

Lydney C of E Primary School

'A caring Christian community where every child achieves a love of life and of learning.'

Science

Trust, Friendship, Respect, Forgiveness, Courage, Truthfulness

Intent

At Lydney C of E Primary School, we follow the Kapow Science scheme of work for Science lessons. Kapow Primary's 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.

The curriculum aims to encourage critical thinking and empower pupils to question the hows and whys of the world around them.

The 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.

Kapow Primary's 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.

Underpinning our Science curriculum are our Christian values: trust, friendship, respect, forgiveness, courage and truthfulness and curriculum drivers.

World Aware: In Science lessons, we explore and celebrate research and developments that take place in many different cultures, both past and present. We explore how scientific discoveries have shaped the, beliefs, cultures and politics of the modern world. We learn about the scientific perspective on the start of the universe and the evolution of life (with consideration of religious beliefs). We study and discuss the impact of human beings on the environment, the problems created by industry and possible solutions.

Belonging: Our Science curriculum aims to allow all children to feel a sense of belonging in their world and environment. Through an understanding of the world around them, they will learn to respect their environment and to take care of the wonders of their world.

Possibilities: In Science, children will learn about the many possibilities of the world through Scientific enquiry and asking questions. They will explore STEM careers and challenge science stereotypes.

Well-being: In Science, children are taught the skills of support, encouragement and perseverance. They will be taught about their health and nutrition, smoking, drugs, making good choices.

Spirituality: Spirituality means many things. Spirituality is not something we can see; it is something we feel inside ourselves. It is about awe and wonder, asking questions, inspiration and being aware of something 'bigger' outside of ourselves. With children we refer to:

- A sense of awe and wonder
- Care for nature and living things
- Wanting to love and to be loved by people

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Science is using evidence to make sense of the world. It has the ability to make us feel both enormously insignificant (compared to the scale of the visible universe) and enormously significant (we are genetically unique). It helps us understand our relationship with the world around us (how the physical world behaves, the interdependence of all living things). Making new discoveries increases our sense of awe and wonder at the complexities and elegance of the natural world. For scientists, this is a spiritual experience and drives us onwards in our search for understanding.

The lessons we teach have an intention of providing a high-quality, coherent and progressive experience of the subject, with scope for cross-curricular learning.

Implementation

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

- Scientific knowledge and understanding of:
 - Biology - living organisms and vital processes.
 - Chemistry - matter and its properties.
 - Physics - how the world we live in 'works'.
- Working scientifically - processes and methods of science to answer questions about the world around us.
- Science in action - uses and implications of science in the past, present and for the future.

Kapow Primary's 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:

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Plants

Animals, including humans

Living things and habitats

Materials

Energy

Forces, Earth and space

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. In Year 1, the scheme eases the transition into Key stage 1, by providing a selection of activities: some adult-led, some independent tasks, and some tasks that can be used during continuous provision.

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. Kapow 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

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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:

The National curriculum coverage document shows which of the units cover each of the National curriculum attainment targets and the strands within it.

The 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

The impact of Kapow Primary's 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 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 Kapow Primary 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 Kapow Primary Science scheme of work is that children will:

- 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.

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- 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.

Teachers will record end of unit judgements on our school tracking system Insight.