



HNPS - SCIENCE Subject Overview

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|--|-----------|--|---------|--|---------|
| | Chemistry | | Physics | | Biology |
|--|-----------|--|---------|--|---------|

LONG TERM PLAN

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer | Summer |
|-----------|--|--|------------------------------------|---|---|--|
| Reception | Living things and their habitats - Animal Adventures | | Materials - I am a scientist | | Plants - Our beautiful planet | |
| | Across the year - Forces, Earth and space - Changing seasons | | | | | |
| Year 1 | Animals, including humans (Sensitive Bodies) | Animals, including humans (Comparing Animals) | Everyday Materials | Seasonal Changes | Plants - Introduction to plants | |
| Year 2 | Animals, including humans (Life Cycles and Health) | Uses of Everyday Materials | Living things and their habitats | Living things and their habitats (Microhabitats) | Plants (Plant Growth) | |
| Year 3 | Rocks and Soil (Exploring the physical properties of rocks and soils and fossil formation) | Light & Shadows | Forces and Magnets | Plants (Plant Reproduction) | Animals, including humans (Movement & Nutrition) | |
| Year 4 | Living Things and Their Habitats (Classification & Changing Habitats) | Electricity and Circuits | Sound and Vibrations | Animals, including humans (Digestion and Food) | States of Matter | |
| Year 5 | Earth and Space | Materials - Mixtures and separation | Materials - Properties and changes | Living things and their habitats (Life Cycles and reproduction) | Forces (Unbalanced Forces) | Animals, including humans (Human Timeline) |
| Year 6 | Living things and their habitats (Evolution and Inheritance) | Animals, including Humans (Circulation and health) | Light & Reflection | Electricity (Circuits, batteries and switches) | Living things and their habitats (Classification) | |



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How does our Science Curriculum align with the National Curriculum?

Our scheme of work fulfils the statutory requirements outlined in the **National curriculum (2014)**. The National curriculum Programme of Study for Science aims to ensure that all pupils:

We have identified these strands which run throughout our scheme of work:

- ★ develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics

Scientific knowledge and understanding

- ★ develop understanding of the nature, processes and methods of science through different types of scientific enquiries that help them to answer scientific questions about the world around them

Working scientifically

- ★ are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Science in action

Key Areas in Science

At HNPS our pupils will develop **Scientific knowledge and understanding** in seven key areas. Their learning in each area is summarised below:



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1. Animals, including humans (Biology)

Identifying animals, their basic structure and their eating habits, as well as their basic needs for survival. Children learn about the life cycles of animals and their place in food chains.

Naming parts of the human body and recognising the function of skeletons, muscles, teeth and the digestive and circulatory systems. Learning about the importance of hygiene and of the right type and amount of nutrition. Children learn about the impact of diet, drugs and exercise on the body and study the life cycles of humans.

This key area covers the Year 1, Year 2, Year 3, Year 4, Year 5 and Year 6 subject content titled 'Animals, including humans' from the National curriculum.

2. Living things and their habitats (Biology)

Identifying something as living and how it is grouped based on its characteristics, similarities and differences.

Naming different types of habitats, learning what they provide for life and the impact of habitats changing. Children learn about the life cycles and reproduction of animals and plants, and how this affects the variation of living things around us, past and present.

This key area covers the Year 2, Year 4, Year 5 and Year 6 subject content titled 'Living things and their habitats' and 'Evolution and inheritance' from the National curriculum.

3. Plants (Biology)

Identifying different plants and their key structures, growing seeds and plants and understanding their requirements for growth. Recognising the function of different plant structures and understanding how plants reproduce.

This key area covers the Year 1, Year 2 and Year 3 subject content titled 'Plants' from the National curriculum.

4. Materials (Chemistry)

Naming materials, describing their properties and understanding why materials have specific uses. Identifying



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how materials may change and the factors that may contribute to this, including changes of state within the water cycle. Children learn about different mixtures and how they can be separated based on their properties.

Identifying different types of rocks and their physical properties, and understanding how fossils and soil are formed.

This key area covers the Year 1, Year 2, Year 3, Year 4 and Year 5 subject content titled 'Everyday materials', 'Uses of everyday materials', 'Rocks', 'States of matter' and 'Properties and changes of materials' from the National curriculum.

