



## Science Policy

### Introduction

This policy sets out the aims and strategies for the teaching and learning of Science at Ellingham Primary School. It is intended to outline the guiding principles by which this school will implement Science in the National Curriculum.

### Intent

The science curriculum at Ellingham Primary School aims to develop the children's understanding of the world around them. We encourage all children to develop their natural curiosity and become excited and inspired about nature, our world and scientific processes. Children develop their knowledge, understanding and skills in science and are encouraged to ask their own questions. Our aims are that all children in our school will have direct access to high quality teaching in science; delivered from a well-resourced and structured subject base which will:

- Stimulate and satisfy curiosity
- Offer direct and practical experiences
- Challenge any misconceptions
- Increase knowledge and understanding of subject matter
- Develop and improve the ability to work scientifically and ask relevant questions
- Develop and improve critical and creative thinking
- Build children's self-confidence to enable them to work independently and cooperatively

## Whole School Overview – knowledge progression

Understanding of the World		
Science		
2 to 3 Year Olds		
<p><b>The World</b></p> <ul style="list-style-type: none"> <li>• Explores objects by linking together different approaches: shaking, hitting, looking, feeling, tasting, mouthing, pulling, turning and poking</li> <li>• Matches parts of objects that fit together, e.g. puts lid on Teapot.</li> <li>• Shows interests in different animals and sound they make</li> </ul>		
•		
3 to 4 Year Olds		
Autumn	Spring	Summer
<p><b>The World</b></p> <ul style="list-style-type: none"> <li>• Comments about aspects of the natural world.</li> <li>• Can talk about some of the things they have observed such as plants, animals, natural and found objects.</li> <li>• Talks about why things happen.</li> <li>• Talks about how things work</li> <li>• Understand light and dark</li> <li>• Beginning to understand the seasons</li> <li>• Food Technology -The children develop a greater understanding of how materials alter when cooking.</li> </ul>	<p><b>The World</b></p> <ul style="list-style-type: none"> <li>• Materials and their properties – similarities and differences in everyday materials, how materials change, dissolving, bending, heating, squashing etc</li> <li>• Asks questions about aspects of the natural world.</li> <li>• Know names of different fruits and vegetables</li> <li>• Know parts of the body</li> <li>• Food Technology -The children develop a greater understanding of how materials alter when cooking.</li> </ul>	<p><b>The World</b></p> <ul style="list-style-type: none"> <li>• Developing an understanding of growth, decay and changes over time.</li> <li>• Shows care and concern for living things and the environment.</li> <li>• Look closely at similarities, differences, patterns and changes.</li> <li>• Understand the importance of washing hands, brushing teeth and eating a healthy snack.</li> <li>• Sort objects into groups by size, colour</li> <li>• Food Technology -The children develop a greater understanding of how materials alter when cooking.</li> </ul>

4 to 5 Year Olds		
Autumn	Spring	Summer
<b>Science</b> <ul style="list-style-type: none"> <li>• Make observations of changes in relation to seasons and weather</li> <li>• Recognise a reversible change e.g. ice</li> </ul>	<b>Science</b> <ul style="list-style-type: none"> <li>• Make observations of the similarities and differences in relation to materials and living things.</li> </ul>	<b>Science</b> <ul style="list-style-type: none"> <li>• Make predictions about patterns and changes e.g. when cooking</li> </ul>

	Year 1	Year 2
<b>Autumn 1</b>	<p><b><u>Seasonal Change (ongoing in a booklet)</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• How to observe the seasons change their local environment across the year</li> <li>• How to describe the weather associated with new seasons</li> <li>• That the length of the day (daylight) changes throughout the year</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• The length of the days in winter is shorter than those in summer</li> <li>• Winter is the coldest season and summer is the hottest</li> <li>• Seasons change at similar times each year</li> <li>• To describe the differences in the four seasons</li> </ul> <p><i>Key vocabulary:</i></p>	<p><b><u>Living things and their habitats</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• The differences between things that are living, dead, and things that have never been alive (life processes)</li> <li>• How to identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>• How different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</li> <li>• 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</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p>

