Ireby Church of England Primary School

'Created to do Good': Ephesians 2:10

Science

Signed by:

_____ _____ Head Teacher Date: 7th February 2025

Next review date: February 2027 or sooner if required

School Governance:

Responsibility of the school leadership

Our Aim:

Our science curriculum is driven by our Christian vision, **'created to do good'**. Our children are taught how to be part of a loving community of learners – collaborating together, sharing their questions and ideas and investigating scientifically to gain a deeper understanding of our world. It teaches our children to be still, how to observe and give thoughtful responses – and how to connect with their world. It teaches them that science can answer many questions we have as humans – but not all. It supports them to appreciate the beauty of our locality, whether it is plants, animals, light or sound. Our children explore the universe around them, learn about the procresses that shaped it and understand the rich diversity of our world.

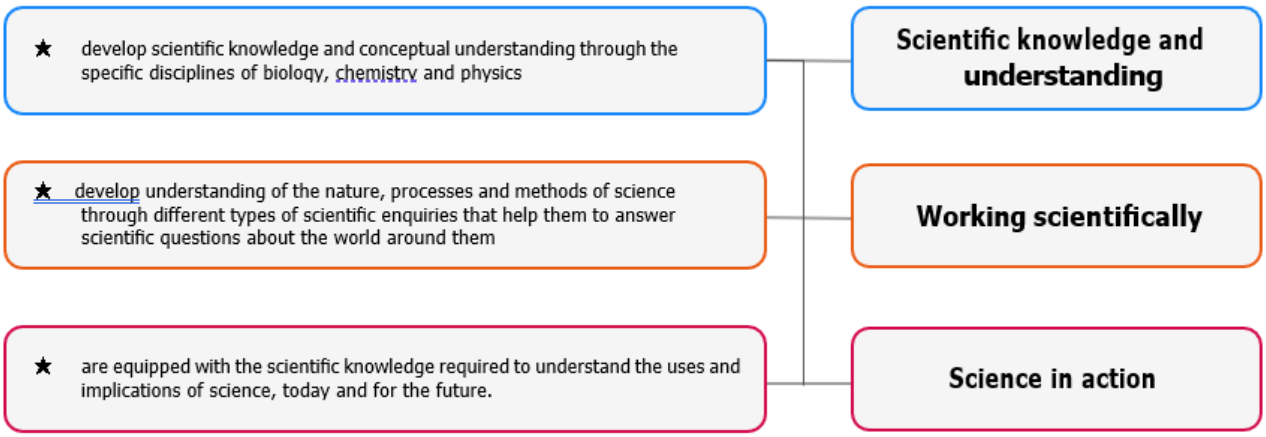
Our aim is to fulfil our Christian vision through science and support our children to be part of a community of loving learners, committed to knowing and understanding more about our world, about themselves and about their place and purpose in it.

Intent

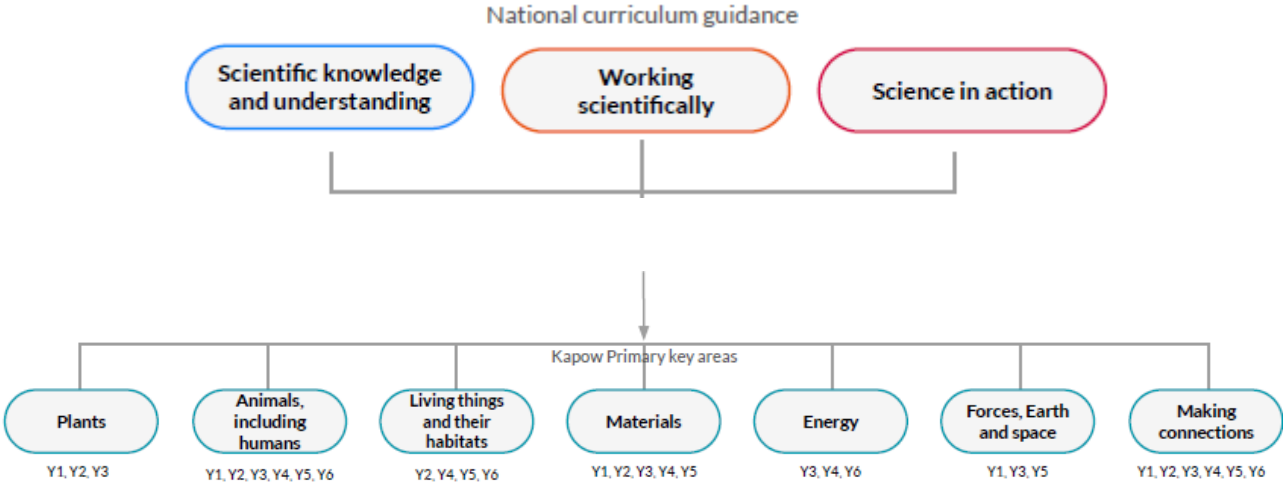
Science at Ireby School not only equips children with the foundations for understanding the world, but also allows them to explore and discover answers to questions that they do not yet know. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena.

