

# **White Court School**



## **Science Policy**

### **October 2018**

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## **1. Purpose of study**

At White Court School, we aim to develop a positive attitude towards Science and raise the children's confidence to use scientific skills in everyday life. During practical activities, problem solving and exploration, linked with high quality teaching, we hope to increase the children's understanding of the nature, processes and methods of Science. By the time they leave, children will learn about three areas (Biology, Chemistry and Physics) and observe, record and evaluate different concepts. Throughout both Key Stages, the children will explore how Science has changed our lives and its vital role in the world's future prosperity.

## **2. Aims**

We aim to help our children to:

- Develop scientific knowledge and conceptual understanding of the various strands of Science that they are exposed to.
- Develop understanding of the nature, processes and methods of Science through asking and answering questions, whilst applying the following scientific skills: observing, explaining, communicating, pattern seeking, experimenting and applying.
- Become equipped with the understanding of how Science plays a vital role within their everyday lives and the impact it will have on their future lives.
- Develop a positive attitude towards Science and the confidence to use scientific skills in everyday life.
- Encourage independence of thought, clear and logical thinking and the ability to solve problems.

### Science in the Early Years Foundation Stage

Children will begin to observe, using all the senses, features of the living things, objects and events in the natural and man-made world. They will begin to develop scientific vocabulary, and respond to questioning. They will sort objects by a single attribute, according to its properties, and notice patterns.

### Science at Key Stage 1

Children will be encouraged to look closely at living things, materials, phenomena and processes which surround them in everyday life. They will learn to observe, compare, record, ask questions and offer explanations and to use correct vocabulary for communicating their findings.

### Science at Key Stage 2

Children will continue to develop their skills, knowledge and understanding of Science through investigations of their environment. They will learn to ask questions, make accurate measurements and observations, handle variables and use appropriate scientific vocabulary when communicating their ideas. They will learn to use a range of methods to record and present information. They will begin to test their ideas and use previous knowledge and understanding of science to make sensible predictions and offer explanations.

### 3. Objectives

#### Key Stage 1

Children will study the 3 strands in Science (Biology, Chemistry and Physics) and will have opportunities to develop their investigative skills through 'Working Scientifically'. The focus is mainly experiencing Science in the world around them.

Scientific teaching will enable children:

- To ask simple questions and recognise and observe that they can be answered in different ways.
- To observe closely using simple equipment, gather and record data to help answer the questions.
- To use their observations and their ideas to suggest answers.

For specific objectives, linked to content, see curriculum map (appendix i).

#### Key Stage 2

Children will study the 3 strands in Science (Biology, Chemistry and Physics) and will have opportunities to develop their investigative skills through 'Working Scientifically'. The focus is mainly broadening and deepening the scientific view of the world around them.

Scientific teaching will enable children:

- To ask relevant questions and use different types of scientific enquires to answer them.
- To set up practical enquires (comparative and fair tests).
- To make systematic and careful observations and gather, record, classify and present data in a variety of ways to help answer questions.
- To clearly write up their aims, methods, predictions and conclusions.
- To use results to draw conclusions, identify differences, similarities or changes related to scientific ideas and processes.

For specific objectives, linked to content, see curriculum map (appendix i).

### 4. Teaching strategies and learning outcomes

In connection with the New Curriculum (2014), 'Working Scientifically' should **always** be taught through, and be clearly related to, the science content in the programme of study. Where appropriate, most of the learning about science should be taught through first-hand, practical experiences which should be in conjunction with appropriate second hand sources to reinforce the learning, such as books/reference texts, digital content and interactive resources (i.e. virtual experiments). Children should be given ample opportunities to ask questions related to their given topics, and then be provided with sufficient time to explore ideas and their natural curiosity surrounding the strands. Where language may be a potential barrier, children should be encouraged to express

their scientific knowledge in other ways (for example; through the use of puppets, pictorial representations of investigations, oral retelling and use of Computing). To support this, vocabulary linked to the term's topic should be clearly displayed or children should have access to resources to allow them to learn, rehearse and apply the related vocabulary i.e. scientific dictionaries, word mats, encyclopaedias or revision guides. To reinforce teaching and learning, Computing should be used as and where appropriate (i.e. data handling within maths (using both software such as Microsoft Excel and hardware such as Data Loggers), non-fiction genres and texts types within Literacy, changes over time within History etc.). Computing should also be used to support learning and progress by exposing children to materials linked to topics that we are not able to explore in the classroom or outdoor classroom i.e. volcanoes, the water cycle and the birth of live young (farm animals).