	<ul style="list-style-type: none"> <li>• Seasons</li> <li>• Change</li> <li>• Summer</li> <li>• Autumn</li> <li>• Winter</li> <li>• spring</li> </ul> <p><b><u>Animals including humans</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• The names for the basic parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth)</li> <li>• How to label a diagram of the human body with the above words</li> <li>• About the 5 senses (sight, smell, sound, taste, touch)</li> <li>• Which body part belongs to each sense</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• Where their basic body parts are on their body</li> <li>• That we have 5 senses and they are linked to specific body parts</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth</li> <li>• sight, smell, sound, taste, touch</li> <li>• senses</li> <li>• human body</li> <li>• label</li> <li>• diagram</li> </ul>	<ul style="list-style-type: none"> <li>• How to identify whether something is living, dead or never been alive based on life processes that are common to all living things</li> <li>• A habitat is a natural environment or home of a variety of plants and animals</li> <li>• A microhabitat is a very small habitat, for example for woodlice under stones, logs or leaf litter</li> <li>• Living things within habitats depend on each other, for example, plants serving as a source of food and shelter for animals</li> <li>• Construct a simple food chain that includes humans (eg, grass, cow, human)</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• Living things</li> <li>• Life processes</li> <li>• Habitat</li> <li>• Microhabitat</li> <li>• Source</li> <li>• Food chain</li> </ul>
<p><b>Autumn 2</b></p>	<p><b><u>Animals including humans</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• The names of a variety of common animals, including fish, amphibians, reptiles, birds and mammals</li> </ul>	<p><b><u>Materials</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> </ul>

	<ul style="list-style-type: none"> <li>• How to identify living things using pictures, photographs and their real-life experiences</li> <li>• That living things can be classified (grouped) according to whether they have common characteristics of fish, amphibians, reptiles, birds or mammals</li> <li>• What the difference is between carnivores, herbivores and omnivores</li> <li>• How to group common animals as carnivores, herbivores or omnivores</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• Name some fish, amphibians, reptiles, birds and mammals</li> <li>• Group living things into the above categories when shown pictures by recognising common characteristics eg. Feathers for birds</li> <li>• Difference between carnivores, herbivores and omnivores</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• Common animals</li> <li>• fish, amphibians, reptiles, birds and mammals</li> <li>• carnivores, herbivores and omnivores</li> </ul>	<ul style="list-style-type: none"> <li>• How to choose a material for a particular purpose (scientific experiment)</li> <li>• How the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> <li>• Scientist study Charles MacIntosh- waterproof</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• How to select a material, based on its properties and suitability, for different uses in everyday life</li> <li>• That the shape of some objects can change by squashing, bending, twisting and stretching but that some won't change shape due to the properties of materials</li> <li>• That Charles Macintosh developed a useful new material that we still need today</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• materials</li> <li>• wood, plastic, glass, metal, water, rock, brick, paper, fabrics, elastic and foil.</li> <li>• squashing, bending, twisting and stretching</li> <li>• hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.</li> </ul> <p>Germs investigation linked to Great Fire of London Louis Pasteur</p>
<p><b>Spring 1</b></p>	<p><b><u>Materials</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• The names of everyday materials including wood, plastic, glass, metal, water, and rock. They will also be shown brick, paper, fabrics, elastic and foil.</li> <li>• Describe the simple properties of everyday materials such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.</li> <li>• How to compare and group a variety of everyday materials</li> </ul>	<p><b><u>Animals including Humans</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• That animals, including humans, have offspring which grow into adults</li> <li>• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene (linked to growing)</li> <li>• find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li> </ul>

