WHIMPLE PRIMARY SCHOOL – DESIGN TECHNOLOGY CURRICULUM OVERVIEW

EXPLORE DISCOVER SUCCEED

"Somewhere, something incredible is waiting to be known." ***Carl Sagan, astronomer***	**VISION** Our vision for Science is to enable children to confidently explore and discover the world around them, so that they have a deeper understanding of the world we live in. We realise that young children are naturally curious and passionate about learning; we provide a stimulating science curriculum that nurtures children's natural curiosity and their on-going intellectual development. Through a hands-on, inquiry-based curriculum, children will experience the joy of having wonderful ideas, exploration and investigation – that is, the joy of finding out. Our aim is that these stimulating and challenging experiences help children secure and extend their scientific knowledge and vocabulary. We believe that these opportunities will ensure that our children are confident, life-long learners who will explore the world around them.

Working Scientifically Golden Threads

Asking questions **Making observations and taking measurements** **Performing tests**

Identify and classify **Answering questions and drawing conclusions** **Gathering and recording data** **Using evidence**

Elm Rec	**EYFS R**	Learn new vocabulary. CL Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. CL Use new vocabulary in different contexts. CL Explore the natural world around them. UW Understand the effect of changing seasons on the natural world around them. UW Describe what they see, hear and feel while they are outside. UW Recognise some environments that are different to the one in which they live. UW Explore the natural world around them. UW Know and talk about the different factors that support their overall health and wellbeing: ● regular physical activity ● healthy eating ● tooth brushing ● sensible amounts of 'screen time' ● having a good sleep routine ● being a safe pedestrian PSED
	EYFS ELG	Make comments about what they have heard and ask questions to clarify their understanding. CL Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. PSED Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. UW Explore the natural world around them, making observations and drawing pictures of animals and plants. UW

