

"Love one another as Jesus loved us" (John 13 v 34-35)



St John's C.E. (V.M.) School Cliviger

'Learn, Pray, Care & Play'

Our church school through its Christian values and caring community
seeks
to inspire each individual to achieve and grow.

Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live. Through investigation, as well as using and applying knowledge and vocabulary, children can develop ways of thinking and working which they will use throughout their lives. We believe in the importance of a broad and balanced science education as an entitlement of all children, regardless of ethnic origin, gender, class, aptitude or disability. We adapt and extend the curriculum to match the unique circumstances of our school. We hope this will help to develop resilient and independent learners who pursue their love for the world around them.

Children are guided through the programme which is set out by the National Curriculum (2014). Teachers adapt and modify the model plans to suit their children's interests, current events, their own teaching style, the use of any support staff and the resources available.

SCIENTIFIC PRINCIPLES

As a whole school we have created our key scientific principles and have decided exactly what science is to us here at St John's. Across both staff and children we decided that science is good when:

- We problem solve
- We use different scientific equipment
- You see things you didn't expect to see
- It links to real life
- We get to help others
- We show off what we know

These key scientific principles are regularly discussed in science lessons and are visible in all classrooms throughout school.

THE SCIENTIFIC CURRICULUM

Science is a core subject in the National Curriculum 2014 (*for England*).

Love-Trust-Understanding-Joy-Forgiveness-Respect-Acceptance-Truthfulness

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The new National Curriculum 2014 states why we teach science in schools: 'A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics...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.'

Aims (taken from NC2014)

The national curriculum for science aims to ensure that all pupils:

- 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.

'Working scientifically' is described separately in the programme of study, but must **always** be taught through and clearly related to the teaching of science content in the programme of study.

The learning environment within all science lessons will be:

- Safe, secure and children with stable relationships so children are able to thrive.
- Knowledge and concept rich which is supportive of a child's independent learning.
- Well resourced so children are able to complete experiments and knowledge challenges to the best of their ability.
- There are high expectations of behaviour so that the classroom is safe and children are able to investigate well.

Foundation Stage

Science is threaded through the foundation stage curriculum. However, the majority of science at foundation stage is taught through the 'Understanding the World' strand of the EYFS curriculum. This involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment. There are independent opportunities for science activities within the foundation stage classroom and children are actively encouraged to investigate and follow their own lines of enquiry. Knowledge and concepts are threaded through a cross curricular approach and are taught alongside scientific enquiry skills. Children are encouraged to use and practice these skills across all areas of the curriculum.

Early Learning Goals: Understanding the world: The World

- 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.

Key Stage1 and Key Stage 2

Science planning is based on the Association for Science Education (ASE) planning matrices. This aims to give children a contextual understanding of science topics whilst weaving through key vocabulary and scientific concepts, scientific investigation skills and knowledge of scientific topics. Each year group has specific prescribed topics to cover, these are in line with the National Curriculum 2014. Each year group has 5 topics except year 2 which has 4. Topics are covered 1 per half term, however

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some need to be completed over a term in order to cover the depth and breadth of the topic. There are models of best practice for each topic which inform planning and progression through topics. Lessons are then planned to be engaging, exciting and informative whilst promoting moral, social, cultural and spiritual awareness of the wider world we live in. If there is a clear and beneficial link, science is related to the literacy topic for each half term.

There is a clear progression of knowledge and key vocabulary through each science topic. Children are encouraged to recall prior knowledge before building and beginning to work towards their current year group expectations. Children will not learn knowledge, vocabulary and concepts from the next progressive step. They will instead practice and rehearse their knowledge and skills in different contexts.

Figure 1: Topic provision across year groups

Year Group	<u>Topics</u>					
	<u>Autumn 1</u>	<u>Autumn 2</u>	<u>Spring 1</u>	<u>Spring 2</u>	<u>Summer 1</u>	<u>Summer 2</u>
Year 1	Animals including humans	Seasonal changes	Everyday Materials	Everyday Materials	Plants	Plants
Year 2	Living things and their habitats	Animals including humans	Everyday Materials	Performing simple tests, gathering and recording data Materials	Living things and their habitats (food chains)	Plants
Year 3	Sources of light and shadows	Animals including humans	Animals including humans	Forces and magnets	Plants	Rocks
Year 4	States of matter	Animals including humans	Sound	Electricity	States of matter	Living things in their habitats
Year 5	States of matter	Properties of materials	Living things and their habitats	Animals including humans	Forces	Earth and space
Year 6	Living things and their habitats	Atlantic oceans as habitats	Electricity	Evolution and inheritance	Animals including humans	Light

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Figure 2: Progression of knowledge and vocabulary through year groups. Example topic of Living things and their habitats.

Year Group	Key Learning	Key Vocabulary
Year 2	All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (this is a simplification but appropriate for year 2 children). An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). Animals and plants live in a habitat to which they are suited which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect what plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.	Key vocabulary: Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc.
Year 4	Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way i.e. positive human impact, such as setting up nature reserves or in a bad way i.e. negative human impact, such as littering. These environments also change with the seasons; different living things can be found in a habitat at different times of the year	Key vocabulary Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate
Year 5	As part of their life cycle plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals including humans have offspring which grow into adults. In humans and some animals these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.	Key vocabulary Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings
Year 6	Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups – those that have backbones (vertebrates) and those that do not (invertebrates). Vertebrates can be divided into five small groups – fish, amphibians, reptiles, birds and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups including insects, spiders, snails and worms. Plants can be divided broadly into two main groups – flowering plants and non-flowering plants.	Key vocabulary: Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering

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Scientific Skills

Scientific skills are built upon and developed from EYFS to Year 6. They are initially taught and practiced within scientific contexts. Following this they are applied across different contexts and topics within the curriculum and children are actively encouraged to use these independently.

