



### Our Vision

Our vision is that every child will fulfil their potential, flourish as individuals who are prepared for the next stage of their life, growing as responsible citizens and lifelong learners.

### Our Ethos

Putting the needs of every child at the heart of everything we think, say and do.

### our Values

Respect, Equality, Resilience, Courage, Awareness and Collaboration

### Science Curriculum at Culverstone Green Primary School

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Respect	Awareness	Equality	Collaboration	Courage	Resilience
Term 1	Seasonal Changes	Habitats	Movement and Nutrition	Digestion and Food	Mixtures and Separation	Classifying big and small
Term 2	Everyday Materials	Microhabitats	Forces and Magnets	Electricity and Circuits	Properties and changes	Light and Reflection
Term 3	Sensitive bodies	Use of Everyday Materials	Rocks and Soil	States of Matter	Earth and Space	Evolution and Inheritance
Term 4	Comparing Animals	Life cycles and health	Lights and shadows	Sound and Vibration	Life Cycles and Reproduction	Circuits, batteries and switches
Term 5	Introduction to Plants	Plant growth	Plant reproduction	Classification and changing habitats	Imbalanced forces	Circulation and health
Term 6	Investigating Science through Stories	Plant Based Materials	Does hand span affect grip strength?	How does the flow of liquids compare?	Human Timeline/Does the size of an asteroid affect its impact strength?	Are some sunglasses safer than others?

**N.B. Seasonal Change in Year 1 continues throughout the year.**

## **Intent**

At Cuvlerstone Green Primary school, we recognise the value and importance of science, both in its rich past, and shaping the future of our world and children. As such, we aim to harness that curiosity within children and encourage them to expand their knowledge and enjoyment of the world around them.

With an inevitable, ever-increasing prominence of STEM careers in their futures, we have a responsibility to provide our children - from EYFS through to Year 6 - with opportunities to learn and gain hands-on experience of how things work, why the world exists as it does today and what we can all do in order to prepare for the world we will be living in tomorrow. Theories of scientists from the past, current scientific knowledge and understanding alongside practical investigations will enable this.

Our children will feel confident in asking and investigating pertinent questions, and will feel equipped to pursue the answers to these through high-quality scientific working, carrying out precise and worthwhile practical work with appropriate equipment, making observations and recording results to then go on to discuss their findings with their peers. Pupils across our school will feel encouraged to explore the world around them, and excited to do so.

Educational visits, visitors to the school, outreach arrangements with STEM ambassadors, a weekly Science club, themed Science Weeks and encouraging an awareness of topical issues will ensure that Science is relevant and brought to life for all children. We hope to educate, empower and inspire our scientists of the future.

At CGPS, in conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

- 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;
- Be equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future.
- Develop the essential scientific enquiry skills to deepen their scientific knowledge.
- Use a range of methods to communicate their scientific information and present it in a systematic, scientific manner, including computing, diagrams, graphs and charts.
- Develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.

- Develop an enthusiasm and enjoyment of scientific learning and discovery.

### **Implementation:**

In Early years, science is taught through the children learning about the world around them in their learning through play. We recognise the importance of working scientifically in the EYFS as a key area of learning. There are three strands under Physical Development, Understanding the World and Expressing Art and Design. In both the indoor and outdoor learning areas there are opportunities for both child-led and teacher directed exploratory play. The children are encouraged to follow their curiosity, explore using senses, observe, predict, investigate and be creative when following their natural inquisitiveness.

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

- 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 during our weekly lessons. A range of engaging recall activities promote frequent pupil reflection on prior learning, ensuring new learning is approached with confidence.

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.

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.

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. Kapow utilises practical activities that aid in the progression of individual skills and also provides opportunities for full investigations.

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in Science. All science teaching will begin with secure subject knowledge and vocabulary based on the broad and thorough National Curriculum objectives to produce an '*extensive and connected knowledge-base...that ensure that learning is meaningful,*' (Ofsted research review series: Science, 2021). Knowledge will be built upon from Year 1-6 using a spiral curriculum by imbedding Kapow. Children will build their substantive scientific knowledge based on:

- 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.

