THORPLANDS PRIMARY SCIENCE CURRICULUM & STRATEGY

Intent

At Thorplands Primary School, we recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in Primary Schools, we give the teaching and learning of Science the prominence it requires.

The Scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world, and with developing skills associated with Science as a process of enquiry. It will develop the natural curiosity of the child, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence.

At Thorplands Primary School, in conjunction with the aims of the National Curriculum, our Science teaching offers opportunities for children to:

- 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;
- be equipped with the scientific knowledge required to understand the uses and implications of Science, today and for the future;
- develop the essential scientific enquiry skills to deepen their scientific knowledge;
- use a range of methods to communicate their scientific information and present it in a systematic, scientific manner, including I.C.T., diagrams, graphs and charts;
- develop a respect for the materials and equipment they handle with regard to their own, and other children's safety;
- develop an enthusiasm and enjoyment of scientific learning and discovery.

We endeavour to ensure that the Science curriculum we provide will give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.
For more information, please refer to the NPAT Science Narrative.

Implementation

At Thorplands, the children are taught discrete Science for a minimum of one hour per week in KS1 and two hours per week in KS2. Science is taught through six high-dividend concepts:

1. Energy,
2. Forces,
3. Matter,
4. Earth and Space,
5. Life and

All these are taught alongside being shown how to use scientific skills, investigative skills and questioning.

The children are taught in a range of practical ways, to guarantee that they have been exposed to a variety of different Scientific enquiries. Children have the opportunity to learn through taking part in practical, hands on tasks and experiments, observing and questioning. Investigations will be reinforced with knowledge and understanding that they have gained from the experience. They have the opportunity to implement their own investigations right from Reception.

Our curriculum ensures progression of substantive and disciplinary knowledge, building sequentially on prior knowledge in small steps, and incorporates explicit horizontal links across a year group, vertical links where knowledge and understanding are built upon from previous units and diagonal links across the wider curriculum. The acquisition of key scientific knowledge is an integral part of our science lessons at Thorplands. Linked knowledge organisers enable children to learn and retain the important, useful and powerful vocabulary and knowledge contained within each unit.

The progression of skills for working scientifically are developed through the year groups and scientific enquiry skills are of key importance within lessons.

Each lesson has a clear focus. Scientific knowledge and enquiry skills are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each unit.

Interwoven into the teaching sequence are key assessment questions, identified in green on lesson plans. These allow teachers to assess children's levels of understanding at various points in the lesson. They also enable opportunities to recap concepts where necessary. The sequence of lessons helps to embed scientific knowledge and skills, with each lesson building on previous learning. There is also the opportunity to regularly review and evaluate children's understanding.

Activities are effectively differentiated so that all children have an appropriate level of support and challenge. Our detailed medium and weekly lesson plans, that are adapted from NPAT plans, include adult guidance to ensure that teachers are equipped with secure scientific subject knowledge, enabling them to deliver high-quality teaching and learning opportunities while making them aware of possible scientific misconceptions.

Early Years

The teaching of science in the Early Years is practical, playful and inclusive with support and challenge from adults in class sessions, small groups and working with individuals. A stimulating, continuous provision provides opportunities for pupils to develop their scientific knowledge and vocabulary through our early years' curriculum.

The most relevant statements for science are taken from the following areas of learning:

- Communication and Language
- Physical Development
- Understanding the World

Three and Four-Year-Olds	Communication and Language	• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Physical Development	• Make healthy choices about food, drink, activity and toothbrushing.
	Understanding the World	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.

Reception	Communication and Language	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen. • Use new vocabulary in different contexts.

Reception Continued	Physical Development		• Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian
	Understanding the World		• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.
ELG	Communication and Language	Listening, Attention and Understanding	• Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	The Natural World	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

This knowledge and skill base will then be built upon in Year 1.

