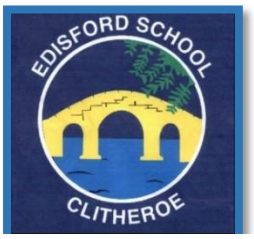

Confidence. Persistence. Getting Along. Organisation. Resilience.

Science Policy

School Vision

Edisford Primary School seeks to broaden children's experiences, ensuring that they build personal characteristics alongside strong academic progress. We do this through a first-hand learning approach wherever possible, so that children learn key characteristics for success, as well as teaching core skills and knowledge associated with each subject.

Science Intent

Our Science lessons at Edisford aim to teach children a fascination and curiosity about the scientific world. Science is vital within our lives and we believe that all children should be taught sound scientific learning. We consider science skills to lead to a strong foundation of understanding of how the world and scientific processes work, whilst also acknowledging that the ability to present rational explanations, keenly observe, make sensible predictions and record accurate data, are highly valuable, transferrable skills. Within our long-term plan, children learn about all aspects of the Science National Curriculum in a spiral curriculum. This allows them to make links with prior knowledge and delve deeper as they progress through the units to build a holistic and deep understanding of the scientific world. More than this, our curriculum builds in the Edisford ethos of first-hand experience and new vocabulary, endeavouring to create long-term memorable knowledge and understanding.

Key to our teaching are the separate disciplines of Science:

1. Biology

Learning about animals including humans, growth, lifecycles, human development, the digestive system and the circulatory system. Children learn key facts to build their knowledge about animals and develop their understanding of the principles of scientific enquiry. They also learn about living things and their habitats and also plants, including looking after our environment. Throughout children learn how to perform scientific enquiry through measuring, recording, observing and analysing data.

2. Chemistry

Children build their knowledge and understanding of scientific enquiry through chemistry units, such as recycling and materials, exploring everyday materials, rocks, uses of everyday materials, states of matter, properties of materials and changes in materials. Opportunities are made for children to perform investigations throughout these units, in order to understand how to observe, measure and record scientific events.

3. Physics

Children learn about physical processes in science lessons, such as the changing seasons, the planets in our solar system, climate change, light, forces and magnets, electricity, sound, Earth and space. Within these units, children undertake scientific enquiry, which is embedded within the units.

Inherent within each discipline is:

4. Scientific Enquiry and Working Scientifically

We wish our children to learn the key methods and processes for working scientifically. Therefore, throughout KS1, we teach them how to ask questions, recognise the many ways they can be answered, observe closely, use simple equipment, perform simple tests, identify and classify, use their observations and ideas to answer questions, gather and record data. In KS2, we build on this by teaching children to set up fair tests to answer questions, ask relevant questions, make systematic observations, take measurements accurately, gather and record data, classify and present data, record findings in a variety of scientific ways, draw scientific conclusions, identify similarities and differences and use straightforward scientific evidence to answer questions. In upper Key Stage 2, we encourage children to be ever more precise, how to control variables, record and present data of increasing complexity, draw conclusions and identify causal relationships, and delve deeper into current scientific evidence to support or refute ideas or questions.

Teaching Methods

We use the Developing Experts Science curriculum to form the basis of our Science teaching. We aim to stimulate children's innate curiosity in the scientific world – to be able to classify and observe the natural world, to be aware of physical processes and to experiment with the materials around us. We want them to understand that science can

be broken down into Biology, Chemistry and Physics and that they must work scientifically to draw evidence-based conclusions. To foster long-term scientific knowledge and understanding, our Edisford ethos is inherent throughout the Science curriculum:

First-hand Experience

We foster a love of learning about the world through first-hand experience. This gives children:

- **Memories**: More memorable learning because it is interactive – children learn through experimenting and observing themselves.
- **New Vocabulary**: Learn new scientific vocabulary to describe the scientific world around them. We highlight a smaller bank of key words on our planning which we insist that children learn.
- **Practical Scientific Enquiry**: Putting theory into practice e.g. testing hypotheses and drawing conclusions from their own experiments. We also teach using demonstrations from the teacher – this allows all children to see first-hand the process of scientific enquiry.

This expresses our core ethos of 'fun, charisma and memories'.

We want children to learn the core skills associated with the study of Science, set out in the National Curriculum, but we also aim to widen children's experiences, study the science in their local area (and deepen their understanding by applying it practically.

Subject Leadership

The subject leader uses the Royal Society for Biology, Physics and Chemistry, and the Association for Science Education to support their knowledge of science teaching and learning. The subject leader refers to the Primary Science Knowledge and Understanding and Working Scientifically text books to substantiate knowledge and ensure that misconceptions are not being taught.

