Deer Park Primary School
SCIENCE CURRICULUM

Our Ultimate End Goal:

What will our scientists be able to do when they leave Deer Park?

- **By the end of their time at Deer Park Primary School our Year 6 scientists will have built up a body of knowledge which will enable them to understand how science can be used to explain what is occurring around them, predict how things will behave and analyse causes.**
- **They will recognise the power of a rational explanation and be able to articulate scientific concepts clearly and precisely using accurate technical terminology.**
- **Scientific learning experiences will have developed an excitement and curiosity about natural phenomena and the world around them. This will prompt the asking of their own questions and the use of the relevant skills needed to work out and explain their answers.**
- **They will have an understanding that scientific ideas change and develop over time and how this has and continues to change our lives and futures.**
- **This full and rounded understanding of the world around them will impact their lives, influencing the choices that they make so that through their actions they are able to make the world a better place.**

Curriculum Coverage (NC) What are the most basic requirements from the National Curriculum?						
EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
UTW (Understanding the world) Basic body parts Growing up/changes Seasonal change (Autumn) Materials (toys) Seasonal change (Winter) Polar regions Penguin life cycle How animals survive the winter Birds (bird feeders) Looking after ourselves Seasonal change (Spring)	**Animals including humans** Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	**Animals including humans** Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	**Animals including humans** Identify that animal, 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 Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	**Animals including humans** Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.	**Animals including humans** Describe the changes as humans develop to old age.	**Animals including humans** 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 their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.
Mini-beasts Life cycle of a butterfly Life cycle of a plant/sunflower Identify parts of a plant Healthy/unhealthy foods		**Living things and their habitats** 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,		**Living things and their habitats** Name a variety of living things in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers	**Living things and their habitats** Describe the life process of reproduction in some plants and animals.	**Living things and their habitats** Including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.

Seasonal change (Summer) Sea pollution Sea creatures		and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including microhabitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain. Within these identify and name different sources of food.		to living things.		
	Everyday Materials Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials including wood, plastic, glass, metal, water and rock. Describe the simple physical properties of a variety of every day materials. Compare and group together a variety of every day materials on the basis of their simple physical properties.	**Use of everyday materials** 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			**Properties and changes of materials** Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	

					Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. 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.	
	Plants 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.	**Plants** Observe and describe how seeds and grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	**Plants** Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. 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. Investigate the way in which water is transported within plants. Explore the part that			

			flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
				Electricity Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.		**Electricity** Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. 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. Use recognised symbols when representing a simple circuit in a diagram
			Light Recognise that they need light in order to see things and that dark is the absence of light.			**Light** Recognise that light appears to travel in straight lines.

			Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.			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. 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
			Forces and Magnets Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. 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.		**Forces** Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	

			Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing			
	Seasonal Changes Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies		**Rocks** Recognise that soils are made from rocks and organic matter.	**States of matter** Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Earth and Space** Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	**Evolution and inheritance** Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
				Sound Identify how sounds are made, associating some of them with something vibrating, Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and		

				features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases.		

Overview

Cycle A			
Reception	**Year 1 and Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Changes Life cycles	Animals including humans	Sound Y4	Animals including humans Y5
Materials Autumn	Animals including humans	States of Matter Y4	Animals including humans Y6
Winter	Everyday Materials	Living things and their habitats Y4	Electricity Y6
Spring	Seasonal Changes	Living things and their habitats Y4	Evolution and inheritance Y6
Plants & Life-Cycles	Plants	Electricity Y4	Forces Y5
Summer	Living Things and Their Habitats	Animals including humans Y4	Forces Y5

Cycle B			
Reception	**Year 1 and Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Changes Life cycles	Animals Including Humans	Plants Y3	Living things and Habitats Y5
Materials Autumn	Everyday Materials	Animals and Humans Y3	Living things and Habitats Y6
Winter	Everyday Materials	Rocks Y3	Properties of Materials Y5
Spring	Seasonal Changes	Rocks Y3	Properties of Materials Y5
Plants & Life-Cycles	Plants	Light Y3	Earth and Space Y5
Summer	Living Things and Their Habitats	Forces and magnets Y3	Light Y6

PROVISION AND ADAPTATIONS FOR SEND LEARNERS

Cognition and Learning		Communication and Interaction	
Subject Challenges for SEND	**Provision for SEND**	**Subject Challenges for SEND**	**Provision for SEND**
Ability of children to access learning of their year group	Pre-teaching (parent or TA). Using social stories to understand different contexts	Lessons where children are required to take part in discussions/expression their views- children with communication difficulties may struggle to access	Embed ground rules to develop clear understanding of boundaries.
Accessing learning due to poor literacy skills	1:1 or small group support	Those who struggle to process language may struggle in sciencelessons where there is lots of written or spoken language	Children to have a partner to practise answers with first. Provide children with opportunities to express their views or contribute to the discussion in different ways e.g. drawing, writing, recording answer on an iPad.
Cognitive development not aligned	Age-appropriate content for all children in the class – adaptive to individual needs. Work and questioning adapted to met the needs of individuals	Group or partner work	Scaffolding through careful questioning Use of simple instructions.
Some topics may seem abstract or out of context e.g., space, forces	Key words displayed. Writing frames and stem sentences to support written work. Linked to real life contexts where possible Practical work where possible		Careful and appropriate modelling to support understanding. Careful groupings Use of scripted language
Cognitive processes and Overload.	Work broken down in to simple steps/reduced		TA or adult support
		Use of accurate language	Use accurate language (avoid euphemisms).

Physical and sensory		Social Emotional and Mental Health	
Subject Challenges for SEND	**Provision for SEND**	**Subject Challenges for SEND**	**Provision for SEND**
Children with visual impairment may not be able to access their learning or resources available	Provide alternative resources e.g. in large print or coloured paper	Children may struggle with certain units of work e.g., reproduction unit	Regular sessions, establish clear routines expectations/boundaries for the start and end of every science session – children know what to expect.

Recording information may be difficult. Accessibility to equipment or resources – physical disabilities. Fear of sight, touch, smell of equipment	Provide additional ways to record information (video/ICT etc) Consider seating plan, Use buddies. Working in groups to support Use of ICT to support access. Consider how children with support equipment e.g. walker can be part of physical lessons or circle time seating. Detail cards and descriptions for children to understand what objects or resources might feel like. Sample objects in bags to use with TA.	Children with SEMH needs may struggle with heightened anxieties/triggering in science when they feel upset or frustrated etc	Feeling cards to support understanding of emotions. Talking to children on 1-1 basis rather than a large group. Opportunities to work in smaller groups. Use of stories. Provide appropriate sensory resources so that children can access the lesson, focus and have sensory breaks when required Providing a safe space for the children within the lesson if needed.

PROCEDURAL KNOWLEDGE - What skills do we want our scientists to have? Analyse, evaluate and solve problems-How will these skills build on what went before and help prepare our children for what is coming next?

EYFS	YEAR 1 & 2	YEAR 3 & 4	YEAR 5 & 6
Beginning to: Show curiosity about objects, events and people. Question why things happen. Take a risk, engage in new experiences and learn by trial and error. Find ways to solve problems / find new ways to do things / test their ideas. Develop ideas of grouping, sequences, cause and effect. Know about similarities and differences in relation to places, objects, materials and living things. Comment and ask questions about aspects of their familiar world such as the place where they live or the natural world. Closely observe what animals, people and vehicles do. Use senses to explore the world around them. Make links and notice patterns in their experience.	**Continue to:** Ask questions and recognise that they can be answered in different ways Observe closely, using simple equipment Perform simple tests Identifying and classifying Use observations and ideas to suggest answers to questions Gather and record simple data to help in answering questions.	**Have developed/developing:** Ask relevant questions and using different types of scientific enquiries to answer them. Set up simple practical enquiries, comparative and fair tests Make systematic and careful observations and where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gather, record, classify and present data in a variety of ways to help in answering questions. 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 their results and conclusions. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	**Can/have/know:** Plan different types of scientific enquiries to answer their own 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 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and present findings from enquiries, including conclusions, casual relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identify and evaluate scientific evidence that has been used to support or refute ideas or arguments.