	<ul style="list-style-type: none"> <li>• How to distinguish between an object and the material from which it is made</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• The names of everyday materials</li> <li>• Some scientific vocabulary to describe materials and group them</li> <li>• How to select a material, based on its properties, for an investigation</li> <li>• How to determine which material an item is made from, based on its properties</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• materials</li> <li>• wood, plastic, glass, metal, water, and rock</li> <li>• brick, paper, fabrics, elastic and foil.</li> </ul> <p>hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.</p>	<p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• That growing into adults for humans means being a baby, toddler, child, teenager and then adult</li> <li>• Other animal examples could be: spawn, tadpole, frog or egg, caterpillar, pupa, butterfly</li> <li>• That in order to grow, humans need the right nutrition, exercise and should be hygienic</li> <li>• What humans need to be healthy</li> <li>• Humans need water, food and air to survive</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• Life cycle- baby, toddler, child, teenager and then adult</li> <li>• egg, caterpillar, pupa, butterfly</li> <li>• Basic needs</li> <li>• Reproduction</li> <li>• Offspring</li> <li>• growth</li> <li>• Hygiene</li> <li>• Nutrition</li> <li>• Diet</li> <li>• Exercise</li> </ul>
<p><b>Spring 2</b></p>	<p>Developing working scientifically skills and applying knowledge taught to more experimental contexts.</p> <p>ask simple questions  observe closely, using simple equipment  observe changes over time (seasonal change)  identify and classify by comparing objects and grouping them  use my observations and ideas to suggest answers to questions  follow simple instructions to gather data  perform simple tests with help  record data using simple drawings and labels  use simple tables to record data, with help  talk about what I have found</p>	

<p style="text-align: center;"><b>Summer 1</b></p>	<p><b><u>Plants</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• How to identify and name a variety of common wild and garden plants using the local area</li> <li>• The difference between deciduous and evergreen trees and some examples of both</li> <li>• Identify and describe the basic structure of flowering plants including leaves, flowers (blossom-linked to Spring), petals, fruit, roots, bulb, seed, trunk, branches, stem.</li> <li>• How to observe closely the growth of their own plant, using magnifying glasses</li> <li>• How plants/trees change over time (linked with seasonal change)</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p>	<p><b><u>Plants</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>• How seeds and bulbs grow into mature plants</li> <li>• What plants need to grow and stay healthy</li> <li>• How to observe the stages of growth in plants</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>• How both new and mature plants grow and change in our local area</li> <li>• That both seeds and bulbs germinate if they are watered but they do not always need light as they have a food store in them (they need light to stay healthy and continue to grow)</li> <li>• Plants need water, light and a suitable temperature to grow and stay healthy</li> <li>• Plants grow in small stages</li> </ul>
<p style="text-align: center;"><b>Summer 2</b></p>	<ul style="list-style-type: none"> <li>• Which common wild and garden plants we can find in the school</li> <li>• The name for some common trees in our school locality</li> <li>• The names for the basic parts of a flowering plant</li> <li>• How trees change in our school over time</li> <li>• How a plant grows slowly and needs certain things to help it</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• Plants</li> <li>• Trees</li> <li>• leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem.</li> <li>• Deciduous trees</li> <li>• Evergreen trees</li> <li>• Seasonal change</li> <li>• Growth</li> </ul>	<p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>• Growth</li> <li>• Seeds</li> <li>• Bulbs</li> <li>• Germinate</li> <li>• water, nutrients, air, water, light, temperature, space, and time</li> </ul>

