



Science

Introduction

At Joydens Wood Infant School we use Kapow Primary to support the delivery and implementation of our Foundation Subjects. The Science curriculum aims to develop a sense of excitement and curiosity about natural phenomena and an understanding of how the scientific community contributes to our past, present and future. The Science curriculum aims to give all pupils the opportunity to experience the joy of science and make associations between their science learning and their lives outside the classroom. Studying science allows children to appreciate how new knowledge and skills can be fundamental to solving arising global challenges.

National Curriculum KS1 Subject Content

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.

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.

Intent

The Science curriculum aims to encourage critical thinking and empower pupils to question the hows and whys of the world around them. Our scheme encourages:

- A strong focus on developing knowledge alongside scientific skills
- Curiosity and excitement about familiar and unknown observations.
- Challenging misconceptions and demystifying truths.
- Continuous progression by building on practical and investigative skills across all units.
- Critical thinking, with the ability to ask perceptive questions and explain and analyse evidence
- Development of scientific literacy using wide-ranging, specialist vocabulary.

Implementation

Our Science curriculum has been separated into the following key strands: scientific knowledge and understanding, working scientifically and science in action. We implement a spiral curriculum with essential knowledge and skills revisited with increasing complexity, allowing pupils to revise and build on their previous learning. A range of engaging recall activities promote frequent pupil reflection on prior learning, ensuring new learning is approached with confidence. The Science in action strand is interwoven throughout the scheme to make the concepts and skills relevant to pupils and inspiring for future application. Cross-curricular links are included throughout each unit, allowing children to make connections and apply their Science skills to other areas of learning.

Impact

By the end of KS1 children will be equipped with the requisite skills and knowledge to succeed in Science in their future education. They will have the necessary tools to confidently and meaningfully question and explore the world around them as well as critically and analytically experiencing and observing phenomena.

Assessment in Science

Teachers will assess children against each learning objective and pupils will be able to use their Learning Ladders, outlining the topic's success criteria, to self-assess their own understanding of the learning. They will be given opportunities to demonstrate their understanding throughout each unit via quizzes and 'knowledge catchers' which form part of the assessment process. End of Term data drop points are distributed throughout the year and Teachers assess children against the National Curriculum in KS1 and the Development Matters statements and Early Learning Goals in EYFS.

Long Term Plan

*From Kapow Primary's Long Term Plan

	Autumn	Spring	Summer
EYFS Understanding the World	<p>Science at Foundation Stage is covered in the 'Understanding the World' area of the EYFS Curriculum. It is introduced indirectly through activities that encourage every child to explore, problem solve, observe, predict, think, make decisions and talk about the world around them.</p> <p>Children will explore creatures, people, plants and objects in their natural environments. They will observe and manipulate objects and materials to identify differences and similarities. They will also learn to use their senses, make observations of animals and plants and explain why some things occur and talk about changes. Children will be encouraged to ask questions about why things happen and how things work. Children will also be asked questions about what they think will happen to help them communicate, plan, investigate, record and evaluate findings.</p>		
Year 1	<p>Seasonal Changes Reflecting on their own experiences, children learn about the four seasons and the weather associated with each. Pupils explore how seasonal changes affect trees, daylight hours and our choices about outfits. They plan and carry out their own weather reports, considering the knowledge required for this job.</p> <p>Everyday Materials Identifying the difference between objects and materials, children explore their surroundings to find examples of each. They work scientifically by planning tests, making observations and recording data. Pupils use results to answer questions and sort and group materials based on their properties.</p>	<p>Animals, including humans Familiarising themselves with the basic parts of the human body, children investigate their senses through stimulating experiences that highlight how we interact with the world around us. They work scientifically, using their senses to make observations, spot patterns and use data to answer questions. They develop an understanding of how science can support those who have lost sensory function and consider how firefighters use their senses at work.</p> <p>Studying both local and global animals, children recognise common characteristics and physical features. They use this information to make comparisons and classify animals. Pupils consider the most effective way to collect data about class pets and record their findings in a block chart. They develop their understanding of classification by comparing the dietary habits of different animals and role play as Jane Goodall carrying out research into chimpanzees in the wild.</p>	<p>Plants Identifying the key features of a plant, children describe important structures and make comparisons between different plants. Pupils use investigative skills to record the growth of a plant over time and begin to reflect on factors that will affect its development. They begin to explore how plants are used by humans and grow their own herb garden</p> <p>Making connections Using picture books and hands-on outdoor activities, children broaden their understanding of plants and animals. They gather and record data to find out if taller trees have larger trunks and recap the features of different animal groups. They identify animals by closely observing footprints and construct waterproof animal homes with natural materials. Pupils sort birds according to their diet and seek patterns in their physical characteristics.</p>

