



Science at Great Wheltenham

C of E Primary School

Year: Year 4/5 – Cycle 1

Title	Electricity
Overview	Children will use resources to construct simple circuits, identifying and naming different parts. We will also investigate what will happen if we break or change a circuit. We will explore how open and closed switches effect circuits as well as identifying conductors and insulators of electricity.
Knowledge Acquisition	Pupils will explore a range of appliances, learning which ones run on electricity. Pupils will learn how to construct a series of circuits; including the use of symbols to draw scientific diagrams. We will explore how switches work in relation to a circuit; also exploring the use of insulators and conductors of electricity.
Key LOs	<ul style="list-style-type: none"> ➤ Identify common appliances that run on electricity. ➤ Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. ➤ Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. ➤ Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. ➤ Recognise some common conductors and insulators, and associate metals with being good conductors.
Key Vocabulary	Cell battery circuit crocodile clip bulb Conductor insulator renewable non-renewable switches Sockets switches buzzers
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Examine a range of appliances and sort which use electricity and which do not (including solar energy). ➤ Construct a series of circuits and record diagrams using correct symbols. ➤ Examine circuit diagrams and predict whether or not they will work, explaining scientific reasoning. ➤ Experiment with a range of materials, investigating which are conductors and which are insulators.

Title	Animals including Humans
Overview	Pupils will construct food chains from different habitats building on prior knowledge. We will identify the main elements of a food chain and try and look for similarities across a range of food chains. We will explore the life cycle of mammals, amphibians, birds and insects – looking for what is the same and what is different. Finally, we will research the reproduction process of plant and animals.
Knowledge Acquisition	Pupils will learn about a range of food chains within different habitats, identifying producers, predators and prey. We will explore how humans change and develop into old age as well as how humans can affect food chains positively and negatively within eco systems. Pupils will then learn about a range of life cycles comparing similarities and differences in different plants and animals.
Key LOs	<ul style="list-style-type: none"> ➤ Construct and interpret a variety of food chains, identifying producers, predators and prey. ➤ Describe the changes as humans develop to old age. ➤ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. ➤ Describe the life process of reproduction in some plants and animals.
Key Vocabulary	Food chain energy producers consumers Predator prey life cycle mammal amphibian Bird insect plants seed dispersal Stamen carperl germination fertilisation
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Understand the key vocabulary of producers, predators and prey. ➤ Understand the arrows show a transfer of energy. ➤ Construct their own food chains from different habitats. ➤ Analyse a range of life cycles comparing similarities and differences. ➤ Be able to name a different parts of a human life cycle and explain when and why these occur. ➤ Examine the 7 life processes of all living things

Title	Earth and Space
Overview	Using a lot of human diagrams, pupils will describe the movement of the earth and other planets relative to the sun. We will focus on using globes and torches to explain how the earth's rotation causes time zones around the world (including night and day).
Knowledge Acquisition	Pupils will be able to describe the movement of the earth – knowing that the sun is at the centre of our universe. Pupils will then link this to Earth, including gravity and the moon's orbit of the Earth. We will explore the Earth's rotations to explain day and night around the world including the sun's apparent movement across the sky.
Key LOs	<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.
Key Vocabulary	Gravity rotation moon earth Pluto Mercury Mars Saturn Venus Jupiter Neptune Orbit Star Planets Uranus Solar System
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Name planets and identify what makes them unique. ➤ Create a scaled interactive model of the solar system. ➤ Create an animation showing the relationship between the moon and the earth. ➤ Create an non chronological report to explain the earth's rotation and show how this creates day and night at different times in different parts of the world. ➤ Possible planetarium experience.

Title	Animals including human (teeth and digestion)
Overview	Children will investigate different skeletons of animals and look for similarities and differences between them. They will be able to identify the different types of teeth and their function. We will then create a working model of the digestive system using practical resources.
Knowledge Acquisition	Pupils will learn about the functions of the basic parts of the digestive system – creating a 3D diagram to being learning to life. They will understand how all the parts work together to complete the whole process of digestion. Moving on, pupils will explore a range of teeth in different animals and their functions.
Key LOs	<ul style="list-style-type: none"> ➤ Describe the simple functions of the basic parts of the digestive system in humans. ➤ Identify the different types of teeth in humans and their simple functions.
Key Vocabulary	Teeth Digestive system Incisors Molars Canines Stomach mouth large intestine small intestine oesophagus pancreas
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Name and labelled different types of teeth and explain their function. ➤ Compare teeth from different skeletons (scientific reasoning) and compare similarities and differences. ➤ Investigate the effect that sugar has on teeth (observing over time). ➤ Describe functions of the digestive systems in humans (extended write opportunity) ➤ Create an interactive model showing the process of food entering the body and travelling through the digestive system.

Title	Animals and their habitats
Overview	Children will Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. We will research how the environment can change which then poses new threats to animals. We will then move into Describing the differences in the life cycles of a mammals, amphibians, insects and birds; looking for similarities and differences.
Knowledge Acquisition	Pupils will learn that animals can be grouped in a range of ways, exploring classification keys. This will allow them to group, identify and name different animals within different environments. Pupils will learn how environments change and how this can pose dangers to living things.
Key LOs	<ul style="list-style-type: none"> ➤ Recognise that living things can be grouped in a variety of ways. ➤ Explore and use classification keys to help group, identify and name a variety of living things in their local environment. ➤ Explore and use classification keys to help group, identify and name a variety of living things in a wider environment. ➤ Recognise that environments can change and that this can sometimes pose dangers to living things.
Key Vocabulary	Classification vertebrate invertebrate environment Habitat Desert woodland Rain forest polar Ocean Pond micro-habitat Threats manmade threats lifecycle mammal amphibian birds Stamen carpel seed dispersal insect
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Sort animals and plants based on characteristics or habitats. ➤ Use classification keys to sort animals. ➤ Make their own classification keys to sort a set of given animals into smaller groups. ➤ Study habitats and create a poster to explain how humans are destroying habitats around the world. ➤ Create a range of lifecycles from different animal classes (reptiles, mammals etc). ➤ Compare similarities and differences of these life cycles. ➤ Look at characteristics of living things. ➤ Identify how flowers reproduce and spread seeds.