	Year 3	Year 4
Autumn 1	<p><b><u>Physical processes</u></b></p> <p><b>Light and Shadow</b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● It is not safe to look directly at the sun</li> <li>● Light comes from a source</li> <li>● Light can be reflected</li> <li>● Different materials enable different levels of light to pass through</li> <li>● Shadows are formed by opaque objects</li> <li>● Shadows change depending on the angle and distance of the light source.</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Dark is an absence of light</li> <li>● Light sources can be natural or artificial</li> <li>● Light can be reflected from a source off different surfaces</li> <li>● Light sources can be blocked by opaque objects</li> <li>● Shadows change throughout the day</li> <li>● Pupils know that classification is sorting things into groups based on their properties</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Source</li> <li>● Shadow</li> <li>● Transparent</li> <li>● Translucent</li> <li>● Opaque</li> <li>● Classification</li> </ul>	<p><b><u>Physical processes</u></b></p> <p><b>Sound</b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● Sound is associated with vibration</li> <li>● Sound travels through a medium</li> <li>● The size of the object influences pitch and volume</li> <li>● Sounds become fainter when further away from the source</li> <li>● The ear receives sounds</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Sounds are caused by vibrations</li> <li>● Sound travels through a medium by hitting particles together</li> <li>● The eardrum vibrates and neurons process this sound</li> <li>● The larger the surface the lower the pitch</li> <li>● The greater the vibration the louder the volume</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Energy</li> <li>● Transfer</li> <li>● Vibration</li> <li>● Medium</li> <li>● Pitch</li> <li>● Volume</li> <li>● Waves</li> <li>● Vacuum</li> <li>● Amplitude</li> <li>● Neuron</li> </ul>

## Autumn 2

### Materials

#### **Rocks and soils**

*Pupils will learn:*

- How the Earth beneath us can tell us about the past
- How rocks and soils affect where things are in our world
- How rocks can change over time

*When assessed, pupils will demonstrate the following sticky knowledge:*

- Pupils can describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Pupils can recognise that soils are made from rocks and organic matter
- Pupils can explain how rock types limit our choices about where we can build.
- Pupils know that comparative testing involves comparing similar things to spot differences

*Key vocabulary:*

- Igneous, metamorphic, sedimentary
- Fossil
- Permeable and impermeable
- Comparative testing

### Animals including humans

*Pupils will learn:*

- How the digestive system works in humans
- The different types of teeth in humans and their purpose
- How the food chain works

*When assessed, pupils will demonstrate the following sticky knowledge:*

- The stages of the digestive process, naming key organs
- Name different parts of a tooth
- Explain the conditions in which teeth decay
- Explain and create a food chain identifying producers, predators and prey.

*Key vocabulary:*

- Digestive system
- Esophagus
- Stomach
- Small and large intestines
- Rectum
- Anus
- Incisor
- Canine
- Premolar
- Molar
- Food chain
- Prey
- Predators
- Producer

<p><b>Spring 1</b></p>	<p><b><u>Animals Including Humans</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● Animals (including humans) cannot make their own food</li> <li>● Animals (including humans) need the right types and amounts of nutrition</li> <li>● Humans and other animals have skeletons and muscles</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Animals (including humans) eat foods that have different properties</li> <li>● Skeletons and muscles are used for support, protection and movement.</li> <li>● Pupils are able to explain that a fair test involves changing one element to see if it has an effect.</li> </ul>	<p><b><u>Living things and their habitat</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● How to use a classification key</li> <li>● How environments changing affects wildlife</li> <li>● How to classify living things</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Pupils will be able to create a classification key</li> <li>● Pupils know the key animal groups (e.g vertebrae, invertebe)</li> <li>● How different animals are suited their environment</li> <li>● How changes to habitats affect Wildlife</li> </ul> <p><i>Key vocabulary</i></p> <ul style="list-style-type: none"> <li>● Classification (key)</li> <li>● Invertebrate</li> <li>● Vertebrate</li> <li>● Mammal</li> <li>● Habitat</li> </ul>
<p><b>Spring 2</b></p>	<p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Balanced diet</li> <li>● Carnivore</li> <li>● Herbivore</li> <li>● Omnivore</li> </ul>	
<p><b>Summer 1</b></p>	<p><b><u>Plants</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● What plants need to grow</li> <li>● Explore why some seed grow better than others</li> <li>● How the roots and stem transport water</li> <li>● How seed dispersal affects successful growth</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Plants need air, light, water, nutrients from soil, and room to grow</li> <li>● Pupils can label the roots, stem/trunk, leaves and flowers on a plant and explain their function</li> <li>● That water and nutrients are taken from the soil through the roots and stem</li> <li>● That pollination, seed formation and seed dispersal make up the life cycle of a plant</li> </ul>	<p><b><u>Electricity</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● Which everyday objects use electricity</li> <li>● How to construct a simple circuit</li> <li>● A complete loop of components is needed to make parts of a circuit work</li> <li>● Switches open and close a circuit</li> <li>● Which materials insulate or conduct Electricity</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Electricity flows around a circuit</li> <li>● A circuit must be a complete loop in order to work</li> <li>● Metals are good conductors of electricity</li> <li>● Switches can control whether a loop is complete</li> </ul>

