

**Science Policy**

**May 2022**

 **Contents**

1. **Curriculum**
2. **Principle Focus**
3. **EYFS**
4. **Key Stage One**
5. **Lower Key Stage Two (Year 3 & 4)**
6. **Upper Key Stage Two (Year 5 & 6)**
7. **Organisation**
8. **Teaching and Learning**
9. **Recording of Learning**
10. **Assessment**
11. **Monitoring and evaluation.**
12. **Safety**
13. **Resources**

**10. Review**

1. **Curriculum**

**Intent**

 The 2014 national curriculum for science states to ensure that all pupils:

* 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 enquires 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.

At Errington Primary School, we encourage children to be inquisitive throughout their time at the school and beyond. The science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe science encompasses the acquisition of knowledge, concept skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills .We ensure that the Working scientifically skills are built-on and developed through the children’s time at the school so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

**Implementation**

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

* Science will be taught in planned and arranged topic block by the class teacher, to have a project-based approach. This is a strategy to enable the achievement of a greater depth of knowledge.
* Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find answers for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up.
* We build upon knowledge and skill development of the previous years. As the children’s knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasing confident in their growing ability to come to conclusions based on real evidence.
* Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children’s school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
* Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children’s understanding of their surroundings by accessing outdoor learning and workshops with experts.
* Children are offered a wide range of extra-curricular activities, visit, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.
* Regular events, such as Science Week or Project days, such as Space Camp, allows all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involves families and the wider community.

**Impact**

The successful approach at Errington Primary results in a fun, engaging, high quality science education, which provides children with the foundations and knowledge for understanding the world around them. Frequent, continuous and progressive learning outside the classroom is embedded throughout the science curriculum. Through various workshop, trips and interactions with experts and local charities, children have the understanding that science has changed our lives and that it is vital to the world’s future prosperity. Children learn the possibilities for careers in science, as a result of our community links and connection with national agencies such as STEM association and the Institute of Education and learn from and work with professionals, ensuring that children have access to positive role models within the field of science from the immediate and wider local community. From this exposure to a range of different scientists from various backgrounds, all children feel they are scientists and capable of achieving. Children at Errington Primary overwhelmingly enjoy science and this results in motivated learning with sound scientific understanding.

**2. Principal Focus**

 **a. EYFS**

The Foundation Stage deliver science content through the ‘Understanding of the World’ strand of the EYFS curriculum. This involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the Development Matters attainment targets.

**b. Key stage 1**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. Children are encouraged to be curious and ask questions about what they notice. They are helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science is done through the use of first-hand practical experiences, but there is also some use of appropriate secondary sources, such as books, photographs and videos. By the end of the year pupils read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

**c. Lower key stage 2 – Years 3 & 4**

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. Children are given every opportunity to write scientifically through a range of cross curricular writing activities.

**d. Upper key stage 2 – Years 5 & 6**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They also begin to recognise that scientific ideas change and develop over time. They select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings in their writing.

**3. Organisation**

Science will be taught and arranged into topic blocks by the class teacher and have a project-based approach. There are 5 topics (4 topics for Year 1 and 2) that can be covered at any point throughout the year.

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| --- | --- |
| **Year group** | **Topics to be taught throughout the year** |
| 1 | Plants | Animals, including humans | Everyday materials | Seasonal changes |
| 2 | Living things and their habitats | Plants | Animals, including humans | Uses of everyday materials |
| 3 | Plants | Animals, including humans | Rocks | Light | Forces and magnets |
| 4 | Living things and their habitats | Animals, including humans | States of matter | Sound | Electricity |
| 5 | Living things and their habitats | Animals, including humans | Properties and changes of materials | Earth and space | Forces |
| 6 | Living things and their habitats | Animals, including humans | Evolution and Inheritance | Light | Electricity |

**4. Teaching and learning**

 Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Children’s starting points are identified at the beginning of each science topic and the children are able to convey and record what they know already, what they think they know, and any questions they have. At the end of the block, children’s knowledge is checked in line with the key knowledge identified prior to the teaching block. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary and teachers ensure that this is developed within each lesson and throughout each science topic. The science curriculum ensures that children are provided with regular opportunities to apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. Children are also able to suggest what they would like to learn at the start of each teaching sequence and this ensures that teachers are able to adapt the programme of study to ensure that this is informed by children’s interests and to maximise their engagement with and motivation to study science.

