CGPS Approach to Science

This guidance outlines the teaching, organisation and management of the Science curriculum taught and learnt at CGPS. The implementation of these guidelines is the responsibility of all teaching staff

INTRODUCTION

At Crowmarsh Gifford Primary School, we are committed to providing our children with a curriculum that has a clear intention and impacts positively upon their needs.

SCHOOL VISION

'A community supporting children to Care, Grow, Persevere and Shine'

INTENT

Also see:

- Subject Goals
- Subject Progression Map

Subject Intent Statement

At Crowmarsh we use Kapow Primary's Science whose 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.
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.

IMPLEMENTATION

Also see: Appendix 1 Science Non Negotiables

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:
○ 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:
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, we have tried to ease 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 to suit your set-up. 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 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.

EYFS
At Crowmarsh we understand the importance of early experiences of science. These are embedded into our EYFS planning within the Understanding the World area of the curriculum.

Subject Planning & Teaching

Through careful stages of planning and 'Quality First Teaching' each teacher differentiates their Kapow planning to meet the needs of the children they teach with the aim of developing independence and the child meeting his/her potential at whichever level they are working at. We acknowledge that children learn in many different ways and recognise the need to use a range of different teaching and learning strategies that will allow all children to learn in ways that best suit them.

In each lesson, children are guided towards the learning objectives (WALTs) provided by Kapow through the use of success criteria.(WILFs) The learning objectives and success criteria are shared at the beginning of the lesson and reviewed by children at the end. They are subsequently used by the teacher during the assessment and review work of children's work and are used to identify individual target areas.

The Science curriculum is mapped to ensure alignment with the national curriculum content and programme of study. Key knowledge and skills relate directly and build towards the achievement of end of key stage 'end points', informed by the KS1 and 2 National Curriculum statements for; Working scientifically, Biology, Chemistry and Physics.

CG Schemes

- Kapow

CG Supporting resources

- Kapow

Subject Enrichment: See Teaching, Learning & Assessment Policy

Inclusion for all Children: See Teaching, Learning & Assessment Policy

EYFS Statutory Framework:
The EYFS framework promotes teaching and learning to ensure children's 'school readiness' and gives children the broad range of knowledge and skills that provide the right foundation for good future progress through school and life. Through this curriculum, children will be exposed to aspects of knowledge, skills and understanding that will be built upon once they enter the National Curriculum Programmes of Study.

Science Curriculum Link to EYFS Framework:

Understanding the World Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

IMPACT

Impact Statement:
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.

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.
● 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.

Standards of pupil work, assessment data and pupil feedback will help the subject leader and senior leaders review the impact of the Science curriculum.

Standards of pupil work
The subject leader will ensure they monitor the teaching and learning and hence the standard of work across the school, matching the knowledge, skills and understanding to the curriculum overview and age-related expectations of the subject. Each leader will be expected to produce an annual report (Deep Dive) informing the senior leaders and governors of their findings.

Assessment

At CGPS we use the Kapow Assessment tracker to support assessment of Science

The learning objectives and outcomes in each planned lesson show how children might demonstrate what they have learnt. Assessment should inform the adaptions to future planning so that children learn and develop skills appropriate to their abilities and understanding. Methods of assessment can include teacher observations, discussion with pupils, self-assessment and peer assessment.
At the start of each unit, children are asked to rate their confidence on a topic and recall previous learning (where approropate). They will then return to this at the end of the unit and reassess their confidence and add new information to what they have learnt. Children are also asked to self- assess on the Knowledge Organiser against the learning outcomes for the topic. This will support teacher judgement.

At the end of each lesson, teachers are asked to use the Kapow assessment tracker to see note which children are On track and have met the LO/WALT for that lesson and who is still working towards. This will then provide the Science Leader an overview of each unit which data is collected each half term.

Overall, children's progress in Science is assessed against the age-related expectations. These describe the types and range of performance that the majority of pupils should characteristically demonstrate, having been taught the relevant programmes of study.

Pupil Feedback:
As part of the on-going review and development of our curriculum, the Science the Subject Leader will hold learning conversations with children; this will be done in a variety of ways. Our teaching staff value pupil feedback and, within lessons, will informally seek the children's thoughts and ideas about their learning.

Role of Science subject leader

- To ensure a high profile of the subject.
- To produce an agreed curriculum statement that outlines the intent, implementation and impact for science within the CG curriculum.
- To produce an agreed progression of content and skills within a curriculum overview, that takes account of the EYFS curriculum and National Curriculum.
- To produce and maintain an annual subject action plan.
- To support colleagues by advising them on planning; appropriate resources; teaching strategies; approaches to assessment; changes and developments within the subject.
- To model the teaching of Science
- To ensure a full range of relevant and effective resources are available to enhance and support learning.

- To monitor the standards of learning, supported by Senior Leaders i.e. through books, lesson observations, learning conversations, data analysis and ensuring that key knowledge is evidenced in outcomes.
- To develop own skills and knowledge through relevant courses; reading; accessing other sources of information and expertise.

Appendix 1 Science Essentials

Science Essentials

Year Groups	Year 1 to Year 6
Time Allocation	1-2 hours per week (cohort driven)

	Resources	In every unit	In Every Lesson	Where Appropriate
INTENT	• NC objectives (Insight) • Kapow Scheme and resources	• Share Knowledge Organiser (Self Assessment)	• Learning following the Kapow lesson plans • Range of resources including the use of IT • Focus on handwriting & presentation (in line with English and Maths) • Exposure to and understanding of new and unfamiliar words used in context • Scientific skills and vocabulary shown in a range of contexts • Write for a range of purposes and audiences including showing results and hypotheses • Knowledge of scientific spelling • Children are encouraged to 'Think like a Scientist	
IMPLEMENTATION	• NC writing objectives (Insight) • Kapow Scheme and resources •	• Learning journey shared with children and displayed in classroom • Practical investigations • Modelling of the investigation or experiment process (as appropriate to lesson content) • Modelling thinking like a Scientist • Scaffolding used to develop writing skills, leading to independent writing • Unit specific word banks • End of topic feedback, self-assessment	• WALTs linked to skill/learning being taught. • Success criteria • WALT and date, underlined using pencil. • Discussion about new and unfamiliar words • Key vocabulary, resources and current learning displayed on working wall • Discussions with children • In-lesson feedback, self and peer assessment, as appropriate • Children aware of their next steps • Exploration of related scientists and how their work links to the	• Thumbs up/down • Choral response • Trio discussions • Think-pair-share (higher order thinking) • Whiteboard responses • Use of dictionary (or IT) to understand new and unfamiliar words (links to English)
IMPACT	• Insight tracking • Kapow Scheme and resources • Teachers AFL records/notes	• Children's self-assessment at the end of topic and teacher assessment alongside for children to see.	• Questions to check understanding. (self assessment) • Scanning classrooms • Mini plenaries • Marking/feedback, as appropriate, in accordance with CG policy • Discussions with children. • Adapted planning for the next lesson. • Teachers' AFL records/notes	• Peer evaluation • Self-assessment • Flexible groupings. • Quizzing • Kapow Assessment