# Science Policy 2022

| Version Number | FGB approval date | Approved by | Date for review |
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| 2 | | | September 2023 |
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We may be small but together we can make a big difference

## Contents:

**Statement of intent**

"*Science has changed our lives and is vital to the world's future prosperity*"
National Curriculum 2013

Loscoe Church of England Primary School and Nursery recognises the importance of science education in teaching pupils about the world around them. This policy will ensure the school complies with the national curriculum and help pupils have a solid grounding in science, a positive attitude towards scientific knowledge, and a strong understanding of experimental processes.

*Our vision is 'We may be small but together we can make a big difference'*

Learning in science is all about innovation, discovery and research. Individuals in science can make discoveries which can change the world!

Loscoe Church of England Primary School and Nursery delivers a broad and balanced science curriculum, in line with national requirements, which enables pupils to:

- 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 science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

## 1. Legal framework

This policy has due regard to all relevant legislation and statutory guidance including, but not limited to, the following:

- The Control of Substances Hazardous to Health Regulations (COSHH) 2002
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013
- DfE (2013) 'Science programmes of study: key stages 1 and 2'
- DfE (2021) 'Statutory framework for the early years foundation stage'

This policy operates in conjunction with the following school policies:

- Health and Safety Policy
- Primary Assessment Policy

## 2. Roles and responsibilities

The governing board is responsible for:

- Ensuring a broad and balanced science curriculum is implemented in the school.
- Ensuring the school's science curriculum is accessible to all pupils.

The headteacher is responsible for:

- The overall implementation of this policy.
- Ensuring the school's science curriculum is implemented consistently.
- Ensuring appropriate resources are allocated to the science curriculum.
- Ensuring all pupils are appropriately supported.
- Appointing a member of staff to lead on the school's approach to teaching science.

The science lead is responsible for:

- Preparing policy documents, curriculum plans and schemes of work for science.
- Reviewing changes to the national curriculum and advising on their implementation.
- Monitoring the learning and teaching of science, providing support for staff where necessary.
- Organising the deployment of resources and carrying out an annual audit of all science resources.
- Leading staff meetings and providing relevant staff with the appropriate training.
- Advising on the contribution of science to other curriculum areas.

Science teachers are responsible for:

- Acting in accordance with this policy.
- Ensuring that lessons are taught in line with the school's Health and Safety Policy at all times.
- Liaising with the science lead about key topics, resources and support for individual pupils if required.
- Ensuring that all relevant statutory content is covered within the school year.
- Monitoring the progress of pupils in their class and reporting this on an annual basis.
- Reporting any concerns regarding the teaching of the subject to the science lead or a member of the SLT.
- Undertaking any training that is necessary to teach the subject effectively.

The special educational needs coordinator (SENDCO) is responsible for:

- Liaising with the subject leader in order to implement and develop specialist music-based learning throughout the school.
- Organising and providing training for staff regarding the music curriculum for pupils with special educational needs and disabilities (SEND).
- Advising staff how best to support pupils' needs.
- Advising staff on the inclusion of musical objectives in pupils' individual education plans.
- Advising staff on the use of teaching assistants in order to meet pupils' needs.

## 3. Early years foundation stage (EYFS)

All pupils in the EYFS are taught science as an integral part of the topic work covered during the academic year.

All science objectives within the EYFS are underpinned by the objectives of the early learning goals (ELGs).

The science curriculum in the EYFS is delivered with particular reference to the Area of Learning – Understanding the World and the ELG - The Natural World, which enables children to:

- 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.

## 4. National curriculum

The national curriculum will be followed for all science teaching.

**During Years 1 and 2, pupils will be taught to**:

**Working scientifically**

- 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.

**Year 1 pupils will also be taught to:**

**Plants**

- 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**

- 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, i.e. 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**

- 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.

**Seasonal changes**

- Observe changes across the four seasons.
- Observe and describe weather associated with the seasons and how day length varies.

**Year 2 pupils will also be taught to:**

**Living things and their habitats**

- 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**

- 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**

- 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, i.e. 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**

- 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.

**During Years 3 and 4, pupils will be taught to:**

**Working scientifically**

- 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 and a range of equipment, including thermometers and data loggers.
- Gather, record, classify and present data in a variety of ways to help answer 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.

**Plants**

- Identify and describe the functions of different parts of flowering plants, i.e. roots, stem or trunk, leaves, and flowers.
- Explore the requirements of plants for life and growth, i.e. air, light, water, nutrients from soil, and room to grow, and how requirements 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.

**Living things and their habitats**

- 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**

- 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.
- 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.

**Rocks**

- 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.

**States of matter**

- 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**

- 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.