Within upper Key Stage 2, the children should encounter more abstract ideas and begin to recognise how these ideas help them to understand different concepts. Before moving onto new strands, children should be given opportunities to broaden and deepen their understanding of the one which they are presently studying.

## **5. Planning and assessment**

Planning is carried out on three levels: long term planning of topic(s) covered, shown on a curriculum map (see appendix i), medium term planning (overviews) and short term planning (teachers' individual plans).

AfL strategies are used to inform and develop teaching.

- Topics commonly begin with an assessment of what children already know. This can be through the use of conversations with the children, mind maps, KWL grids diagnostic tests, whole class lines of inquiry or another suitable method.
- Children are involved in the process of self-improvement, recognising their achievements and acknowledging where they could improve. Activities during, and at the end of, each topic record achievement and celebrate success.
- We mark work positively, making it clear verbally, or on paper, where the work is good, and how it could be further improved.
- As strands are taught, children's understanding is assessed against the Programmes of Study using the White Court Science Assessment grids. These should be levelled for the current year of the child to assess children's scientific understanding of the key topics, not using their Literacy or Maths levels to influence their overall Science level. Through conversations with Science Co-ordinators, other levelled grids can be used for extreme circumstances.
- We use Target Tracker to follow and accelerate children's progress in Science. Whole school data grids are produced by the Science Co-ordinators to note trends and patterns in the key stages.
- Vulnerable groups are tracked at the end of each term, using information from Target Tracker. Trends are identified and feedback to SLT and SMT.
- The Year 2 and Year 6 staff assess children's level of attainment at the end of the KS1 and KS 2 Programme of Study. This teacher assessment is based on assessment records, work samples and discussions with the children.
- Reports to parents are made verbally in the Autumn and Spring terms during parents evenings, and written once a year in their end of year report, describing each

child's attitude to Science, his/her progress and their understanding of the content of the Science strands taught within each year group.

▪ The Rising Stars Assessment package is available for teachers to use in Year 1 to Year 6, alongside the White Court Programmes Assessment grids. Teachers have the opportunity to use Rising Stars or Test Base assessments to support them in assessing the children in their class. Using their preferred method, they should assess the children's prior knowledge at the start of a topic and assess knowledge gained at the end of the topic. There are also opportunities to assess mid-topic and planning should be altered if necessary. Progress is then tracked termly using Target Tracker.

## **6. Mastery and Greater Depth**

Teachers are responsible for the identification of children in their class who demonstrate a particular aptitude for science. These children need to be monitored closely to ensure they are challenged and their science knowledge is stretched. They should have opportunities to work on more challenging investigations and problem solving activities within their class and be given opportunities to investigate their own topic further, broadening their understanding of phenomena. These children will also be challenged through direct questioning within lessons and through less scaffolded activities so their work shows more independence and individuality. Activities will be planned to develop mastery of skills and ensure a deepening breadth of study.

Children demonstrate Mastery in science when they can:

- Transfer their endless curiosity into focused, scientific activity aimed at finding out something new.
- Respond eagerly to challenges that will further their knowledge and understanding.
- Generate questions to extend their learning and know how to answer these questions through their own investigations.
- Move their learning from concrete experiences to pictorial representations to abstract explanations.
- Learn and recall key scientific facts (linked to age expected knowledge and understanding) and apply these to new learning.
- Logically link prior knowledge to current learning.
- Apply their knowledge and understanding in new contexts.
- Justify how and why they have done things in a particular way, and evaluating and adapting their thinking in light of new evidence.
- Model their learning to others and provide clear explanations of what they are doing linked to key scientific ideas.
- Teach other children and adults to understand more deeply the scientific concepts being studied.
- Synthesise new ideas into their current knowledge and understanding to deepen their thinking above the age appropriate level.
- Present their findings clearly and coherently in practical/oral/written/multi-media formats whichever is most suitable.

