'Growing, loving and learning in the arms of Mary'

Science Policy

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unicef UNITED KINGDOM | FOR EVERY CHILD IN DANGER	Children's Rights	
Article 13 (right of participation) All children have a right to find out things and say what they think.		
Article 17 (right of participation) All children have the right to information from the media.		
Article 14 (freedom of expression) All children have the right to think and believe what they want.		
Article 28 (right to education) Every child has the right to an education.		
Article 29 (goals of education) Education must develop every child's personality, talents and abilities to the full.		
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St. Mary's Catholic Primary School Science Policy

'Growing, loving and learning in the arms of Mary'

Introduction

This policy outlines the purpose, nature and management of the science taught and learnt in our school. It has been adopted by the staff of St. Mary's Catholic Primary School. This policy outlines the guiding principles by which this school will implement science in the National Curriculum. It is reviewed periodically. It has been drawn up after recent in-depth discussions with staff, and its implementation is the responsibility of all teaching staff. A shared understanding is important. Responsibility for monitoring and review rests with the science subject leader.

Mission

We recognise that the personal development of children, spiritually, socially, morally and culturally, plays a significant part in their ability to learn and achieve. Therefore we aim for the children to develop a sense of excitement and curiosity to explore and investigate the world in which they live, finding out why things happen as they do. It teaches methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way in which science will affect the future on a personal, national and global level. We aim for the children to develop an understanding of natural phenomena (Article 28 & 29 UN Convention on the Rights of the Child (UNCRC)).We teach the children science through our curriculum drivers which are personal to our school.

These drivers are:

Beliefs

Rights

Environment

Wellbeing

In St Mary's Catholic Primary School our intention is for children to become enthusiastic and creative investigators, in which they explore the world around them.

Aims

Through teaching Science children are given opportunities to:

- Ask and answer scientific questions.
- Plan and carry out scientific investigations, using equipment (including computers) correctly.
- Know and understand the life processes of living things.

- Know and understand the physical processes of materials, electricity, light, sound, and natural forces.
- Know about the nature of the solar system, including the earth.
- Evaluate evidence, and present their conclusions clearly and accurately.

Strategies

Knowledge and Understanding

Children should:

- Be curious about things they observe, experience and explore the world about them with all of their senses.
- Use this experience to develop their understanding of key scientific ideas and make links between different phenomena and experiences.
- Begin to think about models to represent things they cannot directly experience.
- Try to make sense of phenomena, seeking explanations and thinking critically about claims and ideas.

Processes and Skills

Children should:

- Acquire and refine the practical skills needed to investigate questions safely.
- Develop skills of predicting, asking questions, making inferences, concluding and evaluating based on evidence and understanding and use these skills in investigative work.
- Use practical mathematical skills in real contexts.
- Learn why numerical and mathematical skills are useful and helpful to understanding.

Language and Communication

Children should:

- Think creatively about science and enjoy trying to make sense of phenomena.
- Develop language skills through talking about their work and presenting their own ideas using sustained and systematic writing of different kinds.
- Use scientific and mathematical language including technical vocabulary and conventions and draw diagrams and charts to communicate scientific ideas.
- Read non-fiction and extract information from sources such as reference books, CD-ROMs or the Internet.

Values and Attitudes

Children should:

- Work with others, listening to their ideas and treating others with respect.
- Develop respect for evidence and critically evaluate ideas, which may not fit evidence available.
- Develop a respect for the environment and living things and for their own health and safety.

Organisation, Teaching and Progression

The school uses the national scheme of work for science as the basis of its curriculum planning. The national scheme has been adapted to the local circumstances of the school in that we make use of the local environment including the forest school in our fieldwork, although we choose a locality where the physical environment differs from that which predominates in our immediate surroundings.

We carry out our curriculum planning in science in two phases (long-term and medium-term). The long-term plan maps the scientific topics studied in each term during the key stage (**Appendix 1**). The science subject leader works this out in conjunction with teaching colleagues in each year group. In some cases we combine the scientific study with work in other subject areas, especially at Key Stage 1; at other times the children study science as a discrete subject.

Our medium-term plans, which we have based on the national scheme of work in science, give details of each unit of work for each half term. The science subject leader will monitor and review these plans.

The class teacher is responsible for providing differentiated activities to meet the children's needs. We have planned the topics in science so that they build on prior learning. We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each unit, and we also build progression into the science scheme of work, so that the children are increasingly challenged as they move up through the school.

