

The Curriculum Intent and Implementation for Science 'Small Village, Big Horizons'

On the Road to Emmaus – Luke 24: 12 – 35

Two travellers are transformed and enriched by sharing their journey with a guide.

Our distinctive Christian vision continues to underpin our aspiration to provide the highest educational standards possible in order to realise the potential of everyone in our school. The school has a clear Christian vision, which is rotated in our statement: Two travellers are transformed and enriched by sharing their journey with a guide. We view our work to be similar in making a difference to future lives. We travel together on our Journey of transformation and commit to our school to always being supportive, enriching and challenging.

Intent

The ambitions of our curriculum:

- High aspirations permeate across the school.
- The school offers a host of cultural experiences and enrichment opportunities.
- Our pupils develop a love of life-long reading.
- British values are an intrinsic part of the school.

Science teaching at The Emmaus Federation aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and an understanding of the uses and implications of Science, today and for the future.

Our Science teaching uses an **enquiry process** to allow pupils to learn for themselves. These processes, at work in the whole curriculum, are suited to the declarative and process knowledge required to be a scientist. We encourage children to both answer subject specific questions, but also ask their own questions about the world around them.

Our curriculum enables children to **observe, problem-solve, investigate and question** the changing world around them in their handling of scientific-based questions.

Within Science, we have identified the declarative knowledge to allow our pupils to become successful scientists. This is set out in more detail in our termly plans.

Small Village, Big Horizons	
Examples of curriculum intent	
High Aspirations	<ul style="list-style-type: none"> • High standards of expectations which are the same as core subjects. • Allow children to have a deeper understanding of events such as why, how, and when. • Use of precise and technical vocabulary to extend children’s knowledge. • Questioning throughout the lesson that extend knowledge and tests for reliability. • Encourage children to embrace challenge, question themselves and enjoy working hard
Cultural Experiences and Enrichment	<ul style="list-style-type: none"> • Year six had an afternoon of getting hands on and dissecting pig hearts which linked to their current topic. (Emmaus) • KS2 had a “WOW” day in Phoenix in which different experiments took place. (Sutterton)

	<ul style="list-style-type: none"> • Science Week was carried out in March, this involved a workshop challenge for the whole family(Emmaus) • KS1 Rand Farm trip to link with the science topic (Sutterton) • KS2 EDU team delivered live lessons such as Vet School and lambing time (Sutterton) • Resources such as Face Time a Farmer used in KS1. (Swineshead) • KS2 trip to the Space Centre.(Swineshead) • EYFS/KS2 STEM workshops. (Swineshead) • Forest Schools (Reception/Year 1) (Emmaus) • Viking Link National Grid-delivered a live lesson to yr 4/5 looking at the archaeology discovered so far
<p>Life-long love of reading</p>	<ul style="list-style-type: none"> • Classroom has non-fiction books on display that link to topic. • Book links are on topic walls. • Knowledge organiser quizzes/assessment at the end of each subject • Certain topics are taught through text-based writing. E.g. y6 evolution and inheritance <p>Guided reading and Literacy focus – text-based writing to encourage non-fiction – Science topics missed due to lockdown before Christmas.</p>
<p>British Values</p> <ul style="list-style-type: none"> • Democracy <ul style="list-style-type: none"> • Rule of Law • Individual Liberty • Tolerance & Respect 	<ul style="list-style-type: none"> • Listening to the children’s opinions and sharing their ideas • Taking turns • Knowing there are consequences if safety rules are ignored • Using the fair testing rule as a way of following guidance • Making their own choices when planning an investigation • Others may have different views on where to start • Researching famous scientists and understanding their backgrounds, where they came from, their home life and early childhood • Religious beliefs can often compete with scientific understanding • Understanding where different scientific elements come from in the world and comparing the two—for example electricity in the UK compared to other places in the world • Discussing safely and appropriately causes and protests across the world, based on animal rights or saving the environment. Debating these ideas in a calm manner and age appropriate. • Allowing children the chance to choose their resources and have a say in their experiments • Working as a team • Offering advice • Forest schools (co-operation/democracy)

Curriculum Knowledge (Declarative) in Science

The Science curriculum is carefully structure and sequenced to ensure coverage and progression as the children move through the school. The curriculum is broken down into knowledge building blocks as the knowledge is sequenced and the built upon over time: what has been taught before and what the pupils’ need to know to reach their end point – **spiral progression**. This is set out in more detail in our termly plans. The enquiry questions and the key vocabulary are implemented in

our knowledge organisers and brought to life on working walls and within learning objectives for the lesson.

There are specific curriculum areas of knowledge that build together to enable our children to become successful Scientists. These are:

1. Scientific knowledge and conceptual understanding

Ensures that children develop a secure understanding of each key block of knowledge and concepts to progress to the next stage – biology, chemistry, and physics. Ensures that children build up an extended vocabulary and apply mathematical knowledge to their understanding of Science.

2. The nature, processes, and methods of Science

Support working scientifically which is to be embedded into every science lesson. Supporting children to focus on the key features of scientific enquiry, including observing, pattern seeking, identifying, and classifying.

3. Spoken Language

Reflects the importance of spoken language in pupil's development. Supports the quality and variety of language that pupils hear and speak. Develops scientific vocabulary and articulates scientific concepts clearly and precisely.

