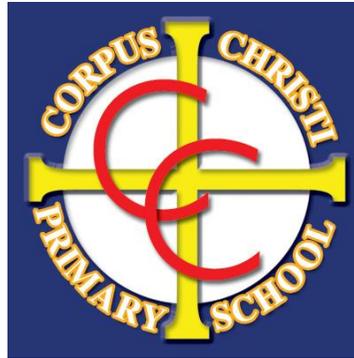


Corpus Christi Catholic Primary School



SCIENCE HANDBOOK

SCIENCE CURRICULUM: INTENT: All of our children will have consistent access to a broad, balanced and high quality science curriculum which will:

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

Science Together we DREAM, together we learn

AIMS

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

At Corpus Christi, our mission statement and the teaching of Jesus is at the centre of all we do.

We intend to show this through our science curriculum:

Give opportunities to **DISCOVER** new facts, skills, information and experiences, through scientific enquiry.

Teach children to **RESPECT** each other, the use of different methods and the scientific resources used to enhance learning across the school.

Provide experiences to **ENTHUSE** and excite and develop scientific knowledge and understanding.

Encourage high **ASPIRATIONS** in both school and beyond, and applying those aspirations in their science work.

Show ways our children can **MAKE A DIFFERENCE** to themselves, each other and outside, in big and small ways, and use their understanding in science to aid their ideas.

STRATEGIES: In order to achieve our aims our school provides:

On site facilities:

- Online Stem Planning and Resources
- www.developingexperts.com
- Online Resources
- ICT resources- iPads and Smart TV in every classroom
- Outdoor learning- school outdoor area including the woodland area.

Offsite facilities:

- Science Leaders Network
- STEM online resources
- Teacher Research Group training and sessions in other schools.

Equipment/Resources

The school maintains a range of resources for science – topic resources eg magnets, rocks and soils, magnifying glasses, iPads/computers, photographs, clipboards and pens for completing outdoor work.

- Outdoor learning environments
- Allotment boxes
- Woodland Area

Offsite facilities:

- St Helens
- Rainford Village/farm land/woodlands

Curriculum Provision

Reception: Continuous provision – Understanding the World

Y1– Y6: 1 x 60 minute science lessons weekly

Children follow the school's scheme of work and are continuously assessed against clear learning objectives.

Additional examples of our commitment to science include:

School trips, talks from visitors, whole school initiatives (Walk to school Week, Big Clean Up, recycling and gardening), science week.

Continuing Professional Development

Teachers and support staff are encouraged to develop their skills and knowledge to enhance the teaching of science.

- Subject Leadership training – Science Lead

Reporting

Verbal reports to parents take place twice a year at Parent's Evening.

Written reports are provided annually.

- All staff are continuously trained so as to ensure that mathematics is taught to a high standard
- This high quality teaching is supported through the appropriate funding, resources, timetables and our whole school environment, which is maintained to a high standard and enhances and promotes our teaching and our children's experiences and learning
- Staff plan and deliver high quality science lessons
- Staff meet regularly to review the quality of our provision and to refresh, reposition and change as appropriate
- Staff meet regularly to track and review the progress of our children and this high quality formative assessment contributes good rates of progress and high levels of attainment
- Strong parent partnerships and home/school systems contribute the quality of our provision

OUTCOMES

The teaching of all aspects of science is consistently good with much outstanding practice.

All of our children are encouraged to be curious and ask questions about what they notice.

All children will be given the opportunity to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions.

All of our children will begin to learn simple scientific language to talk about what they have found out and communicate their ideas.

All of our children make good progress from their starting point in science.

MONITORING EVALUATION REVIEW

The school implements an annual programme of quality assurance which includes:

- Scrutiny of planning
- assessment and work books
- Lesson Observations
- Learning walks
- Conversations with children
- Consultation with parents

Intent

The 2014 National Curriculum for Science aims to ensure that all children:

- 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 skills required to understand the uses and implications of science, today and for the future.
- We understand that it is important for lessons to have a skills-based focus, built on a foundation of supporting knowledge.

Through Developing Experts, we encourage children to be inquisitive throughout their time at school and beyond. The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. We ensure that the Working Scientifically skills are built-on and developed throughout children's time at the school so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

SCIENCE: CURRICULUM IMPLEMENTATION: PLANNING

Our long term planning ensures coverage of the National Science Curriculum and is responsive to local influences. In order to widen and deepen pupils' essential knowledge, skills, understanding and behaviours, our children continuously return to key concepts and skills in order to gain a deeper and more insightful understanding.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

- Science will be taught in planned and arranged topic blocks by the class teacher, to have a project-based approach. This is a strategy to enable the achievement of a greater depth of knowledge.

- Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge. Teachers use precise questioning in class to test conceptual knowledge and skills and assess children regularly to identify those children with gaps in learning, so that all children keep up.
- We build upon the learning and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.
- Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and workshops with experts.
- Children are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.
- Regular events, such as Science Week or project days, such as Space week, having guest speakers who will inspire pupils, allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involve families and the wider community.

Science Long Term Planning						
EYFS	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	Understanding the world- The Natural 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.					
	Can name their 5 senses Use senses in hands on exploration	Understand the weather changes in different countries		Understand the weather changes in different countries	Explore collections of materials, identify similar and different properties	Understand the weather changes in different countries
Reception	Explain what their senses are Can name their 5 senses	Understand the effect of seasons and the natural world discussing when and how things grow		Understand the effect of seasons and the natural world discussing when and how things grow Explore the natural world around them Name and order seasons Say what plants needs to survive Can talk about different life cycles	Talk about differences between materials and changes they notice	
KEY STAGE 1	Pupils should experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions					
YEAR 1	Exploring everyday materials	Seasonal changes	Animals including humans -about animals	Animals including humans- about me	Introduction to plants	Use of everyday materials
YEAR 2	Everyday materials	Animals including humans-growth	Animals including humans- diet and health	Living things and their habitats	Plants- growth and care	Living things and their habitats – habitats around the world
LOWER KEY STAGE 2	The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them.					
YEAR 3	Animals including humans- what makes us	Light	Forces and magnets	Rocks	Plant life cycles	Exploring the world of plants

YEAR 4	State of matter	Classifying living things and their habitats	Sound	Animals Including humans – diet and health	Living things & their habitats- nature and the environment	Electricity
UPPER KEY STAGE 2	<p>The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry.</p>					
YEAR 5	Properties of materials	Changes of materials	Earth and Space	Studying living things	Animals including humans – the human life cycle	Forces
YEAR 6	Living things and their habitats	Evolution and inheritance	Animals, including humans	Looking after our environment	Light	Electricity

New EYFS Progressions

KNOWLEDGE TO BE TAUGHT	<u>Reception</u>				<u>Nursery</u>		
SCIENCE LINKS	Explores the world around them, asking how and why Q's.	Explores the natural world around them SP2	Talks about differences between materials and changes they notice SU1		Explore collections of materials, identifying similar and different properties SU1		Explore collections of materials SU1
		Explain what their five senses are A1		Can name their five <u>senses</u> A1	Can name their five senses A1	Uses senses in hands on exploration A1	
	Identify seasonal weather patterns	Understands the effect of seasons on the natural world, discussing when and how things <u>grow</u> A2 SP2		Names and orders <u>seasons</u> A2 SP2	Can identify what you need to wear for each season and why A2 SP2	Understands that the weather changes and that in different countries you have different weather A2 SP2 SU2	
	Observe the natural and humanly constructed world around them.	Understands the need to respect and care for the natural environment and all <u>things</u> SP2	Can talk about different life cycles SP2	Can say what plants need to survive SP2	Can explain the life cycle of a plant and butterfly SP2	Plant seeds and cares for growing plants with support SP2	Understands the difference between plants and animals SP2

EYFS Progressions

In planning and guiding what children learn, practitioners must reflect on the different rates at which children are developing and adjust their practice appropriately. The three Characteristics of Effective Teaching and Learning are: **playing and exploring** - children investigate and experience things, and 'have a go'; **active learning** - children concentrate and keep on trying if they encounter difficulty; and **thinking critically** - children have and develop their own ideas, make links between ideas, and develop strategies for doing things. In addition, the prime areas of learning (**PSE, CL, PD**) underpin and are an integral part of children's learning in all areas.

