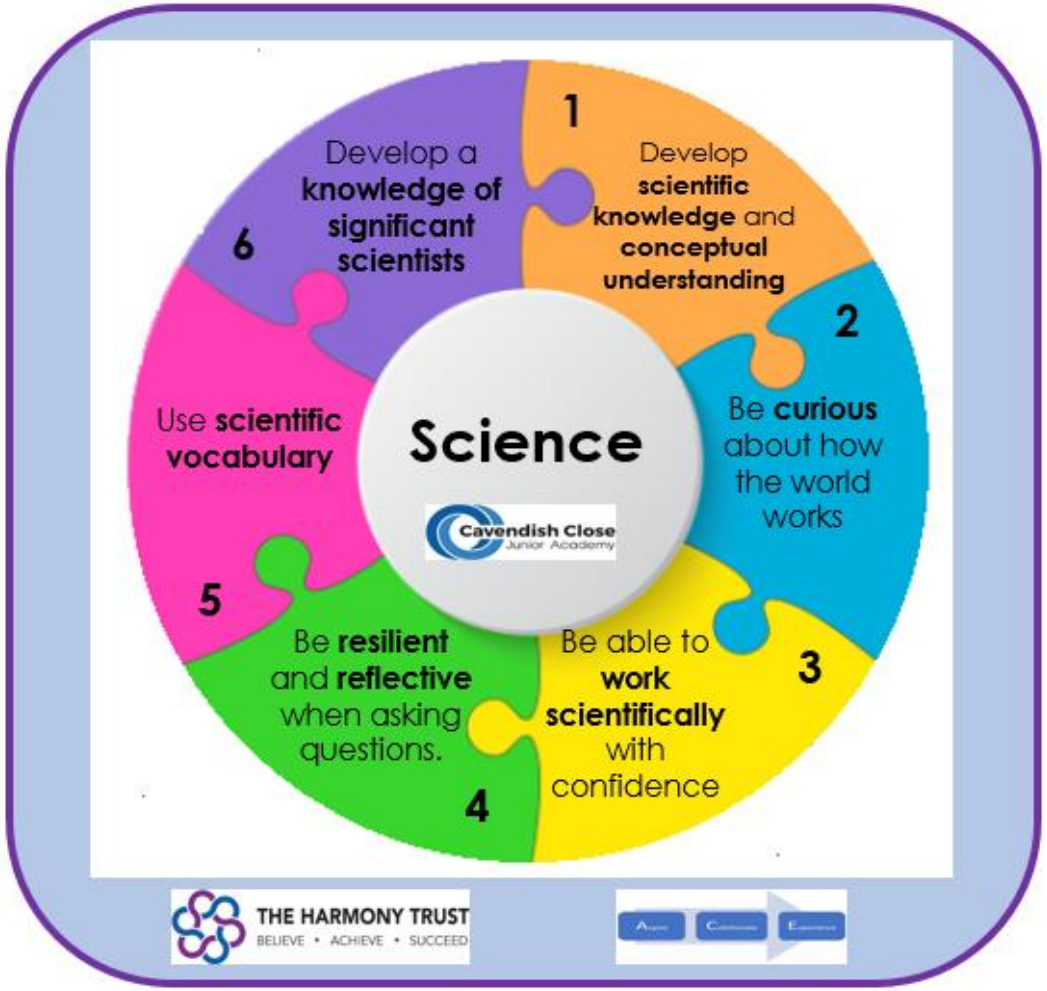
Science Intent

At Ash Croft Primary Academy, we aim to deliver a curriculum that helps children aspire, collaborate and experience a variety of opportunities. We want to help children develop as scientists through a range of learning experiences that are underpinned by our key intentions for learning in this subject and develop a lifelong love of science through a stimulating, engaging and challenging environment.



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1. It is our intention that our children develop **scientific knowledge and conceptual understanding** through the specific disciplines of **biology, chemistry and physics**.
2. It is our intention to **ignite curiosity** in children about our universe which promotes respect for the living and non-living.
3. It is our intention that children are equipped with **a range of skills to work scientifically.**
4. It is our intention that our children learn to be **resilient and reflective** when asking questions about their own and others work.
5. It is our intention that children develop a **progressive scientific vocabulary** that enables them to confidently communicate and justify scientific ideas.
6. It is our intention that our children are **knowledgeable about a range of significant scientists** both from history and modern day.

Science Implementation

Our aim is for Ash Croft children to have a love for science. The National Curriculum 2014 units of Study have been mapped out to instil curiosity and enable children to question Science through a range of situations. The curriculum will be enrichment by exciting hands on practical science, real life 'wow' events, STEM theme days, fieldwork trips, visits from experts and extracurricular clubs.

Key knowledge, skills and understanding are identified at the start of each science unit of work that link back to our key intentions, ensuring that all the key intentions are covered at least once within each science unit of work. Children will have opportunities to work scientifically throughout each unit alongside further developing their scientific skills. Furthermore, we will equip them with key vocabulary to be able to communicate and question their findings from investigations – this is also displayed on the front covers of each unit of work. We plan sequences of lessons that allow children to take small steps in their learning, which allows them to be confident and challenge themselves.

Lessons are thoughtfully sequenced with opportunities to complete retrieval tasks and meta-cognition opportunities within each unit, helping children commit learning to their long term memory. Children also have opportunities to recap prior learning from previous year groups through pre and post learning tasks, retrieval grids, thinkers keys and graphic organisers. These are presented to children in a variety of active ways to encourage and stimulate learning. Concepts taught are therefore reinforced by focusing on the key features of scientific enquiry so that pupils learn to use a variety of approaches to answer relevant scientific questions. Scientific skills are mapped out progressively within each year group ensuring children make progress in their skill set year on year.

Science is taught discretely, however, meaningful links across the curriculum are made to ensure creative cross-curricular learning. We want our children to make strong connections between scientific concepts and use these to support their learning and understanding across other subject areas, especially mathematics and technology.

IMPACT

A range of assessment strategies are used to assess the impact of learning in science. Ongoing formative assessment include: self-assessment, peer assessment and TAPS activities. At the end of a unit the teacher will devise a range of assessment tasks, appropriate to the children's stage of development, to assess the pupils' knowledge, skills and understanding, for example a question and answer session, a class debate or a structured mind map. This assessment will be recorded on our science assessment grids and used to plan the next unit of work.

