St. Thomas' CE Core Science Knowledge Overview

Year Group	Core Knowledge and Skills	Assessment Outcome
Nursery **Key Knowledge** 	**All About Me/ My body** To name basic body parts To learn basic hygiene To learn about oral health To know how to keep your bodies healthy through healthy food choices and exercise. **Sensational Seasons** To know that there are four seasons and describe the main changes. To know that some materials can be changed (e.g. melting a solid to a liquid). To know that plants decay in the winter. **Journeys and where I live** To understand a push and pull To know that materials can be grouped and sorted for recycling To know pollution harms our environment **Beyond my street** To recognise different materials To know materials are used for different purposes To describe materials **Growing and changing/ mini beasts and Habitats** To know that plants need water and sunlight to grow. To name parts of a plant: stem, roots and leaves. To know that a life cycle is a series of stages a living thing goes through during its life. To know that a habitat is an animal's home.	
Development matters statements 	**The most relevant statements for science are taken from the Understanding the world area of learning:** Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Explore how things work. 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. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice	
Reception **Key Knowledge**	**All About Me/ My body** To name basic body parts	Early Learning Goals

Jesus said, 'Come follow me, live your lives the way God wants you to.'

	To learn basic hygiene To learn about oral health To know how to keep your bodies healthy through healthy food choices and exercise. **Sensational Seasons** To know that there are four seasons and describe the main changes. To know that some materials can be changed (e.g. melting a solid to a liquid). To know that plants decay in the winter. **Journeys and where I live** To understand a push and pull To know that materials can be grouped and sorted for recycling To know pollution harms our environment **Beyond my street** To recognise different materials To know materials are used for different purposes To describe materials **Growing and changing/ mini beasts and Habitats** To know that plants need water and sunlight to grow. To name parts of a plant: stem, roots and leaves. To know that a life cycle is a series of stages a living thing goes through during its life. To know that a habitat is an animal's home.	Understanding the World – Children at the expected level of development 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. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.
Development matters statements 	**The most relevant statements for science are taken from the Understanding the world area of learning:** Explore the natural world around them. Describe what they see, hear and feel while they are outside. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them.	**Working Scientifically in EYFS** -asking simple questions -observing closely, using simple equipment -performing simple tests -identifying and classifying -talking about their observations -to make own recordings

Year One 		
	The Human Body To know that our bodies have five senses. To know that we use our eyes to see. To know that sounds travel through our ears to send messages to our brain. To know that our senses help us to understand the world around us. To understand that some people have problems with their senses, such as blindness or deafness. **To know that our five senses help us to understand the world around us.**	I know my senses help me to be aware of the world around me.
	Animals and their Needs To name and describe common animals. To know that scientists group animals according to their features. To understand that we can group animals according to what they eat. To describe the needs of a pet. To describe an animal using scientific words. **To know that scientists group animals according to their features.**	To understand what an animal is and how animals can be grouped
	Seasons and Weather To name and describe the four seasons in detail. To know that tools are used to gather information about the weather. To present data using a graph. To know there are different types of cloud. To understand that weather forecasts help people to prepare for different kinds of weather. To understand that certain types of weather can be dangerous. **To name and describe the four seasons in detail using gathered data.**	To understand and describe the four seasons, and how to gather data about weather
	Taking Care of the Earth To describe different ways we can take care of the Earth. To know that there are natural and manufactured resources that people on earth use. To identify logging as a way of harvesting the Earth's natural resources.	To describe different ways we can take care of the Earth.

	To know that people create pollution which can harm the environment. To know that recycling means turning used things into something new. **To describe different ways we can take care of the Earth's resources and reduce harm to the environment.**	
	<u>Plants</u> To know what plants, need in order to grow To name and describe the purpose of parts of a plant To understand that plants spread their seeds to reproduce. To understand that some trees are evergreen, and some are deciduous. To understand that plants are grown for food and to recognise which parts of plants we eat. **To name and describe the parts of plants and evergreen/ deciduous trees including their purpose.**	To describe some common plants, including trees
	<u>Materials and Magnets</u> To recognise everyday materials. To identify the properties of materials. To explain why materials are chosen for specific tasks. To understand that materials can be sorted according to whether they are or are not attracted to magnets. To investigate which material would be most suitable for (insert purpose). **To recognise and identify properties of materials including magnets.**	I know the properties of some materials and some facts about magnets
<u>Year Two</u>	<u>The Human Body</u> To know that animals including humans, need air, food and water to survive. To know that our skeleton and our muscles help us to move. To know that sounds travel through our ears to send messages to our brain. To know that our heart pumps blood around our body.	I can collect data to answer this question: Is Year 2 a healthy class?