Units and Sequencing

EYFS

Children are taught scientific knowledge and understanding throughout a main theme. They cover science every half term. There are four clear science objectives taught for each topic. In addition, opportunities are created for scientific learning both indoors and outdoors e.g. when counting leaves, children also classify and name (oak, deciduous) and describe the shape (like a hand or palm). Reception also have four outdoor learning weeks per year which focuses on the changing seasons.

In Reception, children cover Science through their Areas of Learning, especially Understanding of the World within the Natural World. There is an overall theme where discrete science activities are taught and scientific skills and knowledge are learnt e.g. Within the theme 'Me, me, me!', children learn about their body and the scientific names for each part of the body and these are carefully sequenced with new learning in Key Stage One. They aim for children to play and explore, think create and think critically and engage in active learning. This allows them to make links and study cause and effect, and problem solve about the scientific world.

Key Stage One

In Year 1 and 2, learning in Science is blocked, so children study each unit through two separate weeks of sequential lessons (e.g. Weeks 1 and 4 or 2 and 5). This equates to six objectives per half term. Teaching and learning is then consolidated throughout the half term to ensure there are no large gaps in learning between units.

Animals including Humans

In KS1, children study animals including humans to name and identify common animals. They use the terms herbivore, omnivore and carnivore to describe animals, too. They describe and compare the structure of different types of animals (vertebrates and invertebrates) and also learn about their own human bodies. They build on this throughout KS1 to learn that animals have offspring, have a lifecycle and that they grow and change. They learn that they have basic needs to stay alive, such as water, food and air. Children also learn that animals need to stay healthy to survive.

Living Things and Their Habitats

Children learn about the concepts of living, dead and never alive. They study the habitats of animals and describe how they provide basic needs for animals. They identify a variety of plants living in the habitats and link this to how animals find their food. Children study different habitats around the world and compare and contrast them.

Plants

Children identify the common wild and garden plants around them and use the terms deciduous and evergreen to describe them. They identify the basic structure of plants and use the correct terms e.g. stem, petal, root. They build on this in Year 2 by learning how seeds and bulbs grow into mature plants. They describe how plants need water, light and a suitable temperature to grow and mature. They observe first-hand how plants grow and use the terms 'germination' and 'reproduction' to explain the life cycle of a plant.

Exploring Everyday Materials

Children learn to distinguish between the object and the material from which it is made, identify everyday materials such as wood and plastic, describe simple physical properties of materials such as whether they are waterproof or absorbent, and compare and group together a range of different materials and their properties. ~They then build on this to identify the suitability of different materials for different purposes e.g. glass for windows, and how some solid materials can change their shape. This forms the starting point for Key Stage 2 to build upon.

Seasonal Change

Children observe changes across the four seasons, describing the weather associated with each season. They note the changes in the plant kingdom that occur throughout the year and relate this to how much light we have and the length of the day.

Summary

The Key Stage 1 curriculum is designed to teach children sequentially over time about the scientific world. They also learn some key scientific enquiry skills to prepare them for Key Stage Two in working scientifically, such as observation, recording data, fair tests.

Key Stage 2

In Years 3 to 6, children study Science twice a week, which equates to twelve lessons in that unit.

Animals including Humans

Children study the skeletal system, learning how skeletons help to protect and support those animals that them. #They learn how muscles work together with the skeletal system to move the body. They also identify that animals need the right sort of nutrition and that they get this nutrition from what they eat. Children also learn about the digestive system and its basic parts. They identify different types of teeth and their simple functions, too. They also study food chains, looking at producers and predators and prey. Building on this, children in upper key stage 2 look at how the human body ages and grows, noting how the body develops. They also study the circulatory system, including the heart, blood vessels and the blood. They recognise the impact of diet, exercise, drugs and lifestyle on the body, too. They describe the way nutrients and water are transported in animals. In Evolution and Inheritance, children learn that living things have changed over time, that fossils give us clues to this, that living things produce offspring, and how offspring vary from their parents. They learn that animals adapt to their environment in different ways and this adaptation is known as evolution.