EYFS Science Skills

Working scientifically	Plants	Animals (Including humans) PSHE link	Everyday materials
<p>Comments and asks questions about aspects of their familiar world such as the natural world, making observations and drawing pictures of animals and plants.</p> <p>Talks about why things happen and how things work</p> <p>Looks closely at similarities, differences, patterns and change</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter</p> <p>Explore and talk about different forces I can feel – gravity, push and pull toys</p>	<p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant</p> <p>Developing an understanding of growth, decay and changes over time</p> <p>Identify similarities and differences in relation to living things</p>	<p>Understand the life cycle of a human</p> <p>Begin to understand the need to respect and care for the natural environment and all living things.</p> <p>Talk about the features of their own immediate environment and how environments might vary from one another.</p> <p>Identify which dinosaurs are meat or plant eaters</p>	<p>Identify similarities and differences in relation to materials</p>

EYFS Science Knowledge

<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> I know how to ask questions about the world through using my senses - feeling, hearing, seeing I know some important processes and changes in the natural world around them, including the seasons and changing states of matter. 		
<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> I know about aspects of my familiar world such as the natural world, making observations and drawing pictures I know and can talk about forces I can feel 	<p><u>Animals</u></p> <ul style="list-style-type: none"> I know how to care for animals (trip) I know some of the features of my own immediate environment and how they might vary from one another (farm/zoo) 	<p><u>Plants</u></p> <ul style="list-style-type: none"> I know how to care for growing plants. I know about the life cycle of a plant I know about growth, decay and changes over time I know some similarities and differences in relation to living things.
<p><u>Working scientifically</u></p> <ul style="list-style-type: none"> I know why things happen and how things work I know some similarities, differences, patterns and change in relation to people 	<p><u>Animals</u></p> <ul style="list-style-type: none"> I know about life cycle of an human I know I need to respect and care for the natural environment and all living things. I know which dinosaurs are meat or plant eaters 	<p><u>Everyday materials</u></p> <p>I know some similarities and differences in relation to materials</p>

Key Vocabulary

Science, experiment, test, fair, why, senses, world, plants – leaf, stem, root, flower, animals, humans, materials - waterproof, natural, change, growth, decay, environment

Scientific Enquiry Progressions.

SCIENCE		RECEPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	Upper KS2 (Y5 and Y6)	
QUESTION		Ask simple questions about immediate environment.	Ask questions and know some can be answered using scientific enquiry.		Identify scientific questions. ie can be investigated through scientific enquiry.		Raise scientific questions and hypothesise	
SCIENTIFIC ENQUIRY	OBSERVE	Qualitative Talk about similarities and differences.	Qualitative and Simple Quantitative Observe change over time. Use Senses/ equipment.		Measure change over time e.g. plant growth. Select equipment	Qualitative and Quantitative Systematic/ careful observations. Use bar charts, pictograms, tables.	Accurate measurements. Use time graphs and other graphs.	Qualitative and Quantitative Accurate/ precise measurements, Diagrams, tables, bar and line graphs. Take repeat readings when appropriate. Scatter graphs.
	CLASSIFY and FIND PATTERNS	Talk and Sort Use simple scientific criteria.	Identify and Classify e.g. familiar plants, animals, materials Compare and contrast		e.g. living/ dead/ never alive; materials Compare differences	Classify and Find Patterns Classify animals/ materials. Link two variables e.g. <i>the closer the magnet the bigger the force.</i>	Use simple classification keys. Link two variables e.g. <i>the more cells in a circuit, the brighter the bulb.</i>	Classify and Find Patterns Use complex classification keys. Identify causal relationships. Develop classification keys. Identify evidence that supports/ refutes causal relationship.
	CONTROL INVESTIGATIONS: comparative and fair testing	Explore objects/ materials/ living things/ resources designed to model scientific processes.	Simple comparative tests e.g. <i>What is the best material for an umbrella?</i>		e.g. <i>What if plants do not get light and water?</i>	Comparative and fair tests Predict. Fair tests e.g. <i>How does distance affect magnet strength?</i>	Predict. Language of independent and control variable.	Design own comparative and fair tests Identify when and how to use tests. Recognise and control variables. Make predictions based on previous test results.
	RESEARCH	Listen and respond to stories about scientific processes/ events/ objects.	Find information using given sources. e.g. <i>animals.</i>	Select information from a range of given sources.	Research using given sources. e.g. <i>research different food groups and how they keep us healthy</i>	Select information to support findings. e.g. <i>research animals</i>	Explore relevant information by using a wide range of secondary sources. Explore how scientific ideas have developed over time. Identify evidence that has been used to support or refute ideas.	