	To understand that scientists have found ways to keep us healthy. **To know how humans and animals stay healthy.**	
	<u>Living Things in their Environments</u> To know the differences between living, dead and never been alive. To know that a habitat is the name given to a place where plants or animals live. To describe rainforests are hot and moist and deserts as dry and hot or cold. To know that each habitat has plants and animals adapted to survive. To name and describe animals who live in underground habitats. To that a food chain describes 'who eats what' within a habitat. **To know that each habitat has plants and animals adapted to survive in a particular environment.**	To know what a habitat is, and give examples of different habitats and how animals and plants are adapted to living in them
	<u>Electricity</u> To identify things that use electricity. To know that electricity is useful, but it can also be very dangerous. To construct an electrical circuit. To identify materials that conduct electricity. **To know how to keep safe with electrical appliances.** **To name electrical components and create a simple circuit for a purpose.**	Pupils should be able to identify electrical appliances, explain how to ensure we are using electricity safely, how to make a simple circuit and to identify electrical conductors and insulators.
	<u>Plants</u> To know there are many different kinds of plants. To know seeds and bulbs grow into mature plants. To know healthy plants need light and water to grow. To understand that plants are grown for food. **To know seeds and bulbs grow into different kinds of mature plants with food, water and light.**	Describe how seeds and bulbs grow into mature plants.

	Materials and Matter To know that materials have specific uses based on their properties. To know that inventors think carefully about materials and their properties. To know that scientists use microscopes to see very small things around us. To know that the shapes of solid objects made from some materials can be changed To understand that water can be a solid and can also be a liquid. **To know that materials have specific uses based on their properties.**	To be able to describe different materials and their properties.
	Astronomy To know there are eight planets in our solar system. To know that Earth travels around the sun. To know that the moon orbits the earth. To know that groups of stars are called constellations. Scientists, including astronomers, learn from each other to make new discoveries about space. **To name the eight planets in our solar system and understand the role of the moon and Sun.**	To show understanding of our Solar System.
	**Working Scientifically at Key Stage One** Explore the world around them and raise their own simple questions Experience different types of science enquiries, including practical activities Begin to recognise different ways in which they might answer scientific questions Carry out simple tests Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying) Ask people questions and use simple secondary sources to find answers Observe closely using simple equipment with help, observe changes over time With guidance, they should begin to notice patterns and relationships	.

	Use simple measurements and equipment (e.g. hand lenses, eggtimers) to gather data Record simple data Use their observations and ideas to suggest answers to questions Talk about what they have found out and how they found it out With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language	
Year Three 	**The Human Body-** To know that we can control our voluntary muscles, but we do not control our involuntary muscles. To know that our bones help us to move and protect some parts of our bodies. To know that the brain is the centre of the nervous system. To understand how the brain and mouth start the digestive process. To describe the simple functions of the basic parts digestive system in humans. **To name all four systems in the human body and describe one in detail.**	To be able to describe one of the many systems in our body.
	Cycles in Nature To know that our natural environment changes as the seasons change. To understand how plants can change through the seasons. To know that plants grow, live and reproduce. To know that some animals migrate. To recognise the different stages in the life cycle of a frog. **To name the three cycles in nature including; seasons and life cycles of plants and animals.**	To understand that there are cycles in nature
	Light To understand that we need light in order to see things. To know that transparent materials let light through and opaque materials block light from passing through. Mirrors can reflect light in different ways depending on their shape. Our shadows change size throughout the day.	To know that light is essential for life on earth.

