

Jesse Gray Primary Science Policy



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Head Teacher Signature:	
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Introduction

This document is a statement of the aims, principals and strategies for teaching and learning of science at Jesse Gray Primary School.

It has been developed and reviewed through a process of consultation with teaching staff and in light of changes in the requirements of the National Curriculum.

It was approved by the governing body on and the next review of the document will take place in Summer 2022. A schedule for the review of this, and all other, policy documents is set out in the school's Policy Review document.

1 Context

Science is a core subject within the National Curriculum. A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

2 Defining Principles

Science is a core subject in the National Curriculum. The fundamental skills, knowledge and concepts of the subject are set out in "Science in the National Curriculum" where they are categorised into 4 attainment targets

- 1 **Working Scientifically**
- 2 **Biology**
- 3 **Chemistry**
- 4 **Physics**

Each attainment target is taught through the programmes of study stated in the national curriculum. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. It is vitally important that the working scientifically strand is not seen as a separate unit but rather as a way of teaching and learning about science. 'Working scientifically' should be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

Science is important because:

- it is a body of knowledge essential to our understanding of the world around us.
- it has built up a methodology for thinking which today forms the basis of most intellectual enquiry.

- the skills and knowledge of science have wide applicability in everyday life.

Our aims in teaching science are that all children will:

- 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
- be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

3 Organisation and Structure

Class teachers teach Science as part of the whole primary curriculum. There is no specialist teaching in Science at primary level.

Science is taught as a discrete subject and is no longer linked to CFLs or topic work as it was found that this weakened science learning. It is now taught in year groups to ensure thorough progression of the new curriculum and each teacher covers 3-4 topics a year in KS1, and 5 topics a year in KS2.

The role of the Science Subject Leader is to:

- take the lead in policy development and the production of schemes of work designed to ensure progression and continuity in science throughout the school
- develop his/her own subject knowledge in order to support colleagues in their individual development needs.
- monitor progress in science and note action needed
- take responsibility for the purchase and organisation of central resources for science
- keep up-to-date with developments in science education and disseminate information to colleagues as appropriate.

Teaching Assistants and classroom helpers are sometimes used to assist:

- in supporting group activities
- in providing extra help for children with particular needs.

Commercially available schemes of work are not used in science explicitly; however some teachers may choose to use them to support their own planning.

Homework is sometimes used to support science through tasks such as:

- finding answers to questions posed in school through the use of computers, books and interviews with friends and family.

Planning in Science is a process in which all teachers are involved, wherein:

- The foundation for curricular planning is: "Overview of science curriculum" (See Appendix 1) which is carefully balanced to ensure full coverage of the National Curriculum and clear progression between year groups.
- Science is now planned as a stand alone unit and taught discretely in year groups
- It may be organised as a science week or blocked into afternoons for a week or two eg: science workshops. The organisation approach for that particular term will be chosen by the planning team.
- 1½ hours a week is to be dedicated to science per week with 2/3 of this being practical investigative work.
- Science planning uses the National Curriculum Objectives.
- Each unit of work has a small selection of skills to focus on. A lesson, or series of lessons, can be planned around one particular skill.
- Staff meeting time is used where appropriate to discuss the science curriculum and ensure consistency of approach and of standards

Central resources in Science are the responsibility of the Subject Leader who has a small budget available. They include class sets of scientific instruments likely to be used sporadically by all classes, such as pooters, magnifiers, stop clocks, spring balances and major, expensive items such as data loggers, microscopes and two digital microscopes.

Information technology is a major resource, which is used in science for communicating information (word processing and graphics/drawing packages), handling information (databases and data capture equipment) and modelling (simulations and spreadsheets).

Smartboards used as a teaching tool throughout the school.

Digital photography is used by pupils as a means of recording findings; and by teachers as evidence of practical investigative work.

The library houses a substantial stock of books on science based subjects and is used regularly for reference. Year groups also use the community library to order in books to support their topics.

