Fishbourne Church of England Primary School
Science Curriculum Overview – Final Draft 2020

Our Ultimate End Goal:

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

By the end of their time at Fishbourne C.E. 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?

To reduce the number of science learning experiences in every year group we have moved content around. This means some learning experiences will have a lot of science content to be covered. Please take this into account when you are planning the length of each experience as some content will not now be covered later on in the school.

Highlighted content shows which year group the content has been moved from.

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	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. * Observe and describe how seeds and bulbs grow into mature plants. (Yr2) **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** * 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. * 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. (Yr3) **Living things and their habitats** *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	**Plants** * Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. *Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Yr2) * 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. **Rocks** *Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. * Describe in simple terms how fossils are formed when things that have lived are trapped within rock.	**Animals including humans** * Identify that humans and some other animals have skeletons and muscles for support, protection and movement. (Yr3) * 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. **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. **Electricity**	**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. **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.	**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. **Living things and their habitats** * Recognise that living things can be grouped in a variety of ways. * Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. * Recognise that environments can change and that this can sometimes pose dangers to living things. (Yr4) * Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and

	* Notice that animals, including humans, have offspring which grow into adults. (Yr2) **Seasonal Change** *Observe changes across the four seasons. * Observe and describe weather associated with the seasons and how day length varies.	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. Identify producers, predators and prey. (Yr4) **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 everyday materials. * Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Yr1) *Iidentify 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.	* Recognise that soils are made from rocks and organic matter. **Light** *Recognise that they need light in order to see things and that dark is the absence of light. * 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. * Recognise that light appears to travel in straight lines. * 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. (Yr6) **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.	*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. * 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. (Yr6) **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.	**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. **Living things their habitats and animals including humans** * Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. * Describe the life process of reproduction in some plants and animals. * Describe the changes as humans develop to old age.	differences, including microorganisms, plants and animals. * Give reasons for classifying plants and animals based on specific characteristics. **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.

			* Describe magnets as having two poles. * Predict whether two magnets will attract or repel each other, depending on which poles are facing.			

PROCEDURAL KNOLWEDGE - 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	Year 2	Year 3	Year 4	Year 5	Year 6
Show curiosity about objects, events and people. Question why things happen. Engage in open-ended activity. 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. Choose the resources they need for their chosen activities. Handle equipment and tools effectively. Create simple representations of events, people and objects.	**Ask questions and plan enquiry** Explore the world around them and raise their own simple questions. Recognise that they can be answered in different ways. Ask people questions and begin to use simple secondary sources. **Set up enquiry** Experience different types of scientific enquiry, including practical activities. Carry out simple tests. **Observe + Measure** Observe closely, using simple equipment such as hand lenses and egg timers. Observe changes over time. With guidance begin to notice patterns and relationships. **Record** Gather and record simple data to help in answering questions. **Interpret + Report** Use their observations and ideas to suggest answers to questions. Talk about what they have found out and how they found it out. Begin to use simple scientific language. **Evaluate** Use their observations and ideas to suggest answers to questions.		**Ask questions and plan enquiry** Raise their own relevant questions about the world around them. Start to make decisions about the most appropriate type of scientific enquiry to use to answer them. Recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations. **Set up enquiry** Set up simple practical enquiries, comparative and fair tests. Recognise when a simple fair test is necessary and help to decide on how to set it up. **Observe + Measure** Help to decide which systematic and careful observations to make and for how long. Where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Begin to look for patterns and relationships and decide what data to collect to identify them. **Record** 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. **Interpret + Report** Look for changes, patterns, similarities and differences in their data in order to draw simple conclusions. And answer their questions. Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for their audience, including oral and written explanations, displays or presentations of their results and conclusions. **Evaluate** Draw simple conclusions, identify new questions arising from the results, make predictions for an extended investigation, suggest improvements and raise further questions.		**Ask questions and plan enquiry** Use their science experiences to explore ideas and raise different kinds of questions. Plan different types of scientific enquiries to answer their own questions, including recognising and controlling variables where necessary. Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. **Set up enquiry** Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Use previous test results to make predictions to set up further comparative and fair tests. **Observe + Measure** Make their own decisions about what observations to make, what measurements to use and how long to make them for. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Look for different causal relationships in their data and identify evidence that refutes or supports their ideas. **Record** Decide how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. **Interpret + Report** Identify the scientific evidence that has been used to support or refute ideas or arguments. Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas. Use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in their results. **Evaluate** Identify and evaluate scientific evidence (their own and others') that has been used to support or refute ideas or arguments. Use their results to make predictions and identify when further observations, comparative and fair tests might be needed.	