Figure 3 – Scientific Skill progression from EYFS to Key Stage 2 - www.ciec.org.uk

<u>EYFS</u>	<u>Key stage 1</u>	<u>Lower Key Stage 2</u>	<u>Upper Key Stage 2</u>
Show curiosity about objects, events and people Playing & Exploring Questions why things happen Speaking: 30-50 months	Explore the world around them and raise their own simple questions	Raise their own relevant questions about the world around them	Use their science experiences to explore ideas and raise different kinds of questions
Engage in open-ended activity Playing & Exploring	Experience different types of science enquiries, including practical activities	Should be given a range of scientific experiences including different types of science enquiries to answer questions	Talk about how scientific ideas have developed over time
Take a risk, engage in new experiences and learn by trial and error Playing & Exploring	Begin to recognise different ways in which they might answer scientific questions	Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions
Find ways to solve problems / find new ways to do things / test their ideas Creating & Thinking Critically	Carry out simple tests Set up simple practical enquiries, comparative and fair tests	Recognise when a simple fair test is necessary and help to decide how to set it up	Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why
Develop ideas of grouping, sequences, cause and effect Creating & Thinking Critically Know about similarities and differences in relation to places, objects, materials and living things ELG: The World	Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)	Talk about criteria for grouping, sorting and classifying; and use simple keys	Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment
Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world The World: 30-50 months	Ask people questions and use simple secondary sources to find answers	Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact
Closely observes what animals, people and vehicles do The World 8-20 months Use senses to explore the world around them Playing & Exploring	Observe closely using simple equipment with help, observe changes over time	Make systematic and careful observations Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	Make their own decisions about what observations to make, what measurements to use and how long to make them for

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Make links and notice patterns in their experience Creating & Thinking	With guidance, they should begin to notice patterns and relationships	Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them	Look for different causal relationships in their data and identify evidence that refutes or supports their ideas
Choose the resources they need for their chosen activities ELG: Self Confidence & Self Awareness Handle equipment and tools effectively ELG: Moving & Handling	Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data	Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately	Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.
Create simple representations of events, people and objects Being Imaginative: 40-60+ months	Record simple data	Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Answer how and why questions about their experiences ELG: Understanding Make observations of animals and plants and explain why some things occur, and talk about changes ELG: The World	Use their observations and ideas to suggest answers to questions Talk about what they have found out and how they found it out	With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	Identify scientific evidence that has been used to support or refute ideas or arguments
Develop their own narratives and explanations by connecting ideas or events ELG: Speaking Builds up vocabulary that reflects the breadth of their experience Understanding: 30-50 months	With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language	Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions	Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results
		With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	Use their results to make predictions and identify when further observations, comparative and fair tests might be needed

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CHALLENGE

All children from EYFS to KS2 will take part in a scientific challenge task each term. This allows them to show and develop their understanding within a problem solving context. The challenges enable the children to combine their scientific knowledge and skills in an independent context.

ASSESSMENT AND RECORDING

We use assessment to inform and develop our teaching. *Assessment is an on-going and vital tool to aid future planning.* Children are assessed based on their written and oral responses as well as a variety of recorded work and each child's progress will be noted for further guidance on assessment and marking (see school's assessment policy).

Assessment strategies used are a combination of the following:

- Initial assessment of knowledge grids
- Distance marking and key points feedback
- Verbal feedback
- Assessment recording and tracking for each topic.
- Reports are made to parents during parents evenings and written reports.

CURRICULUM TIME

In Key Stage 1 and EYFS science will be taught for approximately 1 hour and a half a week. In Key Stage 2 it will be taught for 2 hours per week. This will adapt and change with other timetable needs. For example, during science week classes will be asked to complete much more science than 2 hours per week. What is crucial is that science is taught well, in-depth and is worthwhile.

RESOURCES

Teachers have access to many other shared science resources which are used to enhance planning and delivery of science lessons. These are available through CPD, staff shared area and regular updates for all staff. There are practical resources within the science cupboard, these will enhance all topics and are available for all staff to use. It is the class teachers responsibility to ensure that relevant resources are available to children at the beginning of each science lesson.

EQUAL OPPORTUNITIES

Science is made accessible to all children through support staff deployment, planning, resources and individual provision plans. Teachers are knowledgeable of their class and their needs and will adapt accordingly to this during science lessons. We believe in the importance of a broad and balanced science education as an entitlement of all children, regardless of ethnic origin, gender, class, aptitude or disability.

MONITORING AND EVALUATION

The science subject leader will undertake a number of monitoring activities throughout the academic year. These will be a combination of, but not limited to, the following:

- Pupil interviews
- Lesson observations

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- Book scrutinies
- Planning scrutinies
- Governor meetings

These subject monitoring activities will align with the schools monitoring and evaluation calendar. All subject leader time will be recorded, key strengths will be identified along with issues for attention. Any additional actions to be taken are noted on the science action plan for that school year.

REVIEW

This science policy will be reviewed by the science subject leader and the senior leadership team.

Last review October 2024

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