Answer how and why questions about their experiences. Make observations of animals and plants and explain why some things occur, and talk about changes. Develop their own narratives and explanations by connecting ideas or events. Build up vocabulary that reflects the breadth of their experience.		Identify differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support their finding.	

CYCLE A: Propositional knowledge:
What lines of enquiry do we want our scientists to follow?
What experiences do we want our scientists to have had?

EYFS	YEAR 1 AND YEAR 2	YEAR 3 AND YEAR 4	YEAR 5 AND YEAR 6
UTW (Understanding the world) Changes that have happened throughout my life so far. The weather. Describe what can be seen, heard and felt whilst outside- materials. Describe what can be seen, heard and felt whilst outside - materials. Notice the seasonal changes (autumn). Understand the effect of the changing seasons around them – weather, seasonal features, changing seasons and animal behaviour in autumn The weather linked to seasonal change of Winter. Describe what can be seen, heard and felt whilst outside. Notice the changes happening outside (seasons). Explore the natural world around them about winter. Describe animals and plants (both from photos and real-life experiences). Discuss the weather linked to seasonal change.	**ANIMALS INCLUDING HUMANS** The different parts of the body: Hair - this grows on our head and helps to protect our skull. The skull is the bone that protects our brain. Eyes - these help us see. Ears - these help us hear. Mouth - we use our mouth to eat and talk. Inside our mouths are tongues which help us taste and teeth. Shoulders - these help our arms to lift up Hands - these help us grab things and write, Knees - these help us bend our legs. Feet - these help us stay balanced and upright. Elbows - these help our arms to bend. Neck - connects the head to the rest of the body. Nose - helps us smell. Eyebrows - these protect our eyes. We have five senses. 1) We smell using our nose. 2) We taste using our tongue. 3) We touch using parts of our body, like our hands. 4) We see using our eyes. 5) We hear using our ears Animals, including humans have offspring that grow into adults. This is called a life cycle. There are different stages to life cycles including the human life cycle. All animals need water, air and food to	**ANIMALS INCLUDING HUMANS** Teeth are used for cutting and chewing food. Humans look after their teeth by brushing and flossing and ensuring that they do not eat foods high in sugar. Not looking after teeth can lead to an increase in plaque and tooth decay. Canines are pointed for tearing and ripping food - these are usually used when chewing. Incisors are shovel shaped and help bite lumps out of and cutting food. Premolars and molars are flat and they grind and crush food. The smell of food triggers saliva to be produced. The digestive system begins with the mouth and teeth where food is ingested and chewed. Saliva is mixed with the food which helps to break it up. When the food is small enough to be swallowed, it is pushed down the oesophagus by muscles to the stomach. In the stomach, food is mixed further. The	**ANIMALS INCLUDING HUMANS** The main stages of the human life cycle: Foetus - an unborn animal or human being in the very early stages of development. Newborn - this is a baby that has just been born. Infancy - this is a period of rapid change. Many toddlers learn to walk and talk at this stage. Childhood - children learn new things as they grow. They become more independent. Adolescence - this is when the body starts to change and prepare itself for adulthood. Hormonal changes take place over a few years – known as puberty. Early adulthood - this is when humans are usually at their fittest and strongest. Middle adulthood - changes such as hair loss may happen. There are also some hormonal changes again and the ability to reproduce decreases. Late adulthood - there is a decline in fitness and strength. Puberty is the change that happens in late childhood and adolescence where the body starts to change because of hormones - changes include growth in height, more sweat, hair growth on arms and legs, under the armpits and on genitals, and growth in parts of the body such as male

	survive. To keep healthy, humans need: to eat a balanced diet and healthy food, exercise to keep their muscles and bones healthy, to keep good hygiene by washing regularly, having clean clothes, brushing teeth and hair. Humans cannot make their own food like plants do - we need to eat plants and animals to get our energy. Healthy, balanced diets lead to healthy, active people. The different food types are: Fruit and vegetables; Bread, rice, potatoes, pasta and other starchy foods; Milk and, oils and spreads; Meat, fish, eggs, beans and other non-dairy sources of protein. The different types of nutrients: Proteins help your body to grow and repair itself, examples include red meat, yogurt, and beans. Carbohydrates give you energy, examples include bread, potatoes, pasta. Fats give you energy, examples include nuts, oils, and avocados. Vitamins keep your body healthy, examples of foods high in vitamins include oranges, carrots and nuts. Minerals keep your body healthy, examples of foods high in minerals include milk, sweetcorn, and spinach. Fibre helps you to digest the food that you have eaten, examples of foods high in fibre include wholegrain bread, cereals and lentils. Water helps to move nutrients in your body	mixed food is then sent to the small intestine which absorbs nutrients from the food. Any leftover, broken down food then moves on to the large intestine. The food minus the nutrients arrives in the rectum where muscles turn it into faeces. It is stored here until it is pushed out by the anus. This is called excretion. **Living things and their habitats** Living things can be grouped in a variety of different including by what they eat, where they live and certain characteristics they have. For example, they can be grouped based on their diet. Carnivores eat only other animals. Herbivores eat only plants. Omnivores eat a mixed diet that contains food from plants and animals. Classification keys can be used to identify and group animals. Environmental changes can affect environments in positive and negatives ways. Humans can impact environments and make them better through the creation of nature reserves and park. They can also impact environment in negative ways through litter, residential developments and deforestation. **ELECTRICITY** Electricity is generated using energy from natural sources such as the Sun, oil, water and wind. These can also be called fuel sources.	genitals and breasts. Females begin to menstruate. **ANIMALS INCLUDING HUMANS (UNIT TWO)** Some choices, such as smoking and drinking alcohol can be harmful to our health. Tobacco can cause short-term effects such as shortness of breath, difficulty sleeping and loss of taste and long-term effects such as lung disease, cancer and death. Alcohol can cause short-term effects such as addiction and loss of control and long-term effects such as organ damage, cancer and death Exercise can: tone our muscles and reduce fat, increase fitness, make you feel physically and mentally healthier, strengthens the heart, improves lung function, improves skin. The circulatory system is made of the heart, lungs and the blood vessels. Arteries carry oxygenated blood from the heart to the rest of the body. Veins carry deoxygenated blood from the body to the heart. Nutrients, oxygen and carbon dioxide are exchanged via the capillaries. The heart is composed of four chambers; the right atrium, the right ventricle, the left atrium and the left ventricle. How often your heart pumps is called your

