Curriculum Growth Journey

Science

'Growing Together'

How is Science taught at Trinity?

Curriculum Intent:

What do we want to achieve in our Science curriculum?

At Trinity All Saints CE Primary School, we aim to inspire learners and to stimulate their curiosity of the world around them. We provide children with the building blocks to obtain a thorough understanding of the world through specific disciplines of biology, chemistry, and physics. The children progressively learn specific skills and knowledge to enable them to think scientifically and gain a deeper understanding of scientific processes. At Trinity our intent is to encourage children to recognise the importance of science in the world around them and how science is vital to the world's future prosperity.

At Trinity All Saints Primary School we believe that each individual child is very important. We are committed to offering an inclusive curriculum to ensure the best possible progress for all of our pupils, whatever their needs or abilities, so that they can reach their full potential and grow into the very best versions of themselves. We feel that their contribution to school life should be valued and we seek to build their self-esteem. Spiritual development in our school seeks to support every individual on their spiritual quest.

Implementation:

How will this be achieved?

Our whole curriculum is shaped by our school vision which aims to enable all children, regardless of background, ability, additional needs, to flourish to become the very best version of themselves. We teach the National Curriculum, supported by a clear skills progression throughout the school. This ensures that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children. At Trinity, our aim is to submerse the children in their learning in an active and practical way. The 5 types of scientific enquiry are introduced to children from KS1, so that by the time they reach Year 6, our hope is that they have a solid understanding of the types of enquiry. These are:

- Research using secondary sources
- Pattern seeking
- Comparative and fair testing

- Observing changes over time
- Identifying, grouping and classifying

Our enquiry-based approach allows children to develop their scientific knowledge and conceptual understanding, whilst developing an understanding of the nature, processes and methods of science through the different types of enquires. Children are provided the building blocks they need to be able to answer a wide range of scientific questions and to investigate a range of problems.

When planning science at Trinity All Saints, we ensure there is a balance of knowledge-based learning and working scientifically for children to learn the scientific facts, whilst being able to apply them through practical investigations and relate these facts to the real world. Throughout school, children are encouraged to be curious about the world around them and ask scientific questions and as they move up through school, children will develop their skills to find ways in which they could find the answers to these questions, giving the children ownership over their own learning. By the time children reach upper key stage 2, the focus is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through asking questions and challenging their own predictions and views; talking about their ideas and justifying their predictions; and using the five types of enquiry to investigate their questions to prove or disprove their initial thoughts. We incorporate our Power of Three curriculum drivers (ACT) within our planning, ensuring children are Active in their learning, Contented in themselves and Thoughtful as a citizen.

<u>Opportunities for Spiritual development:</u>

We aim to:

- Develop a spirit of enquiry and open-mindedness enhanced by the use of skilful questioning by the teacher

Impact:

<u>What will outcomes for learners be?</u>

Learners will:

- Enjoy science and talk enthusiastically about their learning
- Know more, remember more and understand more about science
- Use a wider range of scientific vocabulary
- Ask questions about their learning and the world around them and have inquisitive minds

- Inspire learners to have a curiosity and fascination about the world
- Develop and confidently use a range of scientific skills and select the correct skills and tools to answer questions
- Be able to observe, predict, analyse, evaluate and justify their findings

Early Years Foundation Stage

Understanding The World

The Natural World

Children will:

- 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.
- They will understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Animals including humans					
Pupils should be taught to:					
Y1 Tropical World Ledston Park	Y2 Visit from exotic animals	Y3	Y4	Y5	Y6
identify and ***name*** a variety of common animals including fish, amphibians, reptiles, birds and mammals	***notice*** that animals, including humans, have offspring which grow into adults	***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	***describe*** the simple functions of the basic parts of the digestive system in 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 STEM ambassador
identify and ***name*** a variety of common animals that are carnivores, herbivores and omnivores	***find out*** about and describe the basic needs of animals, including humans, for survival (water, food and air)	***identify*** that humans and some other animals have skeletons and muscles for support, protection and movement.	***identify*** the different types of teeth in humans and their simple functions		***recognise*** the impact of diet, exercise, drugs and lifestyle on the way their bodies function First Aid Course
describe and ***compare*** the structure of a variety of common animals (fish, amphibians, reptiles, birds	***describe*** the importance for humans of exercise, eating the right amounts of		***construct*** and ***interpret*** a variety of food chains, identifying producers, predators and prey		***describe*** the ways in which nutrients and water are transported within animals, including humans.

and mammals, including pets)	different types of food, and hygiene.				
identify, name, draw and ***label*** the basic parts of the human body and say which part of the body is associated with each sense.					