Implementation

Our curriculum fulfils the statutory requirements outlined in the National curriculum (2014). The National curriculum Programme of Study for Science aims to ensure that all pupils:



How our curriculum is organised:



Key areas in science

Pupils will develop **Scientific knowledge and understanding** in seven key areas. The learning in each area is summarised below:

Animals, including humans

Identifying animals, their basic structure and their eating habits, as well as their basic needs for survival. Children learn about the life cycles of animals and their place in food chains.

Naming parts of the human body and recognising the function of skeletons, muscles, teeth and the digestive and circulatory systems. Learning about the importance of hygiene and of the right type and amount of nutrition. Children learn about the impact of diet, drugs and exercise on the body and study the life cycles of humans.

This key area covers the Year 1, Year 2, Year 3, Year 4, Year 5 and Year 6 subject content titled 'Animals, including humans' from the National curriculum.

Living things and their habitats

Identifying something as living and how it is grouped based on its characteristics, similarities and differences.

Naming different types of habitats, learning what they provide for life and the impact of habitats changing. Children learn about the life cycles and reproduction of animals and plants, and how this affects the variation of living things around us, past and present.

This key area covers the Year 2, Year 4, Year 5 and Year 6 subject content titled 'Living things and their habitats' and 'Evolution and inheritance' from the National curriculum.

Plants

Identifying different plants and their key structures, growing seeds and plants and understanding their requirements for growth. Recognising the function of different plant structures and understanding how plants reproduce.

This key area covers the Year 1, Year 2 and Year 3 subject content titled 'Plants' from the National curriculum.

Materials

Naming materials, describing their properties and understanding why materials have specific uses. Identifying how materials may change and the factors that may contribute to this, including changes of state within the water cycle. Children learn about different mixtures and how they can be separated based on their properties.

Identifying different types of rocks and their physical properties, and understanding how fossils and soil are formed.

This key area covers the Year 1, Year 2, Year 3, Year 4 and Year 5 subject content titled 'Everyday materials', 'Uses of everyday materials', 'Rocks', 'States of matter' and 'Properties and changes of materials' from the National curriculum.

Energy

Learning about light and its properties, how it enables us to see and how shadows are formed. Identifying the relationship between sounds, volume, pitch and vibrations, and how sound travels to the ear.

Recognising electrical appliances and the components that make up different circuits. Building electrical circuits and identifying factors that affect the output.

This key area covers the Year 3, Year 4 and Year 6 subject content titled 'Light', 'Electricity' and 'Sound' from the National curriculum.

Forces, Earth and space

Identifying changes across the seasons, and the weather and day length associated with each.

Recognising different types of forces and understanding their effect on objects, including the role of pulleys, levers and gears. Children learn about magnetic materials and that magnets attract and repel.

Learning about the movements of planets and moons within the solar system and how this relates to our day and night.

This key area covers the Year 1, Year 3 and Year 5 subject content titled 'Seasonal changes', 'Forces and magnets', 'Earth and space' and 'Forces' from the National curriculum.

Making connections

Finding the optimum: the science subject report (Ofsted, 2023) states that schools should ensure that teachers

'regularly connect new learning to what pupils have already learned. This includes showing pupils how knowledge from different areas of the curriculum connects.'

One of the ways in which we do this is through our Making connections units, which give pupils opportunities, beyond the National curriculum programme of study, to make connections between their science learning.

Different types of knowledge in science

'Pupils need to develop an extensive and connected knowledge-base. When pupils learn new knowledge it should be integrated with the knowledge they already have. This ensures that learning is meaningful'. (Ofsted research review series: Science, 2021)

Substantive knowledge

Referred to as Scientific knowledge and conceptual understanding in the National curriculum and Scientific knowledge and understanding in our scheme of work, this is knowledge of the products of science: concepts, laws, theories and models.

In our *Science: Progression of skills and knowledge* we have broken down the National curriculum attainment targets into knowledge 'chunks' or 'components' and shown how they build over time to develop pupils' understanding of key concepts in Biology, Chemistry and Physics.

Through following our scheme pupils will build their substantive knowledge base by:

- Knowing more facts.
- Giving further examples of the same concept.
- Understanding and using a wider range of vocabulary.
- Using models or concepts that cannot be seen to explain ideas.
- Making and explaining links across areas of science.

Over time, that knowledge will become increasingly organised and connected. The *Recap and recall* section of the lesson helps pupils to activate their prior knowledge and encourages them to make connections between units.

Disciplinary knowledge

Working scientifically specifies the understanding of the nature, processes and methods of science for each year group and is covered alongside our Scientific knowledge and understanding strand in each and every unit, never in isolation.

We have broken down the Working scientifically statements from the National curriculum further to ensure gradual progression and focused teaching of the working scientifically skills. This also allows teaching to focus on the component disciplinary knowledge required to enable pupils to carry out the skills competently.

Pupils should be able to see the interplay between the two types of knowledge and our Science in action strand gives pupils this opportunity through seeing how scientists have worked in the past and continue to work in the present day. This furthers pupils' understanding of how some of the substantive knowledge they learn came to be established.