	To understand that we need light in order to see things.	
	Plants To know flowering plants all have roots, a stem or trunk, leaves and flowers but not all flowering plants look the same. To know that different plants need different things in order to thrive. To know that water moves from the roots of a plant, upwards via the stem. To know that pollination is needed for flowering plants to reproduce. To understand that plants spread their seeds in many different ways to reproduce. **To understand that flowering plants spread their seeds in many different ways to reproduce.**	Flowering plants are living things that reproduce.
	Rocks To know there are many different types of rocks. To know that geologists sort rocks into three main groups. To understand that some rocks allow water to pass through, but others do not To know that some rocks contain fossils which can tell us about life millions of years ago **To name different types of rocks.** **To know that some rocks contain fossils which can tell us about life millions of years ago**	To explain rocks and what they can tell us about our planet.
	Forces and Magnets To know a force is a push or a pull. To know that friction is the force between two surfaces. To understand that magnets have an invisible push or pull force.	To be able to explain that we cannot see forces, but we can see

	To know that magnets have poles and a magnetic field. To know that magnetic forces are not all the same strength. **To know what a force is.**	the impact they have, using examples of gravity, friction and magnetism.
Year Four 	<u>The Human Body</u> To know that cells are the building blocks of the human body and we need nutrition to keep our bodies working as they should. To identify the different types of teeth in humans and their simple functions. To know how food is digested and excreted. To know a healthy diet keeps our bodies healthy. To understand the essential vitamins and minerals needed in our body. **To know how food is digested and excreted.** **To know a healthy diet keeps our bodies healthy.**	To design a balanced meal or explain digestion
	<u>Classification of Plants and Animals</u> To understand that we can classify animals and plants To know that fish and amphibians are vertebrates To know some of the key features of reptiles, birds and mammals To understand and describe some key features of insects, arachnids and molluscs To know that plants can be classified into two main groups: flowering and non-flowering plants **To understand that we can classify animals and plants according to their characteristics.** **To know that plants can be classified into two main groups: flowering and non-flowering plants.**	To understand that plants and animals can be classified according to characteristics
	<u>Ecology</u> To know that living things depend on their habitat. To understand that living things are linked within a food chain. To know that living things depend on each other in an ecosystem. To understand that air pollution is a human threat to the environment.	To show my knowledge and understanding of ecology.

	To know how humans have changed the environment in our local area.	
	Sound To understand how sound is produced and how it travels To know sound travels through the air. To know the difference between pitch and volume. To understand how the human voice makes different sounds. Vibrations in sound waves travel through the different parts of the ear **To understand how sound is produced and how it travels.**	To show my knowledge and understanding of sound.
	States of Matter and the Water Cycle -To know that there are three main states of matter: solid, liquid and gas. -To know that evaporation occurs when water turns into gas. -To know that condensation occurs when water vapour turns into liquid water. (gas into water) -To know that precipitation returns water to the surface of the Earth. -To know how water changes state within the water cycle. **To know how water changes state within the water cycle.**	To know that water changes state within the water cycle.
	Electricity To know that electricity is useful, but it can also be very dangerous. To construct an electrical circuit Switches open and close a circuit. To know that the lightbulb was a very important invention. To identify materials that conduct electricity **To construct an electrical circuit using components.**	To know that electricity flows around a circuit and can make components, such as a light bulb, work

	**Working Scientifically at Lower Key Stage Two** *Raise their own relevant questions about the world around them* *Should be given a range of scientific experiences including different types of science enquiries to answer questions* *Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions* *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* *Talk about criteria for grouping, sorting and classifying; and use simple keys* *Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations* *Make systematic and careful observations* *Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used* *Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them* *Take accurate measurements using standard units* *learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately* *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* *With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions* *Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions* *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.*	

Year Five		
	**The Human Body** To understand that the heart is formed of two sets of chambers. To understand that blood vessels transport blood around the body. To understand that blood is made up of different components. To understand how the heart rate can speed up or slow down depending upon what the body is doing. To know there are many things that can be varied and changed in an experiment, we call the things we can change variables. **To understand that the heart pumps blood around the body to gain oxygen, via blood vessels.**	To understand that the blood circulates throughout the body, gaining oxygen in the lungs and that it is the heart that pumps the blood around
	Materials To understand that materials can be grouped according to their properties and to know the definitions of some properties. To know that thermal conductivity means heat can be transferred through a material. To understand that a solution is a mixture of a solid in a liquid where the solid has broken into parts too small to see. To know methods for separating mixtures including solutions. To understand that all changes are either reversible or irreversible and be able to distinguish between them. **To understand that materials can be grouped according to their properties and to know the definitions of some properties, such as solubility.** **To understand that all changes are either reversible or irreversible and be able to distinguish between them.**	To understand that materials have properties that include solubility. To know how to separate mixtures and that changes are reversible or irreversible
	Living Things To recognise how plants and animals in our local area change throughout the year. Mammals and Amphibians have different life cycles. Insects and Birds have different life cycles. To know that flowering plants need pollen to reproduce. To know that Jane Goodall and David Attenborough have dedicated their lives to studying the natural world and communicating their findings.	Living things grow and reproduce in a continuing cycle of life.