Living things and their habitats					
Pupils should be taught to:					
Y1	Y2 Visit from exotic animals Caterpillar life cycle	Y3	Y4	Y5	Y6
	explore and ***compare*** the differences between things that are living, dead, and things that have never been alive		***recognise*** that living things can be grouped in a variety of ways	***describe*** the differences in the life cycles of a mammal, an amphibian, an insect and a bird	***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
	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		***explore*** and use classification keys to help group, identify and name a variety of living things in their local and wider environment	***describe*** the life process of reproduction in some plants and animals.	***give reasons*** for classifying plants and animals based on specific characteristics.
	identify and ***name*** a variety of plants and animals in their habitats, including microhabitats		***recognise*** that environments can change and that this can sometimes pose dangers to living things.		Owl experience

	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.				

Plants					
Pupils should be taught to:					
Y1 Ledston Park Hirst Wood Myrtle Park	Y2	Y3	Y4	Y5	Y6
identify and ***name*** a variety of common wild and garden plants, including deciduous and evergreen trees	***observe*** and ***describe*** how seeds and bulbs grow into mature plants	***identify*** and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers			
identify and ***describe*** the basic structure of a variety of common flowering plants, including trees.	***find out*** and ***describe*** how plants need water, light and a suitable temperature to grow and stay healthy.	***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.			

Materials					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
distinguish between an object and the material from which it is made	***identify*** and ***compare*** the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses		***compare*** and ***group*** materials together, according to whether they are solids, liquids or gases	***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	

identify and ***name*** a variety of everyday materials, including wood, plastic, glass, metal, water, and rock	***find out how*** the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.		***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)	***know*** that some materials will dissolve in liquid to form a solution, and ***describe how*** to recover a substance from a solution	
describe the simple physical properties of a variety of everyday materials			***identify*** the part played by evaporation and condensation in the water cycle and ***associate*** the rate of evaporation with temperature.	***use knowledge*** of solids, liquids and gases to ***decide how*** mixtures might be separated, including through filtering, sieving and evaporating	
compare and ***group*** together a variety of everyday materials on the basis of their simple physical properties.				***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	

Light					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
		recognise that they need light in order to see things and that dark is the absence of light			***recognise*** that light appears to travel in straight lines
		notice that light is reflected from surfaces			***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

		recognise that light from the sun can be dangerous and that there are ways to protect their eyes			***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
		recognise that shadows are formed when the light from a light source is blocked by an opaque object			***use the idea*** that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
		find patterns in the way that the size of shadows change.			

Rocks (Y3) / Evolution and inheritance (Y6)					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
		compare and ***group*** together different kinds of rocks on the basis of their appearance and simple physical properties			***recognise*** that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
		describe in simple terms how fossils are formed when things that have lived are trapped within rock			***recognise*** that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents

		recognise that soils are made from rocks and organic matter.			***identify*** how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Sound					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
			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.		

Forces and magnets					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
		compare how things move on different surfaces		***explain*** that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	
		notice that some forces need contact between two objects, but magnetic forces can act at a distance		***identify*** the effects of air resistance, water resistance and	

				friction, that act between moving surfaces	
		observe how magnets attract or repel each other and attract some materials and not others		***recognise*** that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	
		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			

Electricity					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
			identify common appliances that run on electricity		***associate*** the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
			construct a simple series electrical circuit, identifying and naming its basic parts,		***compare*** and ***give reasons*** for variations in how components function, including the

			including cells, wires, bulbs, switches and buzzers		brightness of bulbs, the loudness of buzzers and the on/off position of switches
			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		***use*** recognised symbols when ***representing*** a simple circuit in a diagram.
			recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit		Crumble – link with computing
			recognise some common conductors and insulators, and associate metals with being good conductors.		

Seasonal changes					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
observe changes across the four seasons					

observe and ***describe*** weather associated with the seasons and how day length varies.					

Earth and Space					
Pupils should be taught to:					
Y1	Y2	Y3	Y4	Y5	Y6
				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.	