Year 2

Habitats

Considering the life processes that all living things have in common, pupils classify objects into alive, was once alive or has never been alive. Pupils explore global habitats, naming plants and animals that can be found there. They learn how a range of different living things depend on each other for food or shelter. Pupils explore this further by creating food chains to show the sequence that living things eat each other for energy to grow and stay healthy.

Microhabitats

Developing their understanding of scientific enquiry, pupils learn that scientists use a range of skills to answer questions. They discover that microhabitats provide what minibeasts need to survive and carry out a survey to find out where different minibeasts live in the school grounds. They practise asking scientific questions and follow a method to investigate which conditions woodlice prefer. Pupils explore the job role of a botanist by identifying flowering plants.

Uses of everyday materials

Building on their knowledge of everyday materials and their properties, pupils recognise that materials are suited to specific purposes and explore how actions such as stretching and bending affect the shape of solid objects. They compare the suitability of materials; gather and record data in tables and block graphs and use their results to answer questions. Children learn about the harmful effects of plastic and explore eco-friendly alternatives.

Life cycles and health

Studying the life cycles of various animals, children learn what animals need to survive and how they change over time. Pupils collect data that allows them to observe changes in their peers, while also developing their ability to take measurements and record data. They consider how scientific knowledge helps people to make healthy choices.

Plant growth

Using their prior knowledge of important plant structures, children explain what factors are needed for successful growth and compare how those needs vary across different plants. They grow plants from seeds and bulbs to ascertain the needs for initial development and compare this to the survival needs of plants in later growth phases. Pupils take their own measurements and reflect on historical examples to understand how conclusions can be drawn.

Making connections

Identifying ways to reduce, reuse and recycle, children draw on their knowledge of properties to invent creative uses for old objects. They discover some natural materials derived from plants and look at the processes involved in making paper. Using their observational skills, they conduct simple tests to choose the most suitable material for homemade plant pots, venturing outdoors to find natural materials to decorate them.

Plants

Progression of knowledge	
Year 1	Year 2
<p>Plant structure and function To know a variety of common plants, and how they differ.</p> <p>To know that deciduous trees lose their leaves seasonally, but evergreen trees do not.</p> <p>To know the basic structure (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees.</p> <p>Plant growth and needs To begin to understand how plants grow and change over time.</p>	<p>Plant growth and needs To know that seeds and bulbs grow into seedlings by producing roots and shoots.</p> <p>To know that seedlings grow into mature plants by developing parts, that may include stems/trunks, leaves, flowers and fruits.</p> <p>To know that seeds need water to germinate.</p> <p>To know that plants need water, light and a suitable temperature for growth and health.</p>

Animals, including humans

Progression of knowledge	
Year 1	Year 2
<p>Animal growth To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).</p> <p>Animal structure and function To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell)</p> <p>To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth).</p>	<p>Animal growth To understand how living things change, and that animals have offspring that grow into adults.</p> <p>To know which offspring comes from which parent animal.</p> <p>To know the stages in some animal life cycles.</p> <p>Health and nutrition To know that animals, including humans, need water, food and air to survive.</p>

To know the five main senses: sight, smell, hearing, taste and touch.

To know that the skin is used for touch, the tongue is used for taste, the nose is used for smell, the eyes are used for sight and the ears are used for hearing.