The sequence of learning has been designed to include the following:

- **Cyclical:** Pupils return to the key knowledge and skills repeatedly during their time in primary 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:** Prior knowledge is utilised so pupils can build upon previous foundations, rather than starting again. ‘

Science **knowledge organisers** are in place to ensure that:

- Staff have secure scientific knowledge
- There is precise understanding of the specific scientific concepts
- Key knowledge and skills are planned for
- Links to prior science learning are built upon
- Science vocabulary is accurately used and evident across the school.
- Science curiosity and fostering of this love of learning is ubiquitous within the school

## Impact

The effective approach at CGPS results in a fun, engaging, high-quality science education that provides children with the foundations and knowledge for understanding the world around them and beyond. **Every** individual will be able to achieve their full potential by being determined, and have the courage to progress in their science understanding.

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 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.

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 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.

### **Statements for EYFS:**

**By the end of EYFS, children should be able to:**

- Ask questions about the world around them.
- Orally express simple observations and use drawing to show findings.
- Make simple predictions (using drawing to express them.)
- Foster a natural curiosity.
- Know some similarities and differences between the natural world around them and contrasting environments (drawing on own experiences and in class learning.)

- Understand some important processes and changes in the natural world around them (including the seasons and changing states of matter.)

### **Statement for Key Stage 1:**

#### **By the end of KS1, children should be able to:**

- Be curious and ask simple scientific questions about what they notice using observations and ideas to suggest answers to questions.
- Use simple scientific language to talk about what they have found out and communicate their ideas, to a variety of audiences, in differing ways (using the language of the 'Working Scientifically' wheel)
- Observe closely, using simple equipment, noting changes over a period of time and patterns.
- Perform simple comparative tests and pupil led enquiries using first hand experiences and some secondary sources.
- Identify, group and classify.
- Gather and record simple data to help answer questions.
- Read and spell scientific vocabulary at a level consistent with KS1 word reading and spelling knowledge.

### **Statement for Lower Key Stage 2:**

#### **By the end of lower KS2, children should be able to:**

- Ask relevant questions and use different types of scientific enquiries to answer them.
- Set up simple practical enquiries, comparative and fair tests.
- Make systematic and careful observations and, where appropriate, take measurements in standard units.
- Gather, record, classify and present data in a variety of ways to help answer questions.
- Record findings.
- Report on findings from enquiries, including written and oral explanations.

### **Statement for Upper Key Stage 2:**

#### **By the end of upper KS2, children should be able to:**

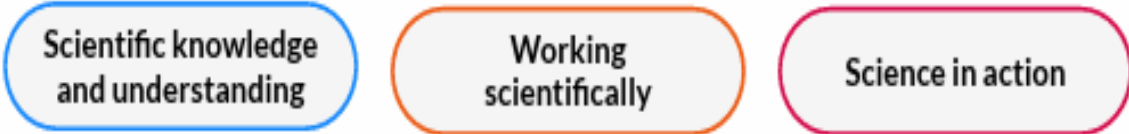
- Plan different scientific enquiries to answer questions, including recognising and controlling variables where necessary.

- Take increasingly accurate measurements using a range of equipment.
- Record data and results of increasing complexity using diagrams, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Use scientific language to report and present findings from enquiries, including conclusions, causal relationships and explanations of a degree of trust of results (in oral and written forms.)
- Draw on scientific evidence that has been used to report or refute scientific arguments.

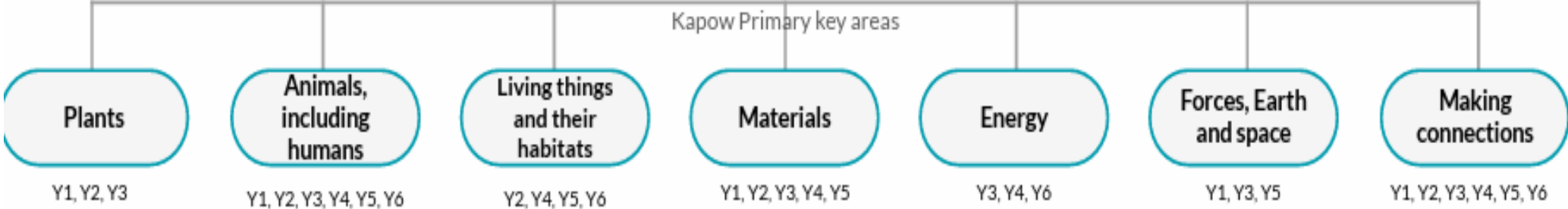


# How is the Science scheme of work organised?

National curriculum guidance



Kapow Primary key areas



# Key areas in Science

Pupils will develop **Scientific knowledge and understanding** in seven key areas. The learning in each area is summarised below:

## Animals, including humans



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.

## Living things and their habitats



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.

## Plants



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.

## Materials



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

## Energy



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.



# Scientific enquiry types