	and get rid of waste that you don't need, examples of foods high in water include celery, cucumber, tomatoes. **LIVING THINGS AND THEIR HABBITATS** Some objects/things are living, some are dead and some things have never been alive. A habitat is a place where living things, such as animals and plants, can find all of the things they need to survive. This includes food, water, air, space to move and grow and some shelter. Some habitats are large, like the ocean, and some are very small, such as under a log. Our local habitats include the fields around the back of the school building. Other habitats include the beach/coast which we visit during out first topic of the year and a forest. **EVERYDAY MATERIALS** Objects are things that you can touch or see. Objects are made from materials. These materials include wood, plastic, glass, metal, water and rock. Objects can be described as hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque and transparent. Objects can be grouped dependent on their simple physical properties including the	Some appliances use batteries and some use mains electricity. Batteries come in different sizes depending on how much and for how long the appliance is used. A complete circuit is a loop that allows electrical current to flowthrough wires. A circuit contains a battery (cell), wires and an appliance that requires electricity to work (such as a bulb, motor or buzzer). The electrical current flows through the wires from the battery (cell) to the bulb, motor or buzzer). A switch can break or reconnect a circuit. A switch controls the flow of the electrical current around the circuit. When the switch is off, the current cannot flow. When objects are placed in the circuits, they may or may not allow electricity to pass through. Objects that are made from materials that allow electricity to pass through and create a complete circuit are called electrical conductors. Objects that are made from materials that do not allow electricity to pass through and do not complete a circuit are called electrical insulators. An ammeter measures the current or flow of electricity through a wire or circuit. The voltage is the force of an electric	pulse. 1. Deoxygenated blood is sent to the heart from the rest of the body. 2. This is then sent from the heart to the lungs. Here, the blood picks up oxygen and disposes of carbon dioxide. 3. Oxygenated blood is then sent back to the heart. 4. The heart sends the oxygenated blood back to the rest of the body. **ELECTRICITY** Can use scientific symbols to represent the components (parts) of a circuit. The brightness of a bulb or the loudness of a buzzer is affected by the number of cells in a circuit. The brightness of a bulb or the loudness of a buzzer is affected by the voltage of cells in a circuit. The number of components in a circuit can affect how they function. The arrangement of components in a circuit can affect how they function. The length of wires in a circuit can affect how the components function. **FORCES** Forces are pushes and pulls. These forces change the motion of an object making it start, speed up, slow down or stop moving. Friction is a force - it is the resistance of motion when one object rubs against another. Other forces that create resistance of motion include water resistance and air

	material they are made out of. Objects can be grouped together based on their simple physical properties. Some materials are more suited to a particular purpose than others, based on their properties. The shape of some materials can be changed when they are stretched, twisted, bent and squashed. Some materials are recyclable this means that waste materials can be processed and used again. Dependent on what they are made from, some solid objects can be squashed, bent, Some materials can change shape by squashing, bending, twisting or stretching. **PLANTS** People may grow plants in their gardens and care for them. They may grow flowering plants which are beautiful to look at or beans and seeds to grow plants for food. The names of some common garden plants are: rose, poppy, sunflower. Some common wild plants are: dandelion, daisy and buttercup. Deciduous trees lose their leaves in the autumn every year. Their leaves are generally broad, flat and have veins running through them. Evergreen trees have green leaves all year round. Their leaves are generally thick,	current. It is measured in volts. Materials which are good thermal conductors allow heat to move through them easily, such as a saucepan which requires heat to travel through to cook food. Thermal insulators do not let heat travel through them easily. Such as woolen clothes and flasks for hot drinks. Electrical conductors allow electricity to pass through them easily while electrical insulators do not. Electrical insulators have a high resistance which means that it is hard for electricity to pass through these objects. **STATES OF MATTER** Particles are what materials are made from. They are so small that we cannot see them with our eyes. Particles behave differently in solids, liquids and gases. In the solid state, the material holds its shape. Solids have vibrating particles which are closely packed in and form a regular pattern. This explains the fixed shape of a solid and why it can't be poured. Solids always take up the same amount of space. In the liquid state, the material holds the shape of the container it is in. This means that liquids can change shape, depending on the container. Liquids have particles which are close	resistance. Gravity is the force that pulls objects to the centre of the Earth. Air resistance pushes up on the parachute, opposing the force of gravity. This makes the parachute land more slowly. Water resistance is the friction that is created between water and an object that is moving through it. Some objects can move through water with less resistance if they are streamlined. Levers and Pulleys allow us to do heavy work with less effort. Gears are toothed wheels. Their 'teeth' can fit into each other so that when the first wheel turns, so does the next one. This allows forces to move across a surface. **EVOLUTION AND INHERITANCE** Evolution is a process of change that takes place over many generations, during which species of animals, plants, or insects slowly change some of their physical characteristics. This is because offspring are not identical to their parents. It occurs when there is competition to survive. This is called natural selection. Difference within a species (for example between parents and offspring) can be caused by inheritance and mutations. Inheritance is when characteristics are passed on from generation to the next. Mutations in characteristics are not inherited from the parents and appear as

	waxy and narrow like needles. **SEASONAL CHANGES** There are four seasons: Autumn - September, October, November Winter - December, January, February Spring - March, April, May Summer - June, July, August. In Autumn - The temperature beings to fall. The leaves on deciduous trees change colour and begin to fall to the ground. The days get shorter and the nights get longer. In the autumn, there are events such as Halloween and Bonfire Night. In Winter - It gets colder still - this is because the temperature has fallen. Deciduous trees have completely lost their leaves and the branches are bare. The days get shorter and the nights get longer. Winter has the shortest days and the longest nights of all the seasons. In the winter, there are events such as Christmas and Valentine's Day. Things people might do are build snowmen, eat warm foods like soups and light fires. In Spring – It gets warmer and the temperature begins to rise. Some things that happen in spring are: leaves begin to appear on deciduous trees.	together but random. Liquid particles can move over each other. Liquids can be poured. In the gas state, particles can escape from open containers. Gases have particles which are spread out and move in all directions. When water (in its liquid form) is heated, the particles start to move faster and faster until they have enough energy to move about more freely. The water has evaporated into a water vapour. When water vapour is cooled, the particles start to slow down. They return to a liquid in a process called condensation. With further cooling they turn into a solid structure and ice is formed. The water has frozen. The temperature at which water turns to ice is called the freezing point. This happens at 0ºC. The temperature at which water turns to gas is called the boiling point. This happens at 100ºC. When the particles of a solid mix with the particles of a liquid, this is called dissolving. **SOUND** The object that makes the sound is called the source. When objects vibrate, a sound is made. The vibration makes the air around the object vibrate and the air vibrations enter your ear.	new characteristics. Evidence of evolution comes from fossils - when these are compared to living creatures from today, paleontologists can compare similarities and differences. Other evidence comes from living things - comparisons of some species may reveal common ancestors. Adaptation is when animals and plants have evolved so that they have adapted to survive in their environments. For example, polar bears have a thick layer of blubber under their fur to survive the cold, harsh environment of the Arctic while giraffes have long necks to reach the leaves on trees. Sometimes adaptations can be disadvantageous. One example of this can be the dodo, which became extinct as it lost its ability to fly through evolution. Flying was unnecessary for the dodo as it had lived for so many years without predators, until its native island became inhabited. When adaptations are more harmful than helpful, these are called maladaptations.

	Some trees begin to blossom. Many plants begin to grow. Lambs are born and chicks begin to hatch. The days become longer and the nights become shorter. In the spring, there are events such as Easter and St. George's Day. In Summer - It gets warmer still - this is because the temperature has risen. The days get longer and the nights get shorter. Summer has the longest days and the shortest nights of all the seasons. In the summer, there are events such as the long school summer holidays. Things people might do are have picnics, go to the beach and have a paddling pool in the garden.	These are called sound waves. Sound waves travel through a medium (such as air, water, glass, stone, and brick). The sound waves travel to the ear and make the eardrums vibrate. Messages are sent to the brain which recognises the vibrations as sounds. The pitch of a sound is how high or low it is. The volume of a sound is how loud or quiet it is. When a sound is created by a little amount of energy, a weak sound wave is created which doesn't travel far. This makes a quiet sound. A vibration with lots of energy makes a powerful sound wave and therefore a loud sound. Amplitude measures how strong a sound wave is. (The higher the wave the stronger the sound). Decibels measure how loud a sound is. Frequency measures how many sound waves there are per second.	

CYCLE B: Propositional knowledge:
What lines of enquiry do we want our scientists to follow?
What experiences do we want our scientists to have had?

