

Our vision:

At Webheath Academy Primary School, we encourage children to be inquisitive throughout their time at the school and beyond. Science makes an increasing contribution to all aspects of life. Children are naturally fascinated by everything in the world around them and Science makes a valuable contribution to their understanding. Children learn by playing with things in their world. They pick up clues about what they see, touch, smell, taste and hear in order to make sense of it all. Eventually they come to conclusions which they match up with all the experiences they have had. Therefore, 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.

Purpose of study and aims:

We live in an increasingly scientific and technological age where children need to acquire the knowledge, skills and understanding to prepare them for life in the 21st century. Through the framework of the National Curriculum 2014, science aims to:

- To stimulate children's interest and enjoyment in the area of science.
- Equip children to use themselves as starting points for learning about science, and to build on their enthusiasm and natural sense of wonder about the world.
- Develop through practical work the skills of observation, prediction, investigation, interpretation, communication, questioning and hypothesising, and increased use of precise measurement skills and ICT.
- Encourage and enable pupils to offer their own suggestions, and to be creative in their approach to science, and to gain enjoyment from their scientific work.
- Enable children to develop their skills of co-operation through working with others, and to encourage where possible, ways for children to explore science in forms which are relevant and meaningful to them.
- Encourage children to collect relevant evidence and to question outcome and to persevere.
- Encourage children to treat the living and non-living environment with respect and sensitivity.
- To encourage children to raise questions and learn how to investigate and explore these using both first-hand experience and secondary sources.
- To help children understand the nature of scientific ideas and to obtain and test the evidence for them.
- To help children recognise and assess risks and hazards to themselves and to others when working with living things and materials and to take action to control them.

## Curriculum offer:

Our whole school follows a 'Mantle of the Expert' approach. These are units of work which follow a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that children 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 and the children are able to convey and record what they know already. At the end of the 'Mantle' experience, children's knowledge is checked in line with the key knowledge identified prior to the teaching block.

Pupils should be able to describe and talk freely about what they have learnt 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. These are also within each classroom through the walking wall.

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. Through use of the 'Mantle' approach children are also able to suggest / direct what they would like to learn at the start of each teaching sequence and this ensures that teachers are able to adapt the programme of study to ensure that this is informed by children's interests and to maximise their engagement with and motivation to study science.

## Early Years:



EYFS
Show curiosity about objects, events and people <b>Playing &amp; Exploring</b>
Questions why things happen <b>Speaking: 30-50 months</b>
Engage in open-ended activity <b>Playing &amp; Exploring</b>
Take a risk, engage in new experiences and learn by trial and error <b>Playing &amp; Exploring</b>
Find ways to solve problems / find new ways to do things / test their ideas <b>Creating &amp; Thinking Critically</b>
Develop ideas of grouping, sequences, cause and effect <b>Creating &amp; Thinking Critically</b>
Know about similarities and differences in relation to places, objects, materials and living things <b>ELG: The World</b>
Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world <b>The World: 30-50 months</b>
Closely observes what animals, people and vehicles do <b>The World 8-20 months</b>
Use senses to explore the world around them <b>Playing &amp; Exploring</b>
Make links and notice patterns in their experience <b>Creating &amp; Thinking Critically</b>
Choose the resources they need for their chosen activities <b>ELG: Self Confidence &amp; Self Awareness</b>
Handle equipment and tools effectively <b>ELG: Moving &amp; Handling</b>
Create simple representations of events, people and objects <b>Being Imaginative: 40-60+ months</b>
Answer how and why questions about their experiences <b>ELG: Understanding</b>
Make observations of animals and plants and explain why some things occur, and talk about changes <b>ELG: The World</b>
Develop their own narratives and explanations by connecting ideas or events <b>ELG: Speaking</b>
Builds up vocabulary that reflects the breadth of their experience <b>Understanding: 30-50 months</b>

These are to be displayed within each classroom to help the children work scientifically. These posters help explain the teacher and child refer to age appropriate language that the children should be using.

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.

We teach Science in the Reception as an integral part of our whole school approach through the 'Mantle' topics that they cover throughout the year. As the reception class is part of the Foundation Stage of the National Curriculum, we relate the scientific aspects of the children's work to the objectives set out in the Early Learning Goals (ELGs), which underpin the curriculum planning for children aged three to five. Science makes a significant contribution to the objective in the ELGs of developing a child's knowledge and understanding of the world, e.g. through investigating what floats and what sinks when placed in water.

Key Stage 1:



Key Stage One
Explore the world around them and raise their own simple questions
Experience different types of science enquiries, including practical activities
Begin to recognise different ways in which they might answer scientific questions
Carry out simple tests
Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)
Ask people questions and use simple secondary sources to find answers
Observe closely using simple equipment
With help, observe changes over time
With guidance, they should begin to notice patterns and relationships
Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data
Record simple data
Use their observations and ideas to suggest answers to questions
Talk about what they have found out and how they found it out
With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language

Classroom poster for 'Working scientifically' language.

Alongside this – the school use Chris Quigley Essentials and for each year group the targets are clearly broken down for each year group. Please see attached on the website.

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.