	MODEL	<p>Concrete context.</p> <p>Create drawings and models of their environment</p>	<p>Concrete context</p> <p>Draw diagrams e.g. <i>parts of plants/ the body</i>.</p>	<p>Explore and create</p> <p>drawings and physical models e.g. <i>habitats</i>.</p>	<p>Abstract contexts e.g. processes and phenomena such as forces/ light. Use labelled diagrams and drawings and physical models.</p>	<p>Abstract contexts e.g. processes and phenomena such as sound/ electricity. Create labelled diagrams and drawings and physical models.</p>	<p>Abstract contexts.</p> <p>Evaluate diagrams/ models e.g. states of matter; solar system.</p>	<p>Abstract contexts.</p> <p>Create own versions of models. e.g. circulatory system; light.</p>
CONCLUDE		<p>Explain simple phenomena: How? Why?</p>	<p>Describe what has happened or been observed.</p>	<p>Explain why a simple observation occurred. Evaluate the effectiveness of observations.</p>	<p>Explain an observation or an event in scientific terms. Distinguish between what has been observed and why it happened. Begin to link evidence from secondary sources as well as primary. Suggest improvements.</p>	<p>Evaluate original hypothesis against observed evidence and reach appropriate conclusions. Identify causal relationships. Begin to identify how reliable the data is.</p>		

Progressions in Knowledge

***** National Curriculum statements in red are from other linked topics.

Plants

Birth to three	<ul style="list-style-type: none"> Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things.
Reception	<ul style="list-style-type: none"> Draw information from a simple map. (Reception – Living things and their habitats) Explore the natural world around them. (Reception – Living things and their habitats) Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats) Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats) Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes)
Year 1	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees.
Year 2	<ul style="list-style-type: none"> 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. Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)
Year 3	<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, 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 part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Year 4	<ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)
Year 5	<ul style="list-style-type: none"> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
Year 6	<ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats) Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)
Key Stage 3	<ul style="list-style-type: none"> Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

Living things and their habitats

Birth to three	<ul style="list-style-type: none"> Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Begin to understand the need to respect and care for the natural environment and all living things.
Reception	<ul style="list-style-type: none"> Draw information from a simple map. Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different to the one in which they live.
Year 1	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) Observe changes across the four seasons. (Y1 - Seasonal change)
Year 2	<ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including microhabitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals including humans)
Year 3	<ul style="list-style-type: none"> Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)
Year 4	<ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)
Year 5	<ul style="list-style-type: none"> 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.
Year 6	<ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (Y6 - Evolution and inheritance) Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 - Evolution and inheritance)
Key Stage 3	<ul style="list-style-type: none"> Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. Differences between species.

Animals, including humans

Birth to three	<ul style="list-style-type: none"> • Explore natural materials, indoors and outside. • Make connections between the features of their family and other families. • Notice differences between people.
Nursery	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Begin to make sense of their own life-story and family's history. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things.
Reception	<ul style="list-style-type: none"> • Talk about members of their immediate family and community. • Name and describe people who are familiar to them. • Recognise some environments that are different to the one in which they live.
Year 1	<ul style="list-style-type: none"> • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
Year 2	<ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • 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. (Y2 - Living things and their habitats)
Year 3	<ul style="list-style-type: none"> • Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. • Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
Year 4	<ul style="list-style-type: none"> • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. • Construct and interpret a variety of food chains, identifying producers, predators and prey.
Year 5	<ul style="list-style-type: none"> • Describe the changes as humans develop to old age. • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) • Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
Year 6	<ul style="list-style-type: none"> • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • Describe the ways in which nutrients and water are transported within animals, including humans. • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats) • Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)
Key Stage 3	<ul style="list-style-type: none"> • Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. • The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. • The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. • The structure and functions of the gas exchange system in humans, including adaptations to function. • The mechanism of breathing to move air in and out of the lungs. • The impact of exercise, asthma and smoking on the human gas exchange system.

Materials

Birth to three	<ul style="list-style-type: none"> • Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about the differences between materials and changes they notice.
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> • 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.
Year 2	<ul style="list-style-type: none"> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Year 3	<ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks) • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) • 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. (Y3 - Forces and magnets)
Year 4	<ul style="list-style-type: none"> • Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity)
Year 5	<ul style="list-style-type: none"> • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.
Year 6	
Key Stage 3	<ul style="list-style-type: none"> • Chemical reactions as the rearrangement of atoms. • Representing chemical reactions using formulae and using equations. • Combustion, thermal decomposition, oxidation and displacement reactions. • Defining acids and alkalis in terms of neutralisation reactions. • The pH scale for measuring acidity/alkalinity; and indicators.