Working scientifically

National curriculum

The National curriculum states that working scientifically should be 'embedded within the content of biology, chemistry and physics' incorporating a range of scientific enquiries that look at the nature, processes and methods of science.

These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.

Ofsted research review

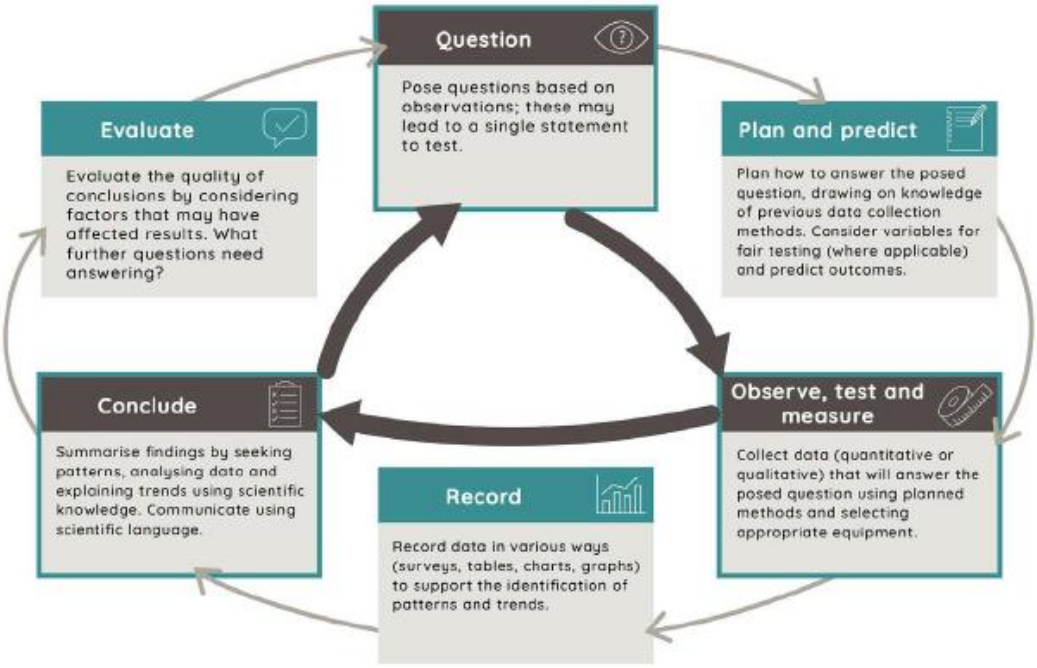
The review states that there are four main content areas for disciplinary knowledge:

1. **Knowledge of methods that scientists use to answer questions.** use of models, classification, description and the identification of correlations (pattern-seeking) have played important roles, alongside experimentation, in establishing scientific knowledge.
2. **Knowledge of apparatus and techniques, including measurement.**
3. **Knowledge of data analysis.**
4. **Knowledge of how science uses evidence to develop explanations.**

Working scientifically forms one of the strands in our curriculum, meaning that it is interwoven into each and every unit alongside scientific knowledge and understanding. We have created a Working scientifically - enquiry cycle which incorporates all the elements of working scientifically mentioned above in an easy-to understand model that also helps pupils to understand the steps involved in a complete scientific enquiry.