Standards in science, to ensure the maximum impact, are monitored in a variety of ways: book scrutinises, professional dialogue, pupil voice questionnaires, Staff voice questionnaires, lesson observations and learning walks.

Science Implementation

Science coverage

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	**Seasonal Changes** (Physics) (Referred to all Year)		**Everyday Materials** (Chemistry)	**Plants** **Signs of Spring** (Biology)	**Animals Including Humans** (Biology)	
Year 2	**Animals including Humans** (Biology)	**Living Things and Their Habitats** **Emperor Penguins** (Biology)	**Uses of Everyday Materials** (Chemistry)	**Plants** **Seeds & Growing** (Biology) Revisit Materials – spotlight plastics		**Living Things and their Habitats** **Micro-habitats** (Biology)
Year 3	**Plants** (Biology)	**Forces and Magnets** (Physics)	**Animals including Humans** (Biology)	**Rocks** (Chemistry)		**Light** (Physics)
Year 4	**States of Matter** (Chemistry)	**Electricity** (Physics)	**Sound** (Physics)	**Living Things and Their Habitats** (Biology)	**Animals Including Humans** (Biology)	
Year 5	**Forces** (Physics)	**Animals Including Humans** (Biology)	**Earth and Space** (Physics)	**Living Things and Their Habitats** (Biology)	**Materials** (Chemistry)	
Year 6	**Animals including Humans** (Biology)	**Light** (Physics)	**Living Things and Their Habitats** (Biology)	**Evolution and Inheritance** (Biology)	**Electricity** (Physics)	

Science Implementation

BIOLOGY

Early Years
- Plants
- Animals including humans

Year 1/2 A
- Plants
- Animals including humans

Year 1/2 B
- Plants
- Animals including humans
- Living Things and Their Habitats

Year 3
- Plants
- Animals including humans

Year 4
- Animals including humans
- Living things and their habitats

Year 5
- Living things and their habitats
- Animals including humans

Year 6
- Evolution and inheritance
- Animals including humans
- Living things and their habitats

Science Implementation

PHYSICS

Early Years
- Processes and changes within the natural world

Year 1/2 A
- Seasonal Changes

Year 4
- Electricity
- Sound

Year 5
- Forces
- Earth and Space

Year 6
- Light
- Forces
- Electricity

Science Implementation

Early Years
- Observe simple states of matter

Year 1/2 A
- Everyday Materials & Their Properties

Year 1/2 B
- Uses of Everyday Materials

Year 3
- Rocks and Fossils

CHEMISTRY

Year 4
- States of Matter

Year 5
- Properties of Materials
- Changes of Materials

Science Implementation

SCIENTISTS

Early Years
- Nina and the Neurons
- Maddie's 'Do You Know?'

Year 1/2 A
- Jeanne Baret
- Charles Macintosh

Year 1/2 B
- John Loudon McAdam
- Louis Pasteur's
- Rachel Carson's

Year 3
- Sir Joseph Banks
- Mary Anning
- Sir Isaac Newton
- Thomas Edison

Year 4
- William Beaumont
- William Gilbert
- Alexander Graham Bell
- Carl Linnaeus

Year 5
- Jane Goodall
- David Attenborough
- Nicolaus Copernicus
- Galileo Galilei
- Joseph Lister
- Florence Nightingale

Year 6
- Charles Darwin
- Alessandro Volta
- Nikola Tesla
- Carl Linnaeus
- Edward Jenner

Key Outcomes – Autumn 1

EYFS

Year 1

Seasonal Changes

1. Children will name and locate parts of the human body and begin to make suggestions about what some parts of the body do. Children will build and label a junk model body.
2. Children will be able to name the five sense and describe how we use these on a daily basis.
3. Children will know the months of the year and relate these to the four seasons.
4. Children will observe and describe weather patterns within each season beginning with Autumn (returning to the key question throughout the year - *'How do we know it is Autumn?...Winter?... Spring?...Summer?'*)
5. Children will investigate
6. **Children will experience the outdoors and be able to say why it is important to take care of our local wildlife.**

Working Scientifically

- Children will use their observations and ideas to suggest answers to questions linked to using their senses and their own body.
- Children will investigate taste, smell, sound, touch and sight through practical activities in and outdoors.
- Children will use scientific vocabulary and use weather symbols to describe their observations.
- Children will ask simple questions about the weather and recognise they can be answered by making simple observations and measurements.
- Children will investigate (using their senses) the local area and school grounds within each season to understand how the natural environment changes and record this using photographs, drawings, tables, ID sheets etc.

Year 2

• Animals Including Humans

1. Children will name and match a variety of animal offspring to their adult forms.
2. Children will understand that adult animals can be different to their young e.g. eggs or live young.
3. Children will talk about how human's change and grow and will be able to sequence life cycle stages.
4. Children will be able to name and order the main life cycle stages of at least one other animal (Penguins in Autumn 2).
5. Children will know the three basic needs that all animals have in order to survive (water, air and food).
6. **Children will begin to understand the importance of reducing food waste and saving water as part of human's essential needs.**
7. Children will be able to notice what happens when we do exercise and talk about the importance of exercise for the human body.
8. Children will discuss and research what is meant by a balanced meal and identify healthy food choices.
9. Children will understand how to keep themselves clean and safe.

Working Scientifically

- Children will consider questions such as: *How does exercise affect my heart rate and why is this important?*
- Children will use scientific vocabulary.
- Children will collect data linked to healthy choices/ diet and exercise, and record these in tables and charts to look for patterns (Maths Link).
- Children will observe and record the effects of exercise (warm skin, thirsty, heart rate increased, breathing heavily). Children will know that some exercise makes their heart beat fast and some slow it down.
- Children will design a balanced lunch box on paper to serve as a reminder of how much of each food group is required for a balance lunch.
- Children will observe the life cycle of tadpoles and chicks and use flowcharts and labels to describe what they observe. (Spring 2 and relate to the school grounds and habitats).