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.			

PROPOSITIONAL KNOWLEDGE - What key concepts or knowledge will our scientists have?
What knowledge do we want to emphasise? How will knowledge be built on what went before and prepare our children for what is coming next?

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	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** A **wild plant** will grow by itself. It does not need to be cared for. If it grows somewhere unwanted, it may be a **weed**. Some common wild plants are: **dandelion, daisy, buttercup, nettle and clover** **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, waxy and narrow like needles. Parts of common trees: **Crown, leaves, twig, branch, trunk and roots.** Parts of common plants: **roots, stem, leaf, flower, seed.** **Animals including humans** A **life cycle** is the series of changes that an animal or plant passes through from the	**Animals including humans** All animals need **water, air and food** to **survive**. To **keep healthy**, **humans** need: to eat a **balanced diet** and healthy food, some **exercise** to keep their muscles and bones healthy, to take **medicines** that are given by doctors and nurses when feeling poorly, 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.	**Rocks** There are three types of rocks that are formed naturally. **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 non-porous. **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 builds 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	**Animals including humans** **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 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**.	**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. It is morning, afternoon and night in different places. 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 days 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**.	**Animals including humans** 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**.

	beginning of its life until its death. Animals, including humans, have offspring which grow into adults. **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 giraffes and then humans **Fish** have fins and scales, breathe underwater using gills, lay eggs in water, and are cold-blooded. 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 a backbone**. They include: insects such as flies, ladybirds and bees, arachnids such as spiders, molluscs 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**	**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 and get rid of waste that you don't need, examples of foods high in water include celery, cucumber, tomatoes. **Living things and their habitats** 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. Some habitats in our local area include the river and woodlands. Other habitats include the coast and the forest. **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	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 becomes deeper, the rock grains become larger until bedrock is reached. **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. This 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. 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 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	**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 meat. **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 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**. **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	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. The Moon's **gravity** causes high and low **tides**. 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**. **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 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.	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 **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. **Living things and their habitats** All **living things**, which can also be called **organisms**, have to do certain things to stay alive. 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 affect 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

	(examples include cows and giraffes) Animals that eat plants and meat are called **omnivores** (examples include humans and squirrels) 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**. **<u>Seasonal Change</u>** 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**, which means it gets colder. The leaves on **deciduous trees change colour and begin to fall to the**	to survive there, such as food and water. Animals and plants **depend** on each other to **survive**. For example, worms depend on plants because they feed on dead leaves, but plants depend on worms who make the soil healthy by digging holes and allowing air in. Birds also need worms because they eat them. Worms are a source of food for birds. This called a **food chain**. If there were no worms, there would be less birds as there would be more competition for food. The soil would not be as healthy without worms. All living things (or things that were once living) have a part to play in food chains. Without them, other animals and plants may not be able 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 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**. A **food web** shows the direction in which energy travels when animals and producers (plants) are eaten by more than one thing. When **part** of the food chain is **removed**, this has an **impact** on	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. **<u>Forces and Magnets</u>** **Forces** are **pushes and pulls**. These forces change the **motion** of an object. They will make it start to move or speed up, slow it down or even make it stop. Forces act in **opposite directions** to each other. 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 means 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**, the **push** each other away. When magnets **attract**, they **pull** together. Objects that are **magnetic**, are attracted to magnets. **Iron and steel** are magnetic. Aluminium 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**.	ear. 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 the number of times per second that the sound wave cycles. (How many waves and how close they are.) **<u>Electricity</u>** **Electricity** is **generated** using **energy** from natural sources such as the Sun, oil, water and wind. These can also be called fuel sources. 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 flow through wires. A circuit contains a **battery** (cell), **wires** and an appliance that requires electricity to work (such as a **bulb, motor or buzzer).**	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. **Springs** can be stretched or squashed. The greater the force pulling or pushing the spring, the greater the force the spring uses to move back to its normal shape. **<u>Properties and changes of materials</u>** 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 woollen 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. When the **particles** of a **solid mix** with the **particles** of a **liquid**, this is called **dissolving**. The result is a **solution**. **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),	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. **<u>Evolution and Inheritance</u>** **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 **new characteristics**. **Evidence** of **evolution** comes from **fossils** - when these are compared to living creatures from today, **palaeontologists** can compare similarities and differences. Other evidence comes from living things - comparisons of some species may reveal **common ancestors**.