Seasonal changes

Birth to three	<ul style="list-style-type: none"> •
Nursery	<ul style="list-style-type: none"> • Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants & Animals, excluding humans)
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.
Year 1	<ul style="list-style-type: none"> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.
Year 2	
Year 3	<ul style="list-style-type: none"> • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)
Year 4	
Year 5	<ul style="list-style-type: none"> • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space)
Year 6	
Key Stage 3	<ul style="list-style-type: none"> • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.

Rocks

Birth to three	<ul style="list-style-type: none"> • Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. (Nursery – Living things and their habitats) • Explore collections of materials with similar and/or different properties. (Nursery – Living things and their habitats)
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. (Reception – Living things and their habitats) • Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats)
Year 1	<ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)
Year 2	<ul style="list-style-type: none"> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)
Year 3	<ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Recognise that soils are made from rocks and organic matter.
Year 4	
Year 5	
Year 6	<ul style="list-style-type: none"> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance)
Key Stage 3	<ul style="list-style-type: none"> • The composition of the Earth. • The structure of the Earth. • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks.

Light

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work. Talk about the differences in materials and changes they notice.
Reception	<ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)
Year 2	
Year 3	<ul style="list-style-type: none"> Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.
Year 4	
Year 5	<ul style="list-style-type: none"> Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials)
Year 6	<ul style="list-style-type: none"> Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Key Stage 3	<ul style="list-style-type: none"> The similarities and differences between light waves and waves in matter. Light waves travelling through a vacuum; speed of light. The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.

Forces

Birth to three	<ul style="list-style-type: none"> • Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> • Explore how things work. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	
Year 2	<ul style="list-style-type: none"> • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)
Year 3	<ul style="list-style-type: none"> • 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.
Year 4	
Year 5	<ul style="list-style-type: none"> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
Year 6	
Key Stage 3	<ul style="list-style-type: none"> • Magnetic fields by plotting with compass, representation by field lines. • Earth's magnetism, compass and navigation. • Forces as pushes or pulls, arising from the interaction between two objects. • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. • Moment as the turning effect of a force. • Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. • Forces measured in Newtons, measurements of stretch or compression as force is changed.

Sound

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work.
Reception	<ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)
Year 2	
Year 3	
Year 4	<ul style="list-style-type: none"> Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.
Year 5	
Year 6	
Key Stage 3	<ul style="list-style-type: none"> Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. Sound needs a medium to travel, the speed of sound in air, in water, in solids. Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. Auditory range of humans and animals. Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. Waves transferring information for conversion to electrical signals by microphone.

Electricity

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work.
Reception	
Year 1	
Year 2	
Year 3	
Year 4	<ul style="list-style-type: none"> 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 will 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.
Year 5	
Year 6	<ul style="list-style-type: none"> 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.
Key Stage 3	<ul style="list-style-type: none"> Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. Differences in resistance between conducting and insulating components (quantitative). Static electricity.

Evolution and inheritance

Birth to three	<ul style="list-style-type: none"> • Make connections between the features of their family and other families. • Notice differences between people.
Nursery	<ul style="list-style-type: none"> • Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Living things and their habitats)
Reception	<ul style="list-style-type: none"> • Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)
Year 1	
Year 2	<ul style="list-style-type: none"> • 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. (Y2 - Living things and their habitats) • Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)
Year 3	<ul style="list-style-type: none"> • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)
Year 4	<ul style="list-style-type: none"> • Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)
Year 5	<ul style="list-style-type: none"> • Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)
Year 6	<ul style="list-style-type: none"> • 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.
Key Stage 3	<ul style="list-style-type: none"> • Heredity as the process by which genetic information is transmitted from one generation to the next. • A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. • The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. • Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.

Earth and space

Birth to three	<ul style="list-style-type: none"> • Explore and respond to different natural phenomena in their setting and on trips.
Nursery	
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> • Observe changes across the four seasons. (Y1 – Seasonal changes) • Observe and describe weather associated with the seasons and how day length varies. (Y1 – Seasonal changes)
Year 2	
Year 3	
Year 4	
Year 5	<ul style="list-style-type: none"> • 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.
Year 6	
Key Stage 3	<ul style="list-style-type: none"> • Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10$ N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). • Our Sun as a star, other stars in our galaxy, other galaxies. • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. • The light year as a unit of astronomical distance.

