



Courthouse Green Primary School

'Doing our best to be our best'



Science Overview

Science stimulates pupil's curiosity, develops their sense of enquiry and their understanding of the world around them. Children learn to work as scientists, planning and undertaking practical investigations on their own and with others.

At Early Years Foundation Stage, activities are planned in relation to the "Understanding the World" area of the foundation stage curriculum. Children's progress and achievements are assessed against the Early Learning Goals at the end of reception.

In Key Stages 1 and 2 the science curriculum is planned through cross curricular topics and specific science lessons. Science planning follows our scheme of work which ensures that the essential skills are met within each phase. Children complete at least 2 science investigations per half term.

Wherever possible, links are made between other subject areas including literacy, maths, ICT and Geography. The relevant essential science skills are covered through the topic areas taught. In Key Stage 1 pupils begin to explore, collect and evaluate evidence and communicate their findings through the use of scientific language, drawings, charts and photographs. At Key Stage 2 pupils plan and carry out their own investigations and apply their scientific knowledge to real life problems and discuss the most appropriate way to communicate their ideas.

Year group	Topic area	Science Focus for the year linked to themes	Science investigations
1	PLANTS	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ℳ Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. ℳ Identify and describe the basic structure of a variety of common flowering plants, including trees. 	<p>Are all leaves the same? How do leaves change? Do pine cones know it's raining? What's in a bud?</p>
1	ANIMALS/ HUMANS	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ℳ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. ℳ Recognise that humans are animals. ℳ Compare and describe differences in their own features (eye, hair, skin colour, etc.). ℳ Recognise that humans have many similarities. 	<p>Can you leap like a frog? What can our hands do? What is camouflage for? Why do we have teeth? Why do we have two eyes? What can you remember? How does it move?</p>
1	ANIMALS	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ℳ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. ℳ Identify and name a variety of common animals that are carnivores, herbivores and omnivores. ℳ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets). ℳ Find out and describe how animals look different to one another. ℳ Group together animals according to their different features. ℳ Recognise similarities between animals: - Structure: head, body, way of moving, senses, body covering, tail. ℳ Animals have senses to explore the world around them and to help them to survive. ℳ Recognise that animals need to be treated with care and sensitivity to keep them alive and healthy. ℳ Animals are alive; they move, feed, grow, use their senses and reproduce. 	<p>What can worms sense? Whose poo?</p>
1	MATERIALS	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ℳ Distinguish between an object and the material from which it is made. ℳ Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. ℳ Describe the simple physical properties of a variety of everyday materials. ℳ Compare and group together a variety of everyday materials on the basis of their simple physical properties. 	<p>Can you be a superhero? How does it feel? What keeps us dry? What makes the loudest sound? How do you make bread?</p>
1	LIGHT AND ASTRONOMY – SEASONAL CHANGE	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ℳ Observe changes across the four seasons. ℳ Observe and describe weather associated with the seasons and how day length varies. 	<p>How wild is the wind? Does it snow in the summer? How big is a raindrop?</p>

Working scientifically: How do you make bread? How does it move? What can you remember?			
2	Environment - Living things and their habitats	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Explore and compare the differences between things that are living, dead, and things that have never been alive. β 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. β Identify and name a variety of plants and animals in their habitats, including microhabitats. β 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. β Different kinds of plants and animals live in different kinds of places. β There are different kinds of habitat near school which need to be cared for β Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples). 	<p>How many arms does an octopus have? Where do snails live? Where do worms like to live? Will it degrade?</p>
2	Animals - Animal survival and growth	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Notice that animals, have offspring which grow into adults. β Find out about and describe the basic needs of animals, for survival (water, food and air). 	<p>What is the life cycle of the ladybird? Do insects have a favourite colour? Do snails have noses?</p>
2	Health – How we grow and stay healthy	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Notice that humans, have offspring which grow into adults. β Find out about and describe the basic needs of humans, for survival (water, food and air). β Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. β Medicines can be useful when we are ill. β Medicines can be harmful if not used properly. 	<p>How do germs spread? Why should I exercise?</p>
2	Plants – Plant growth)	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Observe and describe how seeds and bulbs grow into mature plants β Find out and describe how plants need water, light and a suitable temperature to grow and stay 	<p>Can seeds grow anywhere? How does grass grow? How do plants grow in</p>

healthy.