Light, Sound, Forces and Magnets, Electricity and Earth and Space – Physics

Children recognise that they need light in order to see, that light travels in straight lines and is reflected off surfaces. They learn about the dangers of looking directly at the Sun, and that shadows are formed when light is blocked. Children also learn to explain forces, comparing how things move on different sources due to friction, how magnetic forces behave, find magnetic materials and describe magnets as having two poles. They explore how gravity affects things, the effects of air resistance and how some mechanisms such as pulleys, levers and gears allow a smaller force to have a greater effect. They study electricity and identify common electrical appliances. They construct different circuits and name the basic parts, recognise that switches open and close a circuit, and identify insulators and conductors. They build on this in upper Key Stage 2, by showing that the brightness of the lamp is affected by the voltage of cells used. They learn to use symbols to show a circuit in a diagram. They identify how sound is made through vibrations and that these travel to the ear so we can hear. They describe the movement of the Earth

and the other planets relative to the Sun and the solar system. They describe the movement of the moon in relation to the Earth. They explain day and night through the rotation of the Earth on its axis.

Changes in Materials, Properties of Materials, States of Matter and Rocks – Chemistry

Children learn to compare and group together materials with similar properties, learn that dissolving, mixing and changes of states are reversible changes, explain the formation of new materials and non-reversible change, describe how fossils are formed, group different kinds of rocks based on their properties and appearance, and recognise that soils are made from rocks and other organic matter. They learn about states of matter, grouping together solids, liquids and gases and observe the changes of state when materials are heated or cooled. They note the changes of state in the water cycle, too. This builds on the learning in Key Stage 1, where children identified different types of materials.

Working Scientifically in EYFS, Key Stage 1 and 2

As well as scientific enquiry being inherent in every unit, one unit explores this in depth at the start of Year 3. Teaching picks out one objective for scientific enquiry discretely This allows them to learn the building blocks for scientific investigation in Key Stage 2.

Every unit focuses on key aspects of scientific enquiry, which is planned out in a sequence. This is so children can build their understanding over time, recapping and learning new aspects to working scientifically.

Inclusion

At Edisford, all curricular subjects will be taught inclusively to all children to take into account their special needs, race, religion, culture, gender, sexual orientation and their family circumstances.

Differentiation

- Children with SEND are identified on the SEND register. They are children who make slow progress despite high quality teaching and intervention. They do not miss the same lesson each week when they undertake focused learning through interventions. Work and learning is differentiated for them in the classroom so that they can access the learning and make good progress.

- Equally, children of lower ability, who are at risk of falling behind, still have access to a full and broad curriculum. They also undertake focused work with teaching assistants, but do not miss the same lesson each time. Work and learning is differentiated for them to access the same outcomes.
- Higher ability children are given more challenging work when they have reached an expected standard. This may be in the form of a challenging question to answer or expressing data in a more challenging way.

Subject Monitoring

Science is monitored **each term**, through observations, work scrutiny and pupil interviews. These are performed by the subject leader. This is fed back in SLT and staff meetings in a model of continuous improvement.

Autumn term – Learning walk/observations

Spring term – Work scrutiny/observations

Summer term – Pupil interviews/Work scrutiny

Assessment

Teachers use a range of ways to assess children's knowledge and understanding in Science. This includes end of unit quizzes, recaps at the start of each lesson, and live re-shaping of lessons dependent on knowledge and understanding. Both substantive knowledge (facts) and disciplinary knowledge (scientific enquiry) are assessed.

Prior Knowledge

We recognise that it is important to assess prior knowledge before moving on to ensure it is consolidated.

Science is assessed summatively at two points in the year:

- Mid-point (End of Spring first half term)
- End-point (End of the Summer second half term)

Teachers also use statements for an expected standard at each assessment point in the year. Teachers assess each unit taught at the mid-point and use this to inform the end-point assessment.

Cross-curricular

Children use a range of skills and the expectation is that this compares with a similar English, Maths and Science ability.

Maths skills might be:

- Pie charts (calculating percentages etc.)
- Bar charts (to compare amounts e.g rainfall etc.)
- Line graphs (for temperature etc.)

English skills might be:

- Captions for diagrams
- Scientific reports to record investigations.
- Comprehensions and cloze exercises
- Explanations to show how something works.

Spiritual, Moral and Cultural Development

The study of Science offers children the opportunity to establish the foundations for understanding of the world through the three scientific disciplines. They work together in pairs and groups, study theirs and others bodies, think about how the world began and our place in the world, the variety and diversity of the animal and plant kingdom, the scientific theories established by famous scientists and the beauty of nature. They gain a better understanding of the diversity in the world and this promotes the British values of tolerance and acceptance.

Continuous Professional Development

Training is given by the subject leader and the SLT through discussions and coaching in staff meetings. Teachers scrutinise their own books during assessments and moderate with other teachers. SLT learning walks, subject leader observations and work scrutinies hone the teaching of Science.

This policy was reviewed and renewed in November 2022.