

Temple Ewell Church of England Primary School

Science Policy 2020

But God made the earth by his power; he founded the world by his wisdom and stretched out the heavens by his understanding (Jeremiah 10:12)

1. Subject statement

Intent

The 2014 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 skills required to understand the uses and implications of science, today and for the future.

Science changes our lives every day and is vital for the world's future prosperity and survival. At Temple Ewell we want to encourage scientific thinking through teaching and learning. Our children will be inspired, in a safe environment, to be inquisitive as to develop a sense of excitement and curiosity about our universe and promote a respect for the living and non-living. Through the curriculum, the children will acquire and develop scientific knowledge and concepts. We ensure that our programme of study has a skill-based focus so scientific inquiry skills are built-on and developed throughout a child's time at our school. Children will leave our school with scientific thinking and inquiry skills that will allow them to apply them to many other subjects and allow them to be successful with all their future learning.

Implementation

Our teachers create a nurturing attitude to science learning in their classrooms and reinforce expectations that all pupils are capable of achieving high standards in science. Our whole school approach to teaching and learning involves the following:

- Science Big Ideas will be planned and arranged across the classes in a two year cycle. This strategy enables the achievement of a greater depth of knowledge and skill development.
- Through our planning, we include big questions that allow children to apply their knowledge, and find out answers for themselves. Children are encouraged to use their reasoning skills to ask relevant questions and be given opportunities to use their scientific skills to discover an answer. Teachers scaffold children's learning with precise questioning and scientific resources to aid learning and understanding of scientific concepts enabling all children to succeed.
- We build upon the knowledge and skill development of the previous years. As the children's scientific skills and understanding increases, and become more proficient in building links and comparing ideas, they become increasingly confident to draw 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 inquiry based teaching in keeping with the Big Ideas.
- Teachers demonstrate various working scientifically skills in order to embed scientific understanding and find opportunities to develop children's understanding of their surroundings by accessing outdoor learning.
- Children are offered a wide range of extra-curricular activities, visits and trips to complement and broaden the curriculum. These are purposeful and link with the Big Idea being taught in class.
- Regular activities, such as themed Science Weeks, expert led workshops, visitors, opportunities to compete in National and Local STEM competitions and take part in local research programs, all provide broader enrichment to the curriculum and the acquisition and application of knowledge and skills.

Impact

The Big Ideas and scientific skills focused approach at Temple Ewell results in a fun, engaging, high-quality science education, that provides children with the foundations and skills to carry them through the whole of their education. Our children are excited by science and are well versed on the Big Ideas, investigations or events they have experienced throughout their time at Temple Ewell. They are able to apply their knowledge to make links across subjects and to question what they see or hear in the world around them. They understand that science has changed our lives and that the continuing changes in science can impact our lives' now and in the future. Children learn that science is seen in many different guises and there are many possibilities for STEM careers with access to positive role models from various backgrounds. Our children overwhelmingly enjoy science and this results in motivated learners with sound scientific understanding ready for the next stages of their learning.

2. Teaching and Learning

The principle focus for teaching and learning at Temple Ewell is to broaden our children's scientific view of the world around them by looking closely at the natural and man-made phenomena. This enables their understanding and natural curiosity to build and deepen throughout their primary school career, so when they leave our school they can recognise links and apply their knowledge to all aspects of their learning. They will be confident, independent and motivated learners. We will do this by:

- A **Big Idea question** is the centre of each lesson enabling all children to apply their 'working scientifically skills' and discover the answers together.
- Children have a range of purposeful **engaging activities** to deepen their understanding.
- Children are encouraged to **learn collaboratively** with others, **experiencing** differing roles.
- Children are given opportunities to ask their own questions explore, perform investigative practical work and solve problems.
- **Planning** involves creating engaging lessons where **curiosity is celebrated** in a positive environment.
- Teachers use precise questioning to test conceptual knowledge and skills enabling the **inclusion of all children**.

- New vocabulary and challenging concepts are introduced through direct teaching and revisited regularly to **embed knowledge and understanding**.
- Working scientifically skills are identified and integrated into lessons to ensure these skills are being **developed across the key stages**.
- Big ideas have been carefully mapped across each year group and through the school to ensure key knowledge for each idea and skills are **developed and built upon**.
- Teachers find opportunities to develop children's understanding by accessing outdoor learning, visit and trips or introduce the children to experts.

