



‘My sheep hear my voice, and I know them, and they follow me.’ John 10:27

Parsons Heath Primary School Curriculum Design – Science

‘At Parsons Heath Church of England Primary School, we are inspired by the example of Jesus, the Good Shepherd, who cares for his sheep. Our vision is embedded in the imagery of God/Jesus as the Good Shepherd. We view school as the shepherd, guiding all members through daily life. We follow the example that Jesus gave us using our Christian Values of Belonging, Kindness and Resilience. As the Good Shepherd tends his sheep, so we nurture our school community in a safe, secure environment to ensure that they thrive and fulfil their potential as good shepherds of the future.’

Our Curriculum Drivers

Active Learners We want our children to participate in a curriculum that promotes physical activity to develop collaboration, confidence and resilience. Our children will recognise the importance of physical activity on their emotional well-being.	Independence We want our children to be able to work both individually and as part of a team and have the resilience to take on new and difficult challenges with excitement and curiosity. With this independence we want all our children to strive to reach their highest personal achievement in all aspects of schooling, community action and life-long learning.
Belonging We want our children to be proud to belong to Parsons Heath C of E Primary School. We are a church school and belong to a wider community of Christians and other faiths. We fit together as individuals, classes, a school, within the community, in the United Kingdom and the World.	Communication We want our children to become articulate communicators, attentive listeners and speak confidently in a variety of situations and ultimately express oneself fluently.
Happiness We want our children to thrive in a positive, safe and calm environment. Our community promotes health in body, mind and spirit. We encourage children to build resilience to be happy, successful and confident people.	

Our Christian Values

Belonging	Kindness	Resilience
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Subject Statement of Intent

At Parsons Heath, we recognise how science impacts every aspect of daily life, and without science humankind would not have made progress throughout history. As one of the core subjects taught at primary level, we give the teaching and learning of Science the prominence it deserves.

Learning Science is concerned with increasing pupils' knowledge of our world, and with developing skills associated with Science as a process of enquiry. Our Science curriculum develops the natural curiosity of each child no matter their demographic, encourages them to have respect for living organisms, and instil in pupils the importance of being kind, respectful, caring and compassionate towards the natural environment.

Using the requirements of the Science National Curriculum as our guide, our Science lessons offer opportunities for children to:

- Develop scientific complex knowledge and conceptual understanding of the disciplines of Physics, Chemistry and Biology.
- Adopt and develop a broad range of skills in working scientifically and beyond.
- Formulate their own questions about the natural world and endeavour to be active learners.
- Encourage children to appreciate how new knowledge and skills can be fundamental to solving a rising global challenges.
- Foster the confidence to be resilient and that to 'be wrong' when it comes to making predictions and postulating their own theories while developing their ability to persevere, individual thinking skills and resilience.
- Encourage critical thinking and empower pupils to question the hows and whys of the world around them.
- Promote an awareness of the importance of belonging and kindness during teamwork in scientific experimentation.
- Practically investigate their questions using various methods of enquiry.
- Gain competence in the science skills of planning scientific investigations, gathering and analysing data and critical evaluation of investigations across the disciplines.
- Use a range of methods to gather data from investigations and secondary sources including I.C.T., drawings, diagrams, videos and photographs.
- Present data in a variety of methods including tables, bar charts, line graphs, pictograms and pie charts.
- Produce comprehensive science reports that demonstrate their proficiency in the scientific method.

- Have care for the safety of all individuals in lessons by developing knowledge of the hazards of the materials and equipment they handle, along with mitigating these hazards.
- Develop an enthusiasm and enjoyment of scientific learning and discovery to foster feelings of happiness and wonder.
- Experience the joy of science and make associations between their science learning and their lives outside the classroom.
- Encourage children to appreciate how new knowledge and skills can be fundamental to solving rising global challenges.

We encourage a focus on developing knowledge alongside scientific skills across Biology, Chemistry and Physics. We promote curiosity and excitement about familiar and unknown observations as well as challenging misconceptions and demystifying truths. We aim to provide continuous progression by building on practical and investigative skills across all units and of the ability to ask perceptive questions and explain and analyse evidence. We encourage the development of scientific literacy using wide-ranging specialist vocabulary.

Using 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.

Our teachers are encouraged to continually improve their knowledge and practical competence by:

- Having access to CPD videos that cover every area of the National Curriculum.
- Inspection of pupil work via scrutiny of book work and learning walks.
- Half termly analysis of pupil progress in Science.

The Science Coordinator whose responsibility it is to oversee the Science function of the school aims to:

- 1) Strive to continually improve all aspects of Science in our school.
- 2) Control the budget allocated to Science.
- 3) Complete annual audit of resources.
- 4) Purchase sufficient resources that allows the school to adhere to the principles as set out in the 'Science Lessons' section above.
- 5) Monitor the impact of the KAPOW scheme by liaising with the class teachers, monitoring their end of unit assessments of the pupils and tracking pupil progress using our online assessment tool.
- 6) Improve their own practical and technical knowledge of Science.
- 7) Conduct monitoring tasks and compile an annual action plan and an annual review of the school's science provision.
- 8) Communicate with teaching staff when necessary and provide support to all teachers.

9) Report to the Senior Leadership Team.

Children have weekly lessons in Science throughout the school in Key Stage 1 and KS2, using our scheme of work and resources. In Early Years, Science is taught with the EYFS framework with the focus on the teaching of Understanding the World as well as making links between the other areas of learning and development in the EYFS curriculum with the relevant ELGs at the forefront. The children will be developing their Science knowledge and skills through observation, prediction, critical thinking and discussion with a focus on learning through play.