5. Energy (Physics)

Learning about light and its properties, how it enables us to see and how shadows are formed. Identifying the relationship between sounds, volume, pitch and vibrations, and how sound travels to the ear.

Recognising electrical appliances and the components that make up different circuits. Building electrical circuits and identifying factors that affect the output.

This key area covers the Year 3, Year 4 and Year 6 subject content titled 'Light', 'Electricity' and 'Sound' from the National curriculum.

6. Forces, Earth and Space (Physics)

Identifying changes across the seasons, and the weather and day length associated with each.

Recognising different types of forces and understanding their effect on objects, including the role of pulleys, levers and gears. Children learn about magnetic materials and that magnets attract and repel.

Learning about the movements of planets and moons within the solar system and how this relates to our day and night.

This key area covers the Year 1, Year 3 and Year 5 subject content titled 'Seasonal changes', 'Forces and



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magnets', 'Earth and space' and 'Forces' from the National curriculum.

Different types of knowledge in Science

'Pupils need to develop an extensive and connected knowledge-base. When pupils learn new knowledge it should be integrated with the knowledge they already have. This ensures that learning is meaningful'. (Ofsted research review series: Science, 2021)

Substantive knowledge

Referred to as Scientific knowledge and conceptual understanding in the National curriculum and Scientific knowledge and understanding in our ambitious curriculum, this is knowledge of the products of science: concepts, laws, theories and models.

In our *Science: Progression of skills and knowledge* we have broken down the National curriculum attainment targets into knowledge 'chunks' or 'components' and shown how they build over time to develop pupils' understanding of key concepts in Biology, Chemistry and Physics.

Our curriculum ensures that our pupils build their substantive knowledge base by:

- Knowing more facts.
- Giving further examples of the same concept.
- Understanding and using a wider range of vocabulary.
- Using models or concepts that cannot be seen to explain ideas.
- Making and explaining links across areas of science.

Over time, that knowledge becomes increasingly organised and connected. The Beat it, Test it and Prove it section of the lesson helps pupils to activate their prior knowledge and encourages them to make connections between units.

Disciplinary knowledge



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Working scientifically specifies the understanding of the nature, processes and methods of science for each year group and is covered alongside our Scientific knowledge and understanding strand in each and every unit, never in isolation.

We have broken down the 'Working Scientifically' statements from the National curriculum further to ensure gradual progression and focused teaching of the 'working scientifically' skills. This also allows teaching to focus on the component disciplinary knowledge required to enable pupils to carry out the skills competently.

Through our curriculum pupils are able to see the interplay between the two types of knowledge and 'Science in Action' strand gives our pupils this opportunity through seeing how scientists have worked in the past and continue to work in the present day. This furthers pupils' understanding is how some of the substantive knowledge they learn came to be established.

Science in Action

In addition to working scientifically, the National curriculum also states that pupils should understand the uses and implications of science in the past, present and for the future. References to real-world examples are incorporated into all units, providing the rationale and motivation for why we learn Science. Science in action includes:

Historical applications of Science

- Famous scientists throughout history.
- The methods and equipment used by scientists throughout history and how these have led to modern methods.
- How knowledge and understanding has changed over time, leading to our current understanding of Science.

Careers that use Science

- Broad ranging jobs and careers that use scientific knowledge and methods.
- Scientists of today and their work.
- Science in the news and recent discoveries.
- What Science is attempting to achieve in the future.

The scientific community and beyond



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- Science is a dynamic field and is always undergoing changes.
- Mistakes can be the source of new discoveries!
- Collaboration and peer reviewing is essential for effective scientific progress.
- Spiritual, moral, social and cultural links with Science.

An ambitious, spiral curriculum

Our ambitious curriculum has been designed as a spiral curriculum with the following principles in mind:

- **Cyclical:** Pupils return to the key knowledge and skills repeatedly during their time in our school.
- **Increasing depth:** Each time a skill is revisited it is covered with greater complexity and in varying contexts.
Progression includes:
 - studying a specific scientific concept in more detail;
 - studying further examples of a specific concept to broaden contextual knowledge;
 - studying a broader range of equipment and methods to test an hypothesis;
 - explaining concepts using models or ideas that can't be seen;
 - making and explaining links across areas in science;
 - engaging with increasingly complex ideas and ethical dilemmas.
- **Prior knowledge:** Beat it, Test it, Prove it are utilised so pupils can build upon previous foundations rather than starting again.