EYFS	YEAR 1 AND YEAR 2	YEAR 3 AND YEAR 4	YEAR 5 AND YEAR 6
	ANIMALS INCLUDING HUMANS Vertebrates are animals that have a backbone. There are five groups of vertebrates: mammals, fish, birds, reptiles, amphibians. Mammals give birth to live young, usually have hair or fur, warm-blooded, cannot breathe underwater. Some common mammals are: pets such as dogs, cats, hamsters, farm animals such as cows, sheep and horses, wild animals such as foxes, hedgehogs, lions and giraffe. Fish have fins and scales, breathe underwater using gills, lay eggs in water, and are coldblooded. Some common fish are salmon, cod and tuna. Birds are warm-blooded, have wings and beaks, have feathers, lay eggs. Some common birds are ducks, chickens, penguins and pigeons. Reptiles are cold- blooded, lay eggs, have scales, and cannot breathe underwater. Some common reptiles are snakes and lizards. Amphibians are cold- blooded, lay eggs, live on land and water - can breathe underwater through gills. Some common amphibians are frogs and toads. Invertebrates are animals that do not have	**ANIMALS INCLUDING HUMANS** Animals including humans need the right type and amount of nutrition. They get their nutrition from what they eat. Carnivores eat only other animals. Herbivores eat only plants. Omnivores eat a mixed diet that contains food from plants and animals. Humans and some other animals have skeletons and muscles which protect and support their vital organs and allow them to move successfully. Vertebrates are animals that have a backbone. These skeletons are called endoskeletons - this means that the skeletons are on the inside of the bodies. These skeletons grow with the bodies. When the skeleton exists outside the body, it is called an exoskeleton. An exoskeleton is a covering that supports and protects animals. These have to be shed and a new skeleton is grown. The three most important functions of a skeleton are: provide support and shape to an animal's body. Allow movement through the joints. Protect organs (e.g. the skull protects the brain) Joints are where bones meet - they allow	**LIVING THINGS THEIR HABITATS** Vertebrates are animals that have a backbone inside their body. The major groups include fish, amphibians, reptiles, birds and mammals. Invertebrates don't have a backbone. They either have a soft body, like worms and jellyfish, or a hard outer casing covering their body, like spiders and crabs. The characteristics of the different types of animals should be discussed: Fish belong to a class of creatures called aquatic vertebrates. Their combination of gills, fins and the fact that they live only in the water make fish different from all other animals. Most fish have a skeleton made of bone but some, like sharks, have a skeleton made of cartilage. Mammals have hair, lungs and are warm blooded. Mammals can live on land or in water. Most mammals give birth to live babies. But there are a few mammals who lay eggs. Amphibians are cold- blooded, live on land and lay eggs to reproduce their species (nearly all amphibians lay their eggs in or near water). They have moist skin, do not have scales and have webbed feet. Reptiles have neither fur nor feathers, but scales. Reptiles cannot be confused with amphibians because reptiles have dry,

	a backbone. They include: insects such as flies, ladybirds and bees, arachnids such as spiders, mollusks such as snails. Animals that only eat meat (other animals) are called carnivores examples include lions and eagles. Animals that only eat plants are called herbivores (examples include cows and giraffes) Animals that eat plants and meat are called omnivores (examples include humans and squirrels) **LIVING THINGS AND THEIR HABBITATS** Microhabitats are very small habitats where minibeasts may live. Examples of microhabitats include under stones, in grass, under fallen leaves and in the soil. Minibeasts that can be found there include worms, snails, ants, centipedes, millipedes, and butterflies and they help to keep the microhabitat healthy. Minibeasts are able to survive in their habitats because they can find the things they need to survive there, such as food and water. Animals and plants depend on each other to survive. A food chain is a simple way to show the direction in which energy moves from the producer to the various consumers to the top or tertiary consumer. The producer (a plant) gets its energy from the Sun. An example: the producer (wheat), gets its energy from the Sun. The mouse (primary consumer) eats the wheat and	our bodies to move. Muscles contract and relax. If you place an elbow on a desk and lift your arm up, muscles in your upper arm (biceps) contract while muscles behind the upper arm (triceps) relax. The muscles work together and in opposition to allow your arm to move. Muscles are connected to bones by tendons. **PLANTS** Flowering plants have roots, stems/trunk, leaves and flowers. In order for plants to grow and survive they need air, light, water, nutrients from soil and room to grow. These can vary from plant to plant. Roots absorb water from the soil where the plant is planted. Then, the water travels through the plant to the stem. Water is sucked up through the stem and then the stem passes water on to the leaves. Water evaporates from the leaves into the atmosphere. This process is called transpiration. The plant then sucks up more water with its roots, to replace the water it has lost. As a result, water is constantly moving through plants.	water-proof skin and eggs, as well as more advanced bodily systems. Reptiles evolved from amphibians 300 million years ago. Birds are warm-blooded vertebrates that evolved from dinosaurs. They're identifiable by feathers, toothless beaked jaws and laying of hard- shelled eggs. They also have a high metabolic rate, a four-chambered heart and strong but light skeletons. Birds have wings that are more or less developed between species. The life cycles of mammals, birds, amphibians and insects have similarities and differences. One difference is that amphibians and insects go through the process of metamorphosis. This is when the structure of their bodies changes significantly as they grow (for example, from tadpole to frog or caterpillar to butterfly). Plants reproduction - Male gametes can be found in the pollen. Female gametes can be found in the ovary (they are called ovules). Pollination occurs when pollen from the anthers transferred to the stigma by bees and other insects. The pollen then travels down and meets the ovule. When this happens, seeds are formed - this is called fertilisation. Seeds are then dispersed so that germination can begin again. Some plants, such as daffodils and potatoes, can also produce offspring using asexual reproduction **LIVING THINGS AND THEIR HABITATS UNIT TWO** All living things, which can also be called organisms, have to do certain things to stay alive.

	gets its energy from it. The mouse is then eaten by the owl (secondary consumer). The owl gets its energy from the mouse. The owl is the predator and the mouse is the prey. The owl is then eaten by the wolf (tertiary consumer). The wolf gets its energy from the owl. The arrows show the direction in which the energy travels. When part of the food chain is removed, this has an impact on the other parts of the food chain. **USE OF EVERYDAY MATERIALS** Objects are things that you can touch or see. Objects are made from materials. Some materials are natural while others are man - made. Natural materials are materials which are found in nature. Man- made materials are materials which have been produced by humans. Materials are used for different purposes based on their properties. Glass can be used to make windows because it is transparent. If an object is transparent, you can see through it. If an object or substance is opaque, you cannot see through it. Rulers can be made from wood, plastic or rubber. Spoons are made from metal, because it is waterproof and can be cleaned easily.	Plants really need a constant flow of water because it's how they get nutrients from the soil. If a plant doesn't get enough water, it will droop, wilt, and possibly die. Water helps keeps plants upright. **LIGHT** A light source is something that emits light by burning, electricity or chemical reactions. We must never look directly at the Sun as the light produced is very bright and can be harmful to our eyes (which is why we wear sunglasses). We need light so that we are able to see in the dark. The Moon is not a source of light. The Sun's light reflects on the surface of the Moon making it appear as though the Moon emits light. Shiny things are not light sources - they also reflect the light. Shadows are formed when the light from a light source is blocked by an opaque object. **FORCES AND MAGNETS** Forces are pushes and pulls that can change the motion of an object. It can start to move or speed up, slow it down or even make it stop. Forces act in opposite directions to each other.	These are the life processes: movement, respiration, sensitivity, growth, reproduction, excretion and nutrition Living things can be grouped according to different criteria (where they live, what type of organism they are, what features they have). A classification key is a tool that is used to group living things to help us identify them using recognisable characteristics. Habitats can change throughout the year and this can have an effect on the plants and animals that live there. Humans can have positive and negative effects on the environment: positive effects: nature reserves, ecological parks. Negative effects: litter, urban development The Linnaean system, named after Carl Linnaeus, has different levels where the number of living things in each group gets smaller and smaller, until there will just be one type of animal in the species group. Microorganisms are very tiny organisms where a microscope has to be used to see them. Examples of microorganisms include dust mites, bacteria and fungi, such as mould. Some microorganisms can be helpful in certain situations. Others can be harmful, and their spread needs to be controlled or contained. **PROPERTIES AND CHANGES OF MATERIALS** Everyday materials can be grouped and compared dependent on their hardness, solubility, transparency, conductivity and their response to magnets.