Key Outcomes – Autumn 1

	Years 3	Year 4	Year 5	Year 6
	Plants	**States of Matter**	**Forces**	**Animals including Humans**
	1) Children will 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. 2) Children will be able to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers/petals and create a labelled, annotated diagram to represent this. 3) Children will classify food plants and be able to explain which parts of the plant we can eat. 4) Investigate the way in which water is transported within plants. They will also spot differences in the health of seedlings and begin to think about reasons. 5) Children will be able to name male female parts of the flower (stigma, style, stamen, ovary, ovules). 6) Children will understand that flowers vary in size, colour, shape and form but all play a crucial role in reproduction. 7) Children will be able to explain how fruits develop from pollinated flowers. 8) Children will discover the role played by insects in pollination. 9) Children will understand that the function of a fruit is to produce and disperse seeds.	1. Children will understand that materials can be classified into different states (solids, liquids and gases) and begin to use simple practical enquiries and scientific evidence to support their findings. 2. Children will be able to explain to others, the evidence for gases and to describe how gases move. 3. Children will understand, through practical tasks, that materials change state when they are heated or cooled and to describe this process using scientific language (see vocab sheet). 4. Children will be able to ask a question about evaporation and set up a practical enquiry that will provide the scientific evidence to answer it. 5. Children will know that water moves in a cycle due to changes in temperature causing the water to change from one state to another.	1. Children will be able to explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. 2. Children will learn about life and the significance of Galileo Galilei 3. Children will be able to define gravity and resistance and identify balanced and unbalanced forces. 4. Children will be able to identify the effects of air resistance, that acts between moving surfaces and plan an investigation into the effectiveness of various parachutes. 5. Children will be able to recognise that some mechanisms, including levers and pulleys, allow a smaller force to have a greater effect. 6. Children will recognise that gear mechanisms allow a smaller force to have a greater effect. 7. Children will identify the effects of friction, that acts between moving surfaces. 8. Children will investigate the effect ground friction has on movement. 9. Children will be able to identify the effects of water resistance, that acts between moving surfaces.	1. Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. 2. Children will be able to identify the components of blood and describe their functions, 3. Children will explore the structure and function of the human heart. 4. Children will be able to describe the ways in which nutrients and water are transported within animals, including humans. 5. Children will know that nutrients and water are transported around the body in the blood. 6. Children will be able to demonstrate how blood transports nutrients, water, gases and waste around the body. 7. Children will explore and demonstrate how the circulatory system works including the role of the heart. 8. Children will recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. 9. Children will be able to identify those aspects of a diet that are healthy and unhealthy and the impact diet can have on the body, using scientific evidence alongside examining the amount and types of exercise that keep a child and adult body healthy. 10. Children will be able to identify how drugs impact on the way the human body functions and understand that certain drugs can be used for positive effect in the form of medicine.

Key Outcomes – Autumn 1
Working Scientifically

Years 3

Plants

Working Scientifically

- Ask relevant questions and using different types of scientific enquiries to answer them.
- Set up simple practical enquiries and comparative and fair tests through a seedling investigation.
- Gather, record, classify and present data in a variety of ways to help answer questions through diagrams and models to show the labelled parts of a plants and show which parts are edible. Children will classify the plants according to human use for: leaves, roots, flowers, fruits and seeds.
- Make systematic and careful observations.
- Children will measure the height of seedlings in cm at each observation point ..
- Children will report on findings from enquiries, including oral and written explanations. They will present their results from their seedling investigation in a bar graph and parts of a plant through diagrams and notes.
- Children will use results to draw simple conclusions, make predictions and think of further questions to investigate.
- Use straightforward scientific evidence to answer questions or to support their findings about water transportation and their seedling investigation.

Year 4

States of Matter

Working Scientifically

- Ask and begin to answer questions about the evidence of gases around us.
- Use scientific language to describe what happens when a subject changes state (see vocab. sheet_
- Set up simple practical enquiries to investigate factors that speed up evaporation.
- Use a data logger to record temperature and time and make careful observations over time.
- Use scientific language to explain evaporation and condensation.
- Report on findings from enquiries, including oral explanations
- Use straightforward scientific evidence to answer questions or to support their findings
- Record findings using simple scientific language, drawings, labelled diagrams.
- Identify misconceptions and classify materials into solids, liquids and gases.

Year 5

Forces

Working Scientifically

- Identify scientific evidence that has been used to support or refute ideas or arguments Children will set up and carry out a parachute investigation to determine which one travels the slowest and safest.
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (parachute investigation.
- Children will investigate how pulleys work and note the correlation between the effort required and the number of pulleys.
- Record data and results of increasing complexity using scientific diagrams and labels, and tables.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral form.

Year 6

Animals including Humans

Working Scientifically

- Identify scientific evidence that has been used to support or refute ideas or arguments.
- Children will investigate and recreate heart rates for varying levels of exertion – giving explanations for observations.
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children will investigate diffusion and osmosis.
- Children will complete a survey on healthy eating or exercise.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of results.
- Identify scientific evidence that has been used to support or refute ideas or arguments.
- Children will create line graphs to record the resting heart rate compared to the heart rate after exercise and explain their results.

