HIGH LITTLETON CHURCH OF ENGLAND PRIMARY SCHOOL
SCIENCE CURRICULUM

Curriculum Intent
Learning is a change to long-term memory. To this end, our aim is to ensure that our children experience a wide breadth of study and will have committed to their long-term memory an ambitious body of procedural and semantic knowledge (knowledge and skills).

At High Littleton Church of England Primary School, Science provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Breadth of Study
Key Stage 1
Working scientifically
During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions

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.

Lower Key Stage 2
Working scientifically
During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests

- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

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.

Upper Key Stage 2
Working scientifically
During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

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.

Our curriculum distinguishes between subject topics and *threshold concepts* which tie together the subject topics into meaningful *schema*. The same concepts are explored in a wide breadth of topics. Our *forwards and backwards engineering* of the curriculum allows children to return to the same concepts over and over again, gradually building their understanding of them.

Threshold Concepts
We have identified threshold concepts, the most significant knowledge in the subject, which form schema to help pupils to assimilate new knowledge and are referred to in a wide breadth of topics. In science, our threshold concepts mean knowing about:

Biology
The cellular basis of life
Heredity and Life Cycles
Variation, adaptation and evolution
Organisms and their environments
Health and disease

Physics
Matter
Forces and motion
Sound, light and waves
Electricity and magnetism
Earth in Space

Chemistry
Substances and their properties
Particles and structure

Milestones

These are the goals that the children should reach to show that they are meeting the expectations of our curriculum. At High Littleton Primary School, we help pupils progress in science by:

- carefully sequencing the knowledge that they need to understand scientific concepts in our long term plans
- by providing the vocabulary that they need to articulate their understanding of science
- by providing the children with *deliberate practice* activities that will help them to make progress towards the milestones and remember what they have learnt

Assessment

We assess the outcomes for science through our POP tasks which are built into our planning to help us assess how well and how deeply pupils know and understand what we have taught and what the children have learnt.