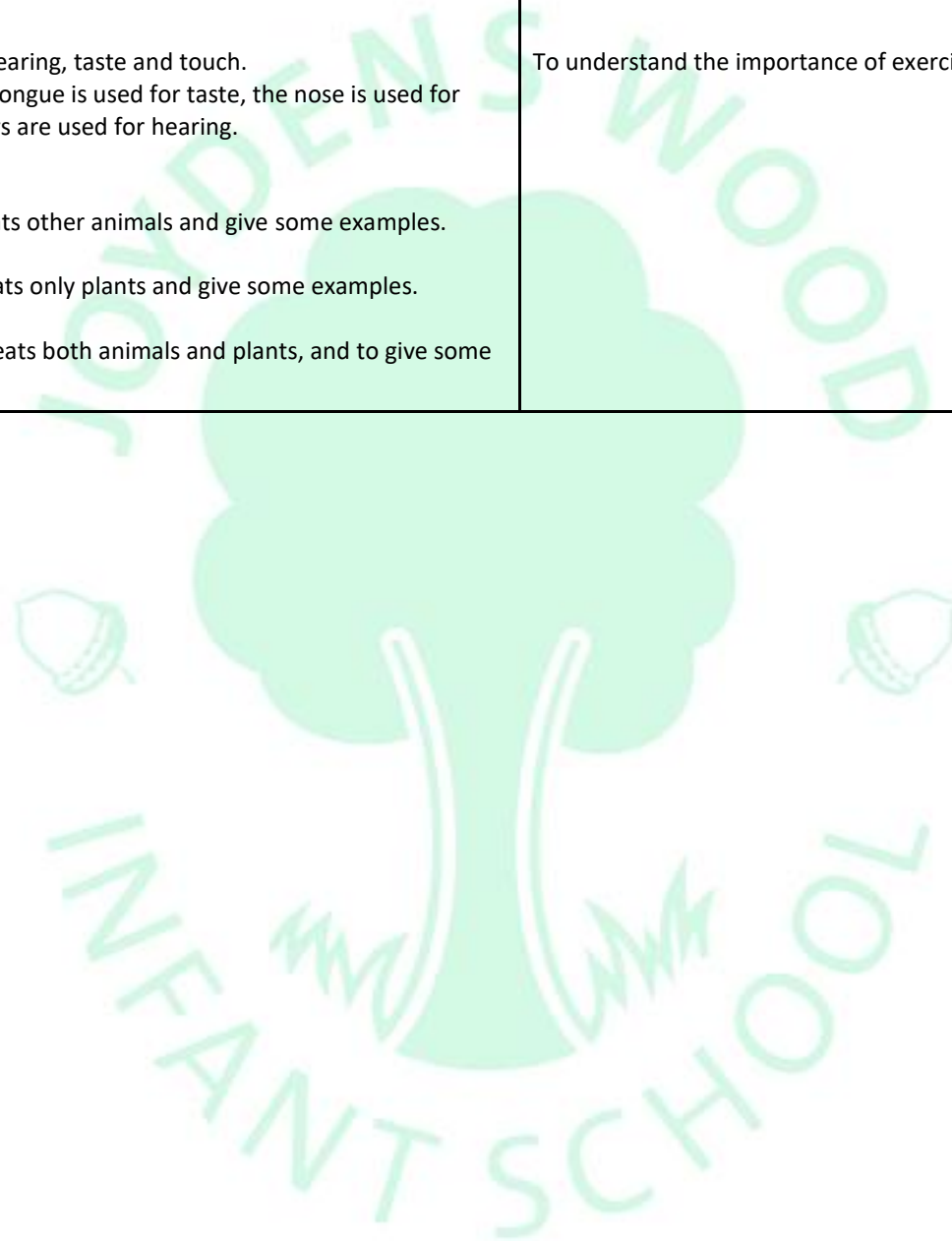
Health and nutrition

To know that a carnivore is an animal that eats other animals and give some examples.

To know that a herbivore is an animal that eats only plants and give some examples.

To know that an omnivore is an animal that eats both animals and plants, and to give some examples.

To understand the importance of exercise, a balanced diet and hygiene for humans.