Key Outcomes – Autumn 2

EYFS		Year 1			Year 2
		Seasonal Changes	**Children will continue their learning linked to seasonal changes and extend their observational skills in relation to their senses.** 1. Children will observe and describe weather patterns within each season – Winter (returning to the key question throughout the year - *'How do we know it is Winter?... Spring?...Summer?'*) 2. Children will understand that air temperature changes with the seasons, and that usually winter is colder. 3. Children will use their senses to investigate seasonal changes linked to winter. 4. Children will explore temperature change in greater detail and understand how weather impacts on our daily lives including the clothes we wear, the things we do and the food we eat. 5. Children will make links between colder temperatures and ice and snow. 6. Children will investigate weather around the world and understand that this varies in different countries according to where they are (Also see Australasia Study) 7. **Children will begin to understand that weather patterns are changing around the world and that this is due to our planet getting hotter due to human activity. Children will learn about simple things we can do to help stop this.** **<u>Working Scientifically</u>** • Children will use scientific vocabulary and use weather symbols to describe their observations. • Children will ask simple questions about the weather and recognise they can be answered by making simple observations and measurements (linked to temperature) • Children will make rain gauges windsocks, and thermometer boxes to measure rainfall, temperature and wind direction – how does this differ to Autumn? • Children will collect data and add this to their weather diary to learn about weather patterns over time. • Children will investigate the local area and school grounds within each season to understand how the natural environment changes and record this using photographs, drawings, tables, ID sheets etc.	Living Things and Their Habitats	**This is one of two parts studying Living Things in Their Habitats – spotlight on Emperor Penguins (see Summer Term 2 for local study)** 1. Children will explore and compare the differences between things that are living, dead, and things that have never been alive. 2. Children will understand the term 'habitat'. 3. Children will study penguins and know how they depend on each other and their habitats. 4. Children will do a simple comparison of three different habitats and animal characteristics – ocean, desert, rainforests etc. (Geography links – Pole-to-Pole). 5. Children will describe how animals obtain their food from plants and other animals, using simple food chains, naming different sources of food. (Also see Summer Term 2 for continued work). 6. Children will understand that animals have certain characteristics that are essential for keeping them alive and healthy. 7. Children will be able to name and order the main life cycle stages of at least one other animal (links to 'Animals including humans' Autumn 1). 8. **Children will understand the human impact on the polar ice-caps and be able to say how humans can help reduce global warming.** **<u>Working Scientifically</u>** • Children will ask simple questions and recognise that they can be answered in different ways. Children will raise questions to investigate what is alive, dead or never alive e.g. *Is a car alive?* • **Children will investigate changes in sea temperature on ice and relate this to climate change/human activity and understand how this is affecting penguin habitats.** • Children will investigate penguin characteristics by making a 'blubber mitten' – make predictions and record first-hand observations with a clear conclusion. • Children will research and observe using videos, photos, books

Key Outcomes – Autumn 2

Years 3

Forces and Magnets

1. Children will understand that there are different types of forces and be able to identify them (gravity, friction, magnestism)
2. Children will investigate the effects of friction on different surfaces.
3. Understand that forces are pushes and pulls which can make things move, stop or change shape.
4. Children will learn about life and the significance of ***Sir Isaac Newton***
5. Children will notice that some forces need contact between two objects, but magnetic forces can act at a distance.
6. Children will explore forces and discover that gravity and magnetism can act without contact.
7. Children will observe how magnets attract or repel each other and attract some materials and not others.
8. Children will be able to describe magnets as having two poles (North and South)
9. Children will 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.
10. **Children will learn the many uses of magnets including; everyday household items, their role in generating renewable energy and how they are used to sort metals in recycling centres.**

Year 4

Electricity

1. Children will be able to identify common appliances that run on electricity (eg microwave, hoover, hair dryer)
2. Children will be able to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
3. Children will be able to recognise some common conductors and insulators, and associate metals with being good conductors.
4. Children will be able to identify the dangers associated with electricity in the home and begin to recognise that the dangers are often associated with materials that are good conductors.
5. Children will be able to 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.
6. Children will be able to recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
7. Children will learn about the life and significance of ***William Gilbert.***
8. **Children will understand that electricity is energy and be able to identify different ways in which energy is generated including, burning of fossil fuels, wind, hydro and solar energy. Children will understand the benefits of renewable energy as part of a sustainable future.**

Year 5

Animals Including Humans

1. Children will be able to describe the changes as humans develop to old age.
2. Children will look for patterns in animal gestation periods and draw logical conclusions.
3. Children will explore the key stages of human foetal development.
4. Children will recognise and explore key milestones in baby and child development.
5. Children will identify and understand the changes in the adolescent human body during puberty and recognise and identify those changes during puberty that are gender specific.
6. Children will explore the key features and emotional changes in puberty in both boys and girls.
7. Children will be able to identify physical and mental changes that happen from adulthood to old age.
8. Children will be able to identify, order and explain the 6 key stages in a human life and create a human timeline diagram.

Year 6

Light

1. Children will recognise that light appears to travel in straight lines.
2. Children will 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.
3. Children will be able to 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.
4. Children will use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
5. Children will draw conclusions and provide answers based on scientific enquiry.
6. Children will describe the movement of light beams off of reflective surfaces and plan and carry out an investigation into the reflectiveness of given materials.
7. Children will be able to explain how a periscope works.
8. Children will investigate the size of a shadow in relation to the light source.
9. Children will plan and carry out an investigation into the strength of various magnifying lenses.
10. Children will understand that light can be bent when it is slowed down and recognise that white light can be split into 7 rainbow colours.
11. Children will investigate light colour mixing.

Key Outcomes – Autumn 2
Working Scientifically

Years 3		Year 4		Year 5		Year 6	
Forces and Magnets	Working Scientifically • Set up simple practical enquiries and comparative and fair tests. Children will ask questions and investigate how toy vehicles move on different surfaces. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment. Children will be able to group items using a magnet. They will investigate how magnets attract some materials and not others. • Ask relevant questions and use different types of scientific enquiries to answer them. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Children will be able to explain why magnets attract some materials. They will also understand that opposite poles attract and like poles repel. • Identify differences, similarities or changes related to simple scientific ideas and processes.	Electricity	Working Scientifically • Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries, comparative and fair tests. Children will investigate which materials are good or bad conductors. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support findings.	Animals including Humans	Working Scientifically • Record data using tables, scatter graphs, bar and line graphs. • Children will look for patterns in animal gestation periods. • Create a scientific diagram to show the key stages of foetal development. • Children will be able to create growth graphs and predict growth patterns. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Children will be able to create a Venn diagram to show changes in both boys and girls during puberty. • Identify scientific evidence that has been used to support or refute ideas or argument. • Record data using scientific diagrams and labels.	Light	Working Scientifically • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary: investigate the length of shadows; how light is reflected; the mixing of light. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Children will measure the length of shadows and observe and record how these re affected as they move closer or further away from the light source/ • Record data and results of increasing complexity using scientific diagrams and labels, tables, bar and line graphs. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Key Outcomes – Spring 1

