

## **RUSH GREEN PRIMARY SCHOOL**

### **SCIENCE POLICY 2014**

#### **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 key foundational knowledge and concepts can be used to explain what is occurring, predict how things will behave, and analyse causes. This foundational understanding should be consolidated through their appreciation of the specific applications of science in society and the economy.

#### **AIMS**

- Deliver a scheme of work which encompasses the objectives from the new National Curriculum for science.
- 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 practical science enquiries that help them to answer scientific questions about the world around them.
- Pupils are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.
- Develop knowledge and understanding of scientific phenomena by challenging pupils' ideas.
- Provide a stimulating but safe environment in which to guide pupils' ideas.
- To build positively on pupils' natural curiosity, ideas and achievements.
- To foster caring attitudes and a sense of awe and wonder.
- To develop communication and language skills which are crucial to pupils' scientific achievement.

#### **DELIVERY**

Teachers can see where units of work fit into the science scheme by examining the science overview document (See table 'Long term plan'). Medium term plans should indicate a short overview of each topic over each half term. Each science unit must be planned to ensure that all the National Curriculum objectives, including the new 'Working Scientifically' objectives, have an equal covering. Teachers should review the plans prior to delivery and these in turn should be altered and differentiated to suit the children's needs and abilities. It should help teachers make the best use of resources available in our school and in our local area. The Science subject leaders give advice and support on matters of curriculum content, resources, planning and delivery. Science is a core subject, therefore each class timetable must indicate where and how long science will be taught throughout the year. It is expected that science sessions last at least 1 hour each work with the preference of being an hour and a half or more per week.

## **THE LEARNING ENVIRONMENT**

Classrooms should have relevant science display board which celebrates the class learning and achievement. The content of these displays could include; copies of pupils work, a working wall, cross curricular written work, cross curricular maths work, examples of scientific vocabulary and their definitions, questions that probe children's learning and posters relevant to subjects being studied.

## **CLASSROOM PRACTICE AND ORGANISATION**

Pupils should be provided with a range and variety of tasks and experiences organised to deliver the units of work in the most effective way. The role of the teacher should be to utilise resources, information and ideas while giving the children progressively greater independence to ask and answer scientific questions, formulate hypotheses, set up and carry out fair tests, record results and evidence and to present conclusions neatly and accurately. Teachers should also look to include links to maths, literacy and foundation subjects where possible. Teachers will use their professional expertise in the delivery of the curriculum, but need to be aware of the following factors:-

### **1. Differentiation**

We recognise that there are children of wide ranging scientific abilities in our classes and try to provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways by: setting tasks of increasing difficulty; providing resources of different complexity, matched to the ability of the child; setting common tasks which are open-ended and can have a variety of responses.

### **2. Use of Language**

Pupils should be taught and encouraged to express themselves clearly in both speech and writing. Emphasis needs to be placed on correct use of scientific terms so that meaning is conveyed in an effective manner. Pupils must learn to correctly spell scientific terminology and errors in spelling must be highlighted and corrected. The children should develop oral skills in science lessons through discussion, questioning and recounting their observations of scientific investigations, using the questioning table to extend and improve their questions.

### **3. I.C.T. and cross curricular opportunities**

Pupils should be provided with opportunities, where appropriate, to develop and apply their Literacy, Maths and I.C.T. capabilities in the study of science. E.g. tables, graphs, a variety of text types for writing and reading, cameras and video cameras to record investigations, data loggers for accurate measurements of temperature and digital microscopes for close observation. Maths should be applied by pupils to read measurements and in order to display results through the use of a variety of media. Literacy should be applied by pupils in the recording of investigations and other practical activities as well as through various research opportunities. Pupils should use I.C.T. to collect, store, retrieve and present scientific information. Teachers will take pictures and videos of scientific enquiries as evidence of 'Working Scientifically'. These images and videos should be either stuck into books or alternatively stored for future assessment opportunities.

### **4. Equal Opportunities**

We teach science to all children, whatever their ability. Science forms part of the school curriculum policy to provide a broad and balanced education for all children. We provide learning opportunities that are matched to the needs of children with learning difficulties. Our work in science takes into account the targets set for SEN pupils. To accommodate the different cultures within the school, the science subject leader in conjunction with senior leaders, is available to answer any parental queries that revolve the subject and nature of any of the science units.

## **5. Gifted and Talented**

Children who have been identified as 'Gifted or Talented' should be given greater opportunities to solve scientific problems through investigation and experimentation. Creating chances for them to work independently, encouraging them to analyse evidence and suggest conclusions and further questions will also help to develop and challenge their scientific skills and thinking.

