St Helens Primary Science Curriculum plan

KS1 National Curriculum Strands

KS1 Working Scientifically

- Asking simple questions and recognising that they can be answered indifferent ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

Year A

Physics	Biology	Biology
Seasonal changes Earth and Space	Animals including humans	Plants

Year B

Chemistry	Biology	Biology
Everyday materials	Animals including humans	All living things and their habitats

Lower KS2 National Curriculum Strands

Lower KS2 Working Scientifically Year 3 & 4

- asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometersand data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, barcharts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

Year A

Physics		Chemistry	Biology	Biology	Physics
Light	Sound	States of matter	Plants	Animals including humans	Earth & Space

Year B

Physics	Chemistry	Biology	Physics	Biology	Physics
Electricity	Rocks	Animals including humans	Forces and magnets	Living things and their habitats	Earth & Space

Upper KS2 National Curriculum Strands

Upper KS2 Working Scientifically Year 5 & 6

- planning different types of scientific enquiries to answer questions, including recognisingand controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy andprecision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting 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
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

Year A

Physics	Biology	Biology	Biology	Chemistry
Earth & Space	Animals including humans	Living things and their habitats	Animals including humans	Child led

Year B

Physics		Biology	Chemistry	Physics
Light	Electricity	Evolution and Inheritance	Properties & changes to materials	Forces

KS1 Year A				
KS1 End Points (NC) • Has experienced & observed phenomena, looked closely at the natural and humanly-constructed world around them. • Shows curiosity, asking questions about what they have noticed. • Developed understanding of scientific ideas using different types of scientific enquiry. • Answer own questions. • Is beginning to use simple scientific language to talk about what they have found out. • Can communicate their ideas to a range of audiences in a variety of ways.	Term	Autumn	Spring	Summer 1
	Topic	Seasonal Changes & Earth and Space	Animals, including humans	Plants
	Key Knowledge	• Knows when each of the four seasons occurs • Knows what the features of autumn are and what happens to trees in this season • Knows that days are longer in summer (sunshine hours) than in winter • Observe changes across the four seasons • Knows about and can describe weather in different seasons over a year. • Knows and can describe the features of different seasons and how they change through the year • Recognise that we live on planet Earth. • Know there are 8 planets in the solar system and can name some of the planets. • Know that the Earth moves around our sun and this causes seasonal changes.	• Can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals e.g. cat, robin, adder, frog, salmon. • Knows and can identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Can describe how animals including humans have offspring which grow into adults, using the appropriate names for the stages-investigate animal life cycles. • Knows that to survive animals need sunlight, water, air, food and a suitable habitat (including shelter for protection from predators and the environment.	• Knows and can identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Knows and can identify and describe the basic structure of a variety of common flowering plants, including trees. • Knows that plants may grow from either seeds or bulbs. • knows that seeds and bulbs can germinate and then grow into seedlings and then continue to grow into mature plants. • Knows that mature plants may have flowers which then develop into seeds, berries and fruits etc. • knows that seeds and bulbs need to be planted at times of the year and will germinate and grow at different rates. • knows that some plants are better suited to growing in full sun and some grow better in partial and full shade. • Knows that plants need water, light and a suitable temperature to grow and stay healthy
	Cross Curricular Links	• Maths: Creation of a pictogram • Art: Create seasonal artwork • Maths: Handling weather data • English: Write a weather report	• Art - Animal sculptures • English: Refer to texts e.g. Life cycle of a spider • History-animals that have become extinct.	• English: Writing instructions for How to plant a seed. • Art: Create a plant collage with key vocabulary. • Geography-plant map of the school grounds
KS1 Skills End Points (Working scientifically): Asks simple questions & recognise that they can be answered in different ways. Observes closely, using simple equipment. Performs simple tests. Identify & classify. Uses observations & ideas to suggest answers to questions. Gather & record data to help in answer questions.	**Key Skills**	Gather and record data about weather conditions, drawing on observation & using simple equipment. Continue to observe weather changes across seasons. Use data to create a pictogram and describe changes in day length over the seasons. Use evidence to describe features of the seasons.. Demonstrate knowledge in different ways such as creating artwork, pictogram. Present changes to weather in different ways to compare seasons Make and test shadow puppets at different times of the day. Make a rainfall gauge and record its results. Make windsocks to measure the direction and strength of the wind. Test: Does it matter where abouts on the school ground you stand?	Make observations of animals from each of the groups Compare the structure of two animals from the same or different group Classify animals using a range of features e.g. lay eggs/give birth to live young. herbivore, omnivore Identify animals by matching statements to named images. Ask questions and use secondary sources to find out about the life cycles of some animals Observe animals growing over a period of time e.g. caterpillars. Ask questions of a parent about how they look after their baby. Ask pet owners questions about how they look after their pet Consider habitats. Where do woodlice like to live? Make different habitat areas.	Can sort and group parts of plants using similarities and differences e.g. the shape of leaves Can use simple charts and Venn diagrams to identify and classify plants. Use photographs and own observations to talk about how plants change over time (e.g. seed to sapling to tree) and over the year (deciduous and fruit bearing trees). Plant seeds and observe how they grow and change. Point to and name the parts of a plant, recognisng that they are not always the same e.g. colours Make close observations of seeds and bulbs Classify seeds and bulbs Research/plan when and how to plant a seeds and bulbs Look after the plants as they grow; weeding, watering. Make close observations and measurements of their plants growing from seeds and bulbs Make comparisons between plants as they grow Can spot similarities and difference between bulbs & seeds Investigate what seeds need to grow.
	School Context			
		• Children to use outdoors to support their learning about seasonal change in the school grounds and local area. • Investigate St Helens weather outdoors	• Local area - use night camera on school field to find out what animals have habitats on or around our school field.	• Children observe plants & conditions around the school grounds. • Planting seeds and use school gardens/green house for growing. • Nature walk around local area • Beach school-investigate plants/trees on beach. What is seaweed/ Look at plants growing in mix of sand/soil