EYFS		Year 1			Year 2	
		Everyday Materials	1. Children will identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. 2. Children will name objects and identify the material it is made of. 3. Children will describe the simple physical properties of a variety of everyday materials and relate this to its purpose. 4. Children will compare and group a variety of everyday materials based on their properties. **5. Children will learn about recycling and recognise the recycling symbol through sorting activities.** 6. Children will understand and investigate materials in relation to their properties - '*waterproof*', '*not waterproof*' '*absorbent*'. 7. Children will investigate the best materials for making an object e.g. What material makes the best umbrella? 8. Children will find out about people who have developed new materials in the context of learning about **Charles Macintosh**. **Working Scientifically** • Children will ask simple questions and recognise that they can be answered in different ways. • Observing closely, using simple equipment. • Perform simple tests linked to properties – soft/hard, bendy/e.g. Material hardness • Identifying and classifying materials in a variety of ways. • Use their observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions e.g. simple tables and displays • Children will investigate the best materials for making an object e.g. What material makes the best umbrella? • Children will identify materials in the real world during field work trips in the local area.	Uses of Everyday Materials	1. Children will identify, name and sort an increasing range of materials according to their properties. 2. Children will talk about the properties of everyday materials using key vocabulary and relate to suitability of uses (What if…?) - including wood, metal, plastic, glass, brick, rock, paper and cardboard. 3. Children will know that some materials can change shape by squashing, bending, twisting and stretching, and relate this to their uses. 4. Children will begin to understand changes in materials when heated and cooled (wax), and relate this to their uses. **5. Children will learn about how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.** **6. Children will relate everyday materials to human waste and understand the human impact of this.** 7. Children will find out about people who have developed useful new materials, for example **John Dunlop and John McAdam, and makes links to future materials and alternatives to plastics.** **Working Scientifically** • Children ask simple questions and recognising that they can be answered in different ways. • Children observe closely, using simple equipment. • Children will carry out investigations into the properties of materials making predictions and testing ideas - magnetic, transparent, floats, squashed, stretched, melts, moulds. • Gather and record data using simple tables and drawings. • Perform simple tests to explore what buildings are made of and relate this to Tudor and modern day building materials (Covered through The Great Fire of London topic). • Children will select suitable materials to create 2D and 3D representations (DT link).

Key Outcomes – Spring 1

Years 3

Animals including Humans

1) Children will 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.
2) Children will understand that animals (including humans) can be grouped by what they eat (carnivores, herbivores and omnivores).
3) Children will understand the 5 food groups and the proportions of each needed to create a healthy, balanced diet (proteins, carbohydrates, fats, fruits, vegetables and dairy).
4) Children will understand that not all animals have an internal skeleton and that the presence of this is an important feature in classifying them.
5) Children will know that a skeleton is needed for support, protection and movement.
6) Children will understand how muscles work in pairs to allow movement and maintain posture.
7) Children will investigate whether people who do more sport have stronger muscles.
8) Children will know the diaphragm is used in breathing and the lungs transfer oxygen to the blood.
9) Children will know that muscles need more oxygen to work hard and this affects breathing rate.

Year 4

Sound

1. Children will be able to identify how sounds are made, associating some of them with something vibrating.
2. Children will be able to recognise that vibrations from sounds travel through a medium to the ear.
3. Children will recognise that sounds get fainter as the distance from the source increases.
4. Children will be able to find patterns between the pitch of a sound and features of the object that produced it.
5. Children will be able to find patterns between the volume of a sound and the strength of the vibrations that produced it.
6. Children will begin to understand some of the workings of the human ear.
7. Children will investigate sound-proofing materials by planning and conducting an investigation into which material best reduces the sounds we hear.
8. Children will learn about the life and significant of ***Alexander Graham Bell.***
9. Cross curricular link to music as children will understand and explore how music is created, produced and communicated, including through the inter-related dimensions: pitch, duration, dynamics, tempo, timbre, texture, structure and appropriate musical notations.
10. **Children will learn about 'deaf' culture through various designers such as, Frederik Podzuweit - 'Music for Deaf People', which converts sound input into vibrations.**

Year 5

Earth and Space

1. Children will be able to describe the movement of the Earth and other planets relative to the Sun in the solar system.
2. Children will be able to describe the movement of the Moon relative to the Earth.
3. Children will be able to describe the Sun, Earth and Moon as approximately spherical bodies.
4. Children will be able to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
5. Children will create a scaled solar system using spherical representations.
6. Children will understand the difference between geo and heliocentric solar system and how views have evolved.
7. Children will learn about the works of ***Nicolaus Copernicus*** and ***Galileo Galilei.***
8. Children will use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
9. Children will observe, measure, record and identify patterns for changing shadows throughout a day.
10. Children will be able to match lunar phases to relative positions of the Moon, Sun and Earth.
11. **Children will understand that the Earth is surrounded by an atmosphere made up of different gases.**
12. **Children will be able to explain greenhouse gases and link this to human activity and the causes of climate change.**

Year 6

Living Things and Their Habitats

1. Children will describe how living things are classified into broad groups according to common observable characteristics and similarities and differences, including microorganisms, plants and animals.
2. Children will be able to give reasons for classifying plants and animals based on specific characteristics.
3. Children will recap who ***Carl Linnaeus*** was and learn about his classification system.
4. Children will use classification keys to sort living things according to observable characteristics.
5. Children will be able to test out classification keys and identify potential flaws.
6. Children will observe, research and record features of a range of leaves found in their local environment and design a key to classify leaves found in their local environment.
7. Children will be able to describe the key characteristics of unusual living things from around the world and use descriptions of features, and online research, to attempt to classify unusual living things.
8. Children will design, describe and name a new creature that characteristically sits within the Animalia classification.
9. **Children will discuss climate change and understand the impact this is having on living things and their habitats both locally and around the world.**