We recognise that in all classes children have a wide range of scientific abilities, and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- Setting tasks which are open-ended and can have a variety of responses;
- Setting tasks of increasing difficulty (we do not expect all children to complete all tasks);
- Grouping children by ability in the room, and setting different resources for each ability group;
- Providing resources of different complexity, matched to the ability of the child;
- Using classroom assistants to support the work of individual children or groups of children.

Assessment

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 learnt and what therefore, should be the next stage in his/her learning. On completion of a piece of work, the teacher assesses it against the learning objectives, and uses this assessment to plan for future learning. Written or verbal feedback is given to the child to help guide his/her progress. Children are encouraged to assess their own learning from the lesson by completing their 'Progress In Knowledge' sheet (**Appendix 2**).

At the end of a unit of work she/he makes a summary judgement about the work of each pupil in relation to age related expectations through the completion of an assessed piece of writing. The

children complete a piece of writing answering the 'Enquiry Question' that has been posed for that topic, and from which the lessons have been planned (**Appendix 3**).

Record Keeping

Teachers use a variety of methods for children to record their observations, predictions, experiments, findings and conclusions according to the ability of the children. Staff record this in children's books. At the end of each term children's attainment levels are recorded onto Insight so that their progress throughout the year is monitored. All staff are aware of the progression in these areas and have high expectations following the science policy guidelines too.

Role of Science Lead

- It is the responsibility of the subject lead to monitor standards in science through lesson observations, pupil voice and book scrutiny.
- To provide support for colleagues with planning, inform staff about current developments in the subject, and provide a strategic lead and direction for science in the school.
- Monitor the resources in science and advise the Head Teacher of any action needed.
- To liaise with staff and Head Teacher regarding resources and training needs.
- To liaise with St Aidan's and St Anthony's secondary schools.

Removing barriers to the primary curriculum for pupils with SEN and/or disabilities

In order to make the curriculum inclusive, teachers anticipate what barriers to taking part in activities, lessons or series of lessons may pose for pupils with SEN and/or disabilities. They consider ways of minimizing or reducing those barriers so that all pupils can fully take part and learn.

In some activities, pupils with SEN and/or disabilities will be able to take part in the same way as their peers. In others, some modifications or adjustments will need to be made to include everyone. (See Curriculum Access Policy)

Occasionally, pupils with SEN and/or disabilities will work on different activities, or towards different objectives, from their peers.

Assessment of pupils with SEN and/or disabilities

When assessing pupils with SEN and/or disabilities teachers plan carefully to give pupils with SEN and/or disabilities every opportunity to demonstrate what they know and are able to do, using alternative means where necessary.