β Plants are living and eventually die

winter?

What's on your wellies?

<p>2</p> <p>How do people celebrate?</p>	<p>Material Properties – Uses of Materials)</p>	<p>Pupils should be taught to:</p> <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 ℞ Some materials can be found naturally; others have to be made 	<p>Can you make a paper bridge?</p> <p>Can water make music?</p> <p>How is mud made?</p> <p>What shape is a bubble?</p> <p>Do all balls bounce?</p> <p>What stuff is stickier?</p> <p>Why do boats float?</p>
<p>Working scientifically:</p> <p>Can you find the treasure?</p>			
<p>3</p>	<p>Plants – Functions of Parts of a Plant)</p> <p>Health - Health/Nutrition)</p>	<p>Pupils should be taught to:</p> <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. ℞ Roots grow downwards and anchor the plant. ℞ Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit. ℞ Nutrients (not food) are taken in through the roots. ℞ Stems provide support and enable the plant to grow towards the light. ℞ Plants make their own food in the leaves using energy from the sun. ℞ Flowers attract insects to aid pollination. ℞ Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind. ℞ Fertilisation occurs in the ovary of the flower. ℞ Seeds are formed as a result of fertilisation. ℞ Many flowers produce fruits which protect the seed and/or aid seed dispersal. ℞ Seed dispersal, by a variety of methods, helps ensure that new plants survive. ℞ Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added 	<p>Are mushrooms deadly?</p> <p>Do plants have legs?</p> <p>What are flowers for?</p> <p>Why are trees tall?</p> <p>Which is the juiciest fruit?</p>

		to soil).	
3	Animals - Skeletons and Movement	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β 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. β An adequate and varied diet is beneficial to health (along with a good supply of air and clean water). β Regular and varied exercise <i>from a variety of different activities</i> is beneficial to health (focus on <i>energy in versus energy out</i>. Include information on making informed choices). 	<p>How do worms move? What are joints for?</p>
3	Material Properties - Rocks)	<ul style="list-style-type: none"> β Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. β Describe in simple terms how fossils are formed when things that have lived are trapped within rock. β Recognise that soils are made from rocks and organic matter. β Rocks and soils can feel and look different. β Rocks and soils can be different in different places/environments. 	<p>How do fossils form? What is soil? What is sand?</p>
<p>Working scientifically: How fast does water flow? Is it safe to eat? What are sunglasses for? What do owls eat? Why do cat's eyes glow at night?</p>			
4	Light and Astronomy - Light, reflections and shadows)	<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <ul style="list-style-type: none"> β Notice that light is reflected from surfaces. β Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. β Recognise that shadows are formed when the light from a light source is blocked by a solid object. 	<p>How can we change sound? Why do shadows change? (year3)</p>

		<ul style="list-style-type: none"> β Find patterns in the way that the size of shadows change 	
4	Forces – Non contact forces)	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Compare how some things move on different surfaces. β Notice that some forces need contact between two objects but magnetic forces can act at a distance. β Observe how magnets attract or repel each other and attract some materials and not others. β 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. β Describe magnets as having two poles. β Predict whether two magnets will attract or repel each other, depending on which poles are facing. 	<p>How mighty are magnets? Why do magnets attract and repel? (year3) What does friction do? (year3) Why did Icarus fall from the sky? Can you block magnetism?</p>
4	Environment – Living things and their habitats)	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Recognise that living things can be grouped in a variety of ways. β Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. β Recognise that environments can change and that this can sometimes pose dangers to living things. β Use and make identification keys for plants and animals. 	<p>Are all sea creatures the same? Can worms sense danger?</p>
4	Animals – Teeth, Eating and Digestion)	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Describe the simple functions of the basic parts of the digestive system in humans. β Identify the different types of teeth in humans and their simple functions. β Construct and interpret a variety of food chains, identifying producers, predators and prey. β Describe how teeth and gums have to be cared for in order to keep them healthy. 	<p>What do squirrels eat? What is spit for?</p>
4	Material Properties and Changes – States of Matter)	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Compare and group materials together, according to whether they are solids, liquids or gases. β 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). 	<p>Are all liquids runny? Is custard a liquid? Where does water go? Why does it flood?</p>