KS1 Year B

KS1 End Points (NC)

- Has experienced & observed phenomena, looked closely at the natural and humanly-constructed world around them.
- Shows curiosity, asking questions about what they have noticed.
- Developed understanding of scientific ideas using different types of scientific enquiry.
- Answer own questions.
- Is beginning to use simple scientific language to talk about what they have found out.
  Can communicate their ideas to a range of audiences in a variety of ways.

Term	Autumn	Spring	Summer
Topic	Everyday materials	Animals including humans	Living Things and their habitats
Key Knowledge	• Distinguish between an object & the material from which it is made. • Can identify & name a variety of everyday materials, including wood, plastic, glass. • Describe the simple physical properties of a variety of everyday materials. • Know how the properties of a material can make it useful for a range of and specific different purposes • knows that different materials can share the same properties. • Knows how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching • Knows the difference between materials that are transparent, translucent and opaque.	• Knows that exercise is important to humans and can explain why. • Knows the different food groups and the benefits of each as part of a healthy, balanced diet • Knows which food groups common foods belong to. • Knows about general hygiene and its importance and can state examples of hygienic practice. • Can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	• Knows and can explain the differences between things that are living, dead, and things that have never been alive. • Knows that most living things live in habitats to which they are suited • Knows and can describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Knows and can name a variety of plants and animals in their habitats, including micro-habitats • Knows and can describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and make the different sources of food.
Cross Curricular Links	• D&T: Children attempt to create a waterproof roof for a lego model •	• PE: investigation into the effects of physical exercise • Maths - non-standard measurements of parts of the body. • Geography-senses map of the school.	• DT & art: Create a habitat from a shoe box • ICT: Create a PowerPoint about a particular habitat-child lead (research and present)
Key Skills	Compare, classify and sort a variety of everyday materials based on simple physical properties e.g. manmade, natural, Classify objects made of one material in different ways. Classify one type of object made from a range of materials e.g. a collection of spoons made of different materials. Chosen an appropriate method for testing an object of a particular property. Use their test evidence to answer the questions about properties e.g. Which cloth is the most absorbent? Test the properties of objects e.g. absorbency of cloths, static in different materials, transparency of objects. Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties. Investigate which materials are fit for a purpose. Explain from their observations how materials change when a force is exerted on them by squashing, bending, etc Recording class data in a table and drawing simple conclusions Ask and answer questions about everyday materials	Investigate the effect of exercise on their bodies Classify food in a range of ways, including using the Eatwell guide Investigate washing hands, using glitter gel (germs) Describe, using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child Measure/observe how animals, including humans, grow. Collate what they know about looking after a baby/animal by creating a parenting/pet owners' guide Explain how development and health might be affected by differing conditions and needs being met/not met Conduct simple sense experiments. Which part of my body is good for feeling, which is not? Which food/flavors can I identify by taste? Take measurements of parts of the body and present results in a table to interpret.	Explore the outside environment regularly to find objects that are living, dead and have never lived Classify objects found in the local environment Observe animals and plants carefully, drawing and labelling diagrams Create simple food chains for a familiar local habitat from first hand observation and research. Create simple food chains from information given. Can sort into living, dead and never lived. Can give key features that mean the animal or plant is suited to its micro-habitat. Using a food chain can explain what animals eat Can explain in simple terms why an animal or plant is suited to a habitat.
	School Context		
	• Identify the materials key local buildings are made from and discuss why those materials have been used. Draw pictures and label. • Children to compare the uses of everyday materials in and around the school with materials found in other places	• Refer to school dinner menu; each day provides from each food group • Geography-senses map: Senses discussed and explored within school. What do we see, hear, touch, smell and taste every day?	• Hunt around the school grounds for a range of items-living (minibeasts), once lived but now dead (flowers/leaves) and never lived (Lego piece)

