



SCIENCE LONG TERM PLANNING

Lower Key Stage 2

At Nicholas Hawksmoor Primary School our science education provides children with strong foundations to understand the world they live in through aspects of biology, chemistry and physics. From years 1 – 6 pupils will be taught essential aspects of the knowledge, methods, processes and uses of science. Each year contains a variety of topics where children will build up a body of key foundational knowledge and concepts, they will be encouraged to explain their findings and develop a sense of excitement and curiosity about natural phenomena. In lessons, the pupils will also be encouraged to understand how science can be used to explain what is happening in our everyday lives, predict how things may behave and analyse data.

Aims of the Science National Curriculum

The National Curriculum for Science aims to ensure that all pupils:

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

Scientific knowledge and conceptual understanding

The programmes of study shown below, that are taught here at Nicholas Hawksmoor, provide a sequence of knowledge and concepts designed to help children not only make progress but develop a secure understanding of each stage before moving on. This removes insecure understandings and the build-up of misconceptions to allow genuine progression.

From this curriculum, pupils should be able to describe scientific processes and key characteristics, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build on their scientific vocabulary at all stages and apply their mathematical knowledge through the tasks of presenting and analysing data.

An understanding of the nature, processes and methods of science

Children will achieve this through 'working scientifically' an area of the Science curriculum which is not taught as a separate strand but embedded within the content of biology, chemistry and physics so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry will be included in the curriculum at Nicholas Hawksmoor and will consist of observations over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and researching using secondary resources.



A scientific language

At Nicholas Hawksmoor we understand the importance of spoken language in science lessons as well as the rest of the curriculum in pupils' development cognitively, socially and linguistically. To develop their scientific vocabulary and help children to articulate scientific concepts it is important that the pupils hear and speak a variety of quality scientific language. We ensure the occurrence of this in our science lessons by providing opportunities for discussion so that thinking is clear, misconceptions are addressed and secure foundations are built.

	Autumn Term		Spring Term		Summer Term	
Year 3	Forces and Magnets	Animals including humans	Light and Shadow	Plants	Rocks	Scientists
Year 4	Living things and their habitats	Animals including humans	Sound	Electricity	States of Matter	Scientists

Working Scientifically

During years 3 and 4, pupils will 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

These are the outcomes expected for each topic in year 3:

Plants

- Describe the different parts of a flowering plant and explain the function of each part. Suggesting why parts may vary in size and shape from one species to another.
- 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 and explain this using a diagram.
- Explore and understand the reproduction of flowering plants (pollination, seed formation, dispersal)

Animals including humans

- Identify that humans and other animals have skeletons to provide support, protection and movement.
- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.

Rocks

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

Light and Shadow

- Understand that light is necessary for vision and that dark is the absence of light
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
- Notice that some surfaces and objects reflect light
- Understand how shadows are formed (when a light source is blocked by a solid object) and how the size of a shadow can be changed.

Year 4

These are the outcomes expected for each topic in year 4:

Living things and their habitats

- Recognise that living things can be grouped in different ways and suggest different ways of grouping
- Use classification keys to help group, identify and name a variety of living things in their local and wider environment. Some can devise their own classification keys to group living things
- Recognise that environments can change and the possible dangers / effects this can have on living things. Go on to describe how animals adapt to environmental change to prevent extinction.

Animals including humans

- Recognise and describe the simple functions of the basic parts of the digestive system in humans:
 - describe the purpose of the digestive system,
 - identify the function of basic organs,
 - explain why the digestive system is necessary.
- Identify the different types of teeth in humans and describe the function of each type of tooth in the human skull.
- Construct and interpret a variety of food chains, identifying producers, predators and prey. Discuss the effect that changes in population of one organism can have on rest of the food chain

States of matter

- Compare and group materials together according to whether they are a solid, liquid or gas, recognising that some materials cannot be easily classified.
- Observe that when heated or cooled, some materials change state. Measure or research the temperature at which this happens.
- Identify the part played by evaporation and condensation in the water cycle and associated the rate of evaporation with temperature. (Suggest patterns in which kinds of material change state at higher or lower temperature)



Forces and Magnets

- Compare how an object, such as a toy car, will move on different surfaces
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Describe how magnets attract or repel each other and attract magnetic materials. Children can then sort these materials on this basis.
- Recognise that magnets have two poles and can predict whether two magnets will attract or repel each other depending on their arrangement of magnets.

Sound

- Identify how sounds are made, associating them with something vibrating.
- Recognise that vibrations from sounds travel through a medium to the ear. Compare the effectiveness of different media.
- Describe the effect of moving further from the source of sound, recognising that sound gets fainter as the distance increases.
- 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.

Electricity

- Identify and list examples of common appliances that run on electricity including both mains electricity and battery.
- Construct a simple series electrical circuit and name its components; cells, wires, bulbs, switches and buzzers.
- Recognise and sort conductors and insulators of electricity, associating metals as good conductors.
- Identify whether a bulb will light in a simple series circuit, based on whether or not the circuit is a complete loop with a battery.
- Recognise that a switch opens and closes a circuit, predicting how the operation of a switch will affect bulbs lighting.