	<p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Growth</li> <li>● Seed</li> <li>● Plant - roots, stem/trunk, leaves, flowers</li> <li>● Soil</li> <li>● Dispersal, Pollination</li> <li>● Seed formation</li> <li>● Nutrition</li> </ul>	<ul style="list-style-type: none"> <li>● Pupils know that comparative testing involves comparing similar things to spot differences but other variables need to be kept the same</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Flow/current</li> <li>● Switch</li> <li>● Wire</li> <li>● Cell/battery</li> <li>● Bulb/buzzer</li> <li>● Conductor/ Insulator</li> </ul>
<p><b>Summer 2</b></p>	<p><b><u>Physical processes</u></b></p> <p><b>Forces and Magnets</b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● Magnetic forces act from a distance</li> <li>● Magnets attract and repel</li> <li>● Magnets have 2 poles</li> <li>● Which materials are magnetic</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Magnetism is a force that pushes and pulls</li> <li>● All magnetic materials are made of metal</li> <li>● Aluminium, copper and gold are not magnetic</li> <li>● Pupils know that pattern seeking involves seeing how one thing changes another</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Attract- pull</li> <li>● Repel- push</li> <li>● North and south pole</li> </ul>	<p><b><u>States of matter</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● The differences between solids, liquids and gases</li> <li>● Examine how materials change state, using degrees Celsius (°C) with accuracy</li> <li>● How the water cycle works with regards to changing states</li> <li>● Different factors that influence the rate of melting and evaporation</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Explain the composition of particles in solids, liquids and gases</li> <li>● Explain how materials change states</li> <li>● Explain how water changes state within the water cycle</li> <li>● Pupils know how to draw conclusions from a fair test</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Solids</li> <li>● Liquids</li> <li>● Gases</li> <li>● Particles</li> <li>● Structure</li> <li>● Evaporation</li> <li>● Condensation</li> <li>● Melting</li> <li>● Celsius (°C)</li> <li>● Water cycle</li> </ul>

	Year 5	Year 6
Autumn 1	<p><b><u>Earth and Space</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● How the planets orbit the sun</li> <li>● How the moon orbits the Earth, resulting in the phases of the moon</li> <li>● That the Earth's rotation results in day and night</li> <li>● The relative properties of the planets of the solar system.</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Name the planets of the Solar System</li> <li>● Explain why we have night and day</li> <li>● Explain why seasons occurs</li> <li>● Explain why planets rotate and orbit around the celestial bodies</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Solar system</li> <li>● Planet</li> <li>● Galaxy</li> <li>● Season</li> <li>● Rotation</li> <li>● Orbit</li> <li>● Phases of the moon (waxing, waning)</li> </ul>	<p><b><u>Electricity</u></b>  <i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● How to identify Electrical Symbols and use them to draw a circuit.</li> <li>● That you can test circuits to identify broken components</li> <li>● What insulators and conductors are</li> <li>● How the brightness of a lamp or the volume of a buzzer can change according to the number and voltage of cells used in the circuit</li> <li>● To compare and give reasons for variations in the way components function</li> <li>● How to design and make electronic board games</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Be able to name and use the symbols when drawing and designing circuits</li> <li>● Be able to solve problems and detect simple errors in circuits</li> <li>● Understand ways in which circuits can be changed to affect the output (brightness/volume etc)</li> <li>● Voltage is the pressure that pushes charged electrons (current) through a circuit and is measured using Volts</li> <li>● Electricity is measured in Watts and kilowatts</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Buzzer</li> <li>● Cell</li> <li>● Battery</li> <li>● Switch</li> <li>● Buzzer</li> <li>● Energy</li> <li>● Voltage</li> <li>● Circuit</li> </ul>