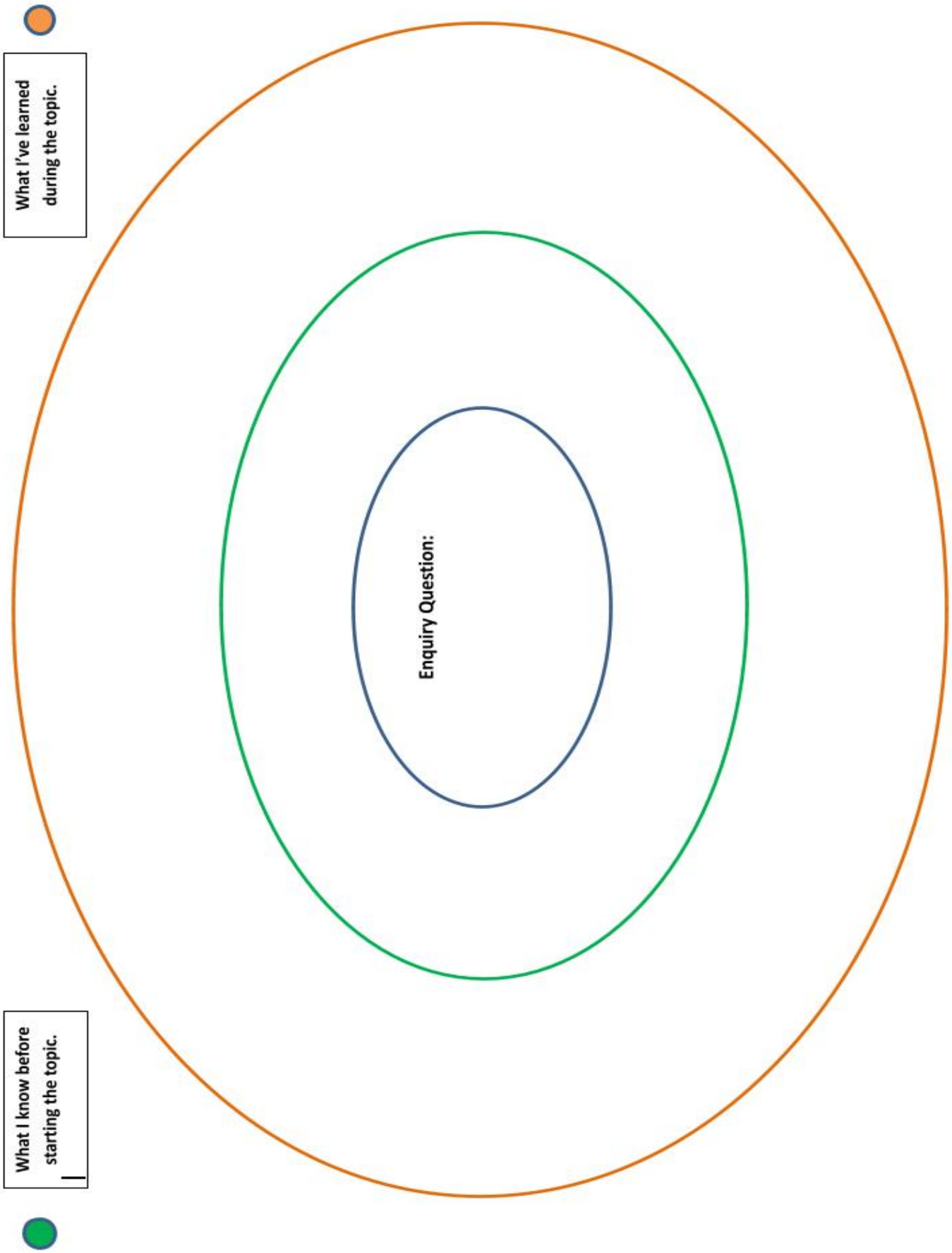
Health and Safety

Pupils will be taught to use scientific equipment safely. Class teachers and Science Lead will check equipment regularly and report any damage, taking defective equipment out of action.

Appendix 1 - The Curriculum

ening / allotment Changes to materials through messy play		Planting Pancake Tuesday Make play dough independently Looking at changes to materials through messy play		Tending the garden New life investigations Insecth Make play dough independently Looking at changes t	
ges through play dough Scientific water play erials and properties Light / dark torches		Pancake Tuesday food tasting Refer to months of the year/seasons Compare photos of babies Make play dough independently Battery operated toys		Growth / Life Cycles Planting / watering Caterpillar Mud play Changes in materials / sensory	
ding Humans me a variety of common ing carnivores, herbivores . el basic body parts. cate the 5 senses.	**Materials** Identify a variety of materials and describe their properties. Compare and group everyday materials by their properties.	**Seasons (Across the year)** Describe weather associated with the seasons and how the length of day changed during the seasons.	**Plants** Identify and name common wild and garden plants including deciduous and evergreen trees. Identify and describe the basic structure of a flowering plant including trees.		**Living Thing** Explore loca School grou Identify crea
ding Humans nimals including humans at grow into adults. hat all animals including o survive and to stay		**Plants** Observe and describe how seeds and bulbs grow into mature plants. Investigate and describe how plants need water, light and warmth to stay healthy.	**Everyday Materials** Identify and compare suitability of a variety of everyday materials. Investigate how the shapes of solid objects can be changed by squashing, bending, twisting and stretching.		**Living Thing** Explore and that are living been alive. Identify anim Describe sim
ictions of different parts of nt. lants need to grow ansportation of water. e importance of the flower .	**Forces and Magnets** Compare how things move on different surfaces. Understand that magnets have two poles and can attract or repel one another and some materials.	**Light** Understand that we need light in order to see things. Understand that light is reflected from surfaces. Recognise that light from the sun can be dangerous. Understand how shadows are formed and identify how they can change.	**Rocks and Soils** Compare and group different kinds of rocks based on physical properties. Describe how fossils are formed. Recognise that soil is mad3e from rocks and organic matter.	**Animals Including Humans** Identify that animals including humans need the right types and amount of nutrition and cannot make their own food. Understand that humans and some animals have skeletons for support and protection and muscles for movement.	
rs unds are made through he vibrations travel to the etween pitch and volume, th of vibrations that made he ear.	**Electricity** Identify common appliances that run on electricity. Construct and name parts of electrical circuits. Identify whether a lamp will light in a simple series circuit. Recognise that a switch opens and closes a circuit. Recognise some common conductors and insulators.	**Animals Including Humans** Describe the functions of the digestive system. Identify different types of teeth and their functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.	**Living Things and Their Habitats** Group living things using classification keys. Recognise that environments can change and that this can pose dangers to living things.		**States of Ma** Compare an whether the Understand state when t Understand condensatio
ice ovement of Earth and elative to the sun. ovement of the moon. st the sun, moon and Earth odies. nd day, and the apparent he sun across the sky in Earth's rotation.		**Materials** Group materials on the basis of their properties. Know some materials will dissolve to form a solution, and describe how to recover a substance from it. Understand how mixtures might be separated. Understand that dissolving, mixing and changes of state are reversible, but some changes are not reversible.	**Forces** Explain that unsupported objects fall towards the Earth because of the force of gravity. 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.	**Living Things and Their Habitats** Describe and compare 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. Describe the life process of reproduction in some animals.	**Animals Inc** Describe the develop to o Draw a timeli growth and Know what puberty. Research th animals. Compare the animals with Find out and of a baby as
ding Humans me the main parts of the ory system. nctions of the heart, blood ood. impact of diet, exercise, tyle on the way their . ays in which nutrients and ported within animals, ans.	**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 symbols when representing a simple circuit in a diagram.	**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. Know that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.		**Evolution Including 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.	**Living Thing** Describe ho into broad g observable c Describe ho based on sir including mi animals. Give reason animals bas characteristi

