



**Science Policy**

**Mrs H Lewis**

**September 2022**

**Approved by Chair:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Review Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Science should stimulate and excite pupils’ curiosity about phenomena, events of the natural world and why things happen the way they do. It teaches methods of enquiry and investigation to stimulate independent and creative thought. At Lodge Farm, we aim to provide a balanced and broad curriculum, which prepares children for an increasingly scientific and technological world.

**Aims**

Through an engaging and broad Science curriculum at Lodge Farm, we intend for every children to have the support to excel and have the supportive environment to ask questions based on prior knowledge.

We aim to:

* Develop pupils’ enjoyment and interest in Science.
* Use a range of investigations and practical activities to deepen an understanding of Science.
* Introduce pupils to a wide range of Scientific vocabulary.
* Encourage children to be curious about Science and the natural world.
* Develop pupils’ independence when learning about Science and taking part in investigations.
* Deepen pupils’ understanding of how Science impacts them, their lifestyles and the world around them.

**Implementation**

At Lodge Farm, there are five threads of enquiry, that weave through the curriculum:

* Research using secondary sources
* Comparative and fair testing
* Observing through time
* Pattern seeking
* Identifying, classifying and grouping

These enquiry themes provide pupils with the chance to constant question and explore scientific concepts. As they are constantly revisited and developed, children deepen their skills in enquiry and develop the independence to pursue areas of curiosity.

The Science curriculum is designed to deliver an engaging, rich and varied learning to all pupils. The National Curriculum provides a primary source of information for the curriculum, though additional resources are utilized and adapted including Hamilton Trust and the Ogden Trust. The skills for ‘Working Scientifically’ are built into all lessons and cross topics. ‘Working Scientifically’ skills are taught regularly through investigations, which are used to develop Scientific knowledge.

Cross-curricular learning is embedded across the curriculum, with Maths, English, PE and Art weaved through the Science curriculum. Maths is particularly developed through the regular use of measuring and weighing; estimations and predictions of data; producing different types of graph; and comparing different numerical results in investigations. Oral skills are developed through the discussion and recounting of observations. Written skills are developed through writing reports and the recording of information.

Key vocabulary and terms are built into medium term plans and where possible, are visually displayed in the classroom environment. Knowledge organisers are used in books so pupils are able to: recap prior learning; refer to scientific vocabulary and meanings; and reference essential visual diagrams.

**National Curriculum**

Science is a core subject within the National Curriculum. This policy is a statement of aims, principles and strategies for the teaching and learning of Science at SHINE academies. This policy should be read in conjunction with the New Curriculum 2014 documentation, which sets out in detail what pupils will be taught in different year groups as of September 2014. The programmes of study set out what should be taught at Key Stage 1 and 2. The programmes of study set out what should be taught at Key Stage 1 and 2 (see Appendix).

EYFS

The Foundation Stage programmes of study for ‘Understanding of the World’ are set out in the EYFS ‘Development Matters’ Framework. Children will:

* Explore the natural world around them
* Describe what they see, hear and feel whilst outside
* Recognize some environments that are different from the one in which they live
* Understand the effect of changing seasons on the natural world around them

**Enrichment Opportunities**

Each year, pupils celebrate key events in the school calendar including British Science Week and World Space Week; these are planned in accordance with national focus topics to raise aspirations and highlight potential career opportunities. During weekly Votes4Schools assemblies, scientific questions are sometimes explored in relation to relevant and topical issues going on in the world such as renewable energy or space exploration.

The outside environment is regularly used to enrich Science learning, with the local environment used to deepen learning and show pupils how they can see scientific concepts in the world around them. In EYFS, the forest area is used regularly to allow children to explore the world around them.

**Assessment**

Assessment is primarily teacher-driven across the school. In EYFS, observations are made and recorded according to the guidance set out in ‘Understanding the World’ in the Development Matters Framework. This could include conversations with adults and peers, photographs, pieces of independent work or observations of activities.

From Years 1 to 6, teacher assessments are recorded at termly intervals. Short, formal tests, which have been developed by Grammarsaurus are used at the end of each topic to inform teacher judgement. Year group assessment grids have been written to assist teachers in their judgements, particularly with the ‘Working Scientifically’.

**Inclusion**

All Science lessons are tailored to the needs of the children in the class. Activities are modelled by teachers often to ensure all pupils are able to access understanding. For SEND or EAL learners, the curriculum is scaffolded depending on their barriers to learning; this could include pictures, drawings with labels or simple recordings. We strive to provide the frequent opportunities for Gifted and Talented pupils to progress in their learning and extend their understanding.

**Monitoring and Evaluation**

The Science Coordinator will regularly review and evaluate the Science work across the school through book monitoring and lesson observations. Samples of children’s work from all ability levels (Upper/Middle/Lower/SEN/ Pupil Premium) will be monitored for appropriateness of activity, differentiation, range of activities and quality of work. Judgements based on any monitoring will be relayed to staff in their feedback. Pupil voice and staff conservations will also be used regularly to inform monitoring and evaluation conclusions.

This policy will be reviewed annually to ensure that it complies with the latest legislation, guidance and best practice.

**Appendix**

**Working Scientifically**

Key Stage 1

* Asking simple questions and recognising 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

* 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. To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
* Reporting on findings from enquires, including oral and written explanations, displays or presentations 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

Upper Key Stage 2

* 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

**Year 1 programme of study**

Plants

Pupils should be taught to:

* 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

Animals, including humans

Pupils should be taught to:

* 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

Everyday materials

Pupils should be taught to:

* 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

Everyday materials

Pupils should be taught to:

* Observe changes across the 4 seasons
* Observe and describe weather associated with the seasons and how day length varies

**Year 2 programme of study**

Living things and their habitats

Pupils should be taught to:

* 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

Plants

Pupils should be taught to:

* 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

Animals, including humans

Pupils should be taught to:

* 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

Uses of everyday materials

Pupils should be taught to:

* 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

**Year 3 programme of study**

Uses of everyday materials

Pupils should be taught to:

* 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

Animals, including humans

Pupils should be taught to:

* 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

Rocks

Pupils should be taught to:

* 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

Light

Pupils should be taught to:

* 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

Forces and magnets

Pupils should be taught to:

* 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

**Year 4 programme of study**

Living things and their habitat

Pupils should be taught to:

* 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

Animals, including humans

Pupils should be taught to:

* 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

States of matter

Pupils should be taught to:

* 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

Sound

Pupils should be taught to:

* 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

Electricity

Pupils should be taught to:

* 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

**Year 5 programme of study**

Living things and habitats

Pupils should be taught to:

* 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

Animals, including humans

Pupils should be taught to:

* Describe the changes as humans develop to old age

Properties and changes of materials

Pupils should be taught to:

* 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

Earth and space

Pupils should be taught to:

* 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

Forces

Pupils should be taught to:

* 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

**Year 6 programme of study**

Living things and their habitats

Pupils should be taught to:

* 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

Animals, including humans

Pupils should be taught to:

* 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

Evolution and inheritance

Pupils should be taught to:

* 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

Light

Pupils should be taught to:

* 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

Electricity

Pupils should be taught to:

* 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