	To recognise how all living things change throughout the year because of continuing life cycles.	
	Forces To know a force is either a push or a pull. To know that friction occurs when two objects move against each other. To understand that objects with a large surface area will have greater air resistance than objects with a small surface area. Pupils carry out an appropriate scientific enquiry as planned last lesson to answer this question: How does surface area affect speed of fall in air (or water)? To understand that simple machines help us to increase the force we apply to an object to help us move it. **To know a force is either a push or a pull.**	Children can explain how forces work using diagrams to show their understanding.
	Astronomy To know that astronomers believe the universe began with the Big Bang, and that it is still expanding today To understand that gravity is a force that holds objects together To know the planets of our Solar System To understand the Moon's phases To understand that the Solar System is just a small part of our universe **To know the planets of our Solar System.** **To understand the Moon's phases.**	To demonstrate knowledge of astronomy.
	Meteorology To know the atmosphere protects Earth and enables life To know that human actions can impact the Earth's atmosphere To know that the UK experiences six air masses affecting the weather	I can write a detailed weather report

	To know a weather front is a boundary where warm and cold air meet To know thunder and lightning is caused by electrical charge moving through the air. **To know the atmosphere protects Earth and human actions can positively and negatively impact this.** **To know the UK experiences 6 air masses affecting the weather.** **To know thunder and lightning is caused by electrical charge moving through the air.**	
Year Six 	**Classification of Living Things** To know there are five kingdoms of organisms. To know that a plant and animal cells are different. To know that taxonomy is used to show organisms are related to each other. To know that vertebrates are classified into give groups: fish, amphibians, reptiles, mammals and birds. To understand that scientists divide invertebrates into groups including insects, arachnids and molluscs. **To name the five animal kingdoms of organisims.** **To recognise, name and label a plant and animal cell.** **To know that scientists divide and classify vertebrates into 5 main groups: fish, amphibians, reptiles, mammals and birds and invertebrates into groups including insects, arachnids and molluscs.**	To be able to classify animals based on specific characteristics and give reasons.
	Electricity To know that electricity flows in a circuit. To understand how the brightness of a lamp or the volume of a buzzer depends on the number and voltage of cells used in a circuit. To know that switches control the flow of electricity in a circuit. To know that circuits can be used to make electrical toys.	Independently design and make a circuit for a purpose

	To know the purpose of a circuit and components within a circuit.	
	Light To know that light is a source of illumination that allows us to see. To know that light enters our eyes, allowing us to see. To test the hypothesis that shadows are always the same shape as the object that made them. To understand what light is made of and how a prism works. To know a periscope uses mirrors to reflect an image of something out of sight. **To understand how we see luminous and illuminous objects.** **To describe what light is made of and how a prism works.** **To label and describe parts of the eye and their purpose.**	To understand how light behaves.
	Evolution- To know fossils are physical evidence of life from long ago. To know offspring are usually similar to, but not identical to their parents. To know living things can adapt to suit their environment. To know who Charles Darwin was and what natural selection is. To know who Alfred Wallace was and understand his contribution to the theory of evolution **To understand fossils are physical evidence of life from long ago.** **To know living things can adapt to suit their environment.** **To know Charles Darwin's theory of evolution and natural selection.**	
	Reproduction- To know that asexual reproduction does not require male and female cells. To understand sexual reproduction in flowering plants. To know that many plants clothe their seeds with fruit. To understand sexual reproduction in animals. To know that different animals have different growth stages.	To know how plants and animals reproduce.

	To name the sexual reproductive parts of flowering plants and the process. **To know the different growth stages of animals.**	
	**Working Scientifically at Upper Key Stage Two** *Use their science experiences to explore ideas and raise different kinds of questions* *Talk about how scientific ideas have developed over time* *Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions* *Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why* *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* *Recognise which secondary sources will be most useful to re-search their ideas and begin to separate opinion from fact* *Make their own decisions about what observations to make, what measurements to use and how long to make them for* *Look for different causal relationships in their data and identify evidence that refutes or supports their ideas* *Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.* *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* *Identify scientific evidence that has been used to support or refute ideas or arguments* *Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results* *Use their results to make predictions and identify when further observations, comparative and fair tests might be needed*	