KS1 Skills End Points (Working scientifically):
Asks simple questions & recognise that they can be answered in different ways.
Observes closely, using simple equipment.
Performs simple tests.
Identify & classify.
Uses observations & ideas to suggest answers to questions.
Gather & record data to help in answer questions.

Lower KS2 Year A

Lower KS2 End Points (NC):	Term	Autumn		Spring		Summer	
Broadened their scientific view of the world through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions. Asks their own questions about what they observe and can make decisions about which types of scientific enquiry are likely to be the best ways of answering them. Draws simple conclusions and uses some scientific language, to write about what they have found out. Reads and spells scientific vocabulary correctly and uses word & spelling knowledge.	Topic	Light	Sound	States of matter	Plants	Animals including humans	Earth and Space
	Key Knowledge	• Knows that light is needed to see & dark is the absence of light • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and how to protect the eyes. • Know shadows are formed when light from a source is blocked by an opaque object. • Find patterns in the changing size of shadows. • Knows how the shadows of transparent, opaque and translucent materials vary.	• Knows how sounds are made. • Knows sound travels from a source to our ears. • Knows the correlation of pitch and an object. • Can explain the correlation: the sound volume and the strength of the vibrations. • Know that sounds get fainter as distance from the sound source increases.	• Knows how to distinguish between a solid, liquid and gas. • Knows that some materials change state when they are heated or cooled. • Knows the temperatures at which ice, water and water vapour change state. • Recalls the part played by evaporation and condensation in the water cycle.	• Identify & describe the functions of different parts of flowering plants. • Knows the requirements of plants eg air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Can explain the ways in which water is transported within plants • Knows the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	• Name basic parts of the digestive system in humans. • Identify the different teeth in humans & the functions. • Identify different organisms; producers, predators & prey. Apply to the construction and interpretation of food chains. • Explain animals need to eat to get needed nutrients • Food contains a range of different nutrients that are needed by the body to stay healthy eg protein, vitamins, etc • Knows food will provide a range of nutrients. • Knows skeletons & muscles help animals and humans move and provide protection	• Name the planets in our solar system. • Know that planets orbit around the sun. • Can recall features of different planets • To explain the moons features
		• R.E Festival of light and Christmas.	• Music: Making sounds	• DT: food prep	• Art: Sketching plants		Art: Space camp art
Lower KS2 (Working Scientifically) Asks relevant questions & use different types of scientific enquiries to answer them. Sets up practical enquiries, comparative & fair tests. Makes systematic & careful observations, takes accurate measurements with standard units & a range of equipment. Gathers, records, classifies and presents data in a variety of ways to answer questions. Records findings using simple scientific language and pictorial representations eg diagrams, keys, bar charts. Reports on findings. Uses results to draw simple conclusions, predictions, suggest improvements and questions. Identifies differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support findings	Key Skills	Observe & identify changes to size & orientation of shadows, relative to proximity to light source. Observe & identify the difference in shadows of opaque, translucent & transparent objects.. Observe how shadows are formed & affected.. To notice that light can be reflected off surfaces and 'investigate the visibility of different materials. Investigate size of shadows at times of day and year. Classify materials e.g. opaque, transparent and translucent. Explain why shadows are formed & how the length/size of a shadow can be changed. Investigates questions related to an object & the shadow it causes.	Experiment with at least three different instruments to observe and explore volume and pitch. Make predictions & draw conclusions about the pitch and volume of sounds.* Note how vibrations make sounds of different volumes and travel to our ears. Identify and show how sound travels through particles and into the ear. Make own instruments that produce a range of pitches.	Observe & classify a range of solids & liquids. Explore making gases visible Classify materials into solids, liquids & gases. Observe different material melting. Investigate how ice melts. Investigate melting point of different materials. Observe non-reversible change/reversable change eg freezing liquids. Observe & measure water temperatures. Observe water evaporating & condensing. And Investigate changing the rate of evaporation. Using data- explain what affects how quickly a solid melts & how to speed up/ slow down evaporation. Present learning in a range of ways (water cycle)	Observe what happens to plants over time when the leaves or roots are removed. Observe the effect of white carnations or celery in colour water. Investigate what happens to plants in different conditions Spot flowers, seeds, berries & fruits throughout the year. Identify pollen Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. Observe seed dispersal e.g. sycamore seeds. Research different types of seed dispersal. Classify seeds in a range of ways e.g how they disperse Create a new species of flowering plant. Compare features of seeds and method of dispersal.	Construct & interpret a variety of food chains, identifying producers, predators and prey. Research & create food chains Identifies differences, and similarities in teeth eg herbivore etc Can record the teeth in their mouth (make a dental record). Recreate the human stomach and observe representation of how food breaks down. Label the different parts of the digestive system. Classify food in a range of ways. Use food labels to explore the nutritional content. Plan a daily diet (balance of nutrients) Explore nutrients contained in fast food Research the parts & functions of the skeleton* Investigate body difference e.g.; Can people with longer legs run faster?; Compare, contrast & classify skeletons of different animals	Ask questions about the solar system Uses secondary research to find out about different planets Makes careful observation of the moon using telescope Conduct an experiment to explain the craters in the moon.
		School Context					
		Classroom brightness in relation to productivity		Magnetic resources	Nature walk -school grounds		Space camp