Ash		Autumn B first	Autumn B second	Spring B first	Spring B second	Summer B first	Summer B second
Ash Class	Unit Overview	**Animals including humans (People and their pets)** The children will observe creatures in the school grounds; photograph them and make sketches. They will collect woodlice and establish colonies in the classroom based on what children know about their habitats. Plan an investigation to test what sort of paper will be best for the job of mopping up a puppy's accident. Talk about and design a good pet and observe different pets in the classroom.	**Seasonal changes (Weather Art)** The children will observe the weather, learn how to present data and make their own weather forecast to present to the class. They will create bar charts to record shadow length over time. The children will set up rain gauges to observe rainfall and bring all the learning together in a recorded weather forecast for the school.	**Everyday Materials (Brilliant Builders)** The children will investigate how to fix a torn umbrella, explore different materials and answer the questions: how can we know that this material will not let the rain through? How can we test it? Go on further to investigate the absorbency and waterproofing of materials.	**Plants (Art and Nature)** Investigate and sort materials according to where they came from. Learn all about those materials that come from plants. Create a large pollen sculpture out of clay, find flowers outside in the playground and sketch them and then make a large model of the inside of a flower using junk modelling materials! Enjoy being outside by doing bark and leaf rubbings and then do a piece of playground art, using cloths, chalk and found materials.	**Everyday Materials (Exploring Changes)** The children will observe a block of ice and record the changes. Devise an investigation to melt the ice quickly or slowly. Then create puddles and measure how they change. Take up the challenge of investigating the absorbency of fabrics and explore changes in wax	**Living Things and their Habitats (Habitats and Homes)** Make a playground allotment complete with edible plants and bird scaring sculptures. Weed and tend the allotment; visit a farm (virtual); and explore farming with small world play. In groups, design a bug hotel and build it.
	Skills Builder Link	**Creativity Step 2: Sharing imagination**		**Teamwork Step 2: Adjusting behaviour**		**Planning Step 2: Identifying successes**	
	Famous Scientist, career focus	*Yann Le Meur* *Animal behaviourist*	Penny Whetton Agricultural Scientist	John McAdam Meteorologist, Climatologist	George Washington Carver Materials Scientist and Inventor	John Dunlop Engineer	Royal beekeeper Beekeeper
	Vocab	**Amphibians, fish, reptiles, mammals, birds, invertebrates, carnivore, herbivore, omnivore, survive, prediction, observation, water, air, food.**	**Season, spring, summer, autumn, winter, weather, daylight, sunrise, sunset, chart, observe, patterns, data.**	**Clay, metal, leather, plastic, wood, glass, paper, fabric, rubber, object, material, absorbent, waterproof, flexible, rigid, test, results.**	**Seed, leaf, flower (blossom), petals, fruit, bulb, roots, stem, trunk, branches, bark, pollen, deciduous, evergreen, reproduce, disperse, germinate, diagram.**	**Water, ice, melts, solid, record, frozen, materials, properties, liquid, chart, gas.**	**Habitats, woodland, meadow, wetlands, seashore, ponds, micro-habitat, food chain, predator, decomposer, pollinator.**
	Learning Focus	1.Observe where invertebrates like to live in the school grounds. 2. Investigate what type of conditions woodlouse prefer. 3. Sort, group and name common animals including pets. 4. Find out about the different diets of animals. 5. Investigate which type of food snails like best. 6. Find out about and describe the needs of animals including pets for survival.	1.Describe how a tree changes through the four seasons. 2. Observe the signs of Autumn. 3. Investigate how a pine cone protects its seeds in wet weather. 4. Interpret data to find out which seasons the longest/shortest days are in. 5. Observe and record the weather through Autumn. 6. Create a block graph to show which weather occurred most/ least in Autumn.	1. Name and group objects into natural or man-made and say what materials man-made objects are made from. 2. Find out how the shapes of solid objects made from some materials can be changed. 3. Predict which materials might be best to fix an umbrella according to its visible properties. 4. Investigate which materials are waterproof. 5. Identify and compare the best paper for absorbing water. 6. Investigate which types of paper make the best floating boats.	1. Plant a bulb, observe and measure how it grows over time. 2. Investigate what is inside a seed. 3. Observe a variety of seeds and find out how they are dispersed. 4. Make observations of flowering plants including pollen. 5. Identify and classify common trees in the school grounds as deciduous or evergreen and describe their basic structure. 6. Find out how plants grow and stay healthy in hot, dry or cold places.	1. Observe what happens to an ice cube when it is left out of the freezer. 2. Observe and record how puddles change over time. 3. Predict and investigate how to melt ice quickly. 4. Investigate which material would be best to stop an ice lolly from melting. 5. Explore what happens to different materials when heated.	1. Explore ways to attract more invertebrates into our school garden. 2. Identify and describe some of the habitats that can be found in the UK. 3. Identify and name invertebrates in their micro-habitats. 4. Use evidence to design and make a bug hotel with features to attract different invertebrates. 5. Find out how invertebrates are important within habitats and food chains.
	Key Knowledge	Identify and name a variety of common animals including fish, amphibians, reptiles and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the variety of a number of common animals. Identify and name a variety of plants and animals in their habitat including micro-habitats. Find out about and describe the basic needs of animals including humans for survival (water food and air).	Observe changes across the 4 seasons. Observe and describe weather associated with the seasons and how day length varies.	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Identify and name a variety of common wild and garden plants including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants including trees. Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Understand how everyday materials can be used for more than one thing. Understand how different everyday materials can be used for the same thing. Understand why the properties of materials make them suitable or unsuitable for particular purposes.	Explore and compare the differences between things that are living, dead and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including micro-habitats. Describe how animals obtain their food from plants and other animals using the idea of a simple food chain and identify and name different sources of food.
	Working Scientifically Skills	Observe animals over time and explore ways to record results. Predict and explore which materials would be best. Identify and classify key differences between living things.	Observe weather over time and explore ways to record results. Use simple equipment	Identify and compare the suitability of a variety of everyday materials, investigate how different material can be bent, twisted, squashed.	Using observations and ideas to suggest answers to questions, identify and classify	Predict and investigate how to melt ice quickly. explore ways to record results for rate of evaporation in puddles.	Explore and compare the differences between things that are living, dead and things that have never been alive, **use evidence to find how different habitats provide for the basic needs of different kinds of animals and plants**