We endeavour to ensure that the Science curriculum we provide at Parsons Heath will give children the confidence and motivation to continue to further develop their skills as confident, thoughtful, articulate, active learners ready for the next stage of their education and life experiences.

Subject Implementation

In order to meet the aims of the National Curriculum for Science and in response to the Ofsted Research review into Science, we have are focusing on 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.

We are using a scheme with a spiral curriculum whereby essential knowledge and skills are 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 their 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 Kapow Primary Science scheme enables teachers at Parsons Heath to use practical activities that aid in the progression of an individual's skills, knowledge and also provides opportunities for full investigations.

Each year group has an 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 are available to be viewed and discussed help to identify prior and future curriculum links to make the scheme as meaningful as possible and reinforce key technical terms.

Teachers at Parsons Heath create a positive attitude to Science learning within their classrooms and outdoors and they reinforce an expectation that all pupils can achieve high standards in Science. Teaching Science at our school is set out by the year group requirements of the National Curriculum which enables the accumulation and progression of scientific knowledge and skills which allows progress in repeated topics in different year groups.

Pupils are given the opportunity to gain and build upon their skills by planning investigations, making observations, gathering results, analysing and presenting their findings. Although each skill is related and there are links between them, there is minimum crossover as they are taught, so each becomes firmly embedded. Through our planning, we involve problem solving opportunities, allowing children to find out for themselves how to answer questions in a variety of practical means. Children are encouraged to ask their own questions and be given appropriate equipment to use their scientific skills to discover the answers. Engaging lessons are created with each lesson having both practical and knowledge elements. Teachers use precise questioning in class to test conceptual knowledge and skills and children are regularly assessed at the end of a unit to identify those children with gaps in learning, so that relevant strategies can be made to support those that need it.

We build upon the learning and skill development of previous years. As the children's knowledge and understanding increases, and they become increasingly proficient in selecting and using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.

The '**working scientifically**' skills are integrated in lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed throughout every unit, in-keeping with the theme of the lesson. Teachers demonstrate how to use scientific equipment, and the various '**working scientifically**' skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning where possible, drawing on experts and in some instances attending a school trip.

Strong subject knowledge is vital for staff at Parsons Heath to deliver a highly effective and robust Science curriculum. Each unit of lessons in the scheme 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 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.

Subject Impact

Teachers can monitor the impact of Science through both formative and summative assessment opportunities. Each lesson includes guidance to support teachers in assessing pupils against the learning objectives and relevant scientific enquiry skills. 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. For children to communicate using scientific vocabulary will form part of the assessment process in each unit.

Pupils should leave school equipped with the skills and knowledge to be successful in Science at Key Stage 3 and 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.
- 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 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

The successful approach to the teaching of Science at Parsons Heath results in a fun, engaging, progressive, high-quality Science education, that provides children with the foundations for understanding the natural world. Our engagement with the local environment ensures that

children actively learn through varied and first-hand experiences. As much learning as possible takes place outdoors so pupils can investigate their immediate environment. Through various workshops, trips and interactions with experts, children have the understanding that Science has changed our lives and that it is vital to the world's future survival and prosperity. Children learn the possibilities for careers in Science as a result of our community links and our participation in the national British Science Week and other agencies such as the RSPB. Pupil voices are used to further develop the Science curriculum, through discussions with pupils and the questioning of pupils to gather their views and attitudes to Science. We aim to encourage the children's enjoyment of Science, foster and develop their natural curiosity, develop their knowledge and skills to succeed in Key Stage 3 Science. We encourage the pupils to use their critical thinking skills and analytical skills at Parsons Heath and we hope that it impacts their lives to continue to develop an enthusiasm and enjoyment of scientific learning and discovery to foster feelings of happiness and wonder.

Long Term Plan

Science	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Forces and space: Seasonal changes Anders Celsius	Materials: Everyday materials Ole Kirk Christiansen	Animals: Sensitive bodies	Animals: Comparing animals Joy Adamson	Plants: Introduction to plants Charles Darwin	Making connections – Investigating science through stories
Year 2	Materials: Uses of Everyday Material Charles McIntosh	Animals: Life Cycles and Health Louis Pasteur	Living Things: Habitats Rachel Carson – Ocean Habitats	Plants: Plant Growth T. Smit & N. Grimshaw - The Eden Project	Living Things: Microhabitats	Making Connections – Plant based Materials
Year 3	Materials: Rocks and Soil Mary Anning	Forces and Space: Forces and Magnets Robert Hooke	Animals: Movement and Nutrition Marie Curie	Energy: Light and Shadows James Clerk Maxwell	Plants: Plant Reproduction George Washington Carver	Making Connections – Does hand span affect grip strength?
Year 4	Animals: Digestion and Food Gerald Durrell	Energy: Electricity and Circuits Thomas Edison	Living Things: Classification and Changing Habits	Materials: State of matter Aristotle	Energy: Sound and Vibrations Alexander Graham Bell	Making Connections – How does the flow of liquids compare?

Year 5	Materials: Mixtures and Separation	Materials: Properties and Change Stefanie Kwolek	Forces: Earth and Space Stonehenge Astronomy	Living Things: Lifecycles and Reproduction David Attenborough	Forces: Imbalanced forces Archimedes	Animals: Human timeline Making Connections – does the size of an asteroid affect the diameter of its impact crater? Leonardo da Vinci
Year 6	Living Things Classifying Big and Small Karl Linnaeus	Animals Circulation and Exercise Marie Maynard Daly	Living Things Evolution and Inheritance Charles Darwin and Mary Leaky	Energy Light and Reflection Issac Newton	Energy Circuits, batteries and switches Steve Jobs	Making Connections – Are some sunglasses safer than others?