	Plastic can also be used as it is light and it cannot hurt children's growing teeth. Waterproof does not let water pass through it. Absorbent materials soak up liquid easily. **PLANTS** People grow plants from bulbs and seeds. Germination is the growth of a plant contained within a seed. In order for their growth into mature plants, to be successful they need to be grown in suitable conditions. They start as seeds and bulbs and then grow into mature plants. The right conditions must include a suitable temperature and a suitable amount of water and light. This may vary from plant to plant. Parts of common plants: roots, stem, leaf, flower, seed. **SEASONAL CHANGES** There are four seasons: Autumn - September, October, November Winter - December, January, February Spring - March, April, May Summer - June, July, August. In Autumn - The temperature beings to fall. The weather may be slightly sunny, windy or rainy. There are more clouds in the sky during autumn compared to the summer.	When an object moves across a surface, friction acts as an opposite force. Friction is a force that holds back the motion of an object. Some surfaces create more friction than others which mean that objects move across them slower. On a ramp, the force that causes the object to move downwards is gravity. Objects move differently depending on the surface of the object itself and the surface of the ramp. Magnets produce an area of force around them called a magnetic field. When objects enter this magnetic field, they will be attracted to or repelled from the magnet if they are magnetic. When magnets repel, they push each other away. When magnets attract, they pull together. Objects that are magnetic, are attracted to magnets. Iron and steel are magnetic. Aluminum and copper are non-magnetic. The ends of a magnet are called poles. One end is called the north pole and the other end is called the south pole. Opposite poles attract, similar poles repel. **ROCKS** There are three types of rocks that are formed naturally.	Certain items are made from specific materials as that is what is most suitable in order for it to perform its task most effectively. Materials that dissolve are soluble. Materials that do not dissolve are insoluble. Some materials can be separated after they have been mixed based on their properties - this is called a reversible change. Some methods of separation include the use of a magnet, a filter (for insoluble materials), a sieve (based on the size of the solids) and evaporation. When a mixture cannot be separated back into the original components, this is called an irreversible change. Examples of this include when materials burn or mixing bicarbonate of soda with vinegar. . **LIGHT** We need light so that we are able to see. Dark is the absence of light. A light source can emit light by burning, electricity or chemical reactions, some examples include: Burning – sun, flames from a fire, stars. Electricity – lamps, car headlights, street lights. Light travels in straight lines. When light is blocked by an opaque object, a dark shadow is formed. These shadows have the same shape as the objects that cast them.

	The clothes you might wear include t-shirts and shorts on sunnier and warmer days, and woolly hats and scarves on colder days - especially as it gets closer to winter. In Winter - It gets colder still - this is because the temperature has fallen. Sometimes, it can freeze overnight and, in the mornings, there may be ice and frost. The weather may be windy and rainy. Sometimes it also snows. The clothes you might wear include warm coats, jumpers, woolly hats and scarves. In Spring – It gets warmer and the temperature begins to rise. The days become longer and the nights become shorter. The weather may be slightly sunny but still windy and rainy on some days. The clothes you might wear include long-sleeved tops and long trousers. As it gets closer to summer, you may wear t-shirts and shorts on sunnier and warmer days. In Summer - It gets warmer still - this is because the temperature has risen. The weather may be hot and sunny with fewer clouds in the sky. The clothes you might wear include t-shirts, shorts and swimming costumes. It is important to stay safe in the summer as the sun can be very strong. You can wear sun hats, sunglasses and sun cream to help keep you safe.	Igneous: When molten magma cools, igneous rocks are formed. This either cools and forms rocks under the earth's surface, or flows out of erupting volcanoes as lava and may mix with other minerals. Examples include granite and basalt. This type of rock is strong, hardwearing and nonporous. Sedimentary: Sometimes, little pieces of rocks that have been weathered can be found at the bottom of lakes, seas and rivers. This is called sediment. Over millions of years, layers of this sediment build up forming sedimentary rocks. Examples include limestone and chalk. Sedimentary rocks are porous and can easily be worn down. Metamorphic: When some igneous and sedimentary rocks are heated and squeezed (pressured), they form metamorphic rocks. Examples include slate and marble. Metamorphic rocks are strong. Fossils are the remains of prehistoric life. They are usually formed when a living thing (plant or animal) dies and the body is covered up or buried by sediment over tens of thousands of years. Some fossils are formed when the tough bones and teeth in animals, and the woody part of plants are preserved. Other fossils are made from imprints in surrounding sedimentary rock such as footprints or imprints from shells. Soil is made from pieces of rock, minerals, decaying plants and water. When rock is broken down into small grains, soil is formed. There are layers of soil: Above the soil is leaf litter and recently decaying plants. As the soil	The size of a shadow changes as the light source moves closer or further away. The further away the light source is, the smaller the shadow is. The closer the source of the light, the bigger the shadow. Reflection is when light bounces off a surface - this changes the direction in which the light travels. We can see round corners using mirrors and reflecting light. **EARTH AND SPACE** The Earth rotates on its axis anti-clockwise and makes a complete rotation over 24 hours (a day). This makes it appear as though the Sun moves through the sky but the Earth's rotation causes day and night. Different parts of the Earth experience daylight at different times. This is also the reason why we have time zones. Because of the Earth's tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter. As the Earth rotates, shadows that are formed change in size and orientation. The Earth takes 365 and a quarter day to orbit the Sun. Because of the extra quarter day it takes to orbit the Sun, every four years on Earth is a leap year! It is the Earth's tilt that causes the seasons. The Moon orbits the Earth anticlockwise and takes approximately 28 days.

		becomes deeper, the rock grains become larger until bedrock is reached.	The Moon spins once on its axis every time it orbits Earth. This means that we only see one side of the Moon. The Moon has different phases depending on where it is in its orbit. There are 8 planets in our Solar System (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune). Pluto is a dwarf planet. They all orbit the Sun, which is a star. Some planets have moons. The first four planets are relatively small and rocky, while the four outer planets are gas giants (Jupiter and Saturn) or ice giants (Uranus and Neptune). There are also asteroids, meteoroids and comets in the Solar System. The Solar System is in a galaxy called the Milky Way. The galaxy is in the universe.

What experiences do we want our scientists to have?

EYFS	YEAR 1 AND YEAR 2	YEAR 3 AND YEAR 4	YEAR 5 AND YEAR 6
Stories and role play areas - Airport - Artic explorers - Jungle - Garage/fire station - Garden centre Outdoor planting and woodland area Minibeast habitats to explore Weather station Rain collectors Opportunities to play in different types of weather throughout the year Opportunities to explore and investigate different materials Opportunities to use their senses to explore Cooking/baking Gardening	Participate in sensory experiences - test senses through taste tests, feely bags, colour blindness tests Learn songs to recall the main parts of the body Go on a minibeast hunt Go on nature walks/walk around the local village Pond dipping Make dens and build animals' habitats Incubate and hatch chicks Visit to Eureka! Science and Discovery Centre Year 2 visit to the EIS in Sheffield – observe the effects of exercise on their bodies Cooking/baking Planting/gardening Go on season walks and observe the changes – make collections of objects	Visit to The Deep Visit Yorkshire Wildlife Park Baking/cooking Visitors e.g. dentist, nurse etc. Planting/gardening Dissecting plants and fruits Junk Percussion Visit Magna Science Centre	Dissect a heart Visit the National Space Center/have a planetarium in to school Create working models Have opportunities to present their work to other children in school

What key vocabulary will our Scientists need?