OAK		Autumn B first	Autumn B second	Spring B first	Spring B second	Summer B first	Summer B second
Oak Class	Unit Overview	**Forces and magnets (White Rose)** The children learn about forces, friction and magnetic attraction. They explore the context of pushing and pulling, and identify different actions as pushes or pulls. They will investigate friction and identify magnetic materials. They will investigate the strength of different magnets and explore the way the magnetic poles attract and repel.	**Sound** The children will learn about how vibrations cause sounds and how sounds travel, as well as how sounds can change pitch and loudness. They will learn how sounds are made and explore pitch. They will investigate how sounds change over distance and through different materials	**Rocks and Fossils (White Rose)** The children will discover the different types of rocks and how they are formed. They will compare and group rocks based on appearance and simple properties. They will learn how fossils are formed and learn about the contribution of Mary Anning to the field of palaeontology. Children will find out how soil is formed and investigate the permeability of different types of soil.	**Light** The children will learn about light, reflections and shadows. They will learn about different sources of light, and that we need light to see. They will investigate reflective materials and find out more about reflective surfaces. They will learn that the sun's light can be dangerous. They will find out which objects are opaque and will learn how shadows change when the distance between the object and light source changes.	**Plants** The children will learn the names of different parts of plants and the jobs they do. They will investigate what plants need to grow well and will find out about the transportation of water within plants. They will identify the parts of a flower and explore the different stages of the life cycle of a flowering plant.	**Animals including humans** Building on learning in KS1, the children will find out more about what makes a healthy, balanced diet. They will learn about the nutrients that different foods provide animals and humans. They also explore the different types of skeletons that animals have and compare these. They will learn some names of bones in the human body. They will learn about how muscles help us to move.
	Skills Builder Link	**Adapting Step 3: Persisting**		**Problem Solving Step 3: Sharing problems**		**Teamwork Step 3: Time keeping**	
	Famous Scientist, career focus	Willhelm Roentgen Astronautical engineer	Kalpana Chawla Seismologist	Charles Richter Geologist	Salvino d'Armate Optician	Gertrude Jekyll Horticulturalist	Tim Spector Dietician
	Vocabulary	*Forces, friction, surface, magnet, magnetic, magnetic field, poles, repel, attract, contact and non-contact force, predict, classify, gather, record*	*vibration, sound wave, volume, amplitude, pitch, ear, particles, distance, soundproof, absorb sound, vacuum, eardrum, patterns, labelled diagram, data, construct*	*Igneous, sedimentary, metamorphic, magma, lava, sediment, permeable, impermeable, granite, pumice, sandstone, chalk, gneiss, reaction, fossilisation, palaeontology, erosion, secondary sources,* interpret, evidence, conclusion	*light source, dark, reflection, reflect, reflective, ray, pupil, retina, opaque, translucent, transparent, improve*	*evaporation, fertilisation, petal, stamen, carpel (pistil), sepal, pollination, pollinator, germination, seed dispersal,*	*Healthy, nutrients, energy, saturated fats, unsaturated fats, vertebrate, invertebrate, muscles, tendons, joints, bar chart, key*
	Learning Focus	1. Understand forces as push or pull and contact or non-contact. Introduce friction. 2. Investigate friction, as a contact force that affects moving objects. Carry out an experiment. 3. Magnets introduced with their different uses. 4. Explore and investigate magnetic and non-magnetic materials including different types of metals. 5. Identify North and south pole on magnets and the effect of putting them together.	1.Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. 2.Find patterns between the pitch of a sound and features of the object that produced it. 3.Find patterns between the volume of a sound and the strength of the vibrations that produced it. 4.Recognise that sounds get fainter as the distance from the sound source increases.	1. Identify rocks observing closely the differences and similarities between them. 2. Group rocks, learning that some rocks have crystals, grains or layers and this information can be used to sort rocks into different groups. 3. Test rocks to find out their different properties and therefore different uses. 4. Local Survey of rocks and their uses. 5. Explore fossils and understand that fossils are usually formed from the shells or bones of living things, but can also be formed from animal tracks and footprints. 6. Understand fossil formation.	1.Recognise that they need light in order to see things, and that dark is the absence of light. 2.Notice that light is reflected from surfaces. 3.Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. 4.Recognise that shadows are formed when the light from a light source is blocked by an opaque object. 5. Find patterns in the way that the size of shadows change.	1. Parts of a plant are discovered by dissecting real plants. 2. Plan and begin an experiment into what affects plant growth. 3. Understand how the roots and stem transport water around the plant. 4. Describe what seeds are and the germination process. 5. Observe the stamen (male) and pistil (female) parts of the plant used for reproduction. Learn the process of pollination. 6. Investigate the different mechanisms of seed dispersal and the reasons for this. 7. Understand the common lifecycle of plants: germination, growth, pollination, seed formation and seed dispersal.	1.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.Identify that humans and some other animals have skeletons and 3. muscles for support, protection and movement. 4. Study the work of a nutritionist.