## Autumn 2

### Forces

*Pupils will learn:*

- How gravity affects objects on Earth
- How air resistance, water resistance and friction acts upon objects
- How levers, pulleys and gears increase the power of a force

*When assessed, pupils will demonstrate the following sticky knowledge:*

- Materials which increase or decrease friction
- Apply identification and classification skills to explain how different forces

act upon objects in everyday situations

- Can create an accurate force diagram
- Can demonstrate how levers and pulleys act as force multipliers

*Key vocabulary:*

- air resistance
- water resistance
- friction
- Gravity
- Force
- Lever
- Pulley
- Gear
- Force multiplier
- Buoyancy

### Living things and their habitats

*Pupils will learn:*

- Why we classify living things
- How our classification system was devised (contributions from Aristotle and Linnaeus)
- How can we group animals according to common observable characteristics and based on similarities and differences?

*When assessed, pupils will demonstrate the following sticky knowledge:*

- That we can group microorganisms, plants and animals based on specific characteristics
- What a classification key is and how we use one
- Explain the difference between vertebrates and invertebrates

*Key vocabulary:*

- Classification
- Vertebrate
- Invertebrates
- Microorganisms

## Spring 1

### Materials and their properties

*Pupils will learn:*

- The properties of solids, liquids and gases
- That materials can be grouped by hardness, solubility, transparency, conductivity and magnetic
- Some materials are soluble to make a solution
- Some mixtures can be separated by filtering sieving and evaporating
- Why certain materials are picked for specific tasks
- Dissolving, mixing and changes of state are reversible
- Some changes result in not materials and these changes are not reversible

*When assessed, pupils will demonstrate the following sticky knowledge:*

- Classifying everyday objects by properties of materials
- Choose a material for a specific purpose
- Choose equipment to separate a mixture
- Explain why some changes are irreversible

*Key vocabulary:*

- Hardness
- Solubility
- Transparency
- conductivity
- Magnetic
- Filtering
- Sieving
- Evaporating
- Comparative test
- Fair test

### Evolution and inheritance

*Pupils will learn:*

- That living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- That living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- How animals and plants are adapted to suit their environment in different ways
- Adaptation may lead to evolution.

*When assessed, pupils will demonstrate the following sticky knowledge:*

- Recognise that variation between humans
- Understand how mutation occurs
- Understand the concept of evolution
- Recognise the role of fossils in evolutionary theory (Charles Darwin)

*Key Vocabulary:*

- Variation
- Mutation
- Evolution
- Natural selection
- Fossils
- Genetics

Spring 2

**Animals including Humans**

Pupils will learn:

- To identify and name the main parts of the human circulatory system
- About the functions of the heart, blood vessels and blood
- How diet, exercise, drugs and lifestyle impact on the way their bodies function
- How nutrients and water are transported within animals, including humans.
- How to perform a basic dissection using a sheep's heart to identify the four chambers

*When assessed, pupils will demonstrate the following sticky knowledge:*

- Label and explain the function of key organs in the circulatory system
- Knowledge of the four chambers and
- Understand that veins transport the blood to the heart and arteries carry the blood away
- Blood takes oxygen from the lungs to the cells of the body. It takes carbon dioxide from the body's cells to the lungs where it is breathed out. Blood transports nutrients, hormones and waste products around the body
- Design a test to compare the effect of action on the circulatory system
- To be able to identify how caffeine and alcohol effects the body and why diet is so important
- To be able to identify how caffeine and alcohol effects the body and why diet is so important