	ground. The days get shorter and the nights get longer. In the autumn, there are events such as Halloween and Bonfire Night. Things people might do are rake leaves, pick blackberries and collect conkers and pine cones. The weather may be slightly sunny, windy or rainy. There are more clouds in the sky during autumn compared to the summer. 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** - As the seasons change from autumn to 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. **Deciduous trees have completely lost their leaves and the braches 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 stews and soups and light fires. The weather may be windy, rainy and chilly. Sometimes it also snows. The clothes you might wear include warm coats, jumpers, woolly hats and scarves on colder days. **In Spring** - As the seasons change from winter to spring, it **gets warmer and the temperature begins to rise**. Some things that happen in spring are: **leaves begin to appear on deciduous trees**. Some trees begin to **blossom**.	the other parts of the **food chain**. The number of some species will increase, while the population of others will decrease. This can have a direct impact on the survival of the species. The **population** of **tertiary consumers depends** on **healthy populations** of **producers, primary and secondary consumers.** **<u>Everyday Materials</u>** **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** because these materials are **smooth** and can be **cut straight**. Spoons are made from **metal**, because it is **waterproof** and can be **cleaned easily**. 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 **soaks up liquid easily**. The shape of some materials can be changed when they are stretched, twisted, bent and squashed. Some materials are recyclable this means that waste		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 current. It is measured in volts. **<u>States of matter</u>** **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 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 together** but random. Liquid	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. **<u>Living things their habitats and animals including humans</u>** 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. This is also 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**. Some 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**.	**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**.

	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. The weather may be slightly sunny but still a little 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** - As the seasons change from spring to 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, have a paddling pool in the garden and mow the lawn. The weather may be hot and sunny. There may not be many 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.	materials can be processed and used again.		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 0°C. The temperature at which water turns to gas is called the boiling point. This happens at 100°C.	**Reproduction** is when an animal or plant produces one or more individuals similar to itself **Sexual reproduction**: requires two parents with male and female gametes (cells) It will produce offspring that is similar to but not identical to the parent. **Asexual reproduction**: requires only one parent and will produce offspring that is identical to the parent. **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 **anther** is 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 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).	

What key vocabulary will our scientists need? *Vocabulary is important because it embodies and communicates concepts.*

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Plants Seeds Bulbs Deciduous	**Animals including humans** Nutrition Survival Water	**Plants** Air Light Water	**Animals including humans** Movement Muscles Bones	**Earth and Space** Earth Sun Moon	**Animals including humans** Circulatory Heart Blood Vessels

	Evergreen trees Leaves Flowers (blossom) Petals Fruit Roots Bulb Seed Trunk Branches Stem **Animals including humans** Fish Reptiles Mammals Birds Amphibians Herbivore Omnivore Carnivore Leg Arm Elbow Head Ear Nose Back Wings Beak **Seasonal Change** Summer Spring Autumn Winter Sun Day Moon Night Light Dark	Air Food Adult Baby Offspring Kitten Calf Puppy Exercise Hygiene **Living things and their habitats** Living Dead Once living Habitat Energy Food chain Producer Predator Prey Woodland Pond Desert **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	Temperature Growth Nutrients Soil Reproduction Transportation Dispersal Pollination Flower **Rocks** Fossils Soils Sedimentary Metamorphic Igneous Crystals Absorbent **Light** Light Shadows Mirror Reflective Dark Absorb Reflection Refraction Spectrum Rainbow Colour **Forces and Magnets** Magnetic Force Contact Attract Repel Friction Poles Push Pull	Skull Skeletons Mouth Tongue Teeth Oesophagus Stomach Small Intestine Large Intestine Herbivore Carnivore Canine Incisor Molar **Sound** Volume Vibration Wave Pitch Tone Speaker **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	Axis Rotation Day Night Phases of the Moon Star Constellation **Forces** Air resistance Water resistance Friction Gravity Newton Gears Pulleys **Properties and changes of materials** Hardness Solubility Transparency Conductivity Magnetic Filter Evaporation Dissolving Mixing **Living things their habitats and animals including humans** Foetus Embryo Womb Gestation Baby Toddler Teenager Elderly Growth Development Puberty Mammal Reproduction Insect Amphibian Bird Offspring (See also the SRE curriculum)	Veins Arteries Oxygenated Deoxygenated Valve Exercise Respiration **Living things and their habitats** Fish Birds Snails Slugs Worms Spiders Insects Environment Habitats Classification Vertebrates Invertebrates Micro-organisms Amphibians Reptiles Mammals **Evolution and Inheritance** Fossils Adaptation Evolution Characteristics Reproduction Genetics