		<ul style="list-style-type: none"> β Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. β Solids, liquids and gases can be identified by their observable properties. β Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action). β Liquids can pour and take the shape of the container in which they are put. β Liquids form a pool not a pile. β Solids in the form of powders can pour as if they were liquids but make a pile not a pool. β Gases fill the container in which they are put. β Gases escape from an unsealed container. β Gases can be made smaller by squeezing/pressure. β Liquids and gases can flow. 	
4.	Sound	<p>Pupils should be taught to:</p> <p>Vibrations</p> <ul style="list-style-type: none"> β Identify how sounds are made, associating some of them with something vibrating. β Recognise that vibrations from sounds travel through a medium to the ear. β Find patterns between the volume of a sound and the strength of the vibrations that produced it. β Recognise that sounds get fainter as the distance from the sound source increases. β Sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body). β Sounds travel away from their source in all directions. β Vibrations may not always be visible to the naked eye. <p>Pitch</p> <ul style="list-style-type: none"> β Find patterns between the pitch of a sound and features of the object that produced it. β Sounds can be high or low pitched. β The pitch of a sound can be altered. β Pitch can be altered either by changing the material, tension, thickness or length of 	<p>Can we block sound? How far can sound travel?</p>

		<p>vibrating objects or changing the length of a vibrating air column.</p> <p>Muffling/blocking sounds</p> <ul style="list-style-type: none"> β Recognise that vibrations from sounds travel through a medium to the ear. β Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase). β Sounds can travel through solids, liquids and air/gas by making the materials vibrate. β Sound travel can be reduced by changing the material that the vibrations travel through. β Sound travel can be blocked. 	
4	Electricity	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Identify common appliances that run on electricity. β Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. β 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. β Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. β Recognise some common conductors and insulators, and associate metals with being good conductors. β Electricity can be dangerous. β Electricity sources can be mains or battery. β Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work. β Faults in circuits can be found by methodically testing connections. β Drawings, photographs and diagrams can be used to represent circuits (although standard symbols need not be introduced until UKS2). 	<p>Can you make a circuit from playdough? How do plugs work? What conducts electricity?</p>

Working scientifically:

- How does pollution affect habitats?
- How do smells get up your nose?
- How does toothpaste protect your teeth?
- How far can an arrow travel?

What are catapults for?			
5	Environment - Observing Life cycles	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. β Describe the life process of reproduction in some plants and animals. 	<p>What is the life cycle of a meal worm? How do worms reproduce? Why do birds lay eggs?</p>
5	Material Properties – Testing Material Properties	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β 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. β Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. β Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity). <p>Temperature and Thermal Insulation</p> <ul style="list-style-type: none"> β Heat always moves from hot to cold. β Some materials (insulators) are better at slowing down the movement of heat than others. β Objects/liquids will warm up or cool down until they reach the temperature of their surroundings. 	<p>Which materials conduct heat? Do all solids dissolve?</p>
5	Material Changes - Reversible changes	<p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <ul style="list-style-type: none"> β Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. β Demonstrate that dissolving, mixing and changes of state are reversible changes. β Changes can occur when different materials are mixed. β Some material changes can be reversed and some cannot. β Recognise that dissolving is a reversible change. β Distinguish between melting and dissolving. 	