*Key vocabulary:*

- Circulation
- Blood vessels
- Heart
- Dissect

		<ul style="list-style-type: none"> <li>● Chambers (Atrium and ventricle)</li> <li>● Septum</li> <li>● Vena cava</li> <li>● Semilunar valve</li> <li>● Pulmonary artery</li> <li>● Pulmonary vein</li> <li>● Aorta</li> <li>● oxygen</li> <li>● oxygenated</li> </ul>
<p style="text-align: center;"><b>Summer 1</b></p>	<p><b><u>Living things and their habitats</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● How living things have life stages that are cyclical</li> <li>● The differences between the life cycle of a mammal, amphibian, insect or bird</li> <li>● The reproductive process in plants and animals</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● The life stages of a flowering plant</li> <li>● The life stages of a bird/ butterfly/mammal</li> <li>● Factors affecting germination</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Life cycle</li> <li>● Reproduction</li> <li>● Life processes</li> <li>● Mammal</li> <li>● Amphibian</li> <li>● Insect</li> <li>● Bird</li> <li>● Germination</li> <li>● Pollination</li> <li>● Dispersal</li> </ul>	<p><b><u>Physical processes</u></b></p> <p><b><u>Light</u></b></p> <p><i>Pupils will learn:</i></p> <ul style="list-style-type: none"> <li>● How light travels</li> <li>● That because light travels in straight lines, objects are seen because they give out or reflect light into the eye</li> <li>● That we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</li> <li>● Why shadows have the same shape as the objects that cast them</li> <li>● How rainbows and coloured filters work</li> </ul> <p><i>When assessed, pupils will demonstrate the following sticky knowledge:</i></p> <ul style="list-style-type: none"> <li>● Light travels in straight lines and objects are seen because they reflect light into the eye</li> <li>● Shadows are the same size as the objects because light cannot bend</li> <li>● How periscopes work</li> <li>● That light is made from the colours of a rainbow and each has its own wavelength</li> </ul> <p><i>Key vocabulary:</i></p> <ul style="list-style-type: none"> <li>● Shadow</li> </ul>

**Summer 2**

**Animals including humans**

*Pupils will learn:*

- How humans change throughout their lives
- Gestation in other animals

*When assessed, pupils will demonstrate the following sticky knowledge:*

- The different stages of human foetal development with approximate weight
- That gestation lengths vary with the size of an animal
- The stages of human development from birth to death

*Key vocabulary:*

- Gestation
- Foetus
- Development
- Womb
- Viable
- Premature

- Light
- Reflection
- Refraction
- Wavelength
- Cornea
- Retina
- Pupil/iris

## Whole School Overview – Working Scientifically Skills Progression



<b><u>To work scientifically in Year 1, I need to be able to:</u></b>	<b><u>To work scientifically in Year 2, I need to be able to:</u></b>
ask simple questions	ask simple questions and recognise that they can be answered in different ways
observe closely, using simple equipment	use simple scientific language to describe ideas
observe changes over time (seasonal change)	observe closely, using a range of equipment
identify and classify by comparing objects and grouping them	observe changes over time
use my observations and ideas to suggest answers to questions	identify and classify by comparing objects and deciding how to sort them
follow simple instructions to gather data	use my observations and ideas from my own research using books or the internet to suggest answers to questions
perform simple tests with help	perform simple tests
record data using simple drawings and labels	record data using drawings with labels and simple tables
use simple tables to record data, with help	begin to notice patterns and relationships
talk about what I have found	talk about what I have found and how I found it

