

Science at The Grove Junior School

National Curriculum

Purpose of study

A high-quality science education provides 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 should 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 should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

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

Links to learning in KS1

The majority of pupils transition to the Grove Junior School from The Grove Infant School. The pupils follow the Programme of Study outlined in the National Curriculum.

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- ask their own questions about what they notice
- use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions:
 - observing changes over time
 - noticing patterns
 - grouping and classifying things
 - carrying out simple comparative tests
 - finding things out using secondary sources of information
 - communicate their ideas, what they do and what they find out in a variety of ways.

Science content

The pupil can:

- name and locate parts of the human body, including those related to the senses and describe the importance of exercise, a balanced diet and hygiene for humans
- describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults
- describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants
- identify whether things are alive, dead or have never lived
- describe and compare the observable features of animals from a range of groups
- group animals according to what they eat [year 1], describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships
- describe seasonal changes
- name different plants and animals and describe how they are suited to different habitats
- distinguish objects from materials, describe their properties, identify and group everyday materials and compare their suitability for different uses

Intent

At The Grove Junior School our science curriculum inspires, excites and engages. We promote our pupils' curiosity by creating experiences that are interactive, purposeful and memorable. We instill confidence in our pupils as scientists so that they are able to explain what they have observed clearly and use their prior knowledge to make sensible predictions. We make links with real life and challenge pupils to explore, ask questions and be creative and deep thinkers. We develop pupils' practical investigative skills by providing opportunities for them to follow their own lines of enquiry and deepen their knowledge by using and understanding scientific vocabulary and concepts. In addition, they study the impact of significant scientific discoveries and the work of famous scientists that relates to their learning.

Implementation

At the Grove Junior School, Science is taught weekly in two-hour sessions. We believe that this regular teaching helps pupils to keep Science at the forefront of their minds, aids recall of key knowledge and concepts and enables pupils to commit them to their long-term memory. In addition, it gives them the opportunity to gradually improve and consolidate their Science skills in order to progress to the next stage of their learning. In practical terms, a two-hour lesson means that sufficient time is available for setting up investigations and enquiries.

Each Year group studies 5 units annually following the Programme of Study outlined in the National Curriculum. Therefore, at least one unit is covered each term but units are usually taught on a half-termly basis. The Science units are arranged to enable cross-curricular links and with practical investigations in mind. For example, in Year 6 Living things and their Habitats and Evolution and Inheritance and are taught consecutively as the units are closely linked. Planning for each unit follows the aims listed in the National Curriculum and uses guidance from the Herts for Learning Progression in Scientific Knowledge document, which gives ideas for further enrichment and Greater Depth challenge. Teachers use a lesson planning format (either Lower KS2 or Upper KS2) which enables them to map the essential practical scientific methods, processes and skills across the year to ensure that pupils have regular opportunities to develop their Working Scientifically skills whilst acquiring the relevant subject knowledge. Lessons are planned with the children's varying starting points in mind. Planning includes consideration of how opportunities for Greater Depth learning and challenge will be provided within the lesson and what form scaffolding or support will take to enable all pupils to access the learning in line with The Grove's commitment to inclusion. Most new Science units begin with a 'Big Question' to encourage discussion and this question is revisited frequently throughout the unit, with the aim that the pupils are able to answer it fully once a unit has been completed. A glossary of new scientific vocabulary is provided for pupils at the start of each topic and they are encouraged to learn the definitions of each word as the unit progresses and add any further subject-specific terms that they have encountered.

The Subject leader regularly audits the practical enquiry opportunities provided for pupils to guarantee that all 5 types of practical enquiry are covered in each Year Group's planning ie. Fair and comparative testing, Observing over time, Identifying and classifying, Looking for patterns and Research from secondary sources. Where possible pupils are encouraged to develop their own lines of enquiry. At the Grove Junior School, formative assessment opportunities are integral to lessons in the form of questioning, discussion, reflection, plenaries etc. These are used to identify misconceptions and gaps in pupils' learning and help to inform future planning.

In terms of summative assessment, teachers are required to assess pupils on a termly basis according to the Hertfordshire Steps. Skills wheels listing the main Working Scientifically criteria (displayed in each pupil's Science book) are annotated by teachers at the end of each unit to monitor which skills have been demonstrated. Their subject knowledge and understanding are assessed both by observation and questioning in lessons and by regular marking of their written work. In addition, short quiz-style questions are used at the end of each topic as an assessment tool and the 'Here are the answers. What are the questions?' document enables teachers to assess the pupils' understanding of vocabulary and concepts. When marking, teachers ask next step questions, which require pupils to explain their thinking more fully, and the pupils answer these in purple pen. In addition, specific Greater Depth/Mastery questions have been developed for some units and are used to give the pupils an opportunity to demonstrate what they have learned and to help teachers assess their progress more accurately.

Impact

As a result of their experiences in Science, pupils at The Grove Junior School are able to ask questions about the world and know the best ways of finding answers to them, either through research or by carrying out investigations. They are familiar with a range of enquiry types and are able to set up their own independent enquiries. In addition, they are able to reflect on their work and evaluate it, suggesting improvements and refinements and learning from their mistakes. They are able to work collaboratively in

groups in order to conduct investigations, can use scientific equipment safely and obtain accurate measurements. They use scientific vocabulary to articulate their understanding of key scientific concepts, are able to explain processes and results and reason scientifically.

Most children reach age related expectations at the end of each Key Stage. Some children are able to work at Greater Depth and make further progress.

Due to the opportunities provided and insights gained in Science lessons, pupils at The Grove Junior School have a deep appreciation of and respect for living things and the natural environment and understand how our behaviour as a species impacts upon it. Above all, they are enthusiastic and confident scientists who wish to learn more about the world around them and are able to make links to prior learning. Children leave The Grove Junior School with the enthusiasm to continue their science education at secondary school and are excited about the next stage in their science journey.

Science Long Term Plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3	Rocks (fossils and soil) Why do we use different types of rocks for different purposes?	Forces and magnets When and how is the force with you?	Light (and shadows) The Sun: friend or foe?	Animals, including humans: Healthy eating and healthy bodies Why do diets differ throughout the animal kingdom?	Plants A world without plants? How would this affect you and your planet?	Assessment/child-led investigation time
Year 4	States of matter On planet Earth, would it be possible to run out of water?	Electricity Has electricity improved our lives?	Animals including humans: Teeth and digestion What do you consider to be the most important part of the digestion process?	Assessment/child-led investigation time	Sound Does open space affect sound?	Living things and their habitats: Classification and interdependence
Year 5	Forces	Earth and Space How has our understanding of our place in the universe changed over time?	Properties and changes of materials How do the properties and use of materials impact our everyday lives?	Assessment/child-led investigation time	Living things and their habitats: Life cycles What impact do we humans have on the life cycles of living things?	Animals including humans: Human life cycles Why do human bodies change?

Year 6	<p>Light</p> <p>If there was no light what could we see?</p>	<p>Living things and their habitats:</p> <p>Classification</p> <p>How and why do scientists classify living things?</p>	<p>Evolution and inheritance</p> <p>How and why have living things adapted over time?</p>	<p>Assessment/child-led investigation time</p>	<p>Electricity</p>	<p>Animals including humans: Humans and health</p> <p>How can we keep our hearts healthy?</p>
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