4 Teaching and Learning

The Science curriculum is organised on a topic basis wherein:

- 3-4 topics are taught in KS1 and 5 topics are taught in KS2.
- Teaching and learning is led by skills, rather than content.
- A range of different methods of working in science is used including co-operative group work, individual work and whole class teaching where appropriate.

We aim to meet the needs of all our children through differentiation in our science planning including:

- A variety of approaches and tasks appropriate to ability levels
- Dyslexic friendly practices- i.e. encouraging children to record in a variety of ways, marking content rather than spelling, using concrete materials and visual representations, using visual, aural and kinesthetic teaching strategies and including collaborative learning between pupils.
- Enhancing and enriching activities to progress more able children to a higher level of knowledge and understanding appropriate to their abilities.
- Closer supervision and more adult support for less able learners.
- The use of Blooms Taxonomy as a basis for differentiated questioning.

This will enable children with learning and/or physical difficulties to take an active part in scientific learning and practical activities and investigations and to achieve the targets they have been set.

The emphasis in our teaching of science is on first hand experience and we encourage children increasingly to take control of their own learning. Our focus is on the working scientifically strand of the National Curriculum thus:

- At least two thirds of the study of science is through practical investigative work
- careful observation is fostered
- resources are made readily available and accessible
- pupils are encouraged to communicate their scientific findings to others using a variety of methods including written or verbal reports; and use of graphs, tables or pictures.

Excellence in Science is celebrated in display and performance including the mounting of graphical display of the results of scientific enquiry and the communication of scientific findings during whole school or whole class gatherings.

Feedback to pupils about their own progress in science is achieved through the marking of work. Feedback is given while a task is being carried out through verbal feedback, conferences and whole class feedback. It aims to help children learn by encouraging them to think critically about what they have achieved.

Marking of written work is used sensitively and with discretion in a dyslexic friendly manner.

Once a half term, work is diagnostically marked and includes specific praise based comments, a next step and an opportunity to respond. Marking of Science follows the school marking policy.

Formative Assessment is used to guide the progress of individual pupils in Science. It involves identifying each child's progress in each area of the Science curriculum, determining what each child has learned and what therefore should be the next stage in his/her learning. Teachers in the course of their teaching mostly carry out formative assessment informally.

5 **Assessment, Recording and Reporting**

- Assessment for learning is continuous throughout the planning, teaching and learning cycle. Scientific Knowledge is assessed throughout the unit of work, and at the end if necessary- objectives on O-track are recorded as red (objective taught and not met), orange (objective taught and partially met), green (objective taught and met) or purple (objective taught and the child shows a greater depth in their knowledge) as the child demonstrates their Scientific Knowledge and understanding.
- SEN children are assessed against B Squared / out of year group statements when appropriate.
- Children are also formally assessed throughout the terms on their Scientific Working skills. Teachers plan into their lessons specific assessment activities for the children to demonstrate specific Working Scientifically skills. As with the assessment of the Scientific Knowledge objectives, these are recorded using O-Track.
- The total number of objectives achieved on O-track for Scientific Working and Scientific Knowledge correlates to the level achieved:

0-33% = W1, 34-66% = W2, 67%-99%= W3, 100%= At, 100% at objectives + 100% Mastery objectives= M

Reporting to parents is done through parents evening meetings (Autumn and Spring term) and annually through a written report. Reporting in science will focus on each child's attitudes to science and progress in 'working scientifically', the ability to investigate scientifically including understanding of the nature of "scientific method".

6 **Working with the wider community**

This may include the school's:

- membership of the Royal Horticultural Society
- Visits on a scientific theme e.g British Geological Society
- Healthy Eating events
- Healthy Schools Initiative
- Occasional use of visiting theatre companies to promote scientific topics
- Parental involvement, to come in and share their science based jobs and experiences (As seen during science week)

7 **Other Policies**

Health and Safety Policy

Consideration of Health and Safety issues is of the utmost importance in Science. Guidelines are provided on appropriate handling of equipment and materials, appropriate storage of equipment and materials.