What experiences do we want our scientists to have had?
What opportunities will our scientists have had to ***'make the world a better place'?***

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Useful science stories Ourselves / The Body: 'From Head to Toe' Eric Carle 'Doctor Miaow's Big Emergency' Sam Lloyd 'Funnybones' Janet & Allan Alhburg 'The Selfish Crocodile' Charles & Jerry 'Crocodiles don't brush their teeth' Fancy & Wilson-Max Animals: 'Mister Seahorse' Eric Carle 'Panda Bear, Panda Bear' Eric Carle 'Dogs', 'Wolves', 'The Rabbit Problem' Emily Gravett 'Egg Day' J Dunbar 'The Emperor's Egg' Martin Jenkins 'Once upon a time, Upon a nest' Emmett & Harry Plants / Growing things: 'Ten Seeds' Ruth Brown 'Jasper's Beanstalk' Nick Butterworth 'Ben Plants a Butterfly Garden' Kate Petty & Alex Scheffler 'Oliver's Vegetables' Vivian French 'Fran's Flower' Lisa Bruce Movement: 'Mr Grumpy's Motor Car' John Burningham ' Sound / Echo: 'Peace at Last' Jill Murphy 'Quiet' Paul Bright 'Little Beaver and the Echo' Amy McDonald 'One Stormy Night' Ruth Brown Space: 'Man in the Moon, Day in the life of Bob' Simon Bartram 'Eric and the Red Planet' Caroline Glisksman	**Plants** •Plant a bulb or a seed and watch it grow. Record your observations in a diary. •Compare the growth of that plant with a plant (using the same bulb or seed) where one of the conditions is different (no water, no light, a smaller container). •Plant seeds or bulbs to give away to people in the local community. Possibly one of our local residential homes. •Find ways to prove that plants are alive •Go on a wild plant hunt! Create a tally chart to show how many of each plant you have found and then use the information to answer questions. •Use time-lapse photography to record how deciduous trees change •Go on a tree hunt around the school or on a trip - what types of trees can you see? •Collect fallen leaves and identify which tree they came from using pictures to help you. •Sort the leaves between deciduous and evergreen trees. •Label the parts of a plant showing where the leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, and stems are. **Animals including humans** •Have caterpillar eggs in class and take time lapse photography of their cycle of life. •Match animals to their offspring then compare and contrast offspring to their parents. •Order the stages in human life. •Find and classify animals in the school environment e.g.	**Animals including humans** •Investigate how animals are cared for in zoos and farms. What do they need to survive? •Investigate the effects of exercise on the body Participate in a series of exercises and investigate how each exercise: makes your body feel, affects your breathing, uses each of your muscles •Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. •Record a food diary and evaluate your diet. •Research how different foods contribute to a varied diet and design meals based on your research. •Describe what happens if one part is missing from a balanced diet and how some groups of people (e.g. vegetarians) may compensate for that. **Living things and their habitats** •Conduct an experiment to decide if an object is alive or not (such as a car) •Investigate habitats (such as hedgerows and trees) and micro-habitats (such as under stones and under logs) in the school environment or forest school. •Investigate what habitats animals/insects like using 'choice chambers' •Go on a minibeast hunt and compare two different microhabitats. What minibeasts can you find? Why can they survive in their habitat? Create a tally chart or pictogram to show your results. •Use your knowledge of biomes to describe the types of	**Plants** •Experiment with different ways to make a seed germinate without soil. Then observe plants as they grow. •Experiment with ways to prove that plants need water to stay healthy. •Experiment with ways to prove that plants need light to stay healthy. • Compare the effect of different factors in plant growth (e.g. the amount of water, the amount of light and the amount of fertiliser).Discuss what would make this a fair test. •Place white carnations in dyed water to observe how plants transport water. •Dissect a flower and identify each of the different parts that help with fertilisation. •Act out the process of pollination to help explain how seeds