Key Outcomes – Spring 1
Working Scientifically

Years 3		Year 4		Year 5		Year 6	
Animals including Humans	Working Scientifically • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support findings - pattern seeking enquiry. • Children will review data from a food survey and present their data in bar charts.	Sound	Working Scientifically • Ask relevant questions and use different types of scientific enquiries to answer them. Children will go on a sound walk through school and begin to think about how sound is made. • Use straightforward scientific evidence to answer questions or to support their findings. Children will be able to explain that sounds are made when an object vibrates. • Set up simple practical enquiries and comparative and fair tests. They will investigate pitch and volume by exploring different instruments and the sounds they make (music link). • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Earth and Space	.Working Scientifically • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children will suggest enquiry questions to back up a series of statements about the Earth the Sun and the Moon. • Identify scientific evidence that has been used to support or refute ideas or arguments. Children will carry out shadow investigations which help support the idea that the Earth moves on it's axis. • Record data of increasing complexity using tables, scatter graphs, bar and line graphs. Children will use fruit to create a model of the solar system. They will research, collate and create graphs for data about the planets. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Children will observe, measure and identify patterns I changing shadows across a day. • Children will use scientific knowledge and logic to solve time problems.	Living Things and Their Habitats	Working Scientifically • Plan different types of scientific enquiries to answer questions. • Record results of increasing complexity using scientific diagrams and labels, and classification keys. Children will create classification routes for a range of living things. • Children will group animals, microorganisms and plants into broad groups then sub groups according to observable features. • Report and present findings from enquiries, including conclusions, in oral and written forms such as displays and other presentations. • Children will make a classification system for sweets. • Record data and results of increasing complexity using classification keys. • Children will observe, record and classify local area living things. • Identify scientific evidence that has been used to support or refute ideas or arguments.

Key Outcomes – Spring 2

EYFS		Year 1			Year 2
		Plants (Signs of Spring)	1. Children will identify the signs of Spring. 2. Children will explore the outdoors and be able to identify and name a variety of spring flowers and trees (*daffodils, tulips, crocuses, snowdrops, blossom trees, buds, including deciduous and evergreen trees)*. 3. Children will name common wild flowers such as, daisies, buttercups, clover, dandelion. 4. Children will use simple keys to identify four trees by their leaves. 5. Children will name parts of plants (flowers and trees) and talk about their function and make labelled drawings (roots, stem, leaves, flowerhead, petals, branches, bark, trunk, crown, buds). 6. Children will be able to identify the differences between bulbs and seeds. 7. Children will be able to describe the simple life cycle of a plant (Using Eric Carle's Sunflower story and through first-hand experiences). 8. Children will find out about the life and discoveries of **Jeanne Baret** - the famous botanist. 9. **Children will connect with nature and talk about how this makes them feel – developing an understanding of the benefits of nature.** **Working Scientifically** **Sid the Scientist** • Children will raise questions about what conditions plants need to germinate and grow. • Children will observe closely using simple equipment, the growth of bulbs and seeds into flowering plants and record using drawings (sunflower seed linked to Eric Carle's story/daffodil bulb – compare growth) • Children will find flowering plants and carefully examine them with a magnifying glass. Sketch and photograph them. • Children will investigate the structure of flowers by taking a flowering plant to pieces. • Children will gather and record data of the flowers and plants they observe in the outdoors and record in simple tables and bar charts (Maths link).	Plants (Growing)	Plants 1. Children will understand that plants grow from bulbs and seeds and recap and extend previous learning through plant hunting in the outdoors and using keys. 2. Children will understand why it is important for a plant to spread its seeds (Using books such as, A fruit is a suitcase of seeds). 3. Children will understand what is meant by the words 'dispersal/disperse', pollination' and 'seed' through studying dandelion seeds and making seed helicopters. 4. Children will test ideas and learn that plants need water, air, light and suitable temperatures to grow and stay healthy. 5. Children will plant a range of seeds to germinate and grow in the school vegetable plot (Using 'The extraordinary Gardener'). 6. **Children will learn about packaging and airmiles on fruit and vegetables and describe the benefits of 'growing your own' as part of a sustainable lifestyle.** 7. **Children will complete a litter survey in Geography and make links to taking care of their environment – linking to their 'growing' projects.** **Working Scientifically** **Sid the Scientist** • Children will raise questions about different methods of growing vegetables. • Children will identify and sort different types of seeds, bulbs and tubers. • Children will observe closely, using simple equipment – seed dispersal and plant growth. • Children will set up a comparative test to show that plants need light and water to stay healthy and test their own questions. • Children will make careful observations and measurements of how vegetables are growing in the vegetable plot.

Key Outcomes – Spring 2

Years 3

Rocks

1. Children will be able to compare and group together different kinds of rocks on the basis of appearance and simple physical properties.
2. Children will be able to name six common rocks (sandstone, limestone, chalk, granite, slate, marble)
3. Children will understand that rocks are formed in three different ways (magma crystals = igneous; layers of sediment = sedimentary; extreme heat and pressure inside the Earth = metamorphic)
4. Children will know the difference between sedimentary, metamorphic and igneous rock.
5. Children will use knowledge of the properties of rocks to determine why particular rocks were selected for different tasks.
6. Children will be able to describe in simple terms how fossils are formed when things that have lived are trapped within rock.
7. Children will report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
8. Children will discover the

Year 4

Living Things and Their Habitats

1. Children will explore and use classification keys and branching databases to group, identify and name a variety of living things in their local and wider environment.
2. Children will know the seven characteristics of a living thing (movement, respiration, sensitivity, nutrition, excretion, reproduction, growth) and relate this to their study of animals.
3. Children will carefully observe and record the living things in the local area.
4. Children will use branching databases and classification keys to better understand ocean eco-systems and ocean habitats.
5. Children will identify the characteristics of a sea turtle and describe how turtles are adapted to their environments.
6. **Children will learn about conservationists and the important role they play in understanding and protecting eco-systems (Spotlight sea turtles/Marine biologists).**
7. **Children will describe the life cycle of a sea turtle and relate this to their conservation needs.**
8. **Children will understand how climate change and pollution are impacting on ocean habitats posing a danger to living things both locally and globally (Spotlight on 'Laura the Sea Turtle').**
9. **Children will investigate food chains**

Year 5

Living Things and Their Habitats

1. Children will be able to describe the life process of reproduction in some plants and animals.
2. Children will be able to label the parts of a flowering plant, including male (anther, filament, stamen) and female structures (stigma, style, ovary, pistil).
3. Children will be able to define sexual and asexual reproduction.
4. Children will learn about processes of natural and artificial asexual reproduction in plants.
5. Children will be able to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
6. Children will learn about the lifecycle and reproduction of amphibians and insects.
7. Children will be able to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
8. Children will be able to record life cycles in the form of annotated scientific illustrations.
9. Children will learn about the significance of scientists: ***Jane Goodall*** and ***David***