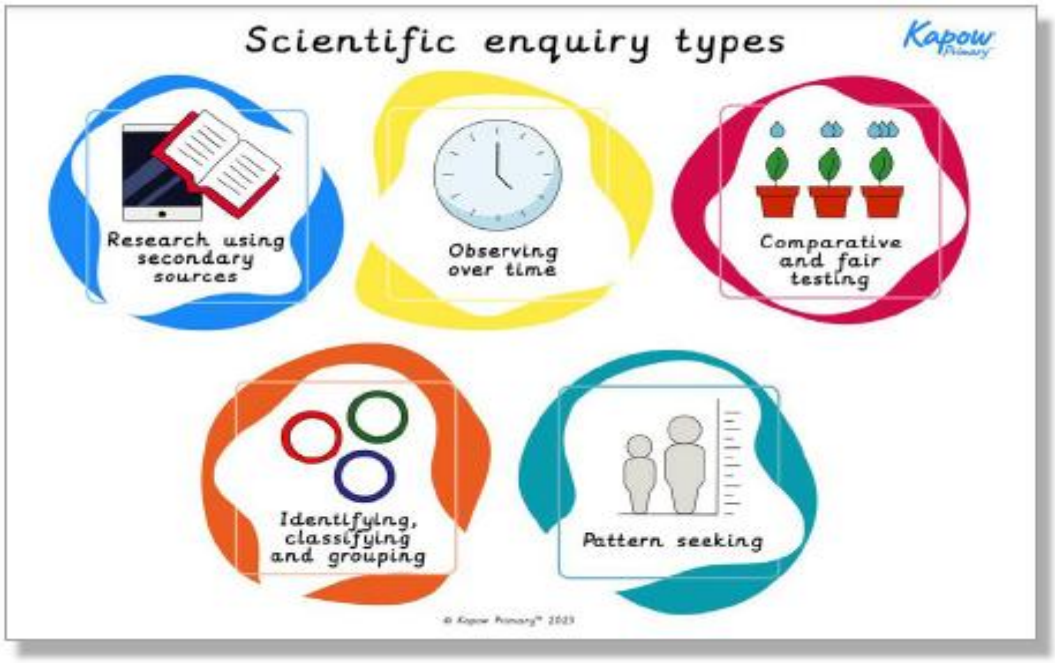
Working scientifically enquiry cycle

The working scientifically enquiry cycle below, demonstrates aspirational steps for scientific enquiry. Short enquiry opportunities focus on a particular 'working scientifically' skill, while ensuring the essential Question - Observe - Conclude cycle is met. Full investigation opportunities will provide an appreciation of how the steps interconnect to form a complete enquiry.



We aim for children to be able to talk confidently about scientific enquiry skills so we have created icons which are visible alongside relevant instructions and activities to help children recognise and become familiar with the stages of the enquiry process.

Working scientifically different types of enquiry



The National curriculum states that 'types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources' but the Ofsted science subject report notes that 'Overall, in primary schools, inspectors found very few examples of pupils gaining knowledge of pattern seeking or learning about secondary sources.'

Our curriculum aims to familiarise pupils with all these types of enquiry so that by the end of Key stage 2 they are able to choose the most suitable enquiry type to answer questions. In Key stage 1, pupils are introduced to enquiry types as 'Super

science skills' and are encouraged to reflect on which skills they have used to answer questions.

Science in action

In addition to working scientifically, the National curriculum also states that pupils should understand the uses and implications of science in the past, present and for the future. References to real-world examples are incorporated into all units, providing the rationale and motivation for why we learn Science. Science in action includes:

Historical applications of Science

- Famous scientists throughout history.
- The methods and equipment used by scientists throughout history and how these have led to modern methods.
- How knowledge and understanding has changed over time, leading to our current understanding of Science.

Careers that use Science

- Broad ranging jobs and careers that use scientific knowledge and methods.
- Scientists of today and their work.
- Science in the news and recent discoveries.
- What Science is attempting to achieve in the future.

The scientific community and beyond

- Science is a dynamic field and is always undergoing changes.
- Mistakes can be the source of new discoveries!
- Collaboration and peer reviewing is essential for effective scientific progress.
- Spiritual, moral, social and cultural links with Science.

A spiral curriculum

Our curriculum has been designed as a spiral curriculum with the following key principles in mind:

Cyclical: Pupils return to the key knowledge and skills repeatedly during their time in primary school.

Increasing depth: Each time a skill is revisited it is covered with greater complexity and in varying contexts.

Progression includes:

- studying a specific scientific concept in more detail;
- studying further examples of a specific concept to broaden contextual knowledge;
- studying a broader range of equipment and methods to test an hypothesis;
- explaining concepts using models or ideas that can't be seen;
- making and explaining links across areas in science;
- engaging with increasingly complex ideas and ethical dilemmas.

Prior knowledge: Prior knowledge is utilised so pupils can build upon previous foundations, rather than starting again.

Sequencing our units of learning:

Lessons are planned to be 90 minutes long, reflecting the importance of science as a core subject in the curriculum. Within each unit, lessons are taught in order as they build upon one another.

While the National curriculum explains that schools are only required to teach the relevant programme of study by the end of the key stage, we have planned our current science curriculum with a sequence in mind.

Our long term plan

CYCLE A	Autumn		Spring		Summer	
Reception	Habitats	Materials	Animals including Humans	Powers	Plants	Potions
Year 1/2	Habitats	Microhabitats	Use of every day materials	Lifecycles and health	Plants growth	Making connections
Year 3/4	Living things and their habitats: Movement and nutrition	Forces and magnets	Rocks and soils	Light and shadows	Plant reproduction	Making connections
Year 5/6	Mixtures and separation	Properties and changes	Earth and space	Imbalanced forces	Life cycles and reproduction	Human timeline/ Making connections

CYCLE B	Autumn		Spring		Summer	
Reception	Seasonal Changes	Potions	Powers and Materials	Animals including Humans	Plants	Habitats
Year 1/2	Seasonal Changes (Yr 1)	Everyday materials (Year 1)	Sensitive bodies (Year 1)	Comparing animals	Introduction to Plants (Yr 1)	Making connections
Year 3/4	Animals including humans: Digestion and food	Electricity and circuits	States of matter	Sounds and vibrations	Classification and changing habitats	Making connections
Year 5/6	Animals including humans: Classifying big and small	Light and reflection	Evolution and inheritance	Circuits, batteries and switches	Circulation and exercise	Making connections

Subject outlines:

	Year 1		
Autumn 1	**Forces, Earth and space** Seasonal changes **(6 lessons)** Reflecting on their own experiences, children learn about the four seasons and the weather associated with each. Pupils explore how seasonal changes affect trees, daylight hours and our choices about outfits. They plan and carry out their own weather reports, considering the knowledge required for this job.	Autumn 2	**Materials** Everyday materials **(6 lessons)** Identifying the difference between objects and materials, children explore their surroundings to find examples of each. They work scientifically by planning tests, making observations and recording data. Pupils use results to answer questions and sort and group materials based on their properties.
Spring 1	**Animals, including humans** Sensitive bodies **(6 lessons)** Familiarising themselves with the basic parts of the human body, children investigate their senses through stimulating experiences that highlight how we interact with the world around us. They work scientifically, using their senses to make observations, spot patterns and use data to answer questions. They develop an understanding of how science can support those who have lost sensory function and consider how a firefighter uses their senses at work.	Spring 2	**Animals, including humans** **Comparing animals (6 lessons)** Studying both local and global animals, children recognise common features and use this information to make comparisons and begin to classify animals. Pupils collect data by surveying class pets, to then explore ways in which this information can be recorded. They develop their understanding of classification by comparing the dietary habits of different animals and use their knowledge and imaginations to take on the role of a zookeeper.
Summer 1	**Plants** **Introduction to plants (6 lessons)** Identifying the key features of a plant, children describe important structures and make comparisons between different plants. Pupils use investigative skills to record the growth of a plant over time and begin to reflect on factors that will affect its development. They begin to explore how plants are used by humans and grow their own herb garden.	Summer 2	**Making connections** **Title TBC** Bringing together pupils' learning from multiple Science units, helping them to make connections between the key concepts and skills.

	Year 2		
	Living things and their habitats		
Autumn 1	Habitats **(6 lessons)** Considering the life processes that all living things have in common, pupils classify objects into alive, was once alive or has never been alive. Pupils explore global habitats, naming plants and animals that can be found there. They learn how a range of different living things depend on each other for food or shelter. Pupils explore this further by creating food chains to show the sequence that living things eat each other for energy to grow and stay healthy.	Autumn 2	Microhabitats **(6 lessons)** Developing their understanding of scientific enquiry, pupils learn that scientists use a range of skills to answer questions. They discover that microhabitats provide what minibeasts need to survive and carry out a survey to find out where different minibeasts live in the school grounds. They practise asking scientific questions and follow a method to investigate which conditions woodlice prefer. Pupils explore the job role of a botanist by identifying flowering plants.
Spring 1	**Materials** Uses of everyday materials **(6 lessons)** Building on their knowledge of everyday materials and their properties, pupils recognise that materials are suited to specific purposes and explore how actions such as stretching and bending affect the shape of solid objects. They compare the suitability of materials, gather and record data in tables and block graphs and use their results to answer questions. Children learn about the harmful effects of plastic and explore eco-friendly alternatives.	Spring 2	**Animals, including humans** **Life cycles and health (6 lessons)** Studying the life cycles of various animals, children learn what animals need to survive and how they change over time. Pupils collect data that allows them to observe changes in their peers, while also developing their ability to take measurements and record data. They consider the role of expert scientific knowledge in careers that inform people to make healthy choices.
Summer 1	**Plants** **Plant growth (6 lessons)** Using their prior knowledge of important plant structures, children explain what factors are needed for successful growth and compare how those needs vary across different plants. They grow plants from seeds and bulbs to ascertain the needs for initial development and compare this to the survival needs of plants in later growth phases. Pupils take their own measurements and reflect on historical examples to understand how conclusions can be drawn.	Summer 2	**Making connections** **Title TBC** Bringing together pupils' learning from multiple Science units, helping them to make connections between the key concepts and skills.

	Year 3		
Autumn 1	**Animals, including humans** Movement and nutrition **(6 lessons)** Studying the human skeleton, children identify key bones and compare them to other animals explaining the role within the body. Pupils explore how changes in muscles result in movement and the implications these discoveries have in the scientific development of prosthetic limbs. They study how energy is used by the body, what constitutes a balanced diet in humans and how research contributes to nutritionist expertise.	Autumn 2	**Forces, Earth and space** Forces and magnets **(6 lessons)** Investigating the movement of vehicles on different surfaces, children learn about the impact of friction and compare uses and drawbacks. They broaden their experience in writing scientific methods and recording data as they investigate contact and non-contact forces. Pupils explore the properties of different magnets and use this to understand their uses.
Spring 1	**Materials** Rocks and soil **(6 lessons)** Studying rocks and their properties, children learn how to classify rocks and identify how they were formed. They look at the work of paleontologists to learn about fossil formation and use models to explore how fossils tell us about the past. Pupils investigate the physical properties of rocks and link these to their particular uses. Pupils also explore soil formation, separate soil using a sedimentation jar and test soil drainage.	Spring 2	**Energy** **Light and shadows (6 lessons)** Identifying examples of light sources, children learn that light is needed to see and how its absence causes darkness. Children investigate reflection and shadow formation, including how different factors change the shadows observed. They explore how shadows can be used to entertain in the arts and create shadow puppets to recount how different people work or experiment with light.
Summer 1	**Plants** **Plant reproduction (6 lessons)** Building on their prior knowledge of plant structures, children describe the functions of named parts and use evidence to explain their significance in plant development. Pupils investigate further factors that may affect the growth of plants and compete with their peers to disperse seeds in a variety of ways. They explore how seeds vary and define the type of plant they are studying, as well as looking at how seed shapes have inspired modern technologies.	Summer 2	**Making connections** **Title TBC** Bringing together pupils' learning from multiple Science units, helping them to make connections between the key concepts and skills.