3. Assessment

Children's progress is continually monitored throughout their time at Temple Ewell school and is used to inform teaching and learning. By the end of each key stage children are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum.

Children receive effective feedback through teacher assessment in line with schools marking policy. Assessment for learning is continuous throughout the planning, teaching and learning cycle using:

- Observations of the children at work, individually, in pairs, in a group and in class
- Questioning, talking and listening to children.
- Considering their 'Working Scientific Skills' and how they can apply those skills with in the topic.

At the end of each Big Idea the children's key knowledge is mapped within their year group, along with skills used during the topic to ensure progression. Outcomes of work also evidence children's levels of acquisition.

4. Planning and Resources

Planning is a process in which all teachers are involved. At Temple Ewell all teachers use the Big Ideas and Working Scientific skills as the focus for all lessons. Teachers have access to the Kent Scheme of Work for Primary Science to inform their planning and are also able to source further support and resource, in line with national pedagogy, from the National Stem Centre.

We have a sufficient range of science resources to aid and support the teaching of all Big Ideas taught. These are kept in a central store area in the school where they are labelled and easily accessible to all staff.

5. Organisation

Science will be arranged, planned and taught in Big Ideas over a two year rolling programme due to the mixed age class organisation of our school. Each Big Idea is mapped across a child's school career so knowledge and skills are built on and revisited to embed concepts and deepen understanding.

Big Ideas	Acorns	Willows	Eims	Sycamores	Oaks
Materials and Matter	<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 	<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 	<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. 	<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. 	<ul style="list-style-type: none"> compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets understand 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
	<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. 	<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 	<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 micro-habitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. 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. 	<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 explore and use classification keys to help group, identify and name a variety of living things in the local and wider environment recognise that living things can be grouped in a variety of ways recognise that environments can change and that this can sometimes pose dangers to living things. describe the changes as humans develop from birth to old age 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. 	<ul style="list-style-type: none"> identify and name the main parts of the human circulatory system, and explain 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. 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.
Animals and Humans	<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. 	<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 animals have skeletons and muscles for support, protection and movement. 			
Earth systems	<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. 	<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. 	<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. 	<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. 	<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.
Plants and living things	<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. 	<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. 	<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. 		<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

	<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 micro-habitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. 	<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. 	<ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 		<ul style="list-style-type: none"> give reasons for classifying plants and animals based on specific characteristics
Forces			<ul style="list-style-type: none"> 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. compare how things move on different surfaces 	<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 gears, pulleys and levers, allow a smaller force to have a greater effect. 	<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 gears, pulleys and levers, allow a smaller force to have a greater effect.
Energy				<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 	<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.
Light and Sound			<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by a solid object notice that light is reflected from surfaces find patterns in the way that the size of shadows change. 	<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. understand that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the 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. 	<ul style="list-style-type: none"> understand that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the 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. 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.
Cycle A					
Cycle B					
Both Cycles					

6. EYFS

The Foundation Stage deliver science content through the 'Understanding of the World' strand of the EYFS curriculum. This involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment.

7. Equal Opportunities and Inclusion (eg EAL/SEN/PPG/HA)

At Temple Ewell Primary School we are committed to providing all children with an equal entitlement to scientific activities and opportunities regardless of race, gender, culture or class. In our school we aim to meet the need of all our children by providing a variety of approaches to scaffold learning, enabling all to achieve. Teachers use the school's inclusion policy to ensure that a range of strategies are used which includes and motivates all learners, ensuring that optimum progress is made throughout the lesson.

8. Role of Subject Leader

It is the responsibility of the subject lead to monitor the standards of the children's learning. Evidence of outstanding science includes:

- Book show progression of knowledge and 'Working Scientifically skills' are progressing.
- Lessons are planned according to skills appropriate to Key Stage to develop active learning.
- Conferencing with children proves children are excited and motivated by the subject.
- Children are given opportunities to experience trips or visitors to deepen scientific understanding.

The subject leader is also responsible for: supporting colleagues in their teaching; for being informed about current developments in the subject and for providing a strategic lead and direction for science in the school. The subject leader monitors the budget, resources science topics and supports the booking of trips and workshops. The subject leader has specially-allocated time for fulfilling the task of monitoring, training, liaising with other subject leaders from other schools and organising science week.