	Key Knowledge	A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles e.g. a north and south, are brought together they will pull together – attract. For some forces to act there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.	A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.	Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.	We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.	Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.	Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.
	Working Scientifically Skills	Asking questions. Gathering and recording data. Performing simple tests.	Observe how different sounds are made Conduct an investigation in which we will Make predictions about which materials will absorb sound Make observations about how different materials affect sound Analyse gathered information to draw conclusions on which materials absorbs sound best	Making systematic and careful observations to classify. Asking relevant questions and using different types of scientific enquiries to answer them.	Set up an investigation into shadows and make predictions. Draw conclusions and find patterns when exploring how shadows change size	Make observations and take measurements. **Gathering and recording data.**	Group and classify foods into food groups and identify the nutrients that different foods provide Present data from food labels in a table to help in answering questions Group and classify animal skeletons and use vocabulary to discuss Set up a fair test and draw simple conclusions from their results Show understanding by using scientific language/labelled diagrams Set up and carry out a test that is fair, including making decisions about what measurements to take

BEECH		Autumn B first	Autumn B second	Spring B first	Spring B second	Summer B first	Summer B second
Beech Class Y4/5	Unit Overview	**States of Matter (White Rose)** The children will learn about the differences between solids, liquids and gases, classifying objects and identifying their properties. They will explore in-depth how water changes state, exploring melting, freezing, condensing and evaporation. They will learn about the stages of the water cycle.	**Animals including humans** The children will learn about the digestive system in humans and animals and the functions of teeth. They will learn more about herbivores, carnivores and omnivores in the context of teeth, digestion and the food chain. They will extend their understanding of food chains to more complex chains and food webs.	**Electricity (White Rose)** The children will investigate building circuits with different components in. Considering insulators and conductors and their use in circuits.	**Forces** The children will learn about types of forces such as gravity, friction, water resistance and air resistance. They will find out about the use of mechanisms such as levers, gears and pulleys. They will identify forces and find out about Isaac Newton and his discoveries about gravity. They will find out about different mechanisms, including levers, gears and pulleys.	**Habitats (White Rose)** Investigate the plants and animals within their locality, and how biodiverse these local habitats are. Explore the differences between urban and rural habitats and how each type meets the needs of the plants and animals that live there. Compare this with their local habitat and consider how biodiverse each location is.	**Properties/Changes of Materials** The children will learn about different materials, their uses and their properties, as well as dissolving, separating mixtures and irreversible changes. They will sort and classify objects and will explore the properties of materials to find the most suitable material for different purposes. They will find out about the best electrical conductor. They will explore dissolving and will find out about different ways to separate mixtures of materials.
	Skills Builder Link	**Problem Solving Step 4: Finding information**		**Teamwork Step 4: Taking responsibility**		**Speaking Step 4: Organising thoughts**	
	Famous Scientist, career focus	Vilhelm Bjerknes Electrical engineer	Ivan Pavlov Architect, Astronautical engineer, Seismologist	Edith Clarke Marine biologist	Archimedes (pulley) Chemical engineer, biochemist	Jacques Cousteau Nanoscientist, Science teacher	Becky Shroeder Dentist
	Vocabulary	*States of matter, solids, liquids, gases, water vapour, melt, freeze, evaporate, condense, precipitation, chemistry (biology, physics) (record) tables, thermometer, measurements*	*Teeth, tongue, stomach, oesophagus, intestine, liver, pancreas, canine, incisor, molar, consumer, herbivore, carnivore, omnivore, producer, predator, prey, biology, oral and written explanations*	*Electricity, generate, renewable, non-renewable, appliances, battery, circuit, standard units, conductor, insulator*	*Forces, gravity, Earth's gravitational pull, weight, mass, friction, air resistance, water resistance, buoyancy, streamlined, mechanism, upthrust, physics, present (data), Fair test (data), plan.*	Habitat, rural, urban, deforestation, renewal, *Organisms, life processes, specimen sensitivity, excretion, nutrition, environment, endangered species, extinct, classification (keys), guides, criteria, contrast, vertebrates, invertebrates, characteristics, relevant question (research)*	*Materials, solids, liquids, gases, melting, freezing, evaporating, condensing, conductor, insulator, transparency, comparative and fair test), variables*
	Learning Focus	1. Explore solids, liquids and gases 2. Identify changes of state. 3. Experiment with melting 4. The water cycle 5. Experiment with evaporating.	1.Describe the simple functions of the basic parts of the digestive system in humans. 2.Identify the different types of teeth in humans and their simple functions. 3.Construct and interpret a variety of food chains, identifying producers, predators and prey. 4. Look at the work of an orthodontist.	**1.** Understand that electricity is a way of moving the energy needed to power appliances. They and identify common appliances that use electricity. 2.Build working circuits and explore the role of each part in these circuits, drawing them. 3.Look at a range of circuits which do not work for different reasons and explain the issue. 4.Understand that a conductor is a material that allows energy to flow through it and an insulator is a material that does not allow energy to flow through it. 5. Think in more detail about how a conductor/ insulator would affect a circuit.	1. Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. 2. Identify the effects of air resistance, 3. water resistance and 4. friction that act between moving surfaces. 5. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	1. Find living things and think about the conditions provided by their habitats to which they are suited. 2.Classification keys (animals), show how animals can be sorted in different ways with closed questions. Children will make their own classification keys (plants). 3. Explore the positive and negative human impact on habitats.	1. Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. 2. Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. 3.Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Demonstrate that dissolving, mixing and changes of state are reversible changes. 4. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. 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 and the action of acid on bicarbonate of soda.