Progression of enquiry skills		
Pupils should be taught to:		
KS1	LKS2	UKS2

Explore the world around them and **raise** their own simple questions	**Raise** their own relevant questions about the world around them	**Use** their scientific experiences to **explore** ideas and raise different kinds of questions
Experience different types of science enquiries, including practical investigations	Should be **given a range of scientific experiences** including different types of science enquiries to answer questions	**Talk** about how scientific ideas have developed over time
Begin to recognise different ways in which they might answer scientific questions	**Start to make their own decisions** about the most appropriate type of scientific enquiry they might use to answer questions	**Select** and **plan** the most appropriate type of scientific enquiry to use to **answer** scientific questions
Carry out simple tests	**Set up** simple practical enquiries, comparative and fair tests **Recognise** when a simple fair test is necessary and help to **decide** how to set it up	**Recognise when** and **how** to set up comparative and fair tests and **explain** which variables need to be controlled and why
Use simple features to **compare** objects, materials and living things and, **with help, decide how** to sort and group them	**Talk** about the criteria for grouping, sorting and classifying; and **use** simple keys	**Use** and **develop** keys and other information records to **identify, classify** and **describe** living things and materials, and **identify** patterns that might be found in the natural environment
Ask people questions and use simple secondary sources to find answers	**Recognise** when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	**Recognise** which secondary sources will be most useful to research their ideas and **begin to separate** opinion from fact
Observe closely using simple equipment / with help, observe changes over time	**Make systematic** changes and careful observations **Help** to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	**Make their own decisions** about what observations to make, what measurements to use and how long to make them for

With ***guidance,*** they should ***begin to notice*** patterns and relationships	***Begin to look*** for naturally occurring patterns and relationships and ***decide*** what data to collect to identify them	***Look*** for different casual relationships in their data and ***identify*** evidence that refutes or supports their ideas
Use simple measurements and equipment (e.g. hand lenses, egg timers) to ***gather*** data	***Take*** accurate measurements using standard units ***Learn how*** to use a range of (new) equipment, such as data loggers / thermometers appropriately	***Choose*** the most appropriate equipment to make measurements with increasing precision and ***explain how*** to use it accurately. Take repeat measurements where appropriate
Record simple data	***Collect*** and ***record*** data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	***Decide how*** to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Use their observations and ideas to ***suggest*** answers to questions and talk about what they have found out and how they found it out	***With help,*** pupils should ***look*** for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	***Identify*** scientific evidence that has been used to support or refute ideas or arguments
With help, they should ***record*** and ***communicate*** their findings in a range of ways and begin to use simple scientific language	***Use*** relevant scientific language to ***discuss*** their ideas and ***communicate*** their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions	***Use*** relevant scientific language and illustrations to ***discuss, communicate*** and ***justify*** their scientific ideas. ***Use*** oral and written forms such as displays and other presentations to report conclusions, casual relationships and explanations of degree of trust in results
	With support, they should ***identify*** new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done	***Use*** their results to make predictions and identify when further observations, comparative and fair tests might be needed

Working scientifically

Pupils should be taught to:		
KS1	LKS2	UKS2
asking simple questions and recognising that they can be answered in different ways	***asking*** relevant questions and using different types of scientific enquiries to answer them	***planning*** different types of scientific enquiries to ***answer*** questions, including ***recognising*** and ***controlling*** variables where necessary
observing closely, using simple equipment	***making*** systematic and careful observations and, where appropriate, ***taking*** accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	***taking*** measurements, ***using*** a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
performing simple tests	***setting up*** simple practical enquiries, comparative and fair tests	***using*** test results to make predictions to set up further comparative and fair tests
identifying and ***classifying***	***gathering, recording, classifying*** and ***presenting*** data in a variety of ways to help in answering questions	
using their observations and ideas to ***suggest*** answers to questions	***reporting*** on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	
gathering and ***recording*** data to help in answering questions	***using*** results to ***draw simple conclusions, make*** predictions for new values, suggest improvements and raise further questions	***reporting*** and ***presenting*** findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
	recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	***recording*** data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
	identifying differences, similarities or changes related to simple scientific ideas and processes	
	using straight forward scientific evidence to ***answer*** questions or to support their findings.	***identifying*** scientific evidence that has been used to support or refute ideas or arguments