The nature, processes and methods of science

‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group and this is embedded within lessons and focuses on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils are given opportunity to seek answers to questions through collecting, analysing and presenting data.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils’ development across the whole curriculum – cognitively, socially and linguistically. At Errington Primary School, science lessons provide a quality and variety of subject specific language to enable the development of children’s confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely. They are encouraged and assisted in making their thinking clear, both to themselves and others, and teachers ensure that pupils build secure foundations by using discussion to probing and remedying their misconceptions.

**5. Recording of learning**

**Key Stage One:**

In key stage one a ‘Big Book’ is used for recording children’s collaborative science learning. Individual work is either recorded in their topic books and/or uploaded onto their digital portfolio (Evidence Me). The Big Book includes photographs, children’s comments, drawings, tables, graphs, annotated diagrams, classification keys and writing. Having a class Big Book means it is easier to track changes in children’s ideas and understand how children are developing their understanding of science.

Each Big Book provides an insight into how children are working scientifically as it enables teachers to make a valid assessment of children’s practical science skills and all types of scientific enquiry by drawing on a body of evidence collected over time. Big Books also promote collaboration and group work in science as many investigations require that children work in groups, and avoids the need to photocopy outcomes for individual records.

We have found using Big Books helps to motivate the children as they are excited and enthusiastic about having their work ‘published’ in their class Big Book. The advantages of a Big Book are that it provides an opportunity for the reluctant writer, the dyslexic child, the EAL child, SEND (and many others) to demonstrate their knowledge and skills in a safe environment because it removes many barriers to learning.

**Key Stage Two:**

In key stage two the children’s learning is either recorded in their topic books and/or uploaded onto their digital portfolio (Evidence Me). The purpose of these books is to: record work from classroom-based tasks; write short self-reflections about their learning; record and annotate photographs of learning or specific achievements. Learning should be recorded in these on a regular basis. Using their knowledge organisers, children are able to revisit their prior learning before starting a new science topic. There is a large emphasis on vocabulary and reading between subjects so that pupils are clear in the meanings of the technical vocabulary they are learning about.

**6. Assessment**

Children’s progress is continually monitored throughout their time at Errington Primary School and is used to inform future teaching and learning. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.

Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of process based ‘success criteria’, provided by and explained by the teacher. Children will have these to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work.

Assessment for learning is continuous throughout the planning, teaching and learning cycle. However children are more formally assessed half termly in KS1 and KS2 using a variety of methods:-

• Observing children at work, individually, in pairs, in a group, and in classes. • Questioning, talking and listening to children. • Considering work/materials / investigations produced by children together with discussion about this with them. • Pupil’s self-evaluation of their work (in key stage two).

Children identify what they know already about each topic, what they think they know, as well as what they would like to know. The programme of study is responsive to the children’s starting points, as well as their specific interests. It also ensures a focus on the key identified knowledge of each topic, which is mapped within and across year groups to ensure progression. At the end of each blocked science topic, this key knowledge is checked. Outcomes of work also evidence its acquisition.

Teacher assessment in science should consider a large body of evidence of the child’s knowledge, their conceptual understanding of scientific processes and their independent practical science skills. Some children will find it easier to explain what they understand, make predictions, plan investigations, or describe their findings from their practical work, orally, rather than in a written format. Using the Big Books in key stage one enables teachers to record oral feedback from children (as well as written work) and use this when making formative assessments to inform planning.

In EYFS, we assess the children’s Understanding of the World according to the Development Matters statements and some aspects of Expressive Arts Design are also science based.

**7. Monitoring and evaluation**

The Subject Leader monitors and evaluates work through carrying out; careful examination of work uploaded onto Evidence Me; a book scrutiny of pupils’ work; lesson observations; monitoring of planning. It is the responsibility of the subject leader and the class teacher to monitor the standards of children’s work. The subject leader is also responsible for supporting colleagues in their teaching, for being informed about current developments in the subject, and for providing a strategic lead and direction for science in the school.

**8. Safety**

Teachers must plan safe activities for science and complete a risk assessment if necessary. Teachers and teaching assistants need to be aware of health and safety procedures when using equipment/food in science lessons. Pupils must be aware of the need for personal safety and the safety of others during science lessons.

**9. Resources**

We have sufficient, high-quality science resources to aid and support the teaching of all units and topics taught, from EYFS to Y6. We keep these in a central store (STEAM Room), where they are labelled and easily accessible to all staff. EYFS have a range of resources kept in classes, for simple access for children during exploration. The library contains a good supply of science topic books to support children’s individual research. The subject leader must be informed of any changes regarding science resources i.e. missing or broken resources and/or when new or replacement resources are required.

**10. Review**

This policy will be reviewed every year or in the light of changes to legal requirements.

**Headteacher: Date:**

**Chair of Governors: Date:**

**Science Co-ordinator: Date:**