The Ivory Federation

Propps Hall Junior, Infant and Nursery School Springhead Infant and Nursery School Rushcroft Primary School

SCIENCE POLICY

RATIONALE

Science is the most powerful method we have for understanding our world. Science fosters a healthy curiosity in children about natural phenomena and events in the environment in which we live. Through the use of an exciting curriculum, children are exposed to a wide range of scientific knowledge. The children are able to make links with existing concepts, have the opportunity to develop their own ideas, assisting in gaining a greater understanding of the science of our world.

Our intention is to inspire and enthuse the children to develop their own curiosity and questioning through independence, exploration and hands on experiences. Good teaching in science lights the fires of interest in children, promoting a commitment to learn and developing a deeper level of understanding. The children learn to question and discuss science-based issues that may affect their own lives, the directions of society and the future of the world.

The 2014 national curriculum for science aims to ensure that all children:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

PURPOSE

- To acknowledge that children have preconceptions that require exploration in order to help children to develop their thinking.
- To use models as an essential part of developing and sharing scientific knowledge, to assist is providing a bridge between children's current ideas and new understanding and helping to simplify things and make them easier to manage and understand.
- To help children to direct their own learning through**; cognition**–children understanding about strategies they can use to learn; **metacognition–**children being able to monitor and purposefully direct their learning and **motivation–**childrens' motivation to learn, including their self-beliefs and interest in topics.
- To support children in their ability to retain and retrieve knowledge.
- To use practical learning purposefully and as part of a learning sequence in science.
- To teach new scientific vocabulary and assist children in becoming competent in the language of science.
- To develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.

BROAD GUIDELINES

CURRICULM ORGANISATION

Children are taught through a thematic curriculum, with the teaching and learning of science being based on exploration, observation and application. The theme is changed each half term to ensure children are exposed to many different scientific topics throughout their time at our school. The thematic curriculum also extends to the Early Years Foundation Stage and the children are taught science through 'Knowledge and Understanding of the World.'

The long-term curriculum plan details the overarching topic each half term and the curriculum subjects being taught within it, this also includes subject specific detail.

The medium term plans provide teachers with the specific units of learning and desirable learning outcomes for each subject. The learning intentions and outcomes directly link to the overarching theme and ensure good curriculum coverage and knowledge acquisition. Links to other areas of the curriculum that enhance the children's understanding of science are identified and incorporated into the document. Each topic is taught as a block of learning each half term.

STRUCTURE OF LESSSONS

The way our school structures science is based on available evidence as detailed in the EEF educational research document 'Improving Secondary Science'. The recommendations within the EEF report are relevant to all key stages and it provides robust accessible guidance for teachers of science. This document, alongside the 'learning blueprint' of our school and our educational offer has informed how we structure our teaching.

Throughout a unit of learning all teachers will ensure that children will have the opportunity to:

1. Build on existing ideas (prior learning and preconceptions)
2. Observe and question (create enquiry)
3. Hypothesise (based on learning from points 1 & 2)
4. Explore and investigate (through practical application)
5. Draw conclusions and communicate ideas



**Appendix 1 provides additional support on how to teach the above structure*

Teachers will support children to retain and retrieve knowledge through; paying attention to cognitive load—carefully structuring tasks to limit the amount of new information pupils need to process; revisiting knowledge after a gap to help pupils retain it in their long-term memory; providing children with the opportunities to retrieve the knowledge that they have previously learnt and encouraging children to elaborate on what they have learnt.

Teachers will use models to help pupils develop a deeper understanding of scientific concepts. Models will only be used if they aid understanding and the ideas that the models are based on should be familiar to the children. Children should understand how the model shown supports the idea or concept.

Teachers will use practical activities purposefully and ensure they are part of a learning sequence. It is important that teachers are clear about the skills or knowledge they are trying to develop in the children with a particular practical activity. A variety of practical approaches will be used to expose the children to the processes of practical science in order to assist in developing the children's scientific reasoning.

