

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.

Aim

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.

Attainment target

- 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.
- Schools are not required by law to teach the content indicated as being 'non-statutory'.

Useful Links

- The Wellcome Trust
- Explorify
- STEM resources Primary Science Teaching Trust
- The Association for Science in Education
- Primary Science Quality Mark
- BBC Terrific Scientific
- NASA
- Core Knowledge
- St Mary's University Primary Science Padlet
- Developing Experts

Scheme of work

		Kapow Primary
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Intent

- This 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.
- We want pupils to develop a complex knowledge of Biology, Chemistry and Physics, but also adopt a broad range of skills in working scientifically and beyond. The scheme of work is inclusive and meaningful, so all pupils may 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.
- Our 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 across Biology, Chemistry and Physics.**
 - **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.**
- The Science scheme of work enables pupils to meet the end of key stage attainment targets in the national curriculum and the aims also align with those set out in the national curriculum.

Implementation

The implementation of the curriculum relates to how the learning is going to be delivered across your school, taking the intent of the learning, and translating it into a progressive and effective curriculum.

- In order to meet the aims of the National curriculum for Science and in response to the Ofsted Research review into Science, we have identified the following key strands:

Scientific knowledge and understanding of	<ul style="list-style-type: none">• Biology - living organisms and vital processes.• Chemistry - matter and its properties.• Physics - how the world we live in 'works'.
Working scientifically	<ul style="list-style-type: none">• processes and methods of science to answer questions about the world around us.
Science in action	<ul style="list-style-type: none">• uses and implications of science in the past, present and for the future.

- The Science scheme is 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.
- Each unit is based upon one of the key science disciplines; Biology, Chemistry and Physics and to show progression throughout the school we have grouped the National curriculum content into six key areas of science:
 - **Plants**
 - **Animals, including humans Living things and habitats Materials**
 - **Energy**
 - **Forces, Earth and space.**

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- Pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant specialist vocabulary. As suggested in Ofsted’s Science research review (April 2021), the ‘**working scientifically**’ skills are integrated with conceptual understanding rather than taught discretely. This provides frequent, but relevant, opportunities for developing scientific enquiry skills. The scheme utilises practical activities that aid in the progression of individual skills and also provides opportunities for full investigations.
- Each year group has an optional exploratory ‘Making connections’ unit that delves beyond the essential curriculum, assimilating prior knowledge and skills to evoke excitement and to provide an additional method of assessing scientific attainment.
- Lessons incorporate various teaching strategies from independent tasks to paired and group work, including practical, creative, computer-based and collaborative tasks. This variety means that lessons are engaging and appeal to those with different learning styles. Guidance for adapting the learning is available for every lesson to ensure that all pupils can access learning, and opportunities to stretch pupils’ learning are available when required. Knowledge organisers for each unit help to identify prior and future curriculum links to make the scheme as meaningful as possible and reinforce key technical terms.
- Strong subject knowledge is vital for staff to deliver a highly effective and robust Science curriculum. Each unit of lessons includes multiple teacher videos and resources to develop subject knowledge, target fundamental misconceptions effectively and support ongoing CPD. The scheme has been created to build confidence amongst non-specialist primary teachers who are required to deliver and assess the full Science curriculum and maximise pupil progression. Videos created by subject specialists feature troubleshooting advice for practical work that does not go to plan, suggested questioning and support for tackling misconceptions, as well as recordings of practical tasks that can be utilised as demonstrations in the classroom or to support pupil reflection on their own observations.
- Useful documentation to support implementation:
 - [National curriculum coverage document](#) shows which of units cover each of the National curriculum attainment targets and the strands within it.
 - [Progression of skills and knowledge](#) shows the skills and key knowledge that are taught within each year group and how these skills develop year on year to ensure attainment targets are securely met by the end of the key stage.

Impact

This relates to how staff identify that the curriculum is having a positive impact on pupils’ learning, how to identify gaps in their learning and how to fill these.

- The impact of the Science scheme can be constantly monitored through both formative and summative assessment opportunities. Each lesson includes guidance to support teachers in assessing pupils against the learning objectives and any relevant scientific enquiry skills. Furthermore, each unit has a unit quiz and a knowledge and skills catcher, which can be used at the beginning and/or end of the unit to provide a summative assessment. Opportunities for children to communicate using scientific vocabulary will also form part of the assessment process in each unit.
- After implementing Science, pupils should leave school equipped with the requisite skills and knowledge to succeed in key stage 3 Science. 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. Pupils will understand the significance and impact of Science on society.
- The expected impact of following the Science scheme of work is that children will:

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- Develop a body of foundational knowledge for the Biology topics in the National curriculum: Plants; Animals, Including Humans; Living Things and Their Habitats; Evolution and Inheritance.
- Develop a body of foundational knowledge for the Chemistry topics in the National curriculum: Everyday Materials; Uses of Everyday Materials; Properties and Changes of Materials; States of Matter; Rocks.
- Develop a body of foundational knowledge for the Physics topics in the National curriculum: Seasonal Changes; Forces and Magnets; Sound; Light; Electricity; Earth and Space.
- Be able to evaluate and identify the methods that ‘real world’ scientists use to develop and answer scientific questions.
- Identify and use equipment effectively to accurately gather, measure and record data.
- Be able to display and convey data in a variety of ways, including graphs.
- Analyse data in order to identify, classify, group, and find patterns.
- Use evidence to formulate explanations and conclusions.
- Demonstrate scientific literacy through presenting concepts and communicating ideas using scientific vocabulary.
- Understand the importance of resilience and a growth mindset, particularly in reference to scientific enquiry.
- Meet the end of key stage expectations outlined in the National curriculum for Science.

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Long Term Plan

CYCLE A	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception						
Years 1 / 2	Forces and space: Seasonal changes	Materials: Everyday materials	Animals: Sensitive bodies	Animals: Comparing animals	Plants: Introduction to plants	Investigation / Fair tasting
Years 3 / 4	Animals: Movement and nutrition	Forces and space: Forces and magnets	Materials: Rocks and soil	Energy: Light and shadows	Plants: Plant reproduction	Investigation / Fair tasting
Years 5 / 6	Materials: Mixtures and separation	Materials: Properties and changes	Forces and space: Earth and space	Living things: Life cycles and reproduction	Forces and space: Imbalanced forces	Animals: Human timeline

CYCLE B	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception						
Years 1 / 2	Living things: Habitats	Living things: Microhabitats	Materials: Uses of everyday materials	Animals: Life cycles and health	Plants: Plant growth	Investigation / Fair tasting
Years 3 / 4	Animals: Digestion and food	Energy: Electricity and circuits	Living things: Classification and changing habitats	Materials: States of matter	Energy: Sound and vibrations	Investigation / Fair tasting
Years 5 / 6	Living things: Classifying big and small	Energy: Light and reflection	Living things: Evolution and inheritance	Energy: Circuits, batteries and switches	Animals: Circulation and exercise	Investigation / Fair tasting

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