



# Westmoor Primary School

## Science Policy

Date policy last updated on: September 2021

Signed by:

	Head teacher	Date:	October 2021
	Chair of governors	Date:	October 2021

# WESTMOOR PRIMARY SCHOOL

## POLICY FOR SCIENCE

### Introduction

This policy is written for teachers, parents, governors and all persons with an interest in the delivery of the Science curriculum at Westmoor Primary School.

The purpose of this policy is to outline how Science is planned, delivered and assessed.

### Intent

Children will:

- Have a sound understanding of the knowledge content of the National Curriculum for Science for their age group
- Have well- developed scientific practical skills
- Be methodical , have a critical approach and connect ideas logically
- Have an appreciation of the role of Science in everyday life and careers involving Science

### Implementation

Staff will :

- plan directly from the National Curriculum (Y1-6), Statutory Framework for the Early Years Foundation Stage, and with regard to Development Matters (N-Rec), meeting the needs of all pupils including those with SEND
- deliver well- paced, engaging lessons through Quality First Teaching, drawing upon the principles of T4W and A4L and supported by a variety of differentiated resources (where appropriate)
- deliver Science lessons weekly
- promote in students an enquiring approach to Science
- use a range of assessment approaches including, Live Marking, AFL, etc to ensure all pupils are making at least expected progress

### Impact

The impact of a clear and consistent approach to the teaching of Science is:

- all lessons are well planned, delivered and resourced
- staff have strong subject knowledge, a clear understanding of expectations and a consistent approach to the teaching of Science
- pupils make at least expected progress against their initial starting points
- pupils have the knowledge and skills that complement each other in developing scientific understanding
- pupils are able to work both independently and collaboratively in Science

## **Appendices**

### **Appendix 1- Science Expectations**

#### **Science Expectations for all children**

Children are given varied, interesting and relevant activities, contexts and environments, through which to learn Science.

Science involves both practical aspects and knowledge elements at all stages.

Science is taught continuously and progressively throughout the year (lessons delivered weekly)

#### **Expectations for those children making less than good progress**

Children experiencing difficulties receive relevant support through additional adult input, targeted or adapted resources or, where appropriate, simplified tasks.

Children with specific areas of misconception, or underdeveloped skills receive detailed feedback and /or intervention session(s).

### **Appendix 2 - Phase Expectations (Curriculum)**

#### **Foundation Stage**

Within the Statutory Education Programme of Understanding the World, activities and experiences related to Science will involve:

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.

Children aged 3 and 4 will:

- Use all their senses in hands-on exploration of natural materials.
- Explore collections of materials with similar and/or different properties.
- Talk about what they see, using a wide vocabulary.
- Begin to make sense of their own life-story and family's history.
- Explore how things work.
- Plant seeds and care for growing plants.
- Understand the key features of the life cycle of a plant and an animal.
- Begin to understand the need to respect and care for the natural environment and all living things.
- Explore and talk about different forces they can feel.
- Talk about the differences between materials and changes they notice.

Reception aged children will:

- Explore the natural world around them.

- Describe what they see, hear and feel while they are outside.
- Recognise some environments that are different to the one in which they live.
- Understand the effect of changing seasons on the natural world around them.

Aspects of Science can be found in several areas of learning within the Framework for Early Years, and referenced in Development Matters:

### Personal Social and Emotional Development

Three and Four Years olds :

- Make healthy choices about food, drink, activity and toothbrushing.

Reception Aged Children:

- Know and talk about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, toothbrushing, sensible amounts of 'screen time', having a good sleep routine, being a safe pedestrian

### Communication and Language

Children aged 3 and 4 will:

Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"

Reception aged children will:

Learn new vocabulary.

Ask questions to find out more and to check what has been said to them.

Articulate their ideas and thoughts in well-formed sentences.

Describe events in some detail.

Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.

Use new vocabulary in different contexts.