are formed. •Dissect fruits and use microscopes and magnifying glasses to observe their structure. Use this to explain how seeds are dispersed. **Rocks** •Explore the types of rocks you can find in the local environment. •Make your own food rocks: **Sedimentary** – sandwich with layers squashed, **Metamorphic** – different biscuit doughs squashed then heated and **Igneous** rocks- different chocolates melted. •Investigate what soil is made from by mixed different soils in cups of water then leaving to settle to display layers. •Investigate drainage of different soils using soils	**Animals including humans** •Identify and group animals with and without skeletons and compare the ways in which they move. •Match animals to their skeletons and explain your reasons for this. •Explore ideas about what would happen if humans did not have skeletons. •Identify which bones are used for support (e.g. backbone), which are used for protection (e.g. cranium) and which are used for movement (e.g. joints) •Experiments to find out which is the strongest muscle group •Dissect a chicken wing to identify the muscles and tendons. •Make a model arm to demonstrate how the muscles work in pairs contracting and extending to move the bones. •Compare the teeth of animals and predict if they are carnivores or herbivores. •Investigate the amount of sugar in drinks and learn how sugar leads to an increase in plaque and how this destroys tooth enamel. •Find out what happens to a tooth left in various types of drinks •Create booklets to share with younger children about the need for brushing your teeth and the dangers of fizzy drinks and sugars to your dental health. •Demonstrate the process of digestion by creating their own digestive system. **Sound** •Experiment with rice on drums and rulers pinged on tables to demonstrate how sounds are created through vibrations.	**Earth and Space** •Use the internet (pen pals) to establish that the time of day is different in different places in the world. •Creating working models of the solar system. •Act out the rotations and orbits of the planets round the sun. •Construct shadow clocks and sundials. •Keep a Moon diary over the course of a month - what do you notice? **Forces** •Experiment to test the strength of different forces and work out how they can be reduced. •Make parachutes to investigate how air resistance works. Ensure that only one variable is changed while other variables stay the same. •Investigate the amount of friction created by different surfaces. Use measures (such as length and time) to show how far or fast and object travels. •Draw diagrams to show how objects move down ramps, through the air and through water, using arrows to show the direction of the forces. •Explore resistance in water by making and testing boats of different shapes. •Design and make products that use levers, pulleys, gears and/or springs and explore their effects. (Knex etc.) **Properties and changes of materials** •Experiment to find properties of materials, e.g. does it attract to a magnet, can heat pass through it...	**Animals including humans** •Identify the parts of the circulatory system and explain their functions. •Explore the different chambers of a heart using an animal's heart from the butcher. •Make a circulatory system with a pump. •Create a presentation to show how our blood is pumped around the body. •Analyse line graphs that show the change in heart rate over time before, during and after exercise. •Investigate which exercise produces the fastest pulse? How would you make this a fair test? **Living things and their habitats** •Locate a range of habitats on the school site •Carefully observe minibeasts in a microhabitat and use a classification key to identify them. Record these in a variety of ways (e.g. Venn and Carroll diagrams, tables) •Use a classification key to sort plants and vertebrate and invertebrate animals into groups, describing their key features. •Design own keys and branch diagrams to identify animals and plants on the school site and lead another year group on a bug hunt using these charts to classify. •Use simple computer software programmes to create a branching classification key. •Explore examples of human impact (both positive and negative) on environments. •Organise an event to make the rest of the school aware of one