Appendix 2 - Links to wider curriculum



Appendix 3 - Enquiry Questions

Year Group	Enquiry Question	Links To Drivers
Year 1	Animals Including Humans - Am I the same as other animals?	Rights-Human and animal: understanding and respecting living things. Belief: Connection between humans and animals- all part of God's creation and all sharing its resources. Wellbeing: Appreciation of our world through our senses.
	Materials - What are things made of?	Belief: Appreciation of the natural world (God's creation) Wellbeing- Taking notice of the world around them and the materials it is made of/from. Environment- Importance of looking after the natural world. (forest school opportunities)
	The seasons - How do the seasons change?	Belief: The seasons are part of God's creation. Environment and Rights: weather is affected by climate change. We need to protect our world and those living in areas worst affected by climate change. Wellbeing: Appreciation of our world through our senses- the beauty of the changing seasons. (opportunities for outdoor/forest school learning).
	Plants - What are plants and why do we need them?	Belief: Plants are part of God's creation. Environment and Rights: We need plants in order to survive. We need to look after plants and make sure everyone has enough. Wellbeing: Appreciation of our world through our senses (opportunities for outdoor/forest school learning).
Year 2	Animals including humans - What do we need to grow healthily?	Rights-human and animal: understanding and respecting living things. Belief: Connection between humans and animals- all part of God's creation and all sharing its resources. Wellbeing: How to live a healthy life.
	Plants - What do plants need to grow healthily?	Belief: plants are part of God's creation. Environment and Rights: We need plants in order to survive. We need to look after plants and make sure everyone has enough. Wellbeing: Appreciation of our world through our senses (opportunities for outdoor/forest school learning).
	Everyday Materials - Why do we use different materials?	Belief: Appreciation of the natural world (God's creation) Wellbeing- Taking notice of the world around them and the materials it is made from. Environment- Importance of looking after the natural world. (forest school opportunities)
	Living things and their habitats - Do animals need plants?	Rights-Human and animal: understanding and respecting living things. Belief: Connection between humans, animals and plants - all part of God's creation and all sharing its resources. Environment: Respecting and preserving animal habitats. (opportunity for outdoor/forest school learning)
Year 3	Plants - How do flowering plants survive and flourish?	Belief: plants are part of God's creation. Environment and Rights: We need plants in order to survive. We need to look after plants and make sure everyone has enough. Wellbeing: Appreciation of our world through our senses: seeing plants grow helps our mood, our appreciation of nature and our connection to it. (opportunities for outdoor/forest school learning).