Year 4

Autumn 1	**Animals, including humans** Digestion and food **(6 lessons)** Using models, children describe the function of key organs in the digestive system. Pupils identify the types of human teeth to create their own model and investigate factors that impact our dental health. They compare human teeth to other animals' and consider this in the light of prior knowledge about predators, prey and food chains. Children take on the role of a naturalist investigating animal faeces for clues about diet, digestion and dentition.	**Autumn 2**	**Energy** Electricity and circuits **(6 lessons)** Exploring appliances that use electricity in their setting, children learn how to work with electricity safely and build circuits. Pupils investigate electrical conductors and insulators and explore the relationship between the number of bulbs and bulb brightness. Real scenarios and historical discoveries inform children about scientific progression and home safety.
Spring 1	**Materials** States of matter **(6 lessons)** Investigating the properties of solids, liquids and gases, children learn about the different states of matter. They explore changes of state using relatable examples and use this to explain changes to water through the water cycle. Pupils investigate the relationship between temperature and rate of evaporation while broadening their experience of working scientifically.	**Spring 2**	**Energy** **Sound and vibrations (6 lessons)** Exploring different ways of producing sounds, children learn about the relationship between vibrations and what they hear. They use examples of dolphins and whales to develop their understanding of how sound travels between objects and investigate the role of insulation to protect our ears. Pupils explore how pitch and volume can be altered and make their own musical instruments to demonstrate these principles.
Summer 1	**Living things and their habitats** **Classification and changing habitats (6 lessons)** Identifying different ways living things can be grouped, children make classification keys to explore which grouping methods are most effective. Pupils study ways that habitats may change over time and understand that humans can have both positive and negative effects on their surroundings. They play the role of naturalists and review the impact of conservation programmes.	**Summer 2**	**Making connections** **Title TBC** Bringing together pupils' learning from multiple Science units, helping them to make connections between the key concepts and skills.

Year 5

Autumn 1	**Materials** Mixtures and separation **(6 lessons)** Pupils explore different types of mixtures and the different methods that can be used to separate them. They dissolve a range of substances, identify different solutions and investigate how temperature affects the time taken to dissolve. They design and create a water filter, sieve soil and evaporate solutions.	**Autumn 2**	**Materials** Properties and changes **(6 lessons)** Broadening their experience of the properties of materials, children investigate hardness, transparency and conductivity and consider how these properties influence the uses of materials. They explore reversible changes, including dissolving and changes of state. Children compare these to irreversible changes, including rusting, burning and mixing vinegar and bicarbonate of soda.
Spring 1	**Forces, Earth and space** Earth and space **(6 lessons)** Exploring some of the key celestial bodies in our Solar System, children learn their names and compare their movements. Pupils discover the relationship between the Earth's rotation and daylight, making models to represent their knowledge. They make their own sundials and consider how and why humans' ideas about the universe have changed over time.	**Spring 2**	**Living things and their habitats** **Life cycles and reproduction (6 lessons)** Studying different animals' life cycles, children learn about the significance of reproduction for a species' survival. Pupils calculate the probability of male and female turtles hatching and grow plants to compare asexual and sexual reproduction. Pupils compare fertilisation across different animals and explore the needs of a fetus. Children narrate their own documentary in the style of an inspirational naturalist.
Summer 1	**Forces, Earth and space** **Imbalanced forces (6 lessons)** Building on their knowledge of contact forces, children explore gravity, air resistance and water resistance in more depth and consider the effect of these forces being imbalanced. They demonstrate key principles in the classroom and plan investigations to further their understanding of the effects of these forces. Pupils test their ideas using models and compete to build the most effective pulley system.	**Summer 2**	**Animals, including humans** **Human timeline (3 lessons)** Studying human development and changes, children identify key stages and consider what data may help determine if a child is growing normally. They describe how puberty affects girls and boys and produce graphs to record how gestation periods vary across different animals. **Making connections** **Title TBC** Bringing together pupils' learning from multiple Science units, helping them to make connections between the key concepts and skills.