Long Term Map

SCIENCE	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 1	**Identifying Common Animals** *Animals, including humans (NC)*	**Identifying Body Parts** *Animals, including humans (NC)*	**Identifying Materials** *Everyday materials (NC)*	**Properties of Materials** *Everyday materials (NC)*	**Identifying Common Plants** *Plants (NC)*	**Structure of plants** *Plants (NC)*
		Seasonal changes 1	**Seasonal changes 2**	**Seasonal changes 3**		**Seasonal changes 4**
Year 2	**Materials – Changing shape** *Uses of everyday materials (NC)*	**Materials – investigating suitability for use.** *Uses of everyday materials (NC)*	**Food chains** *Living things and their habitats (NC)*	***Alive or not?** ***Habitats** *Living things and their habitats (NC)*	*** Animal Growth** *** Requirements for survival and health** *Animals, including humans (NC)*	**Growth of Plants** *Plants (NC)*
Year 3	**Light and Shadows** *Light (NC)*	*** Nutrition** *** Skeletons and muscles** *Animals, including humans (NC)*	**Rocks, soils and fossils** *Rocks (NC)*	**Friction and Magnets** *Forces and Magnets (NC)*	**Plants – Structure, Growth and Transport of Water** *Plants (NC)*	**Flowers and Life Cycle of Plants** *Plants (NC)*

Year 4	**States of Matter** *States of Matter (NC)*	*** Digestive System** *** Food Chains** *Animals, including humans (NC)*	**Electricity** *Electricity (NC)*	**Sound** *Sound (NC)*	**Classification and Keys** *Living things and their habitats (NC)*	**Environmental Change** *Living things and their habitats (NC)*
Year 5	**Earth and space** *Earth and space (NC)*		**Properties and changes of materials** *Properties and changes of materials (NC)*		**Forces and Simple Machines** *Forces (NC)*	**Life Cycles and Reproduction** *All living things and their habitats / Animals, including humans (NC)*
Year 6	*** Circulatory System** *** Healthy Lifestyles** *Animals, including humans (NC)*	**Evolution and inheritance** *Evolution and inheritance (NC)*	**Classification** *Living things and their habitats (NC)*	**Light** *Light (NC)*	**Electricity** *Electricity (NC)*	

Enrichment of STEM Subjects:

Each year, we participate in a **STEM week** which gives the whole school a problem to solve around a theme. The whole school works collaboratively to solve this problem which is shared in assemblies and with parents at the end. We do this to demonstrate to children how science, technology, engineering and maths work together to solve some of the World's biggest problems. We have also **named our classes** after collaborators to the field of STEM to show children some of the areas of work and how they contribute to how we live.

Impact

The successful approach to the teaching of science at Thorplands School results in a fun, engaging, high quality science education, that provides children with the foundations for understanding the world that they can take with them once they complete their primary education.

Assessment at Thorplands School is teacher based and formed using formal strategies (e.g. periodic year group assessment tasks, quizzes) and informal strategies (Use of concept maps, verbal/written outcomes, reflection tasks/presentations).

Formative assessment is used as the main tool for assessing the impact of Science at Thorplands School as it allows for misconceptions and gaps to be addressed more immediately rather than building on insecure scientific foundations.

Children at Thorplands Primary School:

- demonstrate a love of science work and an interest in further study and work in this field
- retain knowledge that is pertinent to Science with a real life context.
- Are able to question ideas and reflect on knowledge.
- are able to articulate their understanding of scientific concepts and be able to reason scientifically using rich language linked to science.
- demonstrate a high love of mathematical skills through their work, organising, recording and interpreting results.
- work collaboratively and practically to investigate and experiment
- achieve age related expectations in Science at the end of their cohort year
- take care about their books that clearly demonstrate the breadth of learning and exploration which has taken place.
- are able to clearly talk about their learning previously and how it has helped to prepare them for future learning
- love Science; they feel challenged and excited by the learning that is on offer to them at Thorplands Primary School.