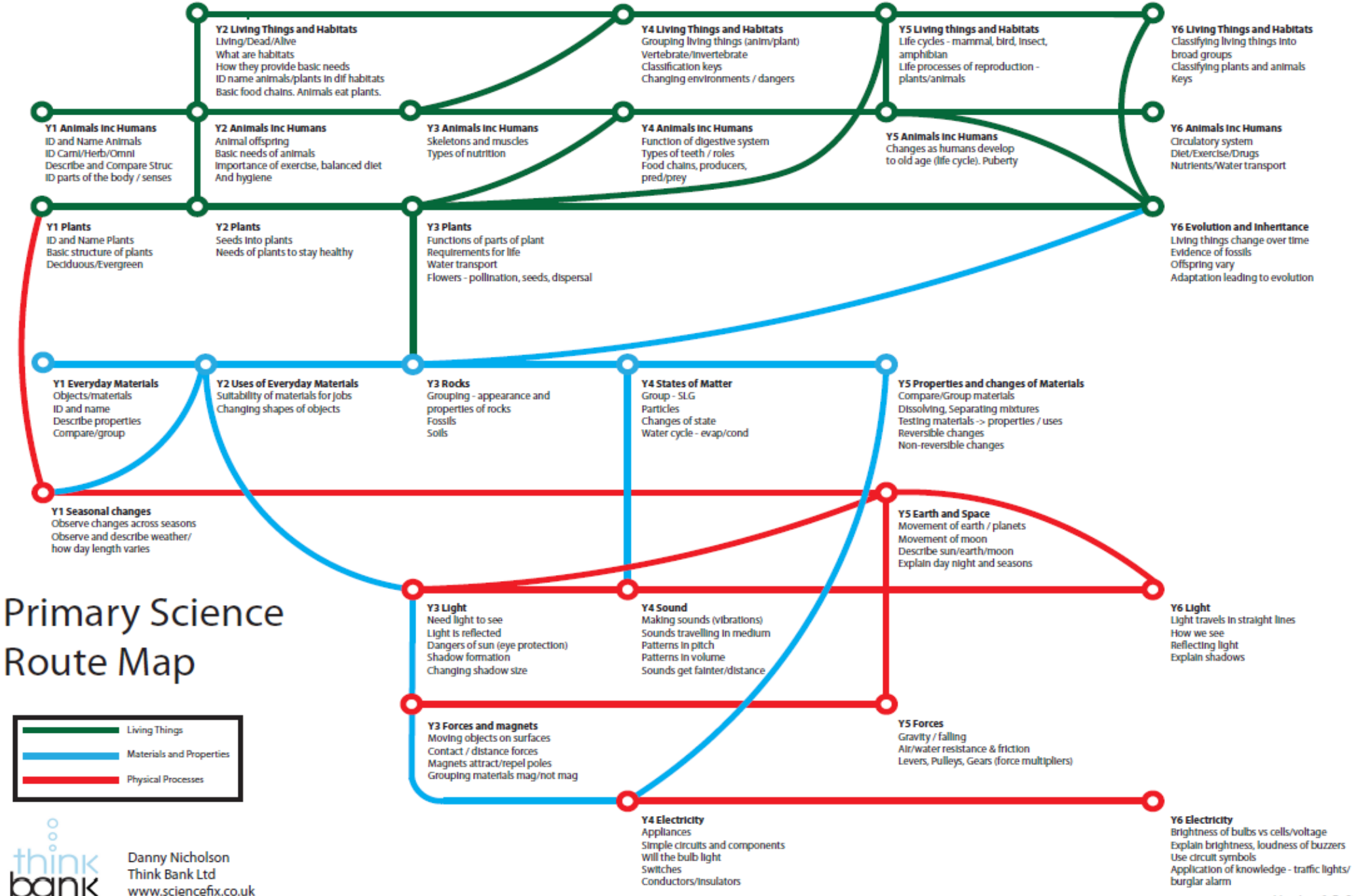
Vocabulary is important because it embodies and communicates concepts.

EYFS	YEAR 1 AND YEAR 2	YEAR 3 AND YEAR 4	YEAR 5 AND YEAR 6
Key Scientific Vocabulary The same, different Change Sort Observe Question Answer Predict	**Key Scientific Vocabulary** Identify Classify Contrast, compare Biology Question, answer Equipment Sort, group Record, chart, diagram, map Describe, observe/observing	**Key Scientific Vocabulary** Scientific Enquiry Present Interpret Fair test, careful observation, accurate measurements Comparative test Data (gather, record), Record (labelled diagrams, bar charts, tables, keys) Oral and written explanations, Conclusions, predictions Differences, similarities Evidence Construct, interpret Changes Research (relevant questions) Equipment, thermometer Secondary sources Guides	**Key Scientific Vocabulary** Identify, classify, describe Plan Variables Measurements, repeat, readings, record data (scientific diagrams. labels, classification keys, tables, scatter graphs, bar graph and line graph) Predictions, report and present (conclusions, casual relationships, explanations, degree of trust, oral and written display and presentation), Systematic, quantitative measurements, Further comparative and fair test Evidence (support, refute ideas or arguments)
Content specific vocabulary	**Content specific vocabulary** **PLANTS** Seeds, bulbs Deciduous/Evergreen trees Leaves, flowers (blossom), petals Fruit Roots, trunk, branches, stem Germination Growth Survival Reproduction Water, light Suitable temperature **ANIMALS INCLUDING HUMANS** Fish, reptiles. Mammals, birds, amphibians	**Content specific vocabulary** **PLANTS** Air, light, water Temperature Growth, nutrients, soil Reproduction Transportation, dispersal, pollination, flower Roots, stem, trunk. leaves **ROCKS** Fossils, soils Sedimentary, Metamorphic, Igneous Crystals, absorbent Layers	**Content specific vocabulary** **ANIMALS INCLUDING HUMANS** Circulatory, heart Blood vessels, veins, arteries Oxygenated, deoxygenated Valve, exercise, respiration Foetus, embryo, womb, gestation, baby Toddler, teenager, elderly Growth, development Puberty Mammal Reproduction Insect, amphibian, bird Offspring *(See also the SRE*

	Herbivore, Omnivore, Carnivore Leg, arm, elbow, head, ear, nose, back Wings. beak Taste, smell, touch, hear, see Nutrition, survival, water, air Food, adult, baby. Offspring Kitten calf, puppy Exercise. Hygiene Carbohydrates Fruit. Vegetable. Fibre, protein, dairy Fats/sugar **SEASONAL CHANGE** Summer, Spring, Autumn, Winter Sun, day, moon, night, light. Dark **LIVING THINGS AND THEIR HABITATS** Living, dead, once living/alive Habitat Energy, food chain Producer, predator, prey Woodland, pond, desert Micro-habitat, minibeast **EVERYDAY MATERIALS** Wood, plastic, glass, paper, water, metal, rock, brick, fabrics, foil Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, Waterproof, absorbent Opaque, transparent Squashing, bending, twisting, stretching, elastic	**LIGHT** Light. shadows Mirror. Reflective Dark Absorb Reflection, refraction, spectrum, rainbow Colour Sun, dangerous, protect **FORCES AND MAGNETS** Magnetic Force. Contact, attract, repel Friction, poles Push, pull **ANIMALS INCLUDING HUMANS** Movement Muscles, bones, skull Skeleton, endoskeleton, exoskeleton Mouth, tongue, teeth Oesophagus, stomach, small intestine, large intestine Herbivore, carnivore Canine, incisor, molar Nutrition Support, protection, diet Carnivore, omnivore, herbivore **SOUND** Volume, vibration, wave, pitch, tone, speaker **LIVING THINGS AND THEIR HABITATS** Characteristics Carnivore. Herbivore, omnivores Classification keys Environmental changes Environments Positive effects, negatives effects Deforestation	*curriculum)* **LIVING THINGS AND THEIR HABITATS** Fish, birds, snails, slugs, worms, spiders, insects Environment, habitats Classification, characteristics, vertebrates, invertebrates Micro - organisms Amphibians, reptiles, mammals Warm blooded, cold blooded **EVOLUTION AND INHERITANCE** Fossils Adaptation. evolution Characteristics. reproduction Genetics **EARTH AND SPACE** Earth, Sun, Moon Axis, rotation, day, night Phases of the Moon Star, constellation **FORCES** Air resistance, water resistance, friction Gravity, Newton Gears, pulleys, teeth, pendulum **PROPERTIES AND CHANGES OF MATERIALS** Hardness Solubility Transparency Conductivity Magnetic/non-magnetic Filter Evaporation, dissolving. Mixing Soluble/insoluble. Separated Reversible change