Year 6

Evolution and Inheritance

1. Children will recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
2. Children will understand that variation occurs within offspring as well as across species.
3. Children will examine the evidence demonstrating how plants have evolved.
4. Children will identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
5. Children will be able to suggest how some animals and plants are adapted to extreme environments.
6. Children will recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
7. Children will recognise the role fossils have in the development of evolutionary theory.
8. To research the life and work of ***Charles Darwin.***
9. Children will design an animal that should thrive and survive in a given environment.
10. Children will examine how the fossil record helps us understand evolutionary relationships.
11. Children will plan an investigation to find out which tool is best at picking up

Key Outcomes – Spring 2
Working Scientifically

Years 3

Rocks

Working Scientifically

- Ask relevant questions and use different types of scientific enquiries to answer them. Children will devise their own fair tests for the hardness of rocks and test their permeability.
- Make systematic and careful observations. Children will observe rocks closely and discover that they have different qualities and features.
- Record findings using simple scientific language, drawings and labelled diagrams.
- Set up simple practical enquiries and comparative and fair tests.
- Make systematic and careful observations. They will use a rock identification key to discover what type of rock each sample is.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Gather, record, classify and present data in a variety of ways to help answer questions.
- Identify differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support findings.

Year 4

Living Things and Their Habitats

Working Scientifically

- Ask relevant questions and use different types of scientific enquiries to answer them. The children will answer questions about diet by extracting data from a food survey and displaying it in tables and bar charts. Children will then use these to look for patterns and trends.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data logger.
- Children will investigate how muscles work in pairs.
- Gather, record, classify and present data to help answer questions.
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

Year 5

Living things and their Habitats

Working Scientifically

- Record data and results of increasing complexity using scientific diagrams and labels.
- Identify scientific evidence that supports or refute ideas or arguments.
- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children will set up an investigation into artificial asexual reproduction in flowering plants
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Children will draw botanical illustrations that show the life cycle of some plants that reproduce sexually.

Year 6

Light

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (bird beak investigation)
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, tables, bar and line graphs (bird beak investigation and snail hunt).
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations (bird beak investigation, snail hunt).

Key Outcomes – Summer 1

EYFS		Year 1		Year 2
		Animals Including Humans	1. Children will identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals . 2. Children will describe and compare the observable features of animals from a range of groups and be able to sort according to these features. 3. Children will understand the terms 'herbivore, carnivore or omnivore' and be able to relate this to animals. 4. Children will identify a variety of common animals within their local environment and be able to classify these based of what they have learned. *How do we know a squirrel is a mammal? Can you name animals that are herbivores?* 5. Children will compare local animals in the UK to animals found in Australasia as part of their Geography project, making links to key science objectives. 6. **Children will develop their knowledge and respect for animals in the local area and develop a sense of respect and desire to protect what they observe.** **Working Scientifically** **Sid the Scientist** • Children will observe closely using magnifying glasses, binoculars and cameras to observe animals in their their local habitat e.g. *bird spotting.* • Children will use observations to identify why animals live in their habitats and relate this simply to the features they have e.g. squirrels and strong tails for climbing • Gather and record data to help in answering questions using charts and tables	Uses of Everyday Materials	**Continue to take care of vegetable plot started in Spring 2.** **Materials and their Properties – relate to previous work and recent litter survey:** ***What material is the litter we collected made of?*** ***What can we do to improve our environment and reduce waste and litter?*** **Which materials cause a problem in our environment for our animals and habitats and why?** **Children will be able to say how humans are impacting on the local habitats and suggest ways to improve this. Children will share their findings with the community and suggest alternatives to packaging, materials and recycling.** **Relate to Seaside project – seaside litter/ocean waste. (see Geography outcomes)**

Key Outcomes - Summer 1

Years 3		Year 4		Year 5		Year 6	
Rocks	See Spring 2 - Rocks	**Animals including Humans**	1. Children will learn about the first stage of the digestive system (cephalic phase). 2. Children will be able to describe the simple functions of the basic parts of the digestive system in humans. 3. Children will learn about the life and significance of ***William Beaumont.*** 4. Children will be able to identify the different types of teeth in humans and their simple functions (incisors – chew food; canines – tear and rip food; molars – crush and grind food). 5. Children will be able to construct and interpret a variety of food chains, identifying producers, predators and prey. 6. Children will be able to explain the different diets of carnivores, herbivores and omnivores. 7. Children will be able to define 'predator', 'prey' and 'producer'. 8. Children will be able to make links between plants and animals in the form of food chains. 9. **Children will describe and draw a range of food chains and understand the impact of pollution and climate change on food chains (linked to previous turtle work).**	**Properties of Materials**	1. Children will compare and group together everyday materials on the basis of their properties, including their hardness, transparency, and conductivity (electrical and thermal). 2. Children will be able to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. 3. Children will explore thermal insulating properties. 4. Children will pan and implement investigations to compare absorbency, strength and durability and apply knowledge of fabric properties to suggest fitness for purpose. 5. Children will investigate the electrical conductivity/insulation of materials. 6. Children will investigate materials which combine sound=proofing with comfort. 7. **Children will investigate materials and waste.** 8. **Children will identify ways in which materials are being repurposed, reused, recycled, repaired and refilled and understand the importance of this for a sustainable future e.g. *textile waste into bricks.*** 	**Electricity**	1. Children will 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. 2. Children will use recognised symbols when representing a simple circuit in a diagram. 3. Children will be able to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. 4. Children will be able to Identify from circuit diagrams those circuits that will or won't work. 5. Children will be able to describe how a dimmer switch affects resistance. 6. **Children will design an electric car and create a prototype of their design, explaining how all of their components work.** 7. **Children will relate the use of electric cars to the reduction in pollution and be able to talk about new targets set by the government in relation to the use of electric cars/burning fossil fuels (survey).** 8. Children will learn about the life and significance of ***Alessandro Volta*** and ***Nikola Tesla and new technologies (solar power).***