Teachers should support the acquisition of mastery by:

- Encouraging individual thinking.
- Allowing sufficient time for children to explore a concept at depth and to follow their own ideas.
- Providing stimulating start points for science that encourages endless curiosity.
- Ensuring that science is a practical subject where children work first hand with a wide range of materials, including living things.
- Constantly focusing on children's collected evidence and expecting children to explain their findings then comparing their ideas with accepted scientific facts and trying to explain any differences.
- Allowing sufficient time on each concept so that deep and sustainable learning is developed which is then revisited in a timely way so that what has been learnt is fully embedded and can be built on further.
- Making connections for children in and between concepts so that children's understanding of the big ideas of science is being constantly developed and expanded so they can extend and deepen their conceptual learning.
- Providing children with a range of opportunities to explore concepts in different ways so they look at the same idea from a new view point.

*Sourced from Science Cluster Mastery Training 2016*

## **7. Curriculum map**

See appendix i.

## **8. Resources**

Resources are regularly checked for relevance to the area of study, abilities of all children and that the general usability of products is still safe. Resources are kept centrally, or within year group areas, and may be borrowed as required. Teams / teachers should consult the Science Co-ordinators when planning their Science curriculum if any additional resources are required.

They are stored as follows:

- Teachers written resources and pupil books are in the stock cupboard.
- Equipment is behind the Science shutters (in clearly labelled boxes).
- Reference books are in the school library.

## **9. Health and Safety**

White Court School follows the safety guidelines in the 'Health, Safety and Wellbeing Policy'.

Teachers' should consult Science Co-ordinators or the Health and Safety co-ordinator and complete risk assessments and share these with the Health and Safety co-ordinator prior to completing hazardous activities.

On the First day of Autumn Term, all staff partake in a Health and Safety induction, where possible risks and measures are discussed.

## **10. Responsibilities**

The Science coordinators are responsible for:

- Monitoring of Science in the curriculum and ensuring its consistent and successful implementation
- Ordering, maintaining and sharing resources with colleagues
- Assisting teachers in planning and assessment
- Evaluating the delivery of the curriculum
- Monitoring standards of achievement within the school through book scrutinies and discussions with pupils against the Programme of Study

All teachers are responsible for:

- Planning and assessing Science work in their classroom
- Sharing outcomes with the Science Co-ordinators
- Inputting assessment information for all strands onto Target Tracker
- Ensuring safe and appropriate use of the resources
- Teaching pupils to identify potential hazards within the working environments, showing how to address, manage and report risks where required
- Identifying gifted pupils in the sciences

Reference should be made to the White Court School Assessment Policy and whole school approach.

The effectiveness of Science education is evaluated with and between teams by the Year Managers, Head and Deputy Heads, Performance Managers and across the school by the Science Co-ordinators. This is achieved by the following:

- Discussion within and between teams
- Monitoring activities by the co-ordinators through lesson observations
- Moderation of children's work
- Scrutiny of plans

## **10. Links to other policies**

### Equal Opportunities

The school will ensure that all children have an equal opportunity to access the curriculum offered regardless of gender, race, religion, culture or disability, as far as is possible.

### Special Educational Needs

Teachers will assess the individual pupil needs and set work that will match and challenge their capabilities. Where possible, children may receive extra support, either to resolve difficulties or to extend existing skills and knowledge.

### Recording and Reporting

To record where pupils are at, Target Tracker is used termly. The teacher will make a judgement as to whether a pupil is working at the expected age related standard, above the expected age related standard or below the expected age related

standard each term in Science and record it using the appropriate steps on Target Tracker. This data is then submitted to SLT and the percentages for at, above and below are tracked across terms.

At the end of the year an overall judgement will be reported to parents.

#### Monitoring and Evaluation

The governing body, in partnership with the Headteacher and Science Subject Leaders, determine the school policy for Science. The Headteacher and Science Subject Leaders are responsible for working with staff to devise, monitor, evaluate and review procedures for Science.

#### Review

This policy will be reviewed as part of the policy review cycle. It will also be monitored for its effect on pupils with protected characteristics.