**Light**

- 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**

- Compare how things move on different surfaces.
- Notice that some forces need contact between two 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 two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

**Electricity**

- 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 a lamp will light in a simple series circuit, based on whether 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 a lamp lights in a simple series circuit.
- Recognise some common conductors and insulators, and associate metals with being good conductors.

**During Years 5 and 6, pupils will be taught to:**

**Working scientifically**

- 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 the results and the degree of trust in them, 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.

**Living things and their habitats**

- 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 how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.
- Give reasons for classifying plants and animals based on specific characteristics.

**Animals, including humans**

- Describe the changes as humans develop to old age.
- 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**

- 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.

**Properties and changes of materials**

- 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**

- 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**

- 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.

**Light**

- 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**

- 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 or off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.

## 5. Cross-curricular links

Wherever possible, the science curriculum will provide opportunities to establish links with other curriculum areas. Opportunities will be identified by the subject leaders and by teams of teachers.

**English**

- Pupils' writing skills are developed through recording their planning, what they observe and what they found out.
- Pupils' speaking skills are developed through their explanations of what they have observed.

**Mathematics**

- Pupils use their knowledge and understanding of data handling, including through recording their findings on charts, tables and graphs.
- Pupils use their knowledge of measurement to use a range of equipment, such as thermometers and stopwatches, within investigations

**PSHE**

- Health education is taught as part of the science units about humans, including information about healthy lifestyles, growth, age, and reproduction.

## 6. Teaching and learning

Science lessons are delivered using the Cornerstones companion projects.

Through these projects, pupils will be taught to describe associated processes and key characteristics in common language, as well as understand and use technical terminology and specialist vocabulary. Lessons will allow for a wide range of scientific enquiry, including the following:

- Questioning, predicting and interpreting
- Pattern seeking
- Practical experiences
- Collaborative work
- Carrying out investigations
- Carrying out time-controlled observations
- Classifying and grouping
- Undertaking comparative and fair testing
- Researching using secondary sources

The class teacher, in collaboration with the subject leader, will ensure that the needs of all pupils are met by:

- Setting tasks which can have a variety of responses.
- Providing resources of differing complexity, according to the ability of the pupils.
- Setting tasks of varying difficulty, depending on the ability group.
- Utilising teaching assistants to ensure that pupils are effectively supported.

Focus is put on the development of a deep structural knowledge and the ability to make connections, with the aim of ensuring that what is learnt is sustained over time.

Core knowledge has been identified by the subject leader for each year group, and flashcards are regularly used by all staff to ensure this knowledge is secure for all pupils.

Key vocabulary has been identified by the subject leader for each year group.

## 7. Planning

The Cornerstones Scheme uses the National Curriculum to provide teachers with projects for each Key Stage in the school. Teachers use the lesson plans, assessment, clear progression and whiteboard resources to support lessons.

Each project consists of:

- Introductory knowledge
- Engage
- Develop 1
- Develop 2
- Innovate
- Express

Within each section of the project, there is a varied number of lessons focused on a specific area within the topic. Working Scientifically skills are interwoven into all lessons, encouraging pupils to become scientists within these lessons.

Teachers are responsible for reviewing and adapting plans taking into account pupils' needs and identifying the methods in which topics could be taught.

In the school, science is taught both as a discrete lesson and as part of cross-curricular themes when appropriate.

Teachers will use the key learning content in the DfE's statutory guidance 'National curriculum in England: science programmes of study', updated in 2015.

Lesson plans will demonstrate a balance of interactive and independent elements used in teaching, ensuring that all pupils engage with their learning.

Long-term planning outlines the units to be taught within each year group.

Medium-term planning outlines the vocabulary and skills that will be taught in each unit of work, as well as highlight the opportunities for assessment.

Short-term planning will be used flexibly to reflect the objectives of the lesson, the success criteria and the aims of the next lesson.

All lessons will have clear learning objectives, which are shared and reviewed with pupils.

## 8. Assessment and reporting

Pupils will be assessed and their progression recorded in line with the school's Primary Assessment Policy. Assessment in science will be based upon scientific knowledge and understanding.

Pupils will be assessed continually throughout the year and will undertake a summative assessment at the end of each Cornerstones project. Formative assessment will be carried out informally throughout the lessons. This will enable teachers to identify pupils' understanding of subjects and inform their immediate lesson planning.

Assessment will take various forms, including the following:

- Talking to pupils and asking questions
- Discussing pupils' work with them
- Marking work against learning objectives
- Specific assignments for individual pupils

- Observing practical tasks and activities
- Pupils' self-evaluation of their work
- Classroom tests and formal exams

Pupils in Nursery will be assessed in accordance with the 'Statutory framework for the early years foundation stage', in order to identify a pupils' strengths and identify areas where progress is less than expected. An EYFS Profile will be completed for each pupil in the final term of the year in which they reach age five.

