Our Approach to Teaching Science

At Whitehall Junior School, we are committed to providing our pupils with a well-rounded education. Our curriculum is planned in a logical and well-considered way, to enable pupils to build upon their skills and have a secure knowledge base from which connections in learning are made. We use 'beautiful' resources from credible sources to enrich our lessons.

What is the big picture for science?

Science is a subject that explains why something happens and the reasons behind this. Every day, science affects us in some way. It is important for children to know and understand different theories and concepts, in order to support their understanding of the world and their own lives. Through science, children are able to gain a bigger picture of the world in which they live and everything that surrounds them. They can also learn about themselves and the changes that happen to them, so it is relevant and personal to their lives.

Through science, children are able to ask questions and test their ideas, to discover answers for themselves. With these investigation skills, children can challenge what they think they know and explore why something happens. Science can be about finding the answer to something very simple or very complex. The children are also able to learn about different scientists and why their discoveries are important to what we know today.

In science across the school, children are given the opportunity to learn about the different areas of science; biology, chemistry and physics. There is progression in what they learn about in the different units of study to allow for a better understanding, building precisely on their prior knowledge. Through the curriculum, the children will use investigations to build a skill-set that will help them test theories and answer their enquiry questions.

Science is organised into the three subject areas: biology, chemistry and physics. Throughout Key Stage 2, the children will learn about different aspects of each area which will build on previous knowledge, from both within the current key stage and from Key Stage 1. Planning considers what has gone before and the learning they will progress onto. This will give the children insight into how to explain the world in which they live and the scientific concepts that permeate all aspects of life. The children will be able to progress through the key stage, developing their understanding of the similarities and differences between the three domains of scientific study and the connections between these.

What is magical about it?

Science is a subject that has endless possibilities. Children are naturally inquisitive and through their natural ability to question something, they are able to discover answers for themselves. It is a subject that helps to explain everyday life. It is always amazing for children to realise how something works or happens, opening their minds to reasoning and explanation. Even the smallest discovery can help a child realise how concepts fit into the wider world.

Why is science an important subject to learn?

Without science, children would find it very hard to explain why they are here! The children would miss the investigations, where they are given a chance to discover something for themselves. They find practical investigations fun and exciting and a different way to learn.

'Science is magic that works.' Kurt Vonnegut

'Somewhere, something incredible is waiting to be known.' Carl Sagari

What do we love about science?

- The experiments and discovery of new ideas independently.
- Being able to learn through practical lessons.
- The self-discovery of questions that have been asked and realising the answers.
- Learning about the world and where we come from.
- The theories of how and why something happens.
- How we can connect with science.
- Learning about our own environments, near and far, and how we can help to care for our world.
- To know about previous research from scientists who are well-known and those who are investigating and researching currently.

How do we want our pupils to talk about science?

- Using the knowledge and concepts so they can explain the reasons behind these.
- To ask questions that are relevant and thought-provoking.
- How their previous learning has helped them to understand something new.
- To use scientific vocabulary to talk about the subject with confidence, building connections between their learning.
- To consider the significance of their learning.

Our approach to teaching science	
Lesson 1	1) Assess the knowledge and vocabulary that the children have previously been taught within KS2 and KS1. Use key vocabulary and key questions on each topic to assess their prior knowledge. E.g. In Year 5 – What are the difference states of matter? - linking this to the materials unit. Ask the children to recall when they learnt previous content. E.g. In Year 4, we learnt about X and how Y happens. From this, gauge if the children are able to link any learning to their new topic. Use this as an initial assessment and refer back to this throughout the topic - compare the response at the end of the unit. 2) From the initial assessment of pre-knowledge, form a word bank of key vocabulary that the children must know, should know and you would like then to know. Use curriculum vocabulary mats to formulate the lists and explore the etymology of key words. 3) In subsequent lessons, revisit these words and make them a key part of the lesson, using quizzes, etc. to aid recall and assess progression of knowledge. 4) Ensure that any misconceptions of words are dealt with from the start. Use good quality visuals to support understanding. Use class discussions to ensure that the children have the opportunity to question the teacher and the rest of the class.
Lesson 2	Start the lesson with a focus question(s) or key vocabulary relating to the previous lesson; this will enable assessment of understanding from the previous lesson. The lesson should focus on planning their investigation, so that they have some hands-on experience to make discoveries memorable. This could include enquiry questions which may build on existing knowledge. At the planning stage, the children will need to consider their line of enquiry. They will also need to give thought to: how they are going to collect their information, how they will display this and what they will write about (how to draw conclusions). The children will need to know and use predictions for what they want to investigate. They will also need to focus on the importance of variables, fair testing and reliability.

	In the planning lesson, the children should have an idea of what equipment they will need for an investigation and their next steps required.
Lesson 3+	Begin each lesson with a form of short assessment. Use key questions and/or key vocabulary to select words or concepts that need embedding. These lessons should focus on conducting experiments and drawing conclusions from their findings. Learning must connect back to building upon scientific knowledge. Use the lesson to teach the children how to use any specific equipment and model its correct use. Ensure that data is being recorded accurately and appropriately. From the children's conclusions, answer and investigate any further questions that come out of their findings.
Lesson Y	In this penultimate lesson, explore a diverse range of scientists that connect to pupil learning and the unit of study. Link the key vocabulary to the scientist from the list that was formed at the start of the unit. Encourage pupils to carry out wider research on the work of the scientist.
Lesson Z	In the last lesson, use a key question/questions to assess the children's learning. The children should have a better understanding of the subject-specific vocabulary and be able to confidently explain what they mean. Use a variety of methods to assess the learning; unaided writing, quizzes, summaries, etc. Use these pieces of evidence, alongside the skills used in class, and the end of unit assessment, to give a true picture of the child's current scientific skills and understanding.