4. Ultimate questions

Uses 'big questions' of meaning, purpose and truth to explore the world around them. Also supports misconceptions to be addressed and challenged.

Application of Knowledge (Process Knowledge)

To enable our children to become successful scientists, we have identified the application of knowledge that will be needed. The application of knowledge for each area of science studied is identified and this knowledge can then be applied across the whole curriculum so our children leave our school 'knowing more and being able to do more'. This is set out in more detail in our termly plans.

- Investigation,
- Expression
- Interpretation
- Reflection
- Empathy
- Application
- Discernment
- Analysis
- Synthesis
- Evaluation

Investigation – in science this includes:

- asking relevant questions;
- knowing how to use different types of sources as a way of gathering information

Expression – in science this includes:

- the ability to explain concepts, methods and practices;
- the ability to identify and articulate scientific understanding

Interpretation – in science this includes:

- the ability to draw meaning from scientific theories, theories and studies
- the ability to suggest meanings

Application – in science this includes:

- making the association in Science between chemistry, biology and physics.

- To ability to be able to apply a range of scientific knowledge and skills in a variety of contexts.

Discernment – in science this includes:

- explaining the significance of scientific studies and investigations

Analysis – in science this includes:

- distinguishing between opinion, belief, and fact
- distinguishing between the feature's methods of different investigations

Synthesis – in science this includes:

- linking significant features of history and Science together in a coherent pattern.

Evaluation – in science this includes:

- the ability to evaluate a finished product and scientific investigation.
- Distinguishing between opinion and fact.

Processes for Effective Learning in Science

1. Identify questions

This includes developing enquires through identifying questions, defining routes of enquiry through Science based questions and using the skill of investigation to answer the questions and enquiries.

2. Plan and carry out enquiries

This includes identifying a specific area of enquiry to be able to carry out and develop. This includes using the skills; questioning, predicting, observing, measuring, comparing, classifying and analysing a range of data, observations, and findings.

3. Present and explain findings

This involves presenting findings in a range of different ways; discussion, written reports, tables, graphs, classification grids. It includes the skill of communicating findings in a clear and concise way, suggesting interpretations of findings and analysing the range of information present.

4. Evaluate

This involves evaluating the conclusions made through enquiry and how this will impact on our own lives and the world around us.

The Daily Implementation of Science at Swineshead St Mary's

- Knowledge Organisers: Children have access to key knowledge, language and meanings to understand Science and to use these skills across the curriculum.
- Working Walls: Science Working Walls throughout the school focus on key knowledge, vocabulary and questions and exemplify the terminology used throughout the teaching of Science.
- Subject specific vocabulary: identified through knowledge organisers and working walls and highlighted to the children at the beginning of and during lessons.
- EYFS: Reception children are given a secure grounding in the Prime Areas of learning, ensuring they have a good foundation on which to build through the specific areas, including Understanding the World. Areas of provision are enhanced to ensure vocabulary understanding and extension and develop understanding of the world around them.
- Books: Children will have access to a growing variety of subject specific fiction and non-fiction books, available in Science lessons, other lessons and in the class book area. Wherever possible, text-based writing will link to the Science being taught.
- Use of equipment: Where possible we use different equipment for the children to explore and investigate. We believe that handling real life science equipment enhances the children's scientific knowledge, understanding the skills and uses for different equipment.

- Consistent teaching sequence: Science lessons will include a range of learning opportunities including putting the learning in the big picture, placing the Science being studied in the context of previous learning, a brief review of previous lesson/s, specifying key vocabulary to be used and its meaning, conducting scientific enquiry using a variety of resources and or sources, pupils interpreting their findings and communicating their scientific knowledge and understanding appropriately, before evaluating their learning and comparing with other science topics studied as appropriate.
- Learning environment: The learning environment is designed to ensure children develop their Science knowledge and continue to know more and remember more. Working walls are key drivers to this, with teachers referring to them during lessons.
- Research: Children will be asked to research scientific aspects of their learning independently. This allows the children to have ownership over their curriculum and lead their own learning in Science.
- Basic skills -English, Maths and ICT skills are taught during discrete lessons but are revisited in Science so children can apply and embed the skills they have learnt in a purposeful context. The expectation is that standards in writing in Science are comparable with standards in English lessons.
- Cultural Capital - We plan visits, visitors and in-school WOW days to provide first-hand experiences for the children to support and develop their learning.

Impact

Learning ABOUT science also enables learning FROM science. It will:

- **Develop increasingly independent enquirers**
- **Develop increasingly critical thinkers**
- **Develop a use of skills of enquiry, analysis, interpretation and evaluation.**
- **Increase their understanding of the world around them and their place in it.**
- **Develop an interest in the wider world around them.**
- **Develop a sense of identity through learning about how they can impact on the wider world.**
- **Develop a love of reading through the use of science-based fiction and non-fiction sources.**
- **Explain not only about the world but also how it works, how it fits together and how to make a difference and become positive contributors to it.**
- **Ensure the children develop the key skills of scientific enquiry, outdoor learning and fieldwork, use of equipment and materials.**
- **Develop the knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.**
- **Develop and understanding of the implications of science, today and for the future.**
- **Ensure children know more, remember more and understand more.**