		ELECTRICITY Cells, wires Bulbs, switches, buzzers, battery, circuit, series Conductors, insulators Amps, volts **STATES OF MATTER** Solid. liquid, gas Evaporation, condensation, particles Temperature, freezing, heating	**LIGHT** Light Shadows Mirror Reflective Dark Absorb Reflection refraction Spectrum, rainbow Colour Straight line **ELECTRICITY** Cells, wires, bulbs, switches, buzzers Battery, circuit, series Conductors, insulators Amps, Volts Brightness Volume Symbols

How does it all link together?



Primary Science Route Map

Living Things

Materials and Properties

Physical Processes

think bank

Danny Nicholson
Think Bank Ltd
www.sciencefix.co.uk

Version 1.5 08/02/21

End Points: Cycle A

What key learning to we want our children to know and remember by the end of each unit?
What will we assess our children against?

EYFS	YEAR 1 AND YEAR 2	YEAR 3 AND YEAR 4	YEAR 5 AND YEAR 6
Identify/observe the main parts of a life cycle. Respect and care for the natural environment and all living things. Explore and talk about the things they observe, can feel, hear touch and smell. Ask questions about aspects of their familiar world such as the place where they live or the natural world. Know the 4 seasons of the year and understand that the weather changes during each season. Know that things change as they can older. Identify similarities and differences in their bodies, faces and features. Explore and use different materials for building models.	**ANIMALS INCLUDING HUMANS** Name the main parts of the body and know what its purpose is. Name the five senses Know that animals, including humans have offspring that grow into adults and this is called a life cycle. Know the 4 main parts of a lifecycle. Know that all animals need water, air and food to survive. Know what humans need to do to keep healthy. Name the 4 different food types and how they keep humans healthy. **LIVING THINGS AND THEIR HABBITATS** Name some objects/things are living, some that are dead and some things that have never been alive. Know and understand what a habitat is. Name some different types of habitats. **EVERYDAY MATERIALS** Name some materials that are man-made and some that are natural. Describe objects using words such as hard,	**ANIMALS INCLUDING HUMANS** Describe how humans can look after their teeth and what might happen if we don't look after them. Name the 4 types of teeth (Canines, incisors and premolars and molars. Describe why our bodies make saliva. Describe the digestive system journey (begins with the mouth and teeth where food is ingested and chewed. Saliva is mixed with the food which helps to break it up. When the food is small enough to be swallowed, it is pushed down the oesophagus by muscles to the stomach. In the stomach the food is mixed further. The mixed food is sent to the small intestine. Any leftover, broken down food then moves on to the large intestine. The food minus the nutrients arrives in the rectum where muscles turn it into faeces. It is stored here until it is pushed out by the anus. This is called excretion). **Living things and their habitats** Be able to group living things in a variety of different ways and explain how they are grouped. Know the difference between carnivores, herbivores and omnivores. Know how to use a classification key to	**ANIMALS INCLUDING HUMANS** Describe the main stages of the human life cycle. Understand that puberty is the change that happens in late childhood and adolescence where the body starts to change because of hormones - changes include growth in height, more sweat, hair growth on arms and legs, under the armpits and on genitals, and growth in parts of the body such as male genitals and breasts. Females begin to menstruate. **ANIMALS INCLUDING HUMANS (UNIT TWO)** Name some choices, which can be harmful to our health. Describe the benefits of exercise on the human body. Using a diagram, name the main parts of the circulatory system. Know that: How often your heart pumps is called your pulse. 1. Deoxygenated blood is sent to the heart from the rest of the body. 2. This is then sent from the heart to the lungs. Here, the blood picks up oxygen and disposes of carbon dioxide. 3. Oxygenated blood is then sent back to the heart. 4. The heart sends the oxygenated blood back to the rest of the body.

	soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque and transparent. Group objects together based on their simple physical properties. Describe how and why a certain material is suited for a purpose based on its properties. Understand how the shape of some materials can be changed. Know which materials can be recycled. **PLANTS** Know why people might growing plants e.g., beauty and food. Name some common garden plants e.g., rose, poppy, sunflower. Some common wild plants are: dandelion, daisy and buttercup. Know and explain the difference between deciduous trees and evergreen trees. **SEASONAL CHANGES** Name the four seasons and their months: Autumn - September, October, November Winter - December, January, February Spring - March, April, May Summer - June, July, August. Explain some of the main changes that occur in Autumn. Explain some of the main changes that occur in Winter. Explain some of the main changes that occur in Spring.	identify and group animals. Name some of the way that humans can impact environments. **ELECTRICITY** Know how electricity is generated using energy from natural sources such as the Sun, oil, water and wind. Know that some appliances use batteries and some use mains electricity. Know that batteries come in different sizes depending on how much and for how long the appliance is used. Be able to understand and make complete circuit. Know and demonstrate what a circuit must contain. Describe what the purpose of a switch is. Know that some objects allow the flow of electricity through a circuit. Name some electrical conductors. Know that some objects block the flow of electricity through a circuit. Name some electrical insulators. Understand what voltage is. Name some thermal conductors. Name some thermal insulators. **STATES OF MATTER** Understand that particles are what materials are made from.	**ELECTRICITY** Can use scientific symbols to represent the components (parts) of a circuit. Know and understand that the brightness of a bulb or the loudness of a buzzer is affected by the number of cells in a circuit and the voltage of cells in a circuit. Demonstrate and explain their understanding verbally, in writing and through diagrams that: The number, arrangement of components and length of wires in a circuit can affect how they function. **FORCES** Explain what a force is using the correct scientific vocabulary. Explain how forces change the motion of an object making it start, speed up, slow down or stop moving. Know and explain what friction is using the correct scientific vocabulary. Name two other forces that create resistance of motion. Be able to explain that gravity is the force that pulls objects to the centre of the Earth. Explain how air resistance makes the parachute land more slowly. Explain how Some objects can move through water with less resistance if they are streamlined. Explain/show in a diagram how levers and

	Explain some of the main changes that occur in Summer.	Particles behave differently in solids, liquids and gases. In the solid state, the material holds its shape. Using their knowledge of particles explain: why solids have a fixed shape and why they can't be poured why liquids hold the shape of the container they are in and can change shape, depending on the container. Why gas particles can escape from open containers. Know what happens to the particles in water when it is heated. Know how condensation is formed. Know that freezing point is 0ºC and boiling point is 100ºC. Explain how things dissolve. **SOUND** Know that the object that makes the sound is called the source. Know how sound waves are made (the vibration makes the air around the object vibrate and the air vibrations enter your ear) Name some of the ways that sound waves travel (such as air, water, glass, stone, and brick). Know that: The pitch of a sound is how high or low it is. The volume of a sound is how loud or quiet	Pulleys work. **EVOLUTION AND INHERITANCE** Know that evolution is a process of change that takes place over many generations, during which species of animals, plants, or insects slowly change some of their physical characteristics. This is because offspring are not identical to their parents. Explain how differences within a species (for example between parents and offspring) can be caused by inheritance and mutations. Know that evidence of evolution comes from fossils - when these are compared to living creatures from today, paleontologists can compare similarities and differences. Other evidence comes from living things - comparisons of some species may reveal common ancestors. Understand what adaptation is and why it happens over time.

		it is. Explain how the amount of energy a vibration has can change the sound it makes (volume) Explain what amplitude measures (how strong a sound wave is.) Know that: Decibels measure how loud a sound is. Frequency measures how many sound waves there are per second.	