## **5. Assessment and recording**

Assessment for learning is continuous throughout the planning, teaching and learning cycle. Children are continuously assessed by:

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking and listening to children
- Considering work/materials / investigations produced by children together with discussion about this with them.
- Next step targets and pupil self assessment.
- 'Working scientifically' to be assessed separately. Teachers will assess each pupil's abilities to carry out an experiment once per term.
- Pupils will carry out end of topic assessments to gain an understanding of their knowledge of the subject matter.

Marking is used to acknowledge achievements and to show the pupils what they need to do in order to improve through Next Step marking. Scientific spellings are modelled and corrected.

## **6. Health and safety.**

Teachers must always be aware of potential hazards and dangers when carrying out scientific investigations. Care must be taken to ensure that equipment used is appropriate to the age, experience and ability level of the pupils.

## **RESOURCES**

The Science subject leaders are constantly reviewing and adding to existing resources to enhance and facilitate science teaching in the school. Resources are stored in subject specific topic boxes in a central resource area. Resources for each lesson are indicated on short term plans.

## **APPROACHES TO TEACHING AND LEARNING**

### ***EYFS***

The principal focus of science teaching in EYFS is delivered mainly through child initiated play and focused activities designed by the teacher in order to stimulate and develop a child's learning. Children are supported in their understanding of new scientific ideas and knowledge in the way the child engages with other people and their environment; playing and exploring, active learning, and creating and thinking critically – underpin learning and development across all areas and supports the child to remain an effective and motivated learner. The core scientific ideas are delivered through the policies 'Development Matters' and 'Early Learning Goals'. Under the education programme 'Understanding The World' children are guided 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.

## **KEY STAGE 1 – YEARS 1 – 2**

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.

During years 1 and 2, pupils should be taught to use the following practical scientific methods, Known as '**working scientifically**', 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.

## **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 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.

'**Working scientifically**' must always be taught through and clearly related to substantive science content in the programme of study. 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
- setting up simple practical enquiries, comparative and fair tests
- making accurate measurements using standard units, using a range of equipment, for example 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, 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 and suggest improvements, new questions and predictions for setting up further tests
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

### **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 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.

**‘Working and thinking scientifically’** must always be taught through and clearly related to substantive science content in the programme of study. 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 enquiries, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models
- reporting findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions
- presenting findings in written form, displays and other presentations
- using test results to make predictions to set up further comparative and fair tests
- using simple models to describe scientific ideas
- Identifying scientific evidence that has been used to support

### **LONG TERM PLAN**

Each year group will have a range of topics to deliver to their pupils throughout the year. It is expected that teachers will teach the statutory and a selection of the non-statutory requirements for each topic. Each topic must be taught chronologically (as prescribed below) however there is no set time limit in which each topic must be completed by. On average, a topic should take approximately one half term to complete. However, a topic may be extended if the teacher feels they have yet to complete the topics statutory requirements or believes the children have not grasped the core skills to an extent where it is feasible to move onto the next topic.

Year group	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5
<b>Y6</b>	<b>Electricity</b>	<b>Light</b>	<b>Animals including humans</b>	<b>Living things and their habitats</b>	<b>Evolution and inheritance</b>
<b>Y5</b>	<b>Changing materials</b>	<b>Forces</b>	<b>Earth, Sun and Moon</b>	<b>Animals and humans</b>	<b>All living things</b>
<b>Y4</b>	<b>Living things and their habitats</b>	<b>Electricity</b>	<b>Forces</b>	<b>Animals including humans</b>	<b>States of matter</b>
<b>Y3</b>	<b>Light</b>	<b>Rocks and soils</b>	<b>Sound</b>	<b>Animals including humans</b>	<b>Plants</b>
<b>Y2</b>	<b>Seasonal changes</b>	<b>Animals including humans</b>	<b>Everyday materials</b>	<b>Plants</b>	<b>/</b>
<b>Y1</b>	<b>Plants</b>	<b>Living things and their habitats</b>	<b>Animals including humans</b>	<b>Uses of everyday materials</b>	<b>/</b>
<b>Reception</b>	<b>Understanding the world</b>				

### THE ROLE OF THE SUBJECT MANAGER

- To undertake monitoring of standards in science (yearly work scrutinies, meetings with teachers and pupils) and use this to inform the science action plan.
- Provide leadership and management of their subject to secure high quality teaching and learning.
- Play a key role in motivating, supporting and modelling good practice for all staff, including the organisation and presentation of School INSET.
- Take a lead in policy development and review.
- To liaise with outside agencies and attend subject specific courses.
- To report to the Head teacher and Governing Body on science related issues.
- To plan and organise the allocation and purchase of resources in accordance with available budget.