

A message from Mrs Powell , our Science lead:

Science is something which I feel incredibly passionate about as it's all around us and ever changing. As a UN Accredited Climate Change Teacher, I am keen to focus on environmental science at our school and by making our school more eco-friendly.

As part of developing Science I am always keen to hear from parents / carers who are involved in the industry in any way and would be willing to share their knowledge and expertise with the children.

Design and Purpose

Children begin to understand the world around them, building their curiosity and wonder in the Early Years. This involves learning through the 'understanding of the world: the natural world'. This forms the beginnings of Threshold Concepts that are built upon from basic to advancing to deep. As children learn science they also learn about its uses and significance to society and their own lives, including the impact of climate change. Science is taught each term. Connections are made to Design and Technology in the Spring Term and the Summer term focuses on Science, Nature and Sustainability.

Science is carefully mapped and units are taught sequentially building knowledge and skills through a combination of practical tasks and opportunities to apply key concepts and knowledge in different ways. Progression of knowledge and skills is mapped across progression rivers for the 4 scientific strands: chemistry, biology, physics and working scientifically.

We develop key areas of working scientifically; classification and identification; observation over time; research; pattern seeking; fair and comparative testing and exploration.

Each science lesson starts with a key question and follow a series of layers allowing children to show what they know, learn and do. This includes the development and use of scientific vocabulary.

Difference

As scientists, our children demonstrate enquiry skills during practical investigations and reasoning activities. They are able to ask questions, make predictions, set up tests, observe and measure what happens, record the data, interpret and communicate their results and evaluate their findings.



Across lessons children 'can' show what they know against 'I can statements'. These are introduced at the start of a unit, revisited during the unit and used to review what they know and can do at the end. Quizzes are used within this process to support children to recall and remember.

Our children demonstrate scientific knowledge and skills at key milestones, for example, in biology; understanding plants at Milestone 1 they name a variety of common plants and their parts. By Milestone 2 they are able to explain the function of the parts of a plant and its lifecycle. At the final milestone they are able to relate the knowledge of plants to evolution and inheritance.

Children at the end of year two reach a level of understanding for the Threshold Concepts: understanding plants, describing humans and animals, recognising living things, describing seasons, exploring materials and forces.

Children at the end of year four extend their level of understanding of the Threshold concepts: Exploring plant life, understanding human and animal functions, classifying living things, investigating materials, understanding forces, movement and magnets, explaining light and reflection, investigating sound and hearing, knowing how electricity works.

Over time, children show that they remember more and remember well with outcomes at the final milestone reflective of advanced and deep knowledge. They are able to make connections and show a secure understanding of the world. In addition, they explore concepts such as evolution and inheritance and the earth's movement in space.

Teacher assessment of Science for year 6 above the expected standard (national 79% 2021-22)) Our children are prepared for change and ready for secondary science. Our children become successful learners. They are active citizens with a secure understanding of science and sustainability. They are confident scientists and effective contributors who engage readily in environmental science, nature and outdoor learning which has led to Darlington Academy flying the Green Flag - with Distinction. We engage in community projects and further enrich our children through visits and trips, visitors in school and practical workshops. This includes a long-standing connection with a local High School whom teach and demonstrate science learning and prepares them for transition to secondary school. We value networking and sharing practice with other schools and community groups to further embed understanding of science and nature.

‘Achieving Excellence Together’

Reflections and Celebrations

This year, Year 5 were visited by WHSB and got a taster for what secondary school science would be like. Activities included looking through microscopes at their cells, investigating what happened when different metals were burnt using a Bunsen burner and creating different electrical circuits.

Examples of Science

The children in **Nursery and Reception** enjoy learning about polar bears and how their blubber helps to keep them warm.

In year 1, children use different materials and learn how toys move including exploring some old toys used in Victorian times.

Year 2 investigate forces by making paper helicopters and investigate their drag.

By the end of this milestone, children are able to ask simple scientific questions and use their observations and data they have gathered to answer these. They can identify, describe and classify plants, animals and materials. They will have learnt about how plants grow and the different parts of a plant, observe seasonal changes, and understand the basic needs of humans and animals.

Year 3 learn about electricity and enjoy practical sessions making circuits and exploring magnets.

Year 4 learn about how the human body works including an experiment to demonstrate how the digestive system works and what our bones do to help us move.

By the end of this milestone, children are able to ask relevant questions, using different types of scientific enquiry to answer them. They will be able to make systematic and careful observations and gather, record, classify and present this information in order to present their findings and conclusions. They can explore what plants need to grow including how water is transported. They can identify what animals and humans need in terms of nutrition and how their bodies work. They can compare and group rocks and soil, describing how they are formed. They can identify sources of light and sound and describe how we see and hear. They can construct different types of circuits and identify how a magnet works.

Year 5 enjoy using their observational skills to investigate how materials changed including non-Newtonian liquids.

Year 6 learn about space, the different planets and enjoy discovering what life is like for astronauts.

By the final milestone children demonstrate their knowledge and skills as scientists. They have a secure understanding of the structure of different types of plants, humans and animals and their life processes; that organisms come into existence, adapt, change and evolve and become extinct; becoming familiar with a range of materials, their properties, uses and how they may be altered or changed; understanding

what causes motion; understanding how light and reflection affect sight; understanding how sound is produced, how it travels and how it is heard; understanding circuits and their role in electrical applications; understanding what causes seasonal changes, day and night and are able to learn and use the learning the methodologies of the discipline of science.

Our children say:

"It was really fun to make circuits in year 3."

"As part of our unit on 'How do I see? How do I hear?' An interesting fact I learnt was that your eyes see upside down and your brain sends it the right way up."

"In Year 6 this year, we have learnt about the phases of the moon. There's eight phases – waxing, waning and a new moon. Then we did some creative writing about it"

Examples of parental and community engagement

Our children have enjoyed growing fruit and vegetables in our school allotment and planting trees and wildflowers ready to encourage further biodiversity in our school grounds in the Spring. We worked with local group, South East Essex Organic Gardeners Group, Castle Point Community Allotment and Waitrose to prepare the area and get the equipment we needed. We worked with local charity, Trustlinks to plant trees with our parents and carers and a local park ranger to prepare and grow flowers in our wildflower garden areas.

Useful websites

<http://www.primaryhomeworkhelp.co.uk/science/index.html>

<https://www.theschoolrun.com/primary-science-glossary-for-parents>

<http://www.madscience.org/>

<https://www.stem.org.uk/>

<https://explorify.wellcome.ac.uk/en/activities>

Science Gallery