Lower KS2 Year B

Lower KS2 End Points (NC):	Term	Autumn		Spring		Summer	
Broadened their scientific view of the world through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions. Asks their own questions about what they observe and can make decisions about which types of scientific enquiry are likely to be the best ways of answering them. Draws simple conclusions and uses some scientific language, to write about what they have found out. Reads and spells scientific vocabulary correctly and uses word & spelling knowledge.	**Topic**	**Electricity**	**Rocks**	**Animals including humans**	**Forces and magnets**	**Living things and their habitats**	**Earth and Space**
	Key Knowledge	• Can name appliances that require electricity. • Names the basic parts of a circuit, eg cells, wires. • For an appliance to work within a circuit, it has to be part of a complete loop with a battery. • A switch in a circuit is a temporary break. • All metals conduct electricity but some, such as aluminium and titanium, are poor conductors. • Knows and uses recognised symbols to represent components of a circuit.	• Rock is a naturally occurring material. • Names and describe the properties of different types of rock e.g. sandstone, • Rocks can be hard or soft. They have different sizes of grain or crystal. • Rocks can be different shapes & sizes, and some absorb water. • Knows, in simple terms, how fossils are formed when things that have lived are trapped within rock. • Knows that soils are made from rocks and organic matter.	• Knows the basic parts of the digestive system in humans. • Identifies the different teeth & functions in humans. • Recognise which organisms are producers, predators and prey then apply to food chains. • Explain animals, must eat to get nutrients. • Food contains a range of different nutrients that are needed to stay healthy. • Humans & some animals have skeletons/muscles which help them move & provide protection/ support.	• Knows that friction affects movement on different surfaces • Knows that some forces need contact between two objects, but magnetic forces can act at a distance • Knows that magnets attract or repel each other and attract some materials • Knows magnets have two poles • Knows two magnets will attract or repel, depending on which poles are facing.	• Group living things in different ways. • Name living things in a range of habitats. • Relate adaptational features of an organism to the known features of its habitat. • Environment changes naturally & due to human impact.	• Know that our universe is called the milky Way and it is one of 1000's of different universes. • Recognize the features of a star. • Know that our sun is a star.
	Cross Curricular Links	D&T: Incorporate a circuit into a 3D model (Primary Engineer)	Computing: Stop/go animation- how rocks formed.	Art: sketching skeltons.	Geography: compasses PE movements	Geography - -beach clean.	Art- Milky Way using pastels.
Lower KS2 (Working Scientifically) Asks relevant questions & use different types of scientific enquiries to answer them. Sets up practical enquiries, comparative & fair tests. Makes systematic & careful observations, takes accurate measurements with standard units & a range of equipment. Gathers, records, classifies and presents data in a variety of ways to answer questions. Records findings using simple scientific language and pictorial representations eg diagrams, keys, bar charts. Reports on findings. Uses results to draw simple conclusions, predictions, suggest improvements and questions. Identifies differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support findings	Key Skills	Construct and investigate a range of circuits. Investigate which materials can be used instead of wires to make a circuit . Classify materials that conduct electricity and those that don't following investigation and record findings.. Investigate the effect of a switch and combinations of switches in simple circuits. Investigate switches and consider variations for specific uses, such as a pressure switch for a burglar alarm. Apply their knowledge of conductors and insulators to design and make different types of switch.	Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Can devise tests to explore the properties of rocks and use data to rank the rocks* Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. Can identify plant/animal matter and rocks in samples of soil Can devise a test to explore the water retention of soils	Construct & interpret a variety of food chains. Research & create food chains Identifies differences, and similarities in teeth. Teeth tally-lost teeth Label the different parts of the digestive system. Classify food in a range of ways. Create a food labels to explore the nutritional content. Plan a daily diet (balance of nutrients) Research the parts & functions of the skeleton* Investigate body difference e.g.; Can people with lbigger hands catch the basketball. Compare, contrast & classify skeletons of different animals	Record and report on findings from investigations, involving how things move on different surfaces* Investigate which materials are magnetic Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic.* Make and investigate predictions on whether two magnets will attract or repel, depending on which poles are facing.	Observe plants & animals in different habitats and use recordings to compare & contrast living things. Explore & use classification keys to group, identify and name living things in their local and wider environment. Classify living things found in habitats based on features. Create a simple identification key.. Explore human impact on the environment e.g. litter Use secondary sources to investigate atural change and positive & negative human impact, and write a report on this.	Observe stars using telescopes Ask relevant questions and finds answers using different types of scientific enquiries Present research using a simple scientific language. Present findings using written explanations and display
	School Context						
			Rocks and soil around our school and local environment.			Litter pick at local beach-material sorting.	Space camp on school field.