'Whatever Next' Jill Murpy <u>Light & Dark / Shadows:</u> 'The Owl who was Afraid of the Dark' J Tomlinson 'Moonbear's Shadow' Frank Asch 'Kipper's Monster' Mick Inkpen 'The Gruffalo's Child' Julia Donaldson <u>Materials:</u> 'Kipper's Rainy Day' Mick Inkpen 'Traction Man is Here!' Grey & Cape 'The Slimy Book' Babette Cole 'Biscuit Bear' Grey & Cape 'The Queen's Knickers' Nicholas Allan	group animals according to what they eat •Look closely at the features of animals using magnifying glasses •Visit from an 'animal person' to introduce less common animals •Learn songs to recall the main parts of the body •Test senses through taste tests, feely bags, colour blindness tests etc •Draw around one of the pupils in your class - label the different parts of the body and describe what each part does. •Complete a simple exercise (such as a star jump) and describe which parts of your body move. •Participate in a sensory experience where you taste, feel, look at and see different foods (check for allergies first). •Use senses to compare different textures, sounds and smells. •Discuss activities where you might use more than one sense (e.g. playing football). **<u>Seasonal Change</u>** **Probably taught as a short unit each term looking at the different seasons.** •Measure the temperature every day and record when the sun rises and sets - what do you notice about the differences from your results of the other the units? •Analyse simple graphs that show how day length changes throughout the seasons. •Investigate seasons in the Northern and Southern Hemispheres. •Investigate animal behaviours during the different seasons. E.g. animals that hibernate or migrate in winter months and return in the summer.	animals and plants that live there. Match animals and plants to their habitats (e.g. forest, ocean, poles, desert). •Answer questions such as 'Why would a polar bear not survive in the desert?' •Construct food chains using given plants and animals, make the longest food chain possible. •Investigate the range of impacts should one aspect of the food chain die out •Match predators and their prey depending on their habitats. •Create food chains for different habitats and compare them. How do the producers, predators and prey compare? What are their teeth like? •Compare animal populations and explain why some populations (e.g. insects) might be higher than others (e.g. wolves) •Explore how the changing environment is having an impact on feeding relationships and food chains/webs. •Hold a bake sale to raise money to adopt an animal that is endangered due to changes in its environment. **<u>Everyday Materials</u>** •Use 'feely bags' to describe the properties of objects through touch alone. •Sort natural materials from man-made materials? •Investigate a variety of plastics and find an example of rough plastic, smooth plastic, transparent plastic, opaque plastic etc. •Investigate how some objects can be changed by squashing, bending, twisting and stretching. •Distinguish between absorbent and waterproof materials. Investigate what happens when water is placed on these materials.	placed inside filter paper and a funnel. •Explain why rocks are used for different purposes based on their properties. •Research the different ways fossils are made. •Sort different types of rocks based on how rough or smooth they are, whether they have grains or crystals, how permeable they are, how easily they can break down, how strong they are and what they look like. **<u>Light</u>** •Experience the lack of light by creating dark dens. •Draw diagrams to show how light travels, to show how we see and what happens when light is reflected from a mirror. •Design an experiment to measure shadow length by changing a variable. •Explore which objects form shadows when light is shone on them and how you can change the size and shape of shadows by using the same object. •Use data loggers to record how much light travels through various materials. •Create shadow puppets to show how light travels and to demonstrate that a shadow has the same shape as the object that casts them. •Make a light ray pass around corners or through a chicane of books using mirrors? •Make a periscope and explain how it works using diagrams and scientific vocabulary. Use the idea that light appears to travel in straight lines to explain how it works. **<u>Forces and Magnets</u>** •Investigate the amount of friction created by different surfaces. Use measures (such	•Experiment with glass jars filled with water to investigate pitch. •Use a data logger to record how the volume of sounds change as the distance from the source increases. •Use one object (such as a saucepan) and try and create a scale of sounds by manipulating it. •Make/use musical instruments using different length strings. How do their pitches differ? •Fill identical jars with different volumes of water. Which one creates the highest pitch? •Which material would make the best sound defender? How can you investigate this? **<u>Electricity</u>** •Set up circuits and predict whether the bulb will light or not. •Set up circuits and experiment with ways to make the bulbs brighter. •Set up a circuit to test materials that are conductors or insulators. •Identify the effects of changing a component in a circuit. •Name the basic parts including cells, batteries, wires, bulbs, switches, motors and buzzers. •Draw circuits using circuit symbols. •Create circuits using switches •Predict, then investigate what happens when more batteries are added to a circuit. Explain why this happens. •Predict, then investigate what happens when more bulbs, motors are added to a circuit. Explain why this happens. •Investigate what happens when the voltage of the battery changes. •Investigate what happens when the length of the wires changes	•Experiment with irreversible changes, e.g. Observe and compare the changes that take place when cakes are baked or bicarbonate of soda mixes with vinegar. (Make cakes to give away and say thank you to those who help us around school. Lunch time supervisors, office staff, cleaning staff etc.) •Find the best material to stop an ice cube from melting. Remember to keep it a fair test. •Investigate the rate at which hot water cools using different thermal insulators. Measure the temperature over time and plot these on the same line graph. Use the line graph to ask and answer questions. •Find out if thermal conductors also make good electrical conductors. •Design an experiment that investigates dissolving - consider which variables you could change. •Create a variety of mixtures using materials such as salt, sand, water, paper clips and rice and use a variety of methods to separate them. **<u>Living things their habitats and animals including humans</u>** •Compare the life cycles of mammals, amphibians, insects and birds. What is similar about their life cycles? What is different? Which have the most and fewest parts? •Compare the life cycles and growth pattern of humans to other animals. •Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. •Research the gestation periods of other animals and comparing them with humans	of these situations in the world. •Sort scenarios where microorganisms might be helpful (e.g. yeast in baking) or harmful; (e.g. infectious diseases). **<u>Evolution and Inheritance</u>** •Investigate the work of renowned palaeontologists such as Mary Anning and how Charles Darwin and Alfred Wallace developed their ideas on evolution. •Identify examples of how animals have adapted to their environments. •Research and then create a fact file of an animal or plant identifying how it has adapted to its environment and how it has evolved to survive. •Create a new planet and describe the environmental features. What animals and plants can live there? How have they adapted to survive?

