

Intent: Why do we teach this? Why do we teach it in the way we do?

At Coberley we want our children to love science. We want them to have no limits to what their ambitions are and grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. We want them to embody our core values.

The science curriculum has been carefully crafted to enable it to be exciting and challenging and work within the parameters of our class structure and the National Curriculum. We want to equip them with not only the minimum statutory requirements but to prepare them for the opportunities, responsibilities and experiences of later life. We want our children to remember their science lessons in our school, to cherish these memories and embrace the scientific opportunities they are presented with. We want to ensure that we teach an inclusive curriculum that allows children with SEND or who are disadvantaged have the same opportunities as everyone else. We also want to ensure the children learn about key scientists and key inventions internationally and within our county; thus providing a rich cultural capital.

We use the Trivium model to teach science These characteristics are:

- **Knowledge:** What scientific knowledge do the children need to know for each topic.
- **Dialectic:** What scientific skills and abilities are the children learning to think and work scientifically using a combination of practical work, discussion and debating and research.
- **Rhetoric:** Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.

The science curriculum promotes curiosity and a love and thirst for learning. It is ambitious and empowers our children to become independent and resilient – like all curriculum areas. We enrich their time in our school with memorable, unforgettable experiences and provide opportunities which are normally out of reach – this piques their interests and passions.

Implementation: What do we teach? What does this look like?

In January 2020, an initial audit of the science curriculum was conducted. On the back of the findings from this audit, the science curriculum has been carefully built and the learning opportunities and assessment milestones for each year group crafted to ensure progression and repetition in terms of embedding key learning, knowledge and skills.

Teaching & Learning

- The school has worked closely with **Birdlip Primary School** to create an exciting, progressive and innovative science provision throughout the school.

- The school has a detailed science **curriculum map** illustrating the topics taught across our classes.
- Our characteristics of a scientist map illustrates how our children fulfil the scientific characteristics in each year group.
- The School uses **Developing Experts** as its main science resource. This delivers lessons, resources, videos and assessments.
- The **science milestones** map illustrates the science content children learn in each class.
- Science is taught discretely throughout the school. However science is explored additionally in a range of topics and throughout activities such as our forest school provision.
- There is also a strong focus on specific vocabulary and a specific list of keywords has been produced for each science topic.
- Science topics and explorations allows all children in all key groups, including SEND, to access the knowledge and scientific inquiry.
- Lessons are practical, whenever possible.
- The **Trivium element** ensures that time is spent learning knowledge, thinking and discussion and recording information in a variety of ways.
- Science **vocabulary** has a key focus for each topic.
- Science coverage and progression is outlined in our curriculum map. The document helps teachers to ensure that there is not unnecessary overlap in our coverage between classes. The programmes of study are divided into the three sciences: chemistry, biology and physics.
- To ensure that the coverage of science meets the needs of the learners, each class assesses the prior knowledge of the children at the beginning of their science topic and encourages pupils to voice what they would like to find out. This also allows teachers to discover misconceptions in knowledge and understanding.

EYFS: The reception year

The following table outlines some of the curriculum links that can be made between Science and areas of learning within the Early Years Foundation Stage. This is in addition to the discrete science taught with Class 1 using Developing Experts on a 3-week rotation.

- These may include prerequisite skills that are necessary to the understanding of Science.
- Children frequently have opportunities to partake in using Scientific skills such as making observations, questioning and making predictions. This is evident in use of the school nature area and the outside area planter.
- In the outside area, children have on-going access to a number of resources to support their Scientific development such as magnifying glasses, tweezers, baskets, clipboards and notebooks. The sand and water tray also plays a part of our continuous provision.
- Scientific vocabulary is modelled and displayed via use of the word wall in the classroom and this is frequently referred to in group and whole class sessions.
- Children develop an understanding of growth and change through use of the birthday display, baby dolls and home corner role play resources, such as puppets and masks.

Reception	Communication and Language	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen. • Use new vocabulary in different contexts.	
Reception	Physical Development	• Know and talk about the different factors that support their overall health and wellbeing: • regular physical activity • healthy eating • toothbrushing • sensible amounts of 'screen time' • having a good sleep routine • being a safe pedestrian	
	Understanding the World	• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.	
ELG	Communication and Language	Listening, Attention and Understanding	• Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	The Natural World	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Assessment

- We assess predominantly using formative assessments.
- We assess each science topic based on the Trivium (Knowledge, Dialectic and Rhetoric) and put assessment information on **INSIGHT**.
- In addition in Class 2 and 3 additional assessment information from Developing Experts using **mini assessments** and **rocket word** quizzes.
- Information about **what a scientist looks like** in each year group allows the children to understand expectations.

Monitoring & Training

- The Science lead attends regular courses provided by SAS, which share information and good practice. Information is fed back to the staff.
- Working alongside Rendcomb specialist science teachers and Birdlip science leads have provided some valuable CPD.
- Work scrutiny ensures progress is monitored within classes and year groups.

Examples of Practice

- We always try to attend the Cheltenham Science Festival which showcases local scientists in addition to staging workshops and lectures.
- Class 2 when the children explore 'Earth and Space' they also tackle; the lives of significant individuals in the past – Neil Armstrong in history, use the text 'Whose footprints are on the moon?' by Simon Bartram in English and use Starry Night by Vincent Van Gogh as inspiration for their collage topic in art and design.
- We are very fortunate to have used Rendcomb Independent School's science facilities for Class 3 science lessons on occasions to create the "wow" factor of using state of the art laboratories, which are very well resourced.
- We use STEM investigations as part of the curriculum and incorporate the K'nex challenge in Class 3.
- House science competition allows children to work in house to solve scientific problems, for example egg drop.
- We use Developing Experts for our science curriculum. The children have persevered with some interesting experiments, turning out some fantastic results. This program links nicely in with Google classroom and not only does it promote scientific knowledge and understanding (rocket words etc). It promotes ICT skills as well.

Impact: What will this look like? By the time children leave our school they will

We use formative assessment grids to systematically assess the 3 key scientific characteristics (Knowledge, Dialectic and Rhetoric). These assessment grids then inform summative assessment judgements for each topic and can inform short-term and long-term plans and interventions. This helps us provide the best possible support for all of our pupils, including the more able. The assessment milestones for each phase have been carefully mapped out and further broken down for each year group. This means that skills in science are progressive and build year on year.

Assessment information is collected frequently and analysed as part of our monitoring cycle. This process provides an accurate and comprehensive understanding of the quality of education in science. A comprehensive monitoring cycle is developed at the beginning of each academic year. This identifies when monitoring is undertaken. The last science monitoring took place in Spring 2020. Monitoring includes: book scrutinies, lesson observations and/or learning walks, pupil/parent and/or staff voice.

Using Developing Experts, our approach and opportunities to spend quality time on science exploration have resulted in a real passion for science (children's voice) with plenty of time spent on experimenting and testing hypotheses. KS1 and KS2 results for science have been consistently higher than the national average for the past 5 years.