	Forces and magnets - What is magnetic force?	Belief: everything created by God has special qualities – some things are magnetic
	Light - How does light change things?	Rights-All living things need light and have a right to it. Belief: God gave us light and light is used to describe his presence in the world: Jesus is called “The Light of the World”. Wellbeing: Light is essential to our wellbeing (production of vitamin D as well as lifting our mood) Environment: Light is essential for growth, but shade caused by blocking light is also essential for some plants and animals.
	Rocks - Is there more than one kind of rock?	Belief: rocks are part of God’s creation. St Peter was named because he was the “rock” on which the Church is built. Environment: rocks form deserts because of climate change. We need to keep our environment balanced and reduce global warming. Wellbeing: Appreciation of the natural world supports our wellbeing: mountains, hills, waterfalls etc all formed by rocks (opportunities for outdoor/forest school learning).
	Animals including humans - What gives me strength?	Rights-human and animal: understanding and respecting living things. The right for basic needs (food) to be met. Belief: Connection between humans and animals- all part of God’s creation, all sharing its resources and all reliant on each other for survival. Wellbeing: Good nutrition contributes to human and animal wellbeing including the healthy growth of bones and muscles.
Year 4	Sound - How are sounds made?	Belief: God has given us senses including hearing to help us appreciate and understand the world. Our hearing enables us to hear God’s word. Wellbeing: Appreciation of the natural world through our senses (hearing) contributes to our wellbeing. (outdoor/forest school learning opportunities) The power of sounds to comfort us, make us feel calm and happy e.g., laughter, music etc. Environment: The impact of noise pollution.

	Electricity - How does electricity travel?	Belief: Link with light - the importance of light and symbolism of light in our faith. Wellbeing: Electricity has made our lives easier and more pleasant e.g., tv computers etc (but too much can be detrimental and we need to balance this with connecting to the natural world.) Environment: The positive and negative impact of machinery on our environment e.g., noise and air pollution but also recycling plants, water treatment plants etc. The impact of the creation of electricity on our environment. Finding more environmentally friendly ways to generate it and the importance of using less electricity when possible.
	Animals including humans - How do animals and humans eat?	Rights-Human and animal: understanding and respecting living things. The right for basic needs (food) to be met. Belief: Connection between humans and animals- all part of God's creation, all sharing its resources and all reliant on each other for survival. Wellbeing: Good nutrition contributes to human and animal wellbeing including the healthy growth of teeth and digestive system. Environment: Importance of food chains in keeping a balance in nature and in ecosystems.
	Living things and their habitats - How can we group living things?	Rights-Human and animal: understanding and respecting living things. The right for basic needs (homes/habitats) to be met. Belief: Connection between humans and animals- all part of God's creation, all sharing its resources and all reliant on each other for survival. Wellbeing: Appreciation of the natural world through our senses and feeling connected to it, contributes to our wellbeing. (outdoor/forest school learning opportunities) Environment: The acts of humans can have a detrimental effect on habitats and plant and animal welfare.

	States of matter - Can things exist in more than one form?	Rights: Everyone has the right to clean water (link with water cycle). Belief: Is something there if we can't see it? We can't see gas but it is there. We can't see God but He is there. Things can exist in different forms (e.g., water) and God exists in different forms (link with the Trinity) Wellbeing: The importance of water to our wellbeing: e.g.,drinking enough water, swimming, being near water – sea, lakes,rivers. Environment: The importance of evaporation in the water cycle. The dangers caused by water pollution. The importance of water conservation.
	The Ear - How do we hear?	Belief: God has given us senses including hearing to help us appreciate and understand the world. Our hearing enables us to hear God's word. Wellbeing: Appreciation of the natural world through our senses (hearing) contributes to our wellbeing. (outdoor/forest school learning opportunities) The power of sounds to comfort us, make us feel calm and happy e.g., laughter, music etc. Environment: The impact of noise pollution.
Year 5	Earth and space - How do astronomical objects move?	Belief: Link with the idea of creation: God created the universe. Wellbeing: An understanding that we are all a part of something bigger. We are connected to the Earth, the universe and everything in it. Environment: Link with idea that we all share one planet and that we all have a duty to protect it.
	Properties and changes of materials - Are all changes of state reversible?	Rights: Link to the idea that we can make changes in our world to ensure everyone has their rights met. Belief: Link to the idea of change. Some changes are physical and some are spiritual (e.g., the changes that happen to the gifts during the mass) Wellbeing: Link to the idea of changes we can make in our lives to improve our wellbeing. Environment: Link to idea that changes to our environment can be both good and bad. Are all of the changes reversible e.g., climate change?