End Points: Cycle B

What key learning to we want our children to know and remember by the end of each unit?
What will we assess our children against?

EYFS	YEAR 1 AND YEAR 2	YEAR 3 AND YEAR 4	YEAR 5 AND YEAR 6
Identify/observe the main parts of a life cycle. Respect and care for the natural environment and all living things. Explore and talk about the things they observe, can feel, hear touch and smell. Ask questions about aspects of their familiar world such as the place where they live or the natural world. Know the 4 seasons of the year and understand that the weather changes during each season. Know that things change as they can older.	**ANIMALS INCLUDING HUMANS** Know that vertebrates are animals that have a backbone. Name the five groups of vertebrates: (mammals, fish, birds, reptiles, amphibians). Know that mammals give birth to live young, usually have hair or fur, warm-blooded, cannot breathe underwater. Name some common mammals, birds, reptiles, amphibians and fish. Know that fish have fins and scales, breathe underwater using gills, lay eggs in water, and are coldblooded.	**ANIMALS INCLUDING HUMANS** Know that animals, including humans need the right type and amount of nutrition and they get their nutrition from what they eat. Using the correct scientific vocabulary, explain what vertebrates and invertebrates are and name some. Know that humans and some other animals have skeletons and explain what the skeleton does. Explain that: Vertebrates are animals that have a backbone. These skeletons are called endoskeletons - this means that the skeletons are on the inside of the bodies. These skeletons grow with the bodies.	**LIVING THINGS THEIR HABITATS** Describe the main characteristic of the different types of animals: fish, mammals, amphibians, reptiles, birds. Using diagrams, explain how the life cycles of mammals, birds, amphibians and insects have similarities and differences. Using the correct scientific vocabulary, explain how plants reproduce. **LIVING THINGS AND THEIR HABITATS UNIT TWO** Know that all living things, which can also be called organisms, have to do certain things to stay alive. Name the life processes: movement,

Identify similarities and differences in their bodies, faces and features. Explore and use different materials for building models.	Know that birds are warm-blooded, have wings and beaks, have feathers, lay eggs. Know that reptiles are cold- blooded, lay eggs, have scales, and cannot breathe underwater. Know that amphibians are cold- blooded, lay eggs, live on land and water - can breathe underwater through gills. Know that invertebrates are animals that do not have a backbone. Explain the difference between a carnivore, herbivore and omnivore. **LIVING THINGS AND THEIR HABBITATS** Give examples of a micro-habitat and what minibeasts could be found there. Explain why a certain habitat might help and animal to survive. . Use a simple diagram to show how a food chain is a simple way to show the direction in which energy moves from the producer to the various consumers to the top or tertiary consumer. **USE OF EVERYDAY MATERIALS** Know that some materials are natural while others are man - made. Know that natural materials are materials which are found in nature and man- made materials are materials which have been produced by humans. Name some materials which are transparent and opaque and what purposes these could be used for.	When the skeleton exists outside the body, it is called an exoskeleton. An exoskeleton is a covering that supports and protects animals. These have to be shed and a new skeleton is grown. Know and explain what joints, muscles and tendons are and what they do. **PLANTS** Name the mains parts of flowering plants. Explain what plants need to grow and survive. Explain the process of transpiration. Explain what will happen if a plant does not get enough water. **LIGHT** Using the correct scientific vocabulary, explain what a light source is. Name some light sources. Explain why we must never look directly at the Sun. Understand that the Moon is not a source of light. The Sun's light reflects on the surface of the Moon making it appear as though the Moon emits light. Understand that shiny things are not light sources - they also reflect the light. Understand that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.	respiration, sensitivity, growth, reproduction, excretion and nutrition Know what it is and use a classification key. Explain how habitats can change throughout the year and how this can have an effect on the plants and animals that live there. Name some of the positive and negative effects that humans can have on the environment. Using the correct scientific vocabulary, explain what microorganisms are. **PROPERTIES AND CHANGES OF MATERIALS** Understand that everyday materials can be grouped and compared dependent on their hardness, solubility, transparency, conductivity and their response to magnets. Know that materials that dissolve are soluble. Materials that do not dissolve are insoluble. Some materials can be separated after they have been mixed based on their properties - this is called a reversible change. Name some methods of separation and evaporation. Describe some examples of a reversible and irreversible change. **LIGHT** Explain that a light source can emit light by burning, electricity or chemical reactions, some examples include: Burning –

	Explain what waterproof means and name some waterproof materials. Explain what absorbent means and name some absorbent materials. **PLANTS** Know that germination is the growth of a plant contained within a seed. Understand that to be successful, plants need to be grown in suitable conditions. The right conditions must include a suitable temperature and a suitable amount of water and light. Name the parts of common plants: roots, stem, leaf, flower, seed. **SEASONAL CHANGES** Name the four seasons and their months: Autumn - September, October, November Winter - December, January, February Spring - March, April, May Summer - June, July, August. Explain some of the main changes that occur in Autumn. Explain some of the main changes that occur in Winter. Explain some of the main changes that occur in Spring. Explain some of the main changes that occur in Summer.	**FORCES AND MAGNETS** Using the correct scientific vocabulary, explain what a force is and how they can start to move or speed up, slow down or even make an object stop. Understand that forces act in opposite directions to each other. Know that friction is a force that holds back the motion of an object. The more friction, the slower the object moves. Using a ramp, explain that the force that causes the object to move downwards is gravity. Know that magnets produce an area of force around them called a magnetic field and when objects enter this magnetic field, they will be attracted to or repelled from the magnet if they are magnetic. Name some magnetic and non-magnetic materials/objects. Know that the ends of a magnet are called poles. One end is called the north pole and the other end is called the south pole. Opposite poles attract, similar poles repel. **ROCKS** Name and describe the three types of rocks that are formed naturally. Igneous, sedimentary, metamorphic. Know that other fossils are made from imprints in surrounding sedimentary rock such as footprints or imprints from shells. Soil is made from pieces of rock, minerals, decaying plants and water.	sun, flames from a fire, stars. Know that light travels in straight lines and when light is blocked by an opaque object, a dark shadow is formed. Know that shadows have the same shape as the objects that cast them and the size of a shadow changes as the light source moves closer or further away. . Using the correct scientific vocabulary, explain what reflection is. Understand that we can see round corners using mirrors and reflecting light. **EARTH AND SPACE** Know that the Earth rotates on its axis anti-clockwise and makes a complete rotation over 24 hours (a day). This makes it appear as though the Sun moves through the sky but the Earth's rotation causes day and night. Know that different parts of the Earth experience daylight at different times. This is also the reason why we have time zones. Understand that because of the Earth's tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter. Know that the Earth takes 365 and a quarter day to orbit the Sun. Because of the extra quarter day it takes to orbit the Sun, every four years on Earth is a leap year! Know that it is the Earth's tilt that causes the seasons.

		Explain how soil is formed.	Know that the Moon orbits the Earth anticlockwise and takes approximately 28 days. Name the planets in order from the sun. Know that the Solar System is in a galaxy called the Milky Way and the galaxy is in the universe.