	Key Knowledge	A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured. Melting and freezing are state changes between solid and liquid. The freezing point of water is 0°C. Evaporation and condensation are a change of state between liquid to gas that happens at specific temperatures.	Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). Food chains, identify producers, predators and prey and show the direction of energy transfer.	Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.	A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.	Habitats usually provide everything an animal or plant needs. Plants and animals live within different habitats depending on what they need to survive. Rural and urban habitats can both be biodiverse but are not suitable for every animal. Plants and animals can be sorted and classified in many ways. Classification keys can be used to classify plants and animals. Closed questions are used in classification keys. Humans can have both positive and negative effects on the natural environment Rewilding increases biodiversity by providing a greater range of habitats by returning a damaged habitat to how it used to be. Nature reserves offer a protected space for plants and animals to live and grow. Natural resources can be limited, and over-using them can damage the environment.	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.
	Working Scientifically Skills	*Sort and classify materials into solid, liquid or gas* *Carry out a range of tests linked to states of matter, focusing on fair testing* *Record data in tables and graphs* Make observations and use this to draw conclusions	*Ask scientific questions around the digestive system and use these answers as evidence.*	*Carry out a range of investigations into switch, conductors and insulators* *Use results to draw simple conclusions when exploring circuits*	Decide how best to record data Suggest improvements to experiments and raise further questions.	Sort living things into a Venn diagram and Carroll diagram. Use questions to sort animals using a key. Show the characteristics of living things in a table. Record observations in a table. Write a report and present findings to the class.	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, and taking repeat readings when appropriate.