The progress and development of pupils within the EYFS is assessed against the early learning goals outlined in the 'Statutory framework for the early years foundation stage'.

Parents will be provided with a written report about their child's progress during the Summer term every year. Reports will include information on the pupil's attitude towards science and the knowledge levels they have achieved. Verbal reports will be provided at parent-teacher meetings during the Autumn and Spring terms.

The progress of pupils with SEND will be monitored by the SENDCO.

## 9. Science events and opportunities

Opportunities for outdoor learning will be provided where possible.

Each year group will have the opportunity to undertake science-based external educational visits at least once per year.

Each year group will have the opportunity to attend an extra curricular STEM club throughout the year, where they will be able to further develop their working scientifically skills.

Pupils will also have the opportunity to have a science lesson taught by a science specialist teacher from Heanor Gate Spencer Academy.

As part of the Loscoe Promise, throughout their time at school, all children will have the opportunity to:

- Walk in the woods/ experience forest schools
- Toast marshmallows on a campfire
- Be taught basic first aid
- To grow and cook our food - plant it, grow it, eat it

## 10. Resources

Science resources for each unit are stored in the science cupboard in the hall.

The science lead is responsible for ensuring that all resources and equipment are sufficiently maintained, and for maintaining an inventory of resources. The science lead will carry out an annual audit of the science resources, reordering any consumables when necessary. Any equipment or resources which are a cause of concern will be removed from the science cupboard immediately.

Equipment will be checked by the relevant teacher prior to each use and any damages or defects will be reported to the science lead immediately. Staff will also inform the science lead of any changes regarding science resources, such as when supplies of resources have

run out or new resources are required. The science lead is responsible for negotiating requests from staff and ensuring resources are bought within the amount allocated in the annual budget.

## 11. Health and safety

Staff will act in accordance with the school's Health and Safety Policy at all times.

A risk assessment will be carried out by teachers before higher-risk science-related activities.

All science teachers and other relevant staff will be shown how to correctly use science equipment as part of their induction training.

Staff will also be made aware of the COSHH and RIDDOR regulations as part of their induction training and will act in accordance with these whilst undertaking activities.

All pupils will be shown how to correctly use equipment prior to use and will be monitored by staff whilst using equipment. Pupils will also be made aware of how they are expected to behave, ensuring that they show respect to other people and the environment, and the personal safety protocols and protective equipment needed when using equipment or carrying out tasks, e.g. goggles.

At the beginning of any experiment, the science teacher will outline the purpose of the experiment to the class, and all hazards and safety precautions will be thoroughly outlined. Any experiments or activities not previously conducted by the science teacher will be trialled prior to being undertaken with pupils.

Accidents and near-misses will be reported following the school's reporting procedures.

## 12. Equal opportunities

All pupils will have equal access to the science curriculum.

Gender, learning ability, physical ability, ethnicity, linguistic ability and/or cultural circumstances will not impede pupils from accessing music lessons.

Where it is inappropriate for a pupil to participate in a lesson because of reasons related to any of the factors outlined above, the lessons will be adapted to meet the pupil's needs and alternative arrangements involving extra support will be provided where necessary.

All efforts will be made to ensure that cultural and gender differences are positively reflected in lessons and the teaching materials used.

Loscoe Church of England Primary School and Nursery aims to provide more able pupils with the opportunity to extend their scientific thinking through extension activities such as investigations which can be carried out at home and research of a scientific nature.

## 13. Adaptations for SEN

Learning opportunities will be provided for children of a wide range of abilities and care will be taken to match the challenge of the task to the needs of the child.

Science is a highly inclusive subject, which promotes practical lessons and investigations and encourages all children to fully engage in a variety of scientific challenges.

Science is taught to all children, whatever their ability or individual needs. Science forms part of the school curriculum to provide broad and balanced educational experiences for all children.

We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those with special gifts and talents, and those learning English as an additional language (EAL), and we take all reasonable steps to achieve this. For further details, see separate S.E.N. policy.

## 14. Monitoring and review

This policy will be reviewed on an annual basis by the subject leaders.

The subject leader will monitor teaching and learning in the subject at Loscoe Church of England Primary School and Nursery, ensuring that the content of the national curriculum is covered across all phases of pupils' education.

A named member of the governing body is briefed to oversee the teaching of science, and meets regularly with the subject leader to review progress.

Any changes made to this policy will be communicated to all teaching staff.