At the end of Foundation Stage, children working at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

## KS1

### Pupils will be taught to

- ask simple questions and recognise that they can be answered in different ways
  - observe closely, using simple equipment
  - perform simple tests
  - identify and classify
  - use their observations and ideas to suggest answers to questions
  - gather and record data to help in answering questions
- 
- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
  - identify and describe the basic structure of a variety of common flowering plants, including trees
  - identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
  - identify and name a variety of common animals that are carnivores, herbivores and omnivores
  - describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)
  - identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense
  - distinguish between an object and the material from which it is made
  - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
  - describe the simple physical properties of a variety of everyday materials
  - compare and group together a variety of everyday materials on the basis of their simple physical properties
  - observe changes across the 4 seasons
  - observe and describe weather associated with the seasons and how day length varies
  - explore and compare the differences between things that are living, dead, and things that have never been alive
  - identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
  - identify and name a variety of plants and animals in their habitats, including microhabitats
  - describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food
  - observe and describe how seeds and bulbs grow into mature plants
  - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
  - notice that animals, including humans, have offspring which grow into adults
  - find out about and describe the basic needs of animals, including humans, for survival (water, food and air)

- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene
- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

### Lower KS2

#### Pupils will be taught to:

- ask relevant questions and use different types of scientific enquiries to answer them
  - Set up simple practical enquiries, comparative and fair tests
  - make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
  - gather, record, classify and present data in a variety of ways to help in answering questions
  - record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
  - report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
  - use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
  - identify differences, similarities or changes related to simple scientific ideas and processes
  - use straightforward scientific evidence to answer questions or to support their findings
- 
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
  - explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
  - investigate the way in which water is transported within plants
  - explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
  - identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
  - identify that humans and some other animals have skeletons and muscles for support, protection and movement
  - compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
  - describe in simple terms how fossils are formed when things that have lived are trapped within rock
  - recognise that soils are made from rocks and organic matter
  - recognise that they need light in order to see things and that dark is the absence of light

- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change
- compare how things move on different surfaces
- notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having 2 poles
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing
- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things
- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey
- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases
- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors

## Upper KS2

### Pupils will be taught to:

- plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- use test results to make predictions to set up further comparative and fair tests
- report and present 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
- identify scientific evidence that has been used to support or refute ideas or arguments
- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals
- describe the changes as humans develop to old age
- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda
- describe the movement of the Earth and other planets relative to the sun in the solar system
- describe the movement of the moon relative to the Earth
- describe the sun, Earth and moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans
- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
  - identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
  - recognise that light appears to travel in straight lines
  - use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
  - explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
  - use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
  - associate the 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

### **Appendix 3 –Planning Expectations**

Science Planning is on a two year cycle for each phase, ensuring full coverage of the National Curriculum Programmes of Study. Science is planned within the Understanding the World Educational Programme in EYFS, using a progressive approach across Nursery and Reception.

Medium Term Planning ensures a balance of scientific skills and knowledge and progression of skills and understanding.

Short term planning allows teachers to tailor their lessons specifically to the needs and abilities of their pupils.

### **Appendix 4 -The Teaching and Learning of Science**

Throughout school, children receive a rich and varied experience in Science with emphasis on practical Science and embedment of scientific skills.

All pupil ages carry out Science at least once a week.

Practical sessions are always teacher assessed for potential risks , and from a young age children are encouraged to consider potential hazards in their work and the safest manner to carry out tasks.

## **Appendix 5 – The Learning Environment**

The teachers will ensure that:

Science is carried out in the most appropriate setting, taking into account context, learning potential, practical considerations and safety. Therefore teaching will occur offsite in relevant locations (inside /outside), in the school grounds and within class.

## **Appendix 6- Live Feedback/Marking**

Pupil understanding in Science, and progress is constantly monitored through a range of techniques. Staff

- respond to pupil work through oral dialogue
- use some Marking Codes and coloured highlighting to provide the children with relevant feedback –see Feedback Policy
- display children’s work in a manner demonstrating teacher’s valuing of pupils efforts
- encourage children to present their ‘offerings’ to a wider audience, e.g. other staff, children, parents and visitors to the school.

## **Appendix 7- Cross curricular Links**

The skills and knowledge that children develop in Science are linked to, and applied in, many other academic subjects of the curriculum, most notably Maths, Literacy, Technology, Geography, History. Artistic subjects, such as Art and Music are enhanced through a good understanding of Science. There are also obvious ties between Science and PE, and indeed between Science and Computing.

In a broader sense too, Science is important in the development of the individual. An appreciation of Science engenders in children a sense of wonder at the world. Knowledge of Science allows children to consider a range of career possibilities. It can allow children to develop debate and discussion skills that respect the views of others, whilst not necessarily agreeing with them. Practical work encourages children to become co-operative in shared activities.