<b><u>To work scientifically in Year 3, I need to be able to:</u></b>	<b><u>To work scientifically in Year 4, I need to be able to:</u></b>
ask relevant questions and use scientific enquiries to answer them	ask relevant questions and use different types of scientific enquiries to answer them
use scientific language to explain processes	use scientific language accurately to explain scientific processes
identify differences, similarities or changes when learning about new ideas	identify differences, similarities or changes related to scientific ideas or processes
identify differences, similarities or changes when learning about new ideas	make systematic and careful observations
make careful observations	set up simple practical enquiries, comparative and fair tests
take accurate measurements using standard units (cm, l, g) and a range of equipment (thermometers)	Develop ability to take accurate measurements using standard units (cm, l, g etc) and a range of equipment (thermometers, data loggers)
set up simple practical enquiries, comparative and fair tests with some support	identify a question to test/investigate
use simple scientific evidence to answer questions	use scientific evidence such as research to answer questions or to support my findings
report on findings from enquiries	report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
<i>record findings with support, using:</i> scientific language drawings labeled diagrams keys bar charts tables	<i>record findings independently, using:</i> scientific language drawings labelled diagrams keys bar charts tables
use results to draw simple conclusions	use results to draw simple conclusions, make new predictions, suggest improvements and ask new questions

<b><u>To work scientifically in Year 5, I need to be able to:</u></b>	<b><u>To work scientifically in Year 6, I need to be able to:</u></b>
ask meaningful questions about scientific ideas	identify a question of enquiry to investigate
plan scientific enquiries to answer questions	plan different types of scientific enquiries to answer questions
recognise and control variables where necessary when planning scientific enquiries	recognise and control variables where necessary when planning scientific enquiries independently
take measurements, using a range of scientific equipment, with increasing accuracy and precision	take measurements, using a range of scientific equipment, with accuracy and precision, taking repeat readings and averages when appropriate
use test results to make predictions to set up further comparative and fair tests	use test results to make predictions to set up further comparative and fair tests
<i>record and present findings from enquiries including:</i> conclusions casual relationships oral and written forms	<i>record and present findings from enquiries including:</i> conclusions casual relationships degree of trust in results oral and written forms such as displays and other presentations
identify scientific evidence that has been used to support or refute ideas or arguments	identify scientific evidence that has been used to support or refute ideas or arguments
plan different types of scientific enquiries to answer questions	plan different types of scientific enquiries to answer questions
recognise and control variables where necessary when planning scientific enquiries	recognise and control variables where necessary when planning scientific enquiries independently
<i>record data and results using:</i> scientific diagrams with labels tables bar graphs line graphs	<i>record data and results of increasing complexity using:</i> scientific diagrams with labels classification keys tables scatter graphs bar graphs line graphs

## Continuity and progression

The continuity and progression of work will be monitored by the Science subject Leader and mapped out in the Science scheme of work above, which can be referred to. Assessments will take place after each topic, these inform teachers' end of year assessments, and they will provide easy reference to strengths and areas for improvement. We will also assess children's knowledge prior to starting a new topic in order to ascertain an appropriate start level using mind maps. We aim to extend children's investigative techniques by assessing the level they are on and moving them forward by challenge.

## Assessment

Assessment must play an integral part in the whole teaching and learning process. Teachers in Years 1 to 6 have been given assessment materials catering for all levels within their year group. Children in the Foundation Stage are assessed using the Foundation Stage Profile.

Regular assessments of investigative technique will also be carried out, highlighting areas of strengths and weaknesses. Teachers will assess children's investigative and research skills using our Science assessment system from Year 1 onwards.

## Recording children's work

Science should not end up as a vast note taking exercise nor should it require large quantities of written work to be produced.

Young scientists should learn to record/present their work so that it is clear, interesting, easy to understand and well structured. This may include using techniques usually associated with other curricular areas such as graphs, tables, word processing, display, dramatisation, making posters, data processing etc.

In Key Stage 2, when children are writing up their own accounts of investigations, they should use their own words, include diagrams and where appropriate, use more formal headings to structure their recording in a way appropriate to higher scientific investigation.

Tables and graphs should be completed using a ruler and pencil.

## Safety

Due to its practical nature, the teaching of science can give rise to potentially dangerous situations. Teachers should not compromise with safety standards and children should be aware of the rules that exist for their safety and the reasons for them.

CLEAPSS available to all staff- speak to science leader