	•Go on a nature walk - what signs of autumn, winter, spring or summer can you spot? •Match events to the seasons they happen in? What is weather like during these events (e.g. Christmas Day, Halloween, and Bonfire Night?) •Discuss why it is good that fireworks happen in the autumn. What would happen if they happened in the summer? •Discuss what happens when the children go home from school in the different seasons- what do they notice about daylight? Compare this to what happens in the other seasons.	•Group materials based on their properties. •Consider why some properties of materials make them suitable or unsuitable for different uses. •What is the best material for an umbrella, lining a dog basket, a superhero costume, curtains or a bookshelf? •Investigate if some items can be made out of more than one material (e.g. cutlery) and explain why. •Discuss which materials are recyclable and why. Follow the recycling process. Find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam.	as length and time) to show how far or fast and object travels. •Explore the uses of magnets in everyday objects •Group everyday objects into magnetic and non-magnetic by testing with magnets •Investigate if the size of a magnet affects how strong it is (using chains of paper clips of varying lengths) •Investigate if all metals are magnetic. •Observe what happens when magnets with similar poles are placed next to each. Repeat this for when the poles are different. •Create a game using this magnetic knowledge. Use them to set up a stall to raise money for a local charity.	•Design and make a set of traffic lights or burglar alarm. **<u>States of matter</u>** •Group materials according to their states. •Act out the particle structure of solids, liquids and gases. •Explore the effect of temperature on substances such as chocolate, butter, cream. Compare their melting points and place them in a table. •Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. •Experiment with the varying melting points of foodstuffs. (Do healthy foods melt quicker/slower?) •Create a solar water still to demonstrate evaporation and condensation. (The water cycle) •Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting. •Analyse and interpret different forms of data (tables, graphs) to show the effects of temperature on states of matter.	•Review how plants reproduce. •Grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. •Collect data around school about height and hand span of different age ranges of pupils. Record the mean, mode and median height of pupils of different ages. Create a graph summarising results. •Create a Venn diagram to show what the similarities and differences are between children, adolescents and adults.	

For useful texts go to:

https://www.stem.org.uk/teaching-science-through-stories

https://www.booksfortopics.com