**Policy ratified at the Full Governing Body Meeting Autumn 2018**

## Appendix

### i. Curriculum Map

#### Science Overview

Year	Autumn Term	Spring Term	Summer Term
EY	<p><b>Explores colour and how colours can be changed</b> - paint mixing</p> <p><b>Beginning to be interested in and describe the texture of things</b> - cooking, play dough, exploring different textures in a tuff tray such as spaghetti, rice, sand, shaving foam.</p> <p><b>Can talk about some things that they have observed such as plants animals, natural and found objects</b> - Life cycles of chicks and tadpoles, planting bulbs and taking care of them.</p> <p><b>Developing an understanding of growth decay and changes over time</b> - as above and weather and seasons, we also do dinosaurs as a topic and talk about what extinct means.</p> <p><b>Talks about why things happen and how they work</b> - Using magnets and talking briefly about forces. Experimenting with ice and making volcanoes.</p>		
FS	<p><b>Myself and my body</b></p> <p><b>Autumn Days</b></p> <p><b>Winter is coming</b></p> <p><b>Water Cycle</b></p>	<p><b>Our World and Beyond</b></p> <p><b>Growth and decay</b></p> <p><b>Life along time ago –</b></p> <p><b>Natural Change</b></p>	<p><b>Food produce and working farms</b></p> <p><b>Holidays now and then</b></p>
Year 1	<p><b>Animals, including humans</b></p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <p><b>Animals, including humans:</b></p> <p><b>Classification of animals</b></p> <p>Identify, name and describe common animals including fish, amphibians, reptiles, birds and mammals.</p> <p><b>Everyday materials- Recycling.</b></p> <p>Describe materials.</p> <p>Explore properties.</p>	<p><b>Everyday materials- Space</b></p> <p>Describe materials.</p> <p>Explore properties.</p> <p>Compare and group together materials.</p> <p><b>Farm Animals</b></p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p><b>Seasonal changes</b></p> <p>including weather and day length</p>	<p><b>Plants</b></p> <p>Names of plants and trees</p> <p>Parts of flowering plants and trees, identify and label</p> <p><b>Everyday materials- Pirates</b></p> <p>Describe materials.</p> <p>Explore properties.</p> <p>Compare and group together materials.</p> <p><b>Seasonal changes</b></p> <p>including weather and day length</p>

	<p>Compare and group together materials.</p> <p><b>Seasonal changes</b> including weather and day length</p>		
Year 2	<p><b>Uses of everyday materials</b> Uses of everyday materials</p>	<p><b>Plants</b> Propagation from seeds and bulbs Conditions for healthy growth</p>	<p><b>Animals, including humans</b> Procreation</p> <p><b>All living things and their habitats</b> Compare things: living, dead or never living identify that most things live in habitats suited to animals or plants Describe how animals obtain their food from plants and other animals, using a simple food chain</p>
Year 3	<p><b>Animals, including humans</b> Healthy diet and nutrition Water transport in humans and animals Skeletal/muscular system for protection support and movement Teeth</p>	<p><b>Rocks</b> Sort and compare by properties- Describe how fossils were formed Constituents of soil</p>	<p><b>Forces and magnets</b> Contact-non contact Magnetic/non-magnetic materials Magnetic poles Repel &amp; attract prediction Compare how things move on different surfaces</p> <p><b>Plants</b> Function of parts of flowering plants Pollination Exploration of conditions for good plant growth Water transportation</p> <p><b>Light</b> Sources; reflection, formation and size of shadows.</p>

Year 4	<p><b>States of matter</b> S,L,G- temperature scale Water cycle</p> <p><b>Electricity</b> Conductors and insulators -Simple series circuits; bulbs, switches</p>	<p><b>Sound</b> Sound as vibrations, we hear with our ears; , pitch related to features of object, volume related to distance</p>	<p><b>Animals, including humans</b> Identify descriptors of plants and animals in food chains <b>Digestion</b> Changing environments and dangers to habitats Classification-keys</p>
Year 5	<p><b>Properties and changes of materials</b> Comparisons Separating techniques S;L;G non-reversible changes leading to new materials</p> <p><b>Forces</b> Gravity, drag, pulley, levers and gears</p>	<p><b>Earth and space</b> Relative movement of Sun, Earth, planets and Moon Day and night</p>	<p><b>Animals, including humans</b> describe the changes as humans develop from birth to old age</p> <p><b>All living things</b> Life cycles of mammal, amphibian insect and bird Reproduction description of life processes</p>
Year 6	<p><b>Light</b> Entering eye, travelling in straight lines, size of shadows</p> <p><b>Electricity</b> Relate brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. use recognised symbols when representing a simple circuit in a diagram</p>	<p><b>Evolution and inheritance</b> Offspring vary from parents-adaptation leads to evolution Evidence from fossils</p>	<p><b>Animals, including humans:</b> Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood. Describe how nutrients and water are transported in animals including humans Recognise impact of diet, drugs and lifestyle on health</p> <p><b>All living things</b> Taxonomic classification based on observation giving reasons</p>
<b>Revision of previous topics</b>			