SMSC Policy

Elements of the Science Curriculum are closely linked to aspects of SMSC (see Appendix 2).

SRE Policy (Links are shown in Appendix 1: overview of science curriculum)

Appendix

Appendix 1: Overview of Science Curriculum.

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The order of topics is subject to change to meet the needs of each year group			
Year	Autumn	Spring	Summer
EYFS	Foundation stage teachers plan topics based around the children’s interest. The EYFS ‘Science’ objectives are arranged in those topics accordingly.		
1	<p>Everyday materials Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials. 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.</p> <p>Seasonal changes Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.</p>	<p>Animals, including humans Identify and name a variety of common animals. 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. Identify name, draw and label the basic parts of the human body.</p> <p>Seasonal changes Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.</p>	<p>Plants Identify and name a variety of common wild and garden plants. Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>Seasonal changes Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies.</p>
2	<p>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 (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>Living things and their habitats Explore and compare the differences between things that are living, dead, and things that have never been alive.</p>	<p>Living things and their habitats Identify that most living things live in habitats to which they are suited. Identify and name a variety of plants and animals in their habitats, including micro-habitats. Simple food chains.</p> <p>Investigation skills focus</p> <p>Plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>Plants Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Use of everyday materials Identify and compare the uses 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.</p>

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Year	Autumn	Spring	Summer
3	<p>Rocks</p> <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p> <p>Investigation skills focus</p>	<p>Animals including humans</p> <p>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.</p> <p>Identify that humans and some animals have skeletons and muscles for support, protection and movement.</p> <p>Forces and magnets</p> <p>Compare how things move on different surfaces.</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>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.</p> <p>Describe magnets as having two poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<p>Plants</p> <p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>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.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>Light</p> <p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</p> <p>Find patterns in the way that the size of shadows changes.</p>
4	<p>Animals including humans</p> <p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p>States of matter</p> <p>Compare solids, liquids or gases.</p> <p>Observe that some materials change state when they are heated or cooled.</p> <p>The water cycle.</p>	<p>Electricity</p> <p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p> <p>Investigation skills focus</p>	<p>Living things and their habitats</p> <p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Sound</p> <p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound increases.</p>

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Year	Autumn	Spring	Summer
5	<p>All 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 processes of reproduction in some plants and animals.</p> <p>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.</p>	<p>Properties and changes of materials Compare and group together everyday material on the basis of their properties. 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. Give reasons for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and change 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.</p> <p>Forces Explain that unsupported objects fall towards the earth because of the 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.</p>	<p>Animals including humans Describe the changes as humans develop to old age.</p> <p>Investigation skills focus</p>
6	<p>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.</p> <p>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/off position of switches. Use recognised symbols when representing a simple circuit in a diagram</p>	<p>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 emit 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.</p> <p>Animals, including humans 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.</p>	<p>Living things and their habitats Describe how living things are classified into broad groups according to common observable characteristics and base on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.</p> <p>Investigation skills focus</p>

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Year	Autumn	Spring	Summer
Working Scientifically	All year groups teach the working scientifically skills throughout all knowledge topics. The working scientifically skills are woven throughout the year and taught according to the classes' needs and ability.		

Appendix 2: Links to SMSC

Subject: Science

Spiritual

- Science supports spiritual development by providing many opportunities for children to think and spend time reflecting on the amazing wonders which occur in our natural world.

Moral

- Science supports moral development by showing children that different opinions need to be respected and valued. There are many moral and ethical issues that we cover in science including discussions about environmental and human issues.

Social

- Science supports social development by exposing children to the power of collaborative working in the science community which has led to some amazing and life changing breakthroughs in medicine. When undertaking experiments and research children work collaboratively

Cultural

- Science supports cultural development by looking at how scientists from a range of cultures have had a significant impact globally. It also helps children to understand how important science is to the economy and culture of the UK.