Teachers will carefully select the vocabulary to teach and focus on the most-tricky words. They will show the links between words and their composite parts and use activities to engage pupils with using scientific language and helping them to understand it. Additionally, teachers will encourage children to see themselves as a scientists and use the working scientifically 'I am a scientist because….' statements. *(see appendix 2 for statement specific year group terminology)*

Progression over time and in lessons is to be recognised as a pivotal element of our science offer and it is the teacher's responsibility to ensure that learning is progressive, where prior knowledge is recognised as a foundation in which to build upon.

All children should complete at least one investigation per half term. These investigations should be based on their current topic but have a focus on developing the children's scientific skills.

Science attainment and progress is assessed through both formative and summative assessment processes using a wide range of sources such as books, pupil voice, data captures. More information related can be found in our assessment policy.
The assessment and recording systems are detailed and in line with the school Assessment Policy

USE OF RESOURCES

There are a wide range of resources available to the school which will be maintained and monitored by the Science Leaders. The resources are a collective responsibility for the whole school, and children are encouraged to treat resources carefully and safely. Children are expected to, where appropriate, to choose their own equipment and set such equipment up for practical Science. This should be done under adult supervision with health and Safety requirements in mind. By doing so, they:

- make sensible choices about which equipment to use
- treat the equipment with care
- use the equipment with their own and other's safety in mind
- become independent learners

The school grounds and surrounding areas offer a great resource for staff and pupils.

ROLE OF THE SUBJECT LEADER

A good science leader ensures that all pupils can develop their understanding of the big ideas of science, and learn the skills needed to work like a scientist, because their teachers are confident practitioners who deliver an enquiry-rich curriculum with access to appropriate resources.

They plan improvement that:

- builds their school's science curriculum, raises standards for children and leads colleagues to teach science better.

Science Leaders:

- keep up to date with broad developments in science and science education, and consider how to share these with colleagues and pupils when appropriate
- are aware of, and take responsibility for, developments that affect school science policy, including health and safety
- are aware of, and take responsibility for, addressing gender stereotyping in science lessons and enrichment activities
- implement a whole-school vision for science, and advise and support colleagues on the pedagogy and appropriate resources to achieve it
- ensure that they access continuing professional development (CPD) for leadership of science, and that colleagues access CPD to address their requirements too
- monitor provision of science and pupils' progress, and contribute to the strategic development of learning in school.

CONCLUSION

The successful implementation of this policy will assist in ensuring our children are exposed to a quality scientific curriculum that strives to ignite and enthuse them for life long learning. Children will gain a better understanding of the world in which we live and understand the function of science within it. Teachers will have a structure in which to teach the core content of the National Curriculum which will allow them to ensure children have the scientific skills required to understand the uses and implications of science, today and for the future. Our offer will hopefully inspire children to become the scientists of the future.

Policy written February 2020

Appendix 1

Ideas to support teaching throughout the unit of learning

1. <u>Build on existing ideas (prior learning and preconceptions)</u>

Images to stimulate thought
Subject specific vocabulary
Key open-ended questions
Photo/ example/objects from the previous learning task
Mind mapping or concept drawings
KWL grids
Communication and discussion
Learning journey / journals



<u>2. Observe and question (create enquiry)</u>

Use of objects or video clips
Experiment with resources
Create a problem
Use a good model to demonstrate
Hot seating or thunks
Hooks to promote discussion
Sensory exploration
Use of outdoors
Curiosity box



<u>3. Hypothesise (based on learning from points 1 & 2)</u>

Refer back to KWL and existing ideas
Scenarios
Explanations
Compose/ draw / write
Ask a question
State a case
Start to make connections



<u>4. Explore and investigate (through practical application)</u>

Collect results
Draw, write, observe, taste, listen
Practical experiment
Use a various methods and a range of equipment
Adjust and adapt
Trial and error
Investigation station
Use of outdoors



<u>5. Draw conclusions and communicate ideas (what do the children know and understand?)</u>

Science wall
Mind mapping with connections
Concept drawings
Make a movie
Debate and discuss
Teach somebody else
Graphs and data collection
Written evaluation or report writing
Presentation to others
Green screen- presenting and recording
Music / songs/raps





Appendix 2

Working scientifically skills