Upper KS2 Year A

Upper KS2 End Points:

- **Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.**
- **Has encountered more abstract ideas and is beginning to recognise how these help them to understand and predict how the world operates.**
- **Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information.**
- **Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.**

Term	Autumn		Spring	Summer
Topic	**The Earth and Space**	**Animals including Humans**	**Living things and their habitats**	**Revision- assessment gaps**
Key Knowledge	• The Sun is a star. It is at the centre of our solar system. There are 8 planets. These travel around the Sun in fixed orbits. • Earth takes 365¼ days to complete its orbit around the Sun. • The Earth rotates (spins) on its axis every 24 hours. • As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. • The Moon orbits the Earth. It takes about 28 days to complete its orbit. • The Sun, Earth and Moon are approximately spherical.	• Can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions • Knows and can describe the way in which nutrients and water are transported within animals, including humans	• Plants can be divided broadly into two main groups; flowering plants and non-flowering plants. • Living things can be formally grouped according to characteristics. • Animals can be divided into two main groups: vertebrates and invertebrates. • Each group has common characteristics. • Can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Can describe the life processes of reproduction in some plants (pollination process) and animals • Knows that bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent	**Child led enquiry (late summer term)**
	• History: historical misconceptions about the earth and scientists who challenged these. • Geography: Time Zones	• Maths - Graphs and Data Collection • PE - Physical Exercise • PSHE - Healthy Eating • D&T - Healthy Meals	• English: leaflet on different life cycles/ report about a life cycle of a mammal • PSHE (SRE): Coverage of specific knowledge related to reproduction.	
Key Skills	Use secondary sources to help create a model e.g. to show the movement of the Earth around the Sun and the Moon around the Earth. Use secondary sources to create a model to show why day and night occur Make first-hand observations of how shadows caused by the Sun change through the day Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. Research time zones Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel.	Plan and conduct a scientific enquiry to identify different food groups. Use labelled diagrams to support understanding of how nutrients & oxygen are delivered around the body. Use information to identify the main components of the heart. Predict what will happen to the heart during exercise. Construct and analyse the variables that make a fair test. Conduct a fair investigation on the effects of exercise on the heart. Use scientific equipment to track results and record data using tables and graphs. ** Analyse whole class data after investigation to compare and reflect on findings and draw conclusions. Use information acquired to write a scientific report on how the human circulatory system works.	Classify plants & animals, record conclusions with classification keys. Use information about the characteristics of an unknown animal or plant to assign it to a group. Research the formal classification system devised by Carl Linnaeus and why it is important. Research an unfamiliar animal or plant using its characteristics- place on the classification system. Grow & observe plants that reproduce asexually e.g. strawberries, spider plant, Organise mammals into different groups - sea and land and marsupials and use scientific evidence to refute/support correct/incorrect statements (such as 'dolphins are fish'). Draw and label scientific diagrams relating to the life cycle of a range of animals. Compare and contrast the life cycles of different living things & present findings Identify which insects complete which type of metamorphosis & present findings. Identify the differences between some amphibians Use data to compare and find patterns, e.g. size of an animal and its expected life span	•
	School Context			
	• Use playground to create role play of the solar system		• Grow plants in school garden • Use observation of flowering plants in school grounds	