	Year 6		
Autumn 1	**Living things and their habitats** Classifying big and small **(6 lessons)** Children broaden their knowledge of how vertebrates, invertebrates, plants and micro-organisms are grouped using shared characteristics. They discover how Carl Linnaeus developed the Linnaean and binomial systems for classifying and naming living things. Pupils use and produce classification keys to sort and identify organisms.	Autumn 2	**Energy** Light and reflection **(6 lessons)** Proving that light travels in a straight line, children use this information to explain observations of reflection and shadows. They explore how our eyes allow us to see and how mirrors can be used in a variety of ways. Pupils investigate factors affecting the size of shadows and the laws of reflection. Children apply what they have learned about light by exploring real-life uses of mirrors.
Spring 1	**Living things and their habitats** Evolution and inheritance **(6 lessons)** Studying patterns in humans and other species, children learn about characteristics that are inherited from parents and those that are environmental. Through the eyes of Darwin and Wallace, pupils understand how observations lead to theories and explore natural selection. By modelling the variation and natural selection of Darwin's finches, they begin to explain how species evolve over time and the role of fossil evidence that supports this theory.	Spring 2	**Energy** **Circuits, batteries and switches (6 lessons)** Using their prior knowledge of electrical circuits, children learn to draw conventional circuit diagrams and use models to explain current and voltage. They make their own batteries, relate this to their knowledge of voltage and explore how battery research has impacted other scientific progress. Pupils investigate the use of switches and fuses and apply their electrical knowledge to design and produce their own electrical device.
Summer 1	**Animals, including humans** **Circulation and exercise (6 lessons)** Studying the human circulatory system, children learn about the role of the heart, blood and blood vessels and use models to demonstrate their function. They play the role of healthcare professionals to diagnose patients and play games to explore how lifestyle choices affect our health. Pupils devise their own investigation to look at the relationship between exercise and heart and breathing rates, applying their knowledge of variables.	Summer 2	**Making connections** **Title TBC** Bringing together pupils' learning from multiple Science units, helping them to make connections between the key concepts and skills.

Rationale for the sequence of units

Each unit is based upon one of the key science disciplines; Biology, Chemistry and Physics and, to show progression throughout the school, we have grouped the National curriculum content into six key areas of science:

Plants

Animals, including humans

Living things and habitats

Materials

Energy

Forces, Earth and space.

Pupils explore knowledge and conceptual understanding through engaging activities and an introduction to relevant specialist vocabulary. As suggested in Ofsted's Science research review (April 2021), the 'working scientifically' skills are integrated with conceptual understanding rather than taught discretely. The curriculum repeat these themes and builds knowledge and skills throughout.

This provides frequent, but relevant, opportunities for developing scientific enquiry skills. Our curriculum utilises practical activities that aid in the progression of individual skills and also provides opportunities for full investigations.

Lessons incorporate various teaching strategies from independent tasks to paired and group work, including practical, creative, computer-based and collaborative tasks. This variety means that lessons are engaging and appeal to those with different learning styles. In Year 1, we have tried to ease the transition into Key stage 1, by providing a selection of activities: some adult-led, some independent tasks, and some tasks that can be used during continuous provision to suit your set-up

Implementation of science will be in-line with our Curriculum intent, implementation and impact policy.

Impact

Throughout their time at Ireby Primary school, children become independent learners, thinkers and explorers. Our pupils hold the ability to apply their strong knowledge to investigations. Through undertaking enquiry, pupils can gather information, record data and interpret findings. Children observe over time, seek patterns, identify, classify and group, test both comparatively and fairly and research using secondary sources. These taught skills provide children in our care with a wealth of opportunity and ensure that they use science now and in their future in the wider world, delivering our Christain vision, 'created to do good.'

Timetabling and organisation

EYFS and Key Stage 1 are taught in their class, Key Stage 2 are taught as Lower Key Stage 2 (Year 3 and 4) and Upper Key Stage 2 (Year 5 and 6). In Key Stage 1 and 2, science is planned on a two-year rolling programme.

End points

Our science curriculum supports every child to reach a required 'end point' by the end of each Key Stage as a miniumum. These 'end points' reflect both the requirements of the National Curriculum 2014, and the needs of the children in our school context.

Science End Points

End of KS1

Work Scientifically	Ask simple questions
	Observe closely, using simple equipment
	Perform simple tests
	Identify simple tests
	Use observations and ideas to suggest answers to questions
	Gather and record data to help in answering questions.
Understand Plants	Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.
	Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers.
	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.
Understand animals and humans	Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates.

	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 (birds, fish, amphibians, reptiles, mammals and invertebrates, 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.
	Notice that animals, including humans, have offspring which grow into adults.
	Investigate and describe the basic needs of 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.
Investigate living things	Explore and compare the differences between things that are living, that are dead and 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 micro-habitats.
	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.
Understand evolution and inheritance	Identify how humans resemble their parents in many features.
Investigating 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.
	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses.
Understand movement, forces and magnets	Notice and describe how things move, using simple comparisons such as faster and slower.
	Compare how different things move.
Understand light and seeing	Observe and name a variety of sources of light, including electric lights, flames and the Sun, explaining that we see things because light travels from them to our eyes.
Investigate sound and hearing	Observe and name a variety of sources of sound, noticing that we hear with our ears.
Understand electrical circuits	Identify common appliances that run on electricity.
	Construct a simple series electrical circuit.