Year 4/5 Cycle 2

Title	Properties and changes of materials
Overview	Children will use a range of practical resources to 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. They will then explore the uses of these materials; giving reasons based on evidence from investigations. We will be focussing on justification for reasoning including predictions about reversible and irreversible changes.
Knowledge Acquisition	Pupils will explore materials on the basis of their properties including hardness, solubility, transparency among others. They will learn which materials dissolve to form a solution. Next, we will give reasons for our answers based on evidence (applying knowledge from the topic). We will learn how some changes will result in the formation of new materials; specifically, changes associated with heating and cooling.
Key LOs	<ul style="list-style-type: none"> ➤ Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. ➤ Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. ➤ Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. ➤ 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. ➤ Provide reasoned justifications for their views.
Key Vocabulary	Reversible irreversible solubility transparency conductivity magnetic Attract repel solid liquid gas
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Identify characteristics of different objects using the correct scientific vocabulary. ➤ Investigate how different materials respond to magnets. ➤ Investigate how materials dissolve in water. Suggest ways to recover them from water. ➤ Identify the properties of Solids, liquids and gasses. ➤ Real life investigation: What material is best for the job? Children to carry out experiment and record findings. ➤ Investigate reversible and irreversible changes.

States of matter	
	Children will use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. We will then aim to prove that we can change some states of matter and then reverse them. Through observations we will investigate how some materials change state when heated or cooled and explain the science behind this. Finally, we will look at the part evaporation plays in the water cycle.
	Pupils will apply previous knowledge of solids, liquids and gasses to decide how mixtures might be separated (including filtering, sieving and evaporating). Pupils will learn how to group materials as well as observing how materials change state when heated. We will link our learning to prior knowledge of the water cycle – exploring key terminology and how evaporation rate can be effected by the temperature.
	<ul style="list-style-type: none"> ➤ Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. ➤ Demonstrate that dissolving, mixing and changes of state are reversible changes. ➤ 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.
	Solid liquid gas freeze melt particles energy heating Water cycle evaporation condensation temperature dissolving
	<ul style="list-style-type: none"> ➤ Sort objects into solids liquids and gasses, having discussion around how some items have elements of both. For example, a deodorant can. ➤ Investigate changes to different materials. Which are reversible and irreversible? ➤ Observe over time what happens to different materials when they are heated and cooled. Draw conclusions based on previous learning. ➤ Research project. Can the children find different materials that change state at different temperatures? ➤ Create a diagram of the water cycle. Model evaporation through making puddles in the playground and observing how they shrink, recording results.

Title	Forces
Overview	During this topic pupils will explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. We will then investigate what can affect the speed that this occurs (air resistance). We will create concept cartoons to explain the other forces that can work against gravity. Finally, making mechanisms and investigating how their components can allow a smaller force to have a greater effect.
Knowledge Acquisition	Pupils will learn that unsupported objects will fall towards Earth because of the force of gravity. They will explore air resistance, water resistance and friction – giving justifications for their reasoning. Finally, identifying mechanisms and how they can allow a smaller force to have a greater effect.
Key LOs	<ul style="list-style-type: none"> ➤ Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ➤ Identify the effects of air resistance, water resistance and friction, that act between moving surfaces ➤ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
Key Vocabulary	Surface friction force gravity air resistance water resistance Mechanism gear lever buoyancy balanced materials rough smooth
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Use a force metre to investigate the relationship between mass and force. ➤ Explore how forces effect different objects. Create concept cartoons ➤ Fair test experiment to assess how water can effect weight and force of an object. ➤ Create mechanisms that include levers, pulleys and gears and use them to investigate force. ➤ Display results using mathematical graphs and tables.

Title	Sound
Overview	Pupils will recognise that vibrations from sounds travel through a medium to the ear. We make a visual display of this by using a slinky. We will explore patterns between the volume of a sound and the strength of vibrations. After labelling parts of the ear, pupils will use 3 different hoses to create their own stethoscope and test which is the best conductor of sound.
Knowledge Acquisition	Pupils will learn how to identify how sounds are made, associating them with vibrations. We will find patterns between the pitch of a sound and the features of the object that produced it. Pupils will learn how sounds changes over a greater difference and that the surroundings can affect how sound travels. Finally, we will make comparisons between sound and light.
Key LOs	<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. ➤ Make comparisons between light and sound
Key Vocabulary	Pitch volume waves vibrating amplitude decibels Distance Light: dispersion transparent opaque translucent shadow reflect refract
Key Learning Experiences	<ul style="list-style-type: none"> ➤ Investigate how sound is measured. Will the same sound create a different volume in different areas of the school? ➤ Label the parts of the ear. ➤ Use different hoses to create stethoscopes and investigate which is the best conductor of sound. ➤ Create graphs to show the difference between high and low pitch sounds. ➤ Investigate how the same sound can change its volume the further away you get from it. ➤ investigate the loudness or softness of a sound by making a sound machine out of a metal spoon, elastic band and string ➤ Use a slinky to show how sound waves travel.