

## Science

### Curriculum Statement

#### **PURPOSE OF STUDY**

A high-quality Science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

#### **AIMS**

The 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 knowledge required to understand the uses and implications of science, today and for the future.

#### **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. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

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. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study Science.

## **THE NATURE, PROCESSES AND METHODS OF SCIENCE**

'Working scientifically' specifies the understanding of the nature, processes and methods of Science for each year group. It should not be taught as a separate strand but should focus 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 should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should 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. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

## **SUBJECT CONTENT**

The National Curriculum 2014 outlines specific schemes of work for each individual year group - refer to our School Science Framework

### **KEY STAGE 1**

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. 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 at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

### **KEY STAGE 2**

#### **Lower Key Stage 2 – Years 3 & 4**

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.

'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.

## **Upper Key Stage 2 – Years 5 & 6**

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.

'Working and thinking 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, spell and pronounce scientific vocabulary correctly.

## **TEACHING & LEARNING**

Within The Warriner Multi Academy Trust our principal aim is to develop children's knowledge, skills, and understanding, as well as a sense of enjoyment in Science. We do this through a variety of approaches including whole-class and small group teaching and enquiry-based research activity. We encourage the children to ask, as well as answer, scientific questions. They have the opportunity to use a variety of data, such as statistics, graphs, pictures, and photographs. They use ICT in Science lessons where it enhances their learning and take part in discussions, where they are able to present reports to the rest of the class. They engage in a wide variety of problem-solving activities.

By providing a curriculum where the content has been carefully designed and sequenced, staff are able to focus on ensuring that all pupils are able to compete on a level playing field. Our research-based guidance on the most effective teaching and learning strategies recognises that teachers and schools must be deliberate about what they teach and how they do it and so our guidance supports staff to deliver lessons appropriately modelled and scaffolded in order that children's learning is developed. These teaching and learning strategies are further developed and refined in our subject specific Professional Learning Groups where we are able to develop subject pedagogy to support teaching across our schools.

## **CURRICULUM PLANNING**

Within the WMAT we have developed a knowledge rich curriculum underpinned by a strong set of values about what matters. It is informed by research and deliberately designed to enable all of our children to have equal access to knowledge, to value the pursuit of that knowledge and to be able to use that knowledge for good.

Our curriculum is ambitious for all children. It uses the National Curriculum in England 2014 Framework for Science as the basis for its' planning which is drawn from the Science Scheme of Work. We know that our classrooms must be a valuable source of knowledge and understanding and are the necessary precursors to critical thinking, analysis and creativity.

Our curriculum is a framework for setting out the aims of our programme of education, including:

- The knowledge and understanding to be gained at each stage (intent)
- Translating that framework over time into a structure, narrative and with subject specific pedagogy (implementation)
- Evaluating what knowledge and understanding pupils have gained against expectations (impact)

Long-term planning clearly identifies the knowledge to be taught and how this builds on prior learning and where it will be further developed in the future. The planned progression built into the Science curriculum means that the children are increasingly challenged as they move through the school. Links are made to termly themes and other curriculum subjects where appropriate and these are identified on the termly units of work. Long-term plans identify individual science units taught across the year group phases and follow a two-year cycle. Science is taught by individual class teachers who take responsibility for planning, resourcing and delivering this area of the curriculum.

### **EARLY YEARS FOUNDATION STAGE**

We teach Science in the Nursery and Reception classes as an integral part of the planned units of work covered during the year. Long-term planning indicates the appropriate descriptors from the Birth to 5 document that relate to the unit of work and area of learning and also identifies how this understanding will support learning as the child moves through EYFS and KS1. We know that science makes a significant contribution to developing a child's knowledge and understanding of the world, for example through investigating what floats and what sinks when placed in water and so careful planning and sequencing, whilst also recognising the child's own curiosity is essential.

### **SPECIAL EDUCATIONAL NEEDS**

We have high expectations for all of our children and work to ensure that barriers are able to be overcome. To that end we expect our staff to plan and deliver lessons where pupils with SEND are able to access their learning in an appropriately supported manner.

### **SPIRITUAL, MORAL, SOCIAL & CULTURAL DEVELOPMENT**

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of Science, children have the opportunity to discuss, for example, the effects of deforestation and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how Science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

## **ASSESSMENT & RECORDING**

Teachers assess children's work in Science by making informal judgements as they observe them during lessons and by providing written and or verbal feedback throughout a unit of work. At the end of the year, the teacher makes a summary judgement about the work of each pupil in relation to the skills they have developed in-line with the National Curriculum in England 2014 and these are reported to parents as part of the child's annual school report. We use this as the basis for assessing the progress of the child and we pass this information on to the next teacher at the end of the year.

## **MONITORING & REVIEW**

Class teachers are responsible for the standard of children's work and for the quality of their teaching in Science lessons. Subject leaders work with their school teams to develop subject pedagogy across the school and to monitor the science teaching and learning taking place through book looks, pupil interviews and learning walks. Where strengths and examples of good practice are noted, they are shared and where areas requiring additional support are highlighted, the necessary CPD is provided.