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 through reading and spelling scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

Key Stage 2:

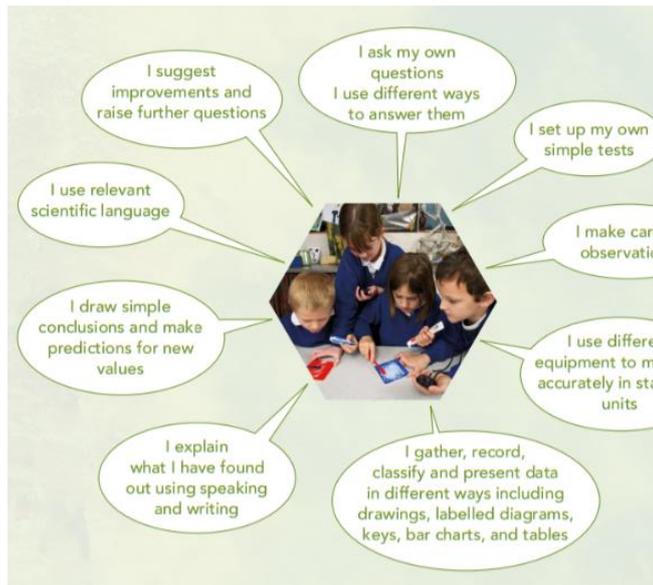
Key Stage 2 is split into two, lower and upper Key Stage 2.

Lower Key Stage 2.

The principal focus of science teaching in lower 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.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Alongside this is the Chris Quigley Essentials which is broken down into specific year groups on our website.



The diagram features a central photograph of four children in school uniforms gathered around a table, engaged in a science activity. Ten speech bubbles radiate from this central image, each containing a specific skill or process:

- I suggest improvements and raise further questions
- I ask my own questions I use different ways to answer them
- I set up my own simple tests
- I use relevant scientific language
- I make careful observations
- I draw simple conclusions and make predictions for new values
- I use different equipment to measure accurately in standard units
- I explain what I have found out using speaking and writing
- I gather, record, classify and present data in different ways including drawings, labelled diagrams, keys, bar charts, and tables

Lower Key Stage 2	
Raise their own relevant questions about the world around them	
Should be given a range of scientific experiences including different types of science enquiries to answer questions	
Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	
Set up simple practical enquiries, comparative and fair tests	Recognise when a simple fair test is necessary and help to decide how to set it up
Talk about criteria for grouping, sorting and classifying; and use simple keys	
Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	
Make systematic and careful observations	Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used
Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them	Take accurate measurements using standard units
Learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately	
Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	
With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	

## Upper Key Stage 2.

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Alongside this is the Chris Quigley Essentials which is broken down into specific year groups on our website.



Upper Key Stage 2
Use their science experiences to explore ideas and raise different kinds of questions
Talk about how scientific ideas have developed over time
Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions
Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why
Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment
Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact
Make their own decisions about what observations to make, what measurements to use and how long to make them for
Look for different causal relationships in their data and identify evidence that refutes or supports their ideas
Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.
Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Identify scientific evidence that has been used to support or refute ideas or arguments
Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas,
Use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results
Use their results to make predictions and identify when further observations, comparative and fair tests might be needed

### Progression and continuity:

Alongside the teaching and learning, our school has identified that it is important to raise the children's working scientifically skills, therefore from the beginning of the school year 'Monthly Science projects' were introduced. This is displayed within our school on our Science board which shows the ongoing journey that our school is on.

We also have a 'Science committee' that meet monthly to discuss science the strengths of science within the school and the next steps.

Teachers and parents/carers can help children to take a second, careful look at the world. By talking together children can be encouraged to explore and observe so that they can group objects and events and look for similarities and differences. They will need to measure and record the things they have found out in ways that make sense to them so that later they can talk to other people about what they have discovered. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes in and out of school.

### Planning:

Our whole school approach at Webheath Academy is through 'Mantle'. Each year group has a two form entry, therefore both teachers plan together. As a school we create Medium Term plans which incorporate all subjects and follow a theme. We use the National Curriculum alongside Chris Quigley essentials. This kind of planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Within the planning Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career. 'Working scientifically' has a big weight in the National Curriculum. 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.

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 ensuring we are covering the curriculum.

### Delivery of our planning:

Our principal aim is to develop children's knowledge and understanding of the methods and implications of science. We encourage the children to ask, as well as answer, scientific questions. We use whole class teaching and group or individual tasks, in which children have the opportunity to engage in practical activities to develop their understanding of the nature and processes of science through a range of different types of scientific enquiries. The children are provided with opportunities to work scientifically using approaches to answer scientific questions. We want our children to develop excitement and curiosity about how science can explain the world around them and could be used in the future. We want our children to build up and use technical terminology/ specialist vocabulary. We want our children to apply their mathematical knowledge such as the opportunity to use a variety of data. They take part in role-play and discussions, and they present reports to the rest of the class. They engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in real scientific activities. Discussion is used to gauge and address any misconceptions the children may have.

### Progress and Achievement:

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. All achievement is recognised and celebrated within the classroom, through Head Teacher's awards and discussions with parents.

### Assessment and Recording:

Children's progress is continually monitored throughout their time at Webheath Academy Primary School and is used to inform future teaching and learning. Work is recorded in their Science book, photographs or observation. 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 – this is identified through Chris Quigley essentials.

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.

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.

### Monitoring:

#### Roles and Responsibilities:

It is the responsibility of the subject leader to monitor the standards of children's work. The subject leader is also responsible for supporting colleagues in their teaching, for being informed about current developments in the subject, and for providing a strategic lead and direction for science in the school.

The science subject leader may keep samples of children's work in a portfolio, and then use these to demonstrate the expected level of achievement in science.

#### SMSC or British Values:

#### Resources:

We have resources to aid and support the teaching of all units and topics taught, from EYFS to Y6. Members of staff can request new resources. We keep these in a central store, where they are 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.