SCIENCE CURRICULUM IMPLEMENTATION: SPIRITUAL MORAL SOCIAL AND CULTURAL DEVELOPMENT

Our Science Curriculum contributes to the spiritual, moral, social and cultural development of our children and embeds our School ethos and mission statement of, Together we DREAM, together we learn.

Spiritual Development	Moral Development	Social Development	Cultural Development
<ul style="list-style-type: none"> • Respect for self and others • Increasing ability to reflect • Empathy, Concern & Compassion • Expressive & creative development • Awareness and understanding of their own and others beliefs • Ability to think in terms of the whole • Readiness to challenge all that would constrain the human spirit: poverty of aspiration, lack of self-confidence and belief, indifference, force, aggression, injustice, self-interest, sexism and racism • Courage and persistence in the defence of their aims, values, principles and beliefs • Appreciation of the intangible • Understanding of feelings and emotions and their likely impact • Respect for insight as well as knowledge and reason 	<ul style="list-style-type: none"> • Ability to distinguish right from wrong • Confidence to act consistently in accordance with their own principles • Respect for others' needs, interests and feelings as well as their own • Desire to explore their own and others' views • A commitment to personal values in areas which are considered right by some and wrong by others • Ability to make responsible and reasoned judgements on moral dilemmas • Ability to think through consequences of their own and others' actions • Considerate style of life • Understanding of the need to review and reassess their values, codes and principles in the light of experience 	<ul style="list-style-type: none"> • Works successfully as a member of a group or team • Appreciates the right and responsibilities of individuals within the wider social setting • Takes advice offered by those in authority or counselling roles • Participates in activities relevant to the community • Exercises responsibility • Resolves conflict • Adjusts to a range of social contexts by appropriate and sensitive behaviour • Challenges, when necessary and in appropriate ways, the values of a group or wider community • Understands how societies function and are organised in structures such as the family, the school and local and wider communities • Shares values and opinions with others and works towards consensus • Reflects on their own contribution to society • Relates well to other peoples' social skills and personal qualities • Understands the notion of interdependence in an increasingly complex society 	<ul style="list-style-type: none"> • Appreciation of the diversity and interdependence of cultures • Ability to appreciate cultural diversity and accord dignity and respect to other people's values and beliefs, thereby challenging racism and valuing race equality • Ability to recognise and understand their own cultural assumptions and values • Understanding of the influences which have shaped their own cultural heritage • Understanding of the dynamic, evolutionary nature of cultures • Sense of personal enrichment through encounter with cultural media and tradition from a range of cultures • Regard for the rights of human achievement in all cultures and societies • Openness to new ideas and a willingness to modify cultural values in the light of experience

SCIENCE CURRICULUM IMPLEMENTATION: EXTRA-CURRICULAR CLUBS

Being able to offer our children a wide range of diverse extra-curricular activities is very important as it encourages them to become independent, confident and successful members of the community. Some of our clubs relating to science are run by external providers and take place after school but we also run clubs at lunchtime. Clubs are available for both KS1 and KS2 children.

The list of clubs is ever changing but generally includes:

- Science Club

SCIENCE CURRICULUM IMPLEMENTATION: HEALTH & SAFETY AND SAFEGUARDING

Risk Assessments are completed for all off site activities.

Appropriate staff supervision ratios are ensured.

Approved venues and transport are used.

SCIENCE CURRICULUM IMPLEMENTATION: STAFF DEVELOPMENT

Key staff undertake ongoing professional development as identified through consistent, embedded monitoring and regular informal professional conversations.

SCIENCE CURRICULUM IMPACT

SCIENCE LESSONS

All children have consistent access to high quality, safe and broad science lessons which:

- Benefit health and well being
- Develop their knowledge, skills and experiences of science
- Build the knowledge, skills, values and confidence necessary for them to make positive, healthy decisions throughout their lives
- Develop their social, moral, spiritual and cultural understanding by linking their understanding and learning to their lives.

SCIENCE EXTRA CURRICULAR CLUBS

All children have access to:

- Extra-curricular opportunities such as, Gardening Club and Science Club
- Opportunities to socialise with different peer groups
- Opportunities to make a positive contribution to our school and community – walking to school, recycling, litter picking and supporting charities

PROFESSIONAL DEVELOPMENT & RESEARCH

- Continuous Staff development is planned annually
- Staff questionnaires are completed annually to ensure suitable coverage and topic success rate