WILLOW		Autumn B first	Autumn B second	Spring B first	Spring B second	Summer B first	Summer B second
Willow Class Y5/6	Unit Overview	**Electricity (White Rose)** The children will learn to represent circuits using symbols in a diagram. They will develop their understanding of what electricity is and how to measure it.	**Light** The children will learn about light, how we see, shadows, reflection and refraction. They will learn how light travels and how this enables us to see objects. They will find out about mirrors and the angles of reflection and incidence. They will investigate refraction, looking at the effects of bending light. They will learn how light creates the colours we see.	**Variation, Evolution & Inheritance (White Rose)** The children will learn about variation and adaptation. They will explore how both Charles Darwin and Alfred Wallace separately developed their theories of evolution. They will examine the scientific evidence from plants and animals that has been gathered to support the theory of evolution.	**Living Things and Their Habitats** The children will learn about the classification of living things, including micro-organisms. They will sort animals into groups based on their similarities and differences and find out about the standard system of classification. They will learn about micro-organisms.	**Animals including Humans (White Rose)** The children will build on their knowledge and understanding of different systems within the body. They will find out about the parts and functions of the circulatory system and how nutrients are transported around the human body. They will explore how a healthy lifestyle supports the body to function and how different types of drugs affect the body.	**Earth & Space** The children will learn about Earth and its place in our Solar System.
	Skills Builder Link	**Adapting Step 5: Reflective learning**		**Creativity Step 5: Suggesting improvements**		**Speaking Step 6: Choosing language**	
	Famous Scientist, career focus	**Roderick Read kite turbines** Renewable energy engineer	**Narinder Singh Capany** Ophthalmologist	**Charles Darwin** palaeontologist	**Gregor Mendel** Plant geneticist	**Sigmund Freud** Haematologist	**Katherine Johnson** Astrophysicist
	Vocabulary	Voltage, brightness, volume, switches, danger, series circuit, circuit diagram, switch, bulb, buzzer, motor, recognised symbols, causal relationship, patterns, systematic	Light source, reflection, incident ray, reflected ray, the law of reflection, refraction, visible spectrum, prism, shadow, transparent, translucent, opaque, accuracy, precision	Offspring, inheritance, variations, characteristics, adaptation, habitat, environment, evolution, natural selection, fossil, adaptive traits, inherited traits, evidence: support, refute, ideas or argument	Characteristics, classify, taxonomist, key, bacteria, microorganism, microscope, species,	Circulatory system, heart, blood vessels, oxygenated blood, deoxygenated blood, drug, alcohol, nutrients, repeat readings, degree of trust, quantitative, accuracy, scatter graph, line graph	Sun, star, moon, planet, sphere, spherical bodies, satellite, orbit, rotate, axis, geocentric model, heliocentric model, astronomer
	Learning Focus	1. Construct and draw series circuits using symbols. 2. Explore reasons why a circuit may be incomplete. 3.Explore variations within circuits and the effects of having fewer or more components. 4. Plan an enquiry 'How does the voltage in a circuit affect the loudness of a buzzer?' 5. Carry out the enquiry and evaluate it.	1. Recognise that light appears to travel in straight lines. 2. 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.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.Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	1. Learn about species similarities and variation. 2. Understand that adaptations are characteristics which improve the chances of survival in a habitat. 3. Build on knowledge of function of parts of plants to recognise adaptations in desert plants. 4. Understand that evolution allows organisms to survive and adapt to their environment and that change occurs over a long period of time. 5. Explain natural selection and Darwin's finches research.	1. Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences. 2. Study the Linnaen classification system. 3. Understand how micro-organisms are classified as well as plants and animals. 4.Give reasons for classifying plants and animals based on specific characteristics. 5. Research microbiology careers.	1. Identify that the circulatory system is made up of the heart, blood vessels, and the blood. 2. Learn about the composition of blood and its purposes. 3. Understand the function of the heart and oxygenated and deoxygenated blood. 4. Consider diet, drugs and cigarettes and their effect on the body. 5. Design carry out and evaluate a heart rate experiment.	1. Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. 2. Describe the movement of the Moon relative to the Earth. 3. Describe the Sun, Earth and Moon as approximately spherical bodies. 4. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.
	Key Knowledge	Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will	Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen.	All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other.	Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can	The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body.	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates

		make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.	Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.	Plants and animals have characteristics that make them suited to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.	make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.	Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. (This content is also included in PSHE.)	(spins) on its axis every 24 hours. As Earth rotates half faces the Sun (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.
	Working Scientifically Skills	*Make observations about changing circuits* *Carry out a thorough investigation into variations in circuits* *Gather and record data during investigation* Draw conclusions about changes in circuits	Make observations and draw conclusions. Answer questions based on my learning.	Examine fossil evidence supporting the idea of evolution.	Classify living things using the Linnaean system. Classify creatures based on their characteristics. Identify the variables in an investigation into harmful microorganisms. Draw conclusions based on the results of my investigation.	Focused enquiry: exercise Explore evidence based on the impact of drugs and alcohol identify scientific evidence that has been used to support or refute ideas record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	Using evidence to support my understanding of Earth and Space Gather and record data linked to daylight hours in different parts of the world Answer questions and draw conclusions from my results.
						Animals including Humans (Y5) As part of PSHE The children will learn about the life cycle of a human being. They will find out about the development of babies and compare the gestation period of humans and other animals. They will learn about the changes experienced during puberty and why these occur. They will find out about the changes to the body as humans get older, as well as comparing the life expectancy of different animals. *Fertilisation, prenatal, gestation, reproduce, asexual reproduction, sexual reproduction, life cycle, adolescence, puberty, menstruation, adulthood, life expectancy* *Record data linked to the human life cycle*	