		<ul style="list-style-type: none"> β Mixtures of solids (of different particle size) can be separated by sieving. β Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (undissolved). β Evaporation helps us separate soluble materials from water. β Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed). β Freezing, melting and boiling changes can be reversed (revision from YR4). 	
	Animals - Human Life Cycles	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Describe the changes as humans develop to old age. β Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. 	Do we slow down as we get older?
	Earth and Space Light and Astronomy –	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. β Describe the movement of the Moon relative to the Earth. β Describe Sun/Earth/Moon as approximately spherical bodies. β Use the idea of the Earth's rotation to explain day and night. β The Earth spins once around its own axis in 24 hours, giving day and night. β The Earth orbits the Sun in one year. β We can see the Moon because the Sun's light reflects off it. β The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this. β The Sun appears to move across the sky from East to West and this causes shadows to change during the day. β Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth. 	<p>Can we track the sun? How do rockets lift off? How does the moon move? How do we know that the earth is round? Why do planets have craters? Why does a compass always point North?</p>
5	Forces – Effects on Movement	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. β Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. β Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a 	

		<p>greater effect.</p> <ul style="list-style-type: none"> β There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity). β Gravity can act without direct contact between the Earth and an object. β Friction, air resistance and water resistance are forces which slow down moving objects. β Friction, air resistance and water resistance can be useful or unwanted. β The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. β More than one force can act on an object simultaneously (either reinforcing or opposing each other). 	
5	Material Changes – Irreversible changes	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> β 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. <p>Notes and Guidance (non-statutory):</p> <p>Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.</p> <p>Note: Safety guidelines should be followed when burning materials.</p> <p>Pupils might work scientifically by:</p> <ul style="list-style-type: none"> β Observing and comparing the changes that take place, for example, when burning different materials or baking bread or cakes. β Researching and discussing how chemical changes have an impact on our lives, for example cooking. β Discuss [research] the creative use of new materials such as polymers, super-sticky 	<p>Will it erupt? Why does milk go off?</p>
6	Environment – classification		<p>Why are things classified? How do animals stay warm? Where do wild plants grow best? How many worms are underground?</p>

		<p>Pupils should be taught to:</p> <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. ☑ Give reasons for classifying plants and animals based on specific characteristics. ☑ Living things can be grouped into micro-organisms, plants and animals. ☑ Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals. ☑ Invertebrates can be grouped as snails and slugs, worms, spiders and insects. ☑ Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses). 	
<p>Working scientifically: Can you clean dirty water? Do doc leaves cure a sting? How clean are your hands? How many potatoes can you grow? How do levers help us? What do pulleys do? Why are zip wires so fast?</p>			
6	Environment – Evolution and Inheritance	<p>Pupils should be taught to:</p> <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 	<p>Why do birds have different beaks? Where do flowering plants grow best? How have eyes evolved? How does inheritance work?</p>

			Why is holly prickly?
6	Animals/Health – Exercise, Health & The Circulatory System	<p>Pupils should be taught to:</p> <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. ▪ The heart pumps blood around the body through vessels and this can be felt as a pulse. ▪ The heart pumps blood through the lungs in order to obtain a supply of oxygen. ▪ Blood carries oxygen/essential materials to different parts of the body. ▪ During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase. ▪ Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. ▪ An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals). 	<p>How does blood flow? What can your heart rate tell you? What's blood?</p>
6	Light and Astronomy – How light travels	<p>Pupils should be taught to:</p> <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 the light that 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. 	<p>Is green really green? What colour is a shadow? What is a reflection? How does light travel?</p>
6	Electricity	<p>Pupils should be taught to:</p> <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. ▪ Circuit diagrams can be used to construct a variety of more complex circuits predicting whether they will 'work'. 	<p>Can fruit light a lightbulb? Can you turn light down?</p>

Working scientifically:

Can we slow cooling down?

Can you see through it?

Can you send a coded message?