Upper KS2 Skills End Points (Working Scientifically):

Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Reports and presents 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.
Uses test results to make predictions to set up further comparative and fair tests.
Identifies scientific evidence that has been used to support or refute ideas or arguments.

Upper KS2 Year B

Upper KS2 End Points:

- **Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.**
- **Has encountered more abstract ideas and is beginning to recognise how these help them to understand and predict how the world operates.**
- **Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information.**
- **Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.**

Term	Autumn		Spring		Summer
Topic	**Electricity**	**Light**	**Evolution and Inheritance**	**Properties and changes to materials**	**Forces**
Key Knowledge	• Light appears to travel in straight lines • Knows and can explain that objects are seen because they give out or reflect light into the eye • Knows and can 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. • Knows and can explain, with reference to how light travels, why shadows have the same shape as the objects that cast them	• The brightness of a bulb, or the volume of a buzzer, correlates with the voltage of cells in the circuit. • Knows & can give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Knows the effect of adding more components to a circuit with one cell & the effect of adding multiple cells • Knows and can use the recognised symbols to represent a simple circuit in a diagram.	• Know all living things have offspring of the same kind. Offspring are not identical to parents. • Plants and animals have characteristics that make them suited to their environment. • Know environmental changes will mean some variations may not suit the new environment and will die. If it changes slowly, animals and plants with variations that are best suited survive and reproduce. • Understand what evolution means. • Fossils give us evidence of what lived on the Earth millions of years ago scientists such as Darwin and Wallace observed how living things adapt to different environments	• Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. • Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. • Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials, and these are not reversible.	• Knows that unsupported objects fall to Earth because of the force of gravity acting between the earth and the falling object • Knows and can identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Knows that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
		DT Project- incorporates mechanics & electronics. Art- Christmas light up card	Key Texts (Origin or species) and Mary Anning Biography		D&T: Y4 (Levers), Y6 (Pulleys)
Key Skills	Plan and conduct a test to investigate how light travels and explain/present the findings. Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light. Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram.	Draw circuit diagrams of a range of simple series circuits, use recognised symbols. Communicate structures of circuits using circuit diagrams with recognised symbols Make electric circuits & investigate/demonstrate, how variation of components can be changed. Plan & select resources for a fair scientific enquiry, deciding variables to control. Record results from an experiment using tables and graphs Evaluate & explain their investigation, results & conclusions.	Follow lines of enquiry to support Explanation of the process of evolution. Demonstrate an understanding, with specific examples, of how an animal or plant has evolved over time Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. Compare the ideas of Charles Darwin and Alfred Wallace on evolution. Research the work of Mary Anning and understand how this provided evidence of evolution. Referring to and using examples of fossil evidence that support the theory of evolution.	Investigate the properties of different materials & recommend materials for particular functions based on these properties. Explore adding a range of solids to water and other liquids. Investigate rates of dissolving by carrying out comparative and fair test and records findings. Separate mixtures by sieving, filtering & evaporation choosing a suitable method/ equipment for each mixture. Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, Carry out comparative and fair tests involving non-reversible changes Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes)	Investigate the pull on different objects using a newton meter and record forces in Newtons (N). Report on conclusions relating to an object's mass and its weight in Newtons. Investigate the effect of friction in a range of contexts. Investigate the effects of water resistance in a range of contexts. Investigate the effects of air resistance in a range of contexts e.g. parachutes. Explore how levers, pulleys and gears work. Research how the work of scientists such as Galileo Galilei helped to develop the theory of gravitation.
School Context					
DT: pin hole camera DT- Victorian room with a circuit for a light bulb.					

Upper KS2 Skills End Points (Working Scientifically):

Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Reports & presents findings from enquiries, including conclusions, causal relationships and explanations of & degree of trust in results, in oral and written forms such as displays.
Uses test results to make predictions to set up further comparative and fair tests.
Identifies scientific evidence that has been used to support or refute ideas/ arguments.