



## PETERBOROUGH KEYS ACADEMIES TRUST

### Science

#### Intent:

The Science curriculum at Ravensthorpe Primary School provides children with coherent, substantive knowledge of the scientific disciplines of biology, chemistry, and physics. Beginning first with the National Curriculum, we have designed our curriculum as a progressive model around vertical concepts which provide a clear path through which to study and contextualise science and provide firm foundations for KS3 and KS4.

It also intends to embed core disciplinary knowledge, and the ability to systematically approach challenging, scientifically valid questions through:

- **Scientific Attitudes & Planning**  
asking scientifically relevant questions and designing controlled investigations.
- **Measuring & Observing**  
learning how to use scientific apparatus for measurement and make systematic close observations.
- **Recording & Presenting**  
setting up data collection tables and presenting this data in a variety of charts and graphs.
- **Analysing & Evaluating**  
interpreting and analysing findings; drawing conclusions and evaluating the reliability of investigations.

It equips children with sufficient knowledge to be procedurally fluent and for them to think, act and work like a scientist. Our curriculum is designed in a way which creates awe and wonder about science, that inspires a curiosity about natural phenomena and the world around them. It ensures that all pupils can see themselves reflected in the science curriculum, by highlighting present-day role models and the contributions of scientists from a wide range of backgrounds; and considering social and cultural values around scientific ideas.

#### Implementation:

Early Years is the first opportunity to develop our children's curiosity for Science. We implement our science curriculum by following the interests of the children through the Early Years Foundation Stage Statutory Framework which aims to guide children to make sense of the natural world around them. Through continuous provision children are able to explore their scientific interests through regularly updates, science investigation areas and through well planned challenges.

In Key Stages 1 and 2 substantive knowledge ensures pupils master core content through the development of key concepts and timely revisiting of key knowledge. The careful planning and delivery of the curriculum prevents common misconceptions that are often formed at an early age. Pupils apply and make connections between the disciplines of science, the wider curriculum, and the wider world.

Disciplinary knowledge (working scientifically) is sequenced so that they are explicitly taught and practiced alongside the substantive knowledge. It is regularly reviewed and built upon across the key stages. At Ravensthorpe we make deliberate and explicit links to other curriculum areas – particularly geography and mathematics – to ensure that pupils are always first taught content in the most relevant subject. We enjoy



conducting practical tasks that have a clear purpose: to demonstrate or prove substantive concepts, or to allow pupils to deliberately practice working scientifically in a relevant context.

When teachers plan a unit, they begin with the end in mind, having clarity about exactly what they want the children to learn. Outcomes are clear and detailed, and each lesson has a concise learning intention. We are determined that children develop the progressive skills of a scientist throughout their time at Ravensthorpe and not just learn a series of scientific facts. Substantive knowledge rich lessons where children build on prior learning and situate knowledge within carefully constructed concepts are delivered following Rosenshine's Principles of Instruction. Teachers use knowledge organisers which outline the key substantive knowledge and vocabulary which all children should master with each unit being carefully planned for progression and depth. The curriculum is well designed and developed to be ambitious for all learners and to ensure children know more, do more and can remember more. Using up-to-date research on cognitive load and how children learn most effectively, has determined our approach to implementing our science curriculum. While spacing out the introduction of new knowledge, each unit has built in practice, retrieval, and reinforcement of the key vertical concepts to ensure knowledge sticks in the long-term memory. This is achieved by using meaningful contexts in a connected way.

For each unit of learning, teachers plan for and children experience:

- The disciplinary knowledge needed to be successful scientists
- Co-operative learning to ensure high levels of accountability and engagement for all children.
- A careers pathway that highlights the range of jobs and careers that learning in science can lead to.
- Educational visits, visiting experts and artefacts to enhance the learning experience.
- Where possible, we use the outdoor environment to give first hand experience and enhance learning.
- Questioning is used to allow pupils to consolidate knowledge and understanding where necessary or to apply learning in an open manner.
- Opportunities for all pupils to see themselves reflected in the curriculum by exploring present-day role models and the contributions of scientists from a wide range of backgrounds; and considering social and cultural values around scientific ideas.
- To enable children of all abilities to access the curriculum, additional models and scaffolds are provided. Changes to pedagogy are also considered and changes to content are made in consultation with the Science Lead and the SENCO.

### **Impact:**

Our Science Curriculum is high quality, well sequenced and planned to demonstrate progression. Children will become increasingly critical and analytical in their thinking; being able to form their own theories and hypotheses based on key scientific concepts. They will become increasingly aware of the role science plays in our everyday lives, the world around and the part they play in the preservation of our natural world. Children will develop a passion for science and an enthusiastic engagement in learning, which develops their sense of curiosity in the fields of chemistry, physics, and biology.

Our curriculum is designed in a way to be suitably challenging to ensure all pupils are making good or better progress.

In addition to this, we measure the impact of our curriculum through the following methods:

- A pre learning quiz to ascertain whether children have mastered the prior learning needed to enable them to access the planned unit. This takes place prior to the start of new learning to provide time for any prior learning gaps to be addressed. This is evidenced in pupil books.
- A reflection on standards achieved against the planned outcomes.
- Low stakes quizzes.



- Pupil's books and pupil discussions about their learning which are also monitored by the subject leader.
- Writing opportunities are planned to provide children with the opportunity to write demonstrating their knowledge gained at the end of the learning sequence.
- Teachers constantly interact with children assessing their thinking, knowledge and understanding giving actionable feedback.
- Teachers review learning during lessons, spaced after the unit has been taught, and after protracted periods of time. Recall and retrieval practice demonstrates whether learning has been remembered.

Our science curriculum is also planned in a way which promotes the cultural capital of all our children. We enhance our curriculum especially for the most disadvantaged by organising Science weeks which focus on the wider world and promote careers in science. We also provide additional opportunities such as farm visits and work in the environment.