Key Outcomes – Summer 1
Working Scientifically

Years 3		Year 4		Year 5		Year 6	
Rocks	See Spring 2 - Rocks	Animals including Humans	Working Scientifically • Ask relevant questions and use different types of scientific enquiries to answer them. • Use straightforward scientific evidence to answer questions or to support findings. Children will compare teeth of a herbivore and carnivore and consider why they are different. • Set up simple practical enquiries and comparative and fair tests. Children will investigate which drinks are bad for the teeth. • Identify differences, similarities or changes related to simple scientific ideas and processes. Children will use everyday objects to explore the human digestive system.	Properties of Materials	Working Scientifically • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children will plan an investigation to test the hardness of the materials. They will also investigate which materials make the best thermal insulators. • Children will investigate possible food packaging materials. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using tables and scatter graphs. (Hardness investigation – table and scatter graph form; thermal insulators – line graph). • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Electricity	Working Scientifically • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. The children will plan and carry out a series of simple circuit investigations. • Children will explore the effects f voltage of electrical components. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Children will create annotated drawing to reflect their design ideas for a dimmer switch. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using tables, scatter graphs, bar and line graphs. • Children will analyse the designs of others and give feedback. • Use test results to make predictions to set up further comparative and fair tests. • Identify scientific evidence that has been used to support or refute ideas or arguments. • Children will effectively use appropriate materials, tools and equipment.

Key Outcomes – Summer 2

EYFS	Year 1		Year 2
	Continue with Seasonal Changes Seasonal Changes - *How do we know it is Summer?* Children will continue to develop their knowledge of plants and end the year by growing sun flowers from seed and beans from seed linked to Eric Carle and traditional stories. 1. Children will know that plants grow from seed. 2. Children will know how to take care of plants grown in the outdoors and the indoors. 3. Children will observe changes over time and record these using a simple diary. 4. Children will understand the effects of light, rain and temperature on plants and adapt according e.g. more more when needed. 5. Children will experience the full life cycle through the growth of sunflowers and beans.	**Animals In Their Habitats**	1. Children will explore microhabitats in the school grounds using ID Keys, making and recording observations. 2. Children will understand that most of the living things they observed live in those microhabitats because they are suited to them. 3. Children will understand that different habitats provide for the basic needs of different kinds of animals and plants and try and answer a range of questions: What microhabitat is best for moss to grow? What living things can be found in muddy microhabitats? Which microhabitats had the biggest variety of living things? Etc. **4. Children will design and make their own microhabitat.** **5. Children will design and make their own bug hotels for a range of invertebrates living in microhabitats.** **6. Children will recognise the importance of taking care of the plants and animals in our local area and relate this to climate change.** **<u>Working Scientifically</u>** **<u>Sid the Scientist</u>** • Children will ask questions about microhabitats and explore the answers in the outdoors. • Children will make careful observations of animals in the same group and will use simple features to compare living things (animals), explaining why they have sorted them this way. • Children will use their senses to compare different textures, sounds and smells. • Children will gather and record data to make conclusions. • Children will sort and classify minibeasts into simple groups based on simple characteristics. • Children will carry out simple investigations to show what minibeasts prefer (linking to habitats).

Key Outcomes – Summer 2

Years 3

Light

1. Children will recognise that they need light in order to see things and that dark is the absence of light.
2. Children will know that light is reflected from surfaces.
3. Children will know that light from the sun can be dangerous and identify ways to protect their eyes.
4. Children will recognise that shadows are formed when the light from a light source is blocked by an opaque object.
5. Children will find patterns in the way that the size of shadows change.
6. Children will learn that white light is composed of a spectrum of coloured light.
7. Children will learn about the life and significance of ***Thomas Edison.***
8. **Children will learn about the development of lightbulbs over time and how this has lead to more energy efficient light bulbs.**
9. **Children will discuss the role of renewable energy in providing light in our homes for a sustainable future and compare this to energy created from fossil fuels.**
10. **Children will understand the impact of burning fossil fuels and connect this to our own carbon footprints.**

Year 4

States of Matter

See summer 1 – Animals including Humans

IS THE TURTLE PROJECT IN HERE SOMEWHERE??

Year 5

Changes of Materials

1. Children will compare and group together everyday materials on the basis of their properties, including their solubility and response to magnets.
2. Children will know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.
3. Children will use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
4. Children will be able to demonstrate that dissolving, mixing and changes of state are reversible changes.
5. 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 fossil fuels** and the action of acid on bicarbonate of soda.
6. **Children will learn about climate change and be able to explain the causes of increased greenhouse gases in the atmosphere. Children will identify ways to reduce greenhouse gases.**
7. Children will be able to define and explain oxidation.
8. Children will learn about the life and significance of ***Joseph Lister*** and ***Florence Nightingale.***

Year 6

Light

See Summer 1 – Electricity unit Continued

1. **Children will understand the term 'energy' and identify the main energy sources – *fossil fuels, solar, hydro and wind power.***
2. **Children will understand that energy is one of the main contributors to climate change and identify ways in which we can all reduce our carbon footprint.**
3. **Children will deliver a 'Switch off' campaign around school and within the community.**

Key Outcomes – Summer 1
Working Scientifically

Years 3

Light

Working Scientifically

- Ask relevant questions and use different types of scientific enquiries to answer them. Children will learn through investigation that light travels in straight lines.
- Make systematic and careful observations.
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
- Gather, record, classify and present data in a variety of ways to help answer questions.
- Record findings using simple scientific language, drawings and labelled diagrams.
- Use straightforward scientific evidence to answer questions or to support their findings. Children will investigate the properties of mirrors and reflection.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Record and predict which colours show up best and least in the dark. Children will predict and then investigate how well different colours and materials reflect light in a simulated dark cave. They will record findings by sorting and classifying colour samples, noting observations and drawing conclusions.

Year 4

States of Matter

See summer 1 – Animals including Humans

Year 5

Changes of Materials

Working Scientifically

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children will investigate filtration, evaporation and sieving methods in order to separate materials. They will also plan and carry out an investigation into the impact of certain ingredients on an end product.
- Record data and results of increasing complexity using scientific diagrams and labels, tables and line graphs and photographs.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

Year 6

Light

See Summer 1 – Electricity unit continued