	Forces - What effects do forces have on objects?	Rights: Link with idea that we need to act forcefully to ensure rights are met. Belief: Link with the idea that forces can be both physical and spiritual e.g., that God's power is a spiritual force. We can all be a force for good in the world. Wellbeing: link with idea that acting as a force for good is also good for our wellbeing. Environment: Link with idea that natural forces in the world can become more extreme through climate change e.g., flooding, storms etc.
	Living things and their habitats -Do animals and plants reproduce in the same way?	Rights-human and animal: the right to conditions that enable us to grow and reproduce. The right to have children. Belief: Connection between all of God's creation - plants, humans, and animals- all reproduce, grow, change, and die. Wellbeing: living a healthily lifestyle e.g., exercise, nutrition enables us to grow and develop and have healthy offspring (outdoor/forest school learning opportunities) Environment: protecting our world for future generations.
	Animals Including Humans - How do we change as we grow?	Rights-Human and animal: the right to conditions that enable us to live as long as possible. The right to have children. Belief: Connection between all of God's creatures- humans and animals- all reproduce and grow, change, and grow old. Wellbeing: Living a healthily lifestyle e.g., exercise, nutrition enables us to grow and develop. (outdoor/forest school learning opportunities) Environment: protecting our world for future generations.
Year 6	Animals Including Humans - Why are our hearts so important?	Rights- The right to conditions that enable us to live as long and as healthily as possible. Belief: Link with idea of a healthy heart – a heart can be both physically healthy and spiritually healthy - through love of God and other people. Wellbeing: Living a healthily lifestyle e.g., exercise, nutrition enables us to have healthy hearts (outdoor/forest school learning opportunities)

	Electricity - What makes a difference to components in a circuit?	Rights: Everyone has the right to access electricity. Belief: Link with light - the importance of light and symbolism of light in our faith. Wellbeing: Electricity has made our lives easier and more pleasant e.g., tv computers etc (but too much can be detrimental and we need to balance this with connecting to the natural world.) Environment: The positive and negative impact of machinery on our environment e.g., noise and air pollution but also recycling plants, water treatment plants etc. The impact of the creation of electricity on our environment. Finding more environmentally friendly ways to generate it and the importance of using less electricity when possible.
	Light - How does light travel?	Rights-All living things need light and have a right to it. Belief: God gave us light and light is used to describe his presence in the world: Jesus is called “The Light of the World”. Wellbeing: Light is essential to our wellbeing (production of vitamin D as well as lifting our mood) Environment: Light is essential for growth, but shade caused by blocking light is also essential for some plants and animals. Some living things may be deprived of shade because of deforestation and other human activity.
	Evolution including inheritance - What is the difference between adaptation and evolution?	Rights: Basic human rights should not be adapted; they should be constants in our world. Belief: Things on earth adapt and change but God’s love is unchanging. Wellbeing: Sometimes we need to adapt the way we think and act to improve our wellbeing. Environment: The need to adapt and change the way we use resources in order to protect our environment.

	Living things and their habitats - How can we classify living things?	Rights- We all have the same rights regardless of difference. Explore concept of animal rights. Belief: Connection between all of God's creation – plants, humans, and animals. Appreciating and celebrating similarities and differences. Wellbeing: Appreciating our connection to other living things is good for our wellbeing Environment: Our duty to protect all living species on Earth.

Appendix 4 - The contribution of science to developing skills and teaching in other curriculum areas

English

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study in English are of a scientific nature. The children develop oral skills in science lessons through discussions (for example of the environment) and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. When the children use weights and measures, they are learning to use and apply numbers. Through working on investigations they learn to estimate and predict. They develop accuracy in their observation and recording of events. Many of their answers and conclusions include numbers.

Personal, social and health education (PSHE) and citizenship

Science makes a significant contribution to the teaching of PSHE and citizenship. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of citizenship and social welfare. For example, children study the way people recycle material and how environments are changed for better or worse. Secondly, the subject gives children numerous opportunities to debate and discuss. They can organise campaigns on matters of concern to them, such as helping the poor or homeless. Science thus promotes the concept of positive citizenship.

Spiritual, moral, social and cultural development

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of science, children have the opportunity to discuss, for example, the effects of smoking, and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet, and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

Science and ICT

Information and communication technology enhances the teaching of science in our school significantly, because there are some tasks for which ICT is particularly useful. It also offers ways of impacting on learning which are not possible with conventional methods. Software is used to animate and model the Scientific concepts, and to allow children to investigate processes, which it would be impracticable to do so directly in the classroom. Data loggers are used to assist in the collection of data and in producing tables and graphs. Children use ICT to record, present and interpret data, to review, modify and evaluate their work, and to improve its presentation. Children learn how to find, select, and analyse information on the Internet and on other media.