'Caring, Curious and Confident'

Curry Rivel Church of England Primary School

Curriculum Overview: Science

Our curriculum approach to Science reflects our vision 'Caring, Curious and Confident'. In particular, we aim for pupils to develop curiosity in Science as well as providing opportunities to work co-operatively with others and become confident and resourceful learners.

Intent

We recognise that Science is unique and includes its own substantive knowledge, disciplinary knowledge and skills. We are a six-class school and nursery, with mixed age classes. Due to demographic changes and unpredictable in-year admission numbers, our class structure is not guaranteed to be the same year after year. Therefore, we have sequenced the content of Science using a two year 'rolling programme' for each class which ensures that whatever path a pupil takes through the school, the National Curriculum content is covered. More importantly, our curriculum is a 'spiral curriculum' in which key concepts are presented repeatedly throughout the curriculum, but with deepening layers of complexity.

Expertise in science requires pupils to build at least 2 forms, or categories, of knowledge. The first is **'substantive' knowledge'**, which is knowledge of the products of science, such as models, laws and theories. The second category is **'disciplinary knowledge'**, which is knowledge of the practices of science. This teaches pupils how scientific knowledge becomes established and gets revised. Importantly, this involves pupils learning about scientific enquiry. Knowledge is carefully sequenced to reveal the interplay between substantive and disciplinary knowledge. This ensures that pupils not only know 'the science'; they also know the evidence for it and can use this knowledge to 'work scientifically'.

- **substantive knowledge** (knowledge of the products of science, such as concepts, laws, theories and models): this is referred to as scientific knowledge and conceptual understanding in the national curriculum
- **disciplinary knowledge** (knowledge of how scientific knowledge is generated and grows): this is specified in the 'working scientifically' sections of the national curriculum and it includes knowing how to carry out practical procedures

By learning substantive and disciplinary knowledge, pupils not only know 'the science'; they also know the evidence for it. When learning disciplinary knowledge, we focus on these areas.

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'Substantive' knowledge' is carefully 'curated' and we use 'Knowledge Organisers' to present this core knowledge. Progression in '**Knowledge and Conceptual Understanding' and in 'Working Scientifically'** are shown in our **Progression Overviews**.

By revisiting the concepts and the disciplinary knowledge, we are able to embed knowledge and create connections with prior understanding, therefore making the learning 'sticky'.

Implementation

- We use 'Grammasaurus' as a source of high quality planning for our teachers.
- Each class is taught Science weekly for half a term every term.
- High expectations and 'Cultural Capital' is gained by:
  - Using **high quality literature and texts** across the curriculum.
  - Valuing **'oracy'** and teaching high-level **vocabulary**.
  - Using **'authentic'** high quality resources. Making links to **'Primary Futures'** which shows children how what they are learning at school can lead to an interesting, exciting future, job or career.
- Teachers use 'Assessment for Learning' strategies including 'fast feedback' and the 'Teacher Assessment Record' to check learners' understanding systematically, identify misconceptions accurately and provide clear, direct feedback.
- In Science we develop sticky knowledge by:
  - Building opportunities for retrieval practice within the topic E.g Through low stakes mini-quizzes, use of flash cards, multiple choice questions or short 'Q and A' activities.
  - Using 'Flashbacks' to retrieve knowledge and skills from last week, last term and last year.
  - Using knowledge organisers.
  - Integrating new knowledge into larger key concepts

Impact

- In Science we want learners to develop detailed knowledge and skills and as a result, achieve well. This will be reflected in the end of unit quizzes. We want children to be able to talk confidently about what they have learned and how this is connected to other units of work they have been taught.
- The Subject Leader uses a range of tools to evaluate the Science curriculum including end of unit assessments, staff and pupil interviews. They will ask:
  - Is the curriculum working- what do assessments tell me? Are children progressing?
  - What impact is the curriculum having? If children are not progressing, is my subject sequenced correctly? Are layers of learning there? Are we revisiting things enough? Is teacher subject knowledge good enough? Are we meeting the needs of SEND pupils?
  - What can/cannot children do? What have they learned/not learned? How do I know?
  - What is this telling me about the organisation and sequence of the Science curriculum?

Reviewed by Ali Pook (June 2021)