Living things and their habitats

Progression of knowledge	
Year 1	Year 2
N/A	<p>Characteristics of living things To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition.</p> <p>To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.</p> <p>Variation and inheritance To know a variety of plants and animals and describe some differences.</p> <p>Habitats and interdependence To name a variety of habitats, including woodland, ocean, rainforest and seashore.</p> <p>To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive.</p> <p>To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter).</p> <p>To know that living things depend upon each other (e.g. for food, shelter.)</p> <p>To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.</p>

Materials

Progression of knowledge	
Year 1	Year 2
<p>Identifying and naming To know that objects are items or things. To know that a material is what an object is made from.</p> <p>To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.</p> <p>Properties and Uses To know that property refers to how a material can be described.</p> <p>To describe the physical properties of a variety of everyday materials.</p> <p>To understand that materials can be grouped based on their physical properties.</p>	<p>Properties and Uses To know why objects are made from particular materials and to give examples of their suitability.</p> <p>To know that one material can be used for a range of purposes (and to give examples.)</p> <p>To know that different materials can be used for the same purpose (and to give examples.)</p> <p>To know why certain materials are unsuitable for particular objects.</p> <p>Change To know that a push or pull must be applied to change the shape of a solid object.</p> <p>To know that solid objects can be squashed, bent, twisted or stretched.</p> <p>To know that different solid objects may take a different amount of force to change shape.</p>

Forces, Earth and Space

Progression of knowledge	
Year 1	Year 2
<p>Key facts To know the name and order of the four seasons; spring, summer, autumn and winter. To know that it is unsafe to look directly at the Sun.</p> <p>Forces in motion To know weather associated with the four seasons and how it changes (in the UK). To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.</p>	<p>N/A</p>

Working Scientifically

Progression of Skills

Year 1

Posing questions

Exploring the world around them and raising their own simple questions.

Recognising there are different types of enquiry (ways to answer a question).

Responding to suggestions on how to answer questions.

Planning

Beginning to recognise whether a test is fair.

With support, deciding if suggested observations are suitable.

Ordering a simple method.

Predicting

Suggesting what might happen, often justifying with personal experience.

Observing (qualitative data)

Using their senses to describe, in simple terms, what they notice or what has changed.

Measuring (qualitative data)

Using non-standard units to measure and compare.

Beginning to use standard units to measure and compare.

Beginning to use simple measuring equipment to make approximate measurements.

Reading simple numbered scales.

Year 2

Posing questions

Exploring the world around them and raising their own simple questions.

Recognising there are different types of enquiry (ways to answer a question).

Responding to suggestions on how to answer questions.

Planning

Beginning to recognise whether a test is fair.

With support, deciding if suggested observations are suitable.

Ordering a simple method.

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Beginning to use simple measuring equipment to make approximate measurements.

Reading simple numbered scales.

Researching

Gathering specific information from one simplified, specified source.

Recording (diagrams)

Drawing and labelling simple diagrams.

Recording (tables)

Using a prepared table to record results including:

- Numbers.
- Simple observations.
- Tally frequency.

Grouping and classifying

Grouping based on visible characteristics.

Organising questions to create a simple classification key.

Graphing

Representing data using pictograms and block charts.

Analysing and drawing conclusions

Using their results to answer simple questions.

Beginning to recognise when results or observations do not match their predictions.

Evaluating

Beginning to recognise whether a test is fair or not.

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Science in Action

Progression of knowledge	
Year 1	Year 2
<p>To know about famous scientists throughout history.</p> <p>To know about a range of jobs and careers that use scientific knowledge and methods.</p> <p>To know about the work of modern-day scientists.</p> <p>To know about science in the news and recent discoveries.</p> <p>To know there are spiritual, moral, social and cultural links with Science.</p>	<p>To know about famous scientists throughout history.</p> <p>To know about a range of jobs and careers that use scientific knowledge and methods.</p> <p>To know about the work of modern-day scientists.</p> <p>To know about science in the news and recent discoveries.</p> <p>To know there are spiritual, moral, social and cultural links with Science.</p>

