative tasks; recording; communicating.

Foundation Stage

We teach science in the Foundation stage as an integral part of the topic work covered during the year. It comes under Understanding the World in the EYFS. Children must be supported in developing the knowledge, skills and understanding that help them to make sense of the world. Their learning must be supported through offering opportunities for them to use a range of tools safely; encounter creatures, people, plants and objects in their natural environments and in real-life situations; undertake practical 'experiments'; and work with a range of materials.

Key Stage 1

The main 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. Most of the learning about Science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. Pupils should read and spell scientific vocabulary at a stage consistent with their current reading and spelling knowledge.

Key Stage 2

The main focus of Science teaching in 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 scientific questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out 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 should read, spell and pronounce scientific vocabulary correctly.

Vocabulary

Helping children to understand how to use a vast array of unfamiliar technical vocabulary is one of the many challenges of teaching primary science effectively.

Many words will be entirely new to children and some that are familiar will have different meanings to their everyday use — "weight", "material", "diet" and "chemical".

In science particular focus should be given in lessons and units of work to ensure unfamiliar words are explicitly taught and checked in. This may include but is not limited to:

- Teaching actions alongside unfamiliar words
- Adding words to class displays
- Developing a class science dictionary
- Using a picture glossary
- Teaching roots of scientific words

Planning

Long Term Planning

This is provided by the school in order to ensure coverage of all national curriculum topics throughout the year. (Appendix A)

Using the national curriculum should ensure progression across subjects over time although it may be necessary to revise work that has been completed, at times, a number of years earlier. Appendix C shows the complete list of objectives arranged by theme in order to track backwards or forwards in planning as appropriate.

Medium Term Planning

This is completed by teachers on the agreed format. All teachers should work with year group partners to ensure the same diet of science education is provided for all pupils. Teachers should start at the national curriculum when writing medium term plans to ensure coverage is clear. Medium term planning should be an overview and a learning intention for each science session should be sufficient. It should be possible to see the progression in skills and knowledge across a unit of work in science.

A number of opportunities for "Working Scientifically" should be planned in to every unit in line with the guidance from the national curriculum.

Short Term Planning

Teachers use medium term plans to develop more detailed short term planning. This planning is for the teachers to use but consideration should be made that this will often be shared between year groups. Teachers should adjust this as required for their own class and the particular context of children involved.

Information such as specific vocabulary, timings of lessons, resources, key questions and key concepts being taught should be included in short term planning.

Assessment

Children's progress is continually monitored throughout their time at Oasis Academy Putney and is used to inform future teaching and learning. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.

Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the learning intention and/or success criteria. Children will have

these to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work.

Assessment for learning is continuous throughout the planning, teaching and learning cycle. However, children are more formally assessed half termly in KS1 and KS2 using a variety of methods:

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking and listening to children
- Considering work/materials / investigations produced by children together with discussion about this with them.

We also ensure a focus on the key identified knowledge of each topic, which is mapped within and across year groups to ensure progression. At the end of each blocked science topic, this key knowledge is checked. Outcomes of work also evidence its acquisition.

In the Foundation Stage, we assess the children's Understanding of the World according to the Development Matters statements and some aspects of Expressive Arts Design are also science based.

Resources

We use a range of resources in order to teach science effectively. Attached in Appendix B is the list of resources available in the school.

Role of the Subject Leader

- To monitor the subject and be able to comment accurately on:
 - standards throughout the school
 - progression of skills throughout the school
 - trends over time
- Know the strengths and weaknesses in science and implement an action plan in line with school policy.
- Write, maintain and develop a policy for the delivery of science in the school.
- Advice and assist members of staff within the school in the delivery of science.
- Order and maintain resources so the subject can be successfully delivered throughout the school.
- Manage the science budget.
- Maintain professional development of the subject leaders and staff within the school in regard to science.
- Lead staff meetings and feedback to staff on any undertaken CDP.
- Work alongside the SENCO and staff to support the provision for identified pupils.

Appendix A

Curriculum Overview Science

	Autumn		Spring		Summer	
Reception	All about my body	Light and Dark	Animals	Floating and Sinking/ Materials	Minibeasts	Seasons
Year 1	Plants	Everyday Materials	Everyday Materials	Animals including Humans	Seasonal Changes	Seasonal Changes
Year 2	Plants	Use of Everyday Materials	Use of Everyday Materials	Animals Including Humans	Animals Including Humans	Living Things and their Habitats
Year 3	Animals Including Humans	Animals Including Humans	Forces and Magnets	Rocks	Light	Plants
Year 4	Sound	States of Matter	States of Matter	Animals Including Humans	Electricity	Living Things and Their Habitats
Year 5	Living Things and their Habitats	Animals Including Humans	Properties and Changes of Materials	Forces	Forces	Earth and Space
Year 6	Electricity	Animals Including Humans	Animals Including Humans	Living Things and their Habitats	Evolution and Inheritance	Light

Appendix B

Science Resource List

- A collection of magnets in different shapes and strengths
- Force Metres with a range of strengths
- Magnetic and non-magnetic material testing kits

Appendix C

Progress in Individual Areas of Science

Plants

Year 1

- 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.

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.

Year 3

- 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.

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

Year 5 (Living Things and Their Habitats)

- describe the life process of reproduction in some plants and animals.

Year 6 (Living Things and Their Habitats/Evolution and Inheritance)

- 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 how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Light

Year 3

- 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.

Year 6

- 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.

Forces and Magnetism

Year 3

- 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 5

- 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.

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.

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.

Year 4 (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.

Year 5

- 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.