Edison Primary Science Policy

Date	Review Date	Coordinator	Nominated Governor
March 2022	March 2024	Sunita Vnar Rita Faransis	Standards Committee

Curriculum Statement Intent

The 2014 national curriculum for science aims 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 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 at Edison Primary, 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, concepts, 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 throughout 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.

Our whole school approach to the teaching and learning of science involves the following;

● Science will be taught in planned and arranged in Orange Science books. 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 out answers for themselves. This is 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 the knowledge and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient 3 in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.

● Working Scientifically skills are embedded into each lesson to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching.

- 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.

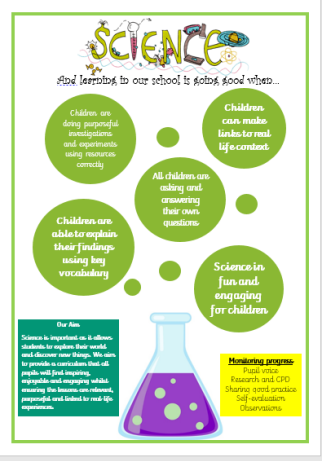
● Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.

● Regular events, such as Science Week or project days, such as World Science Day, allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. Some of these events involve families and the wider community.

Impact

The successful approach at Edison Primary results in a fun, engaging, high-quality science education, that provides children with the foundations and knowledge for understanding the world. Our engagement with the local environment ensures that children learn through varied and first hand experiences of the world around them. Frequent, continuous and progressive learning outside the classroom is embedded throughout the science curriculum. Through various workshops, trips and interactions with experts, 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 the STEM association 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 Edison Primary overwhelmingly enjoy science and this results in motivated learners with sound scientific understanding.

1. Teaching and Learning



Staff and children were involved in the creation of the Edison Primary Science Principles.

Science principles informed by staff and pupil voice, to represent Edison Primary's aims for science learning. Science is good when;

- Children can make links to real life context
- Children are doing purposeful investigations and experiments using resources correctly
- All children are asking and answering their own questions
- Children are able to explain their findings using key vocabulary
- Science in fun and engaging for children

These posters are on display on the working wall in science and referred to throughout the coverage of each science topic.

● 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.
● Teachers ask a range of questions which enable all children to take part, listening carefully to answers and taking learning forward, using open and closed questions and allowing children time to think.
● 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.
● New vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
● Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career. The key knowledge for each topic and across each year group is mapped across the school and checked at the end of each science topic.

● 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 by accessing outdoor 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. 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.

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. Edison Primary 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.

2. Assessment

Children's progress is continually monitored throughout their time at Edison 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.

The programme of study takes 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. 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.

3. Planning and Resources

Planning is a process in which all teachers are involved. Planning should be done with parallel teachers. All teachers should keep a copy of the termly and weekly planning in the shared files. We use the Snap Science scheme of work and the HeadStart scheme for assessment. Teachers also have access to the Hamilton resources and are able to source further support and resources, inline with national pedagogy, from the National Stem Centre.

Further evidence of 'good science' taking place in classrooms includes:

● An active learning environment, showcasing the Edison Primary Science Principles, and relevant Working Scientifically posters for age phase on the working walls during science topic coverage.

● Children being encouraged to ask and answer questions and discuss their work and ideas.

● Children devising and conducting their own investigations within the context of the relevant curriculum content, as well as being given opportunities to develop their working scientifically skills.

● Children recording their findings in a variety of ways.

● Children showing enjoyment in the activities they are undertaking.

● The cross curricular teaching of science. We have sufficient, high-quality science resources to aid and support the teaching of all units and topics taught, from EYFS to Y4 and this will develop as the school grows. We keep these in a central store, where they will be 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.

5. Organisation

Science will be taught and recorded in Science books. Below is the long term plan of Science for the whole school. These topics can be taught in any order but must be organised and planned at the start of the year.

AGE STAGE	YEAR Group	AUTUMN		SPRING		SUMMER	
EYFS	Reception	ANIMALS	PLANTS	OBJECT AND MATERIALS	LIGHT & SPACE	ELECTRICITY & MOVEMENT	THE LOCAL ENVIRONMENT
KS1	1	PLANTS & PLANT DETECTIVES	ANIMALS ANTICS	LOOKING AT ANIMALS	OUR CHANGING WORLD:SENSING SEASONS	USING OUR SENSES	EVERYDAY MATERIALS
		Observe plants throughout the year Observe seasonal changes (LIGHT & ASTRONOMY) throughout the year (including sunlight, weather and link with plants)					
	2	1. OUR CHANGING WORLD 2. WHAT IS YOUR HABITAT	3. THE APPRENTICE GARNDER		4. MATERIALS GOOD CHOICES & SHAPING UP		5. TAKE CARE 6. GROWING UP
		Observe plants and animals in the local environment throughout the year					
LKS2	3	HOW DOES YOUR GARDEN GROW	OUR CHANGING WORLD	CAN YOU SEE ME?	AMAZING BODIES	THE POWER OF FORCES	ROCKS DETECTIVES
	4	1. 'OUR CHANGING WORLD 2. 'IN A STATE'		3. WHERE DOES ALL THAT FOOD GO? 4. HUMAN IMPACT		5. SWITCHED ON 6. GOOD VIBRATIONS 7. WHO AM I	
		Use the local environment throughout the year to identify, study and observe changes of plants and animals in their habitat					
UKS2	5	'LIVING THINGS & THEIR HABITATS'	'EARTH & SPACE'	'FORCES'	'PROPERTIES & CHANGES OF MATERIALS'	'PROPERTIES & CHANGES OF MATERIALS'	'PROPERTIES & CHANGES OF MATERIALS'
		Observe life cycles of plants and animals in the local environment throughout the year 'ANIMALS, INCL HUMANS' (Y5 Human life cycles) teach through PSHE lessons plus ideas incorporated into 'Living Things and Their Habitats'					
	6	'LIVING THINGS & THEIR HABITATS' (classification)	'EVOLUTION & INHERITANCE' (incL adaptations)	'ANIMALS, INCL HUMANS' (Circulatory system and Exercise)	HEALTH 'ANIMALS, INCL HUMANS' (Keeping Healthy, Diet & Lifestyle)	LIGHT & ASTRONOMY 'Y6 LIGHT'	ELECTRICITY

Working Scientifically

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.

KS1

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. They should be encouraged to be curious and ask questions about what they notice. They should be 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 should 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 should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. 'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

KS2

The principal focus of science teaching in key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should 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 should 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 should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the

programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.