## **Promoting British Values**

The staff will ensure that through the teaching of Science they will promote the fundamental British values of:

**Democracy**– respect for and participation in the democratic process

**Rule of Law**- respect for the laws of England

**Equality**– equality of opportunity for all

**Liberty**– respect for the liberties of all

**Tolerance**– respect for ad tolerance of different faiths and religious beliefs.

## The Local / Global Environment

The staff take every opportunity to develop children's knowledge and concern regarding environmental issues through the whole school curriculum.

## Spiritual Development

At Westmoor Primary School, we aim to deliver the whole curriculum in a way which provides our children with opportunities for exploration, questioning and reflection, and Science is an integral part of this.

## **Appendix 8- Equal Opportunities**

This school believes that every pupil is of equal value and has the right to equal education opportunities, irrespective of age, ability, race, creed and gender; therefore we help all our children to:

- access the full curriculum in Primary Science

## Cultural Recognition

Steps are taken to promote cultural diversity and celebrate difference and the school takes steps to ensure that Science lessons are culturally/ ethnically inclusive.

## Special Educational Needs and Disability

Learning difficulties are assessed by the class teacher and SENCO as necessary. Pupils participate fully in scientific activities, through appropriate differentiation / support.

## **Appendix 9- Assessment and Monitoring**

At Westmoor Primary School, assessment of children's work is used to inform planning for the future and thus ensure pupils' progress. All children are assessed using a range of formal and informal methods.

Assessment is in line with the whole school policy (see assessment policy for processes and proformas).

## Monitoring

The Science curriculum, planning, delivery and attainment is monitored by the Co-ordinator through:

- Work Scrutinies (Termly)
- Curriculum Walks
- Pupil Voice (Termly)
- Overview of Progress (Target Tracker)

- Auditing and updating resources.

## **Appendix 10 -Parental Involvement and Community Relations**

The staff believe that it is beneficial to promote links between the school and the wider community. We therefore encourage:

- parents to take an active role in their child's learning through specific homework projects , e.g. Space (UKS2)
- good relationships between our school and our local high school – laboratory visits for Y6 pupils, occasional requests to borrow equipment
- visits from specialist speakers
- special activities e.g. British Science Week

## **Appendix 11- Resources**

### **Science Equipment Inventory - May 2020**

#### **Common Usage Equipment**

Tubing, Pipette, Syringes : Various Sizes

Thermometers : 20 Classroom Thermometers (KS2 suitable)

10 Large-scale Thermometers (KS1 suitable)

Torches : 20 Torches and Spare Batteries

Timers : 6 Table Timers

2 Stopwatches

Binoculars : 8 pairs

Magnifying Glasses : 40

Microscopes : 2 Binocular , 1 Monocular

Separation Equipment : Funnels, Cylinders, Jugs/Beakers – Assorted

Sieves (6 standard size, 1 set of other sizes)

Filter Papers, Mortar and Pestle, Petri Dishes

Materials : Wood, Wax, Coal, Plastic, Stone, Wool, Card, etc

### Unit Related Equipment

#### PHYSICS

Electricity : Leads, Crocodile Clips, AA Batteries, Battery Holders, Buzzers, Lamps, Bulbs, Switches, Motors (sufficient for 2 classes)

Magnetism : Paired Bar Magnets (class set)

Direction Compasses (20)

Metal Discs (2 sets)

Assorted Magnets , Magnetic Toys, Demonstration Apparatus

Sound : Ear Model, Tuning Forks (4), Kazoos (6), Elastic Bands

Light : Study Lamps (6) , Mirrors (50), Colour Filters (2 sets), Zoetrope,  
Prisms (3 sets), Periscopes (4), Kaleidoscopes (5)

Forces : Force Meters – 10 N (class set), 1N,2N,5N,20N,50N (5 of each)

KS1 Forces Kit

Ramp, Cars, Surfaces

Space : Solar System Model, Posters

Seasons / Weather : Weather Station, Digital Anemometer, Light Meter

Energy : Renewable Energy Kit

#### CHEMISTRY

Rocks and Soil : Labelled tubs of rocks (3 sets), Soil Samples, Large  
Specimens of Certain Minerals – Coal, Granite, Limestone  
Study Cards, pH Papers

## BIOLOGY

Human Body : Internal Organ Model  
Skeleton Model  
X Rays  
Body Poster  
Body Puppet (Foundation Stage)  
Healthy Eating Cards

Living Things : Plant Posters  
Pooters – 20  
Pond Dipping Kit  
Wildlife Photos

### Developing and Monitoring of the Science Curriculum

To ensure the coherence and progress of the development of Science in this school the monitoring of the curriculum is a development areas, which will shortly be addressed.