Understand the Earth's movement in Space.	Observe the apparent movement of the Sun during the day.
	Observe changes across the four seasons.
	Observe and describe weather associated with the seasons and how day length varies.
Our Christian vision	Understand how developing skills and knowledge in science can be used to support our Christian vision, 'created to do good' and that children can use these skills to make our world a better place.

End of Lower Key Stage 2

Work Scientifically	Ask relevant questions
	Set up simple, practical enquiries and comparative and fair tests
	Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.
	Gather, record, classify and present data in a variety of ways to help in answering questions.
	Record findings using simple scientific language, drawings, labelled diagrams, 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 and suggest improvements, new questions and predictions for setting up further tests.
	Identify differences, similarities or changes related to simple, scientific ideas and processes.
	Use straightforward, scientific evidence to answer questions or to support their findings.
Understand Plants	Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.
	Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.
	Investigate the way in which water is transported within plants.
	Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Understand animals and humans	Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.
	Construct and interpret a variety of food chains, identifying producers, predators and prey.
	Identify that humans and some 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.
Investigate living things	Recognise that living things can be grouped in a variety of ways.
	Explore and use classification keys
	Recognise that environments can change and that this can sometimes pose dangers to specific habitats.
Understand evolution and inheritance	Identify how plants and animals, including humans, resemble their parents in many features.
	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
	Identify how animals and plants are suited to and adapt to their environment in different ways.
Investigating materials (Rocks and Soils)	Compare and group together different kinds of rocks on the basis of their simple physical properties.
	Relate the simple physical properties of some rocks to their formation (igneous or sedimentary).
	Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock.
	Recognise that soils are made from rocks and organic matter.
Investigating materials (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 the temperature at which this happens in degrees Celsius ('c), building on their teaching in scienceematics.
	Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
Understand movement, 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.
Understand light and seeing	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 a solid object.
	Find patterns in the way that the size of shadows change.
Investigate sound and hearing	Identify how sounds are made associating some of them with something vibrating.
	Recognise that vibrations from sounds travel through a medium to the ear.
Understand electrical circuits.	Identify common appliances that run on electricity.
	Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches, and buzzers.
	Identify whether or not a lamp with light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.
	Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
	Recognise some common conductors and insulators, and associate metals with being good conductors.
Understand the Earth's movement in Space	Describe the movement of the Earth relative to the sun in the solar system.
	Describe the movement of the moon relative to the Earth.
Our Christian vision	Understand how developing skills and knowledge in science can be used to support our Christian vision, 'created to do good' and that children can use these skills to make our world a better place.

End of Upper Key Stage 2

Work Scientifically	Plan enquiries, including recognising and controlling variables where necessary.
	Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
	Take measurements, using a range of scientific equipment, with increasing accuracy and precision.
	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.
	Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.
	Present findings in written form, displays and other presentations.
	Use test results to make predictions to set up further comparative and fair tests.

	Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.
Understand Plants	Relate knowledge of plants to studies of evolution and inheritance.
	Relate knowledge of plants to studies of all living things.
Understand animals and 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 importance of diet, exercise, drugs and lifestyle on the way the human body functions.
	Describe the ways in which nutrients and water are transported within animals, including humans.
Investigate living things	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.
	Give reasons for classifying plants and animals based on specific characteristics.
Understand 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.
Investigate materials	Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets.
	Understand how 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, oxidisation, and the action of acid on bicarbonate of soda.

Understand movement, forces and magnets	Describe magnets as having two poles.
	Predict whether two magnets will attract or repel each other, depending on which poles are facing.
	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
	Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces.
	Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.
	Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.
	Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect.
Understand light and seeing	Understand 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 eyes.
	Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes.
	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.
Investigate sound and hearing	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.
Understand electrical circuits	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.
Understand the Earth's movement in 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.
Our Christian vision	Understand how developing skills and knowledge in science can be used to support our Christian vision, 'created to do good' and that children can use these skills to make our world a better place.

Monitoring and evaluation of effectiveness of this policy

The headteacher and science subject leader are responsible for monitoring and evaluating the effectiveness of this policy towards meeting our stated vision and aims. This will be achieved through:

Activity	**Frequency**
Lesson observations	Our science leader will sample science lessons during the year
Pupil voice	Two samples during year
Collecting and evaluating summative assessment	Termly Teachers will review learning towards 'end points' and record data on Scholarpack for evaluation by the subject leader

The role of governors

Our governors determine, support, monitor and review the school's approach to teaching and learning. In particular they:

- support the use of appropriate teaching strategies by allocating resources effectively;
- ensure that the school buildings and premises are used optimally to support teaching and learning;
- check teaching methods in the light of health and safety regulations;
- seek to ensure that our staff development and our performance management both promote good-quality teaching;
- monitor the effectiveness of the school's teaching and learning approaches through the school's self-review processes, which include reports from the headteacher, senior leaders and subject leaders, and a review of the continuing professional development of staff.

Monitoring and review of this policy

Senior leaders monitor the school's science policy so that we can take account of new initiatives and research or any changes in the science curriculum, developments in technology or changes to the physical environment of the school. We will therefore review this policy every three years or sooner if required.