Wool CE Primary School

Science Progression

Overview:
We provide a high-quality science curriculum based on scientific knowledge and conceptual understanding alongside scientific enquiry to lay the foundations for understanding the world. We want our pupils to have the scientific knowledge required to understand the uses and implications of science today and for the future. We aim to develop excitement and curiosity of natural phenomena.

Aims for the National Curriculum science curriculum:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Pupils will be taught the following knowledge and skills:

Scientific Enquiry Skills							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
PREDICT AND PLAN Predict Ask questions BEFORE ~ planning	To respond to 'I wonder' questions **To make a guess about what they think will happen** To explore the natural world around them, making observations and drawing pictures of animals and plants To know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Share ideas clearly with adults and peers. Ask simple questions such as, what's that? where and who Show curiosity by asking questions about what they notice	To know that scientific investigation begins with a question they want to find the answer to **To say what they think the outcome of the experiment may be** To ask questions about the world and then make observations to answer these questions	**To make a prediction on the outcome of the experiment and say why they think that** To plan a simple test To ask simple questions and recognise that they can be answered in different ways With help, use simple texts to find information	To understand that they can set up their own simple practical enquiries by identifying a question they want the answer / responding to a given question to and **making sure the test is fair** To u**nderstand that fair testing means changing one variable at a time (independent variable)** **To understand that the variable being tested or measured is called the dependent variable** To know that predictions should have reasoning behind them (based on scientific understanding or real life experiences) use simple texts and ICT to find information	**To plan and carry out comparative tests** **To make relevant predictions based on their increasing scientific knowledge** that will be tested in a scientific enquiry To ask relevant questions and use different types of scientific enquiries to answer them use simple texts and ICT to find information	To independently **plan a fair test recognising and controlling variables where necessary** i.e. during investigations show how to vary one factor while keeping the others the same To plan in factors to ensure reliability of results (e.g. take multiple measurements) To plan different types of scientific enquires to answer given questions To select the most appropriate ways to answer science questions using different types of scientific enquiry Select information from sources provided	**To know how to choose appropriate variables to test a hypothesis** (e.g. plant height as a dependent variable when measuring effect of light on plant growth) To know that a theory is an explanation of observations that has been tested to some extent To know that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry To plan different types of scientific enquiries to answer their own or others' questions Select information from sources provided

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CONDUCT Observe Measure Time DURING~ obtaining and presenting evidence	**To try out their guesses and observe what happens** Make observations using their senses To observe and interact with natural processes, such as ice melting, a sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object	**To know that they can use magnifying glasses to observe objects closely** **To know that objects can be identified or sorted into groups based on their observable properties and comparisons following their observations** **To use non- standard measures whilst making measurements of length and time**	To set up and **perform simple tests** To use systematic observation to gather results to answer a question To know that observation is a valid way of collecting data about changes. **To use a ruler for standard measure** *(once taught in maths)* **whilst making measurements of length and time**	With some help, carry out a fair test **To take accurate measurements using standard units** and selected equipment, including data loggers (*light unit*), rulers (*metres in humans and mm in plants*), stopwatches (*humans*) i.e. make measurements of temperature, force , volume and length…using a range of simple equipment	With some help, carry out a fair test **recognising and explaining why it is fair** **To know that equipment should be used systematically and carefully to take accurate measurements using standard units and a range of equipment**, including thermometers (*changes of state*)	To know that scientific enquiries are limited by the accuracy of the measurements and by the extent to which conditions can vary **To know that repeating enquiries, measurements and taking measures, to keep conditions as consistent as possible, can improve an enquiry** **To take accurate measurements using simple apparatus which they have selected, using standard units, using a range of equipment, taking repeat readings when appropriate**	**To know how to accurately use further measuring devices,** recognising the relative accuracy of each device, e.g. heart rate monitors (*humans*) **To know how and when to repeat measurements** To know how to find an average of a set of measurements To know how to recognise and remove outliers from a set of data, justifying the removal as a potential inaccurate measurement
RECORD Draw Tables Graphs Labelled diagrams DURING~ obtaining and presenting evidence	To draw pictures of the natural world, including animals and plants, after close observation Make measurements of length using (non-) standard measures	Present results in tables, drawings and block graphs which are either provided or designed with the teacher **To write down words and numbers into pre-drawn tables** **To draw pictures to record what is found**	Present results in tables, drawings and block graphs which are either provided or designed with the teacher **To record results to experiments in different ways: a table, a labelled diagram** To know how to draw a clear table To know how to label a diagram using lines to connect information to the diagram	**To know that results can be classified and presented in a variety of ways to help answer questions,** *e.g. use simple scientific language, drawings (Y1), labelled diagrams, tables (Y2), keys, bar charts* Present results in tables, drawings and block graphs which are either provided or designed with the teacher **and begin to design their own** To know how to draw bar charts to record scientific results To know how to use a coloured key To know how to draw a classification key	Present results in tables, drawings and block graphs which have been **designed by the children** **To know that a simple scientific enquiry write-up includes an introduction, a list of equipment, a numbered method, details of results and a conclusion** To know how to show the relationship between an independent variable in a two-way table To know how to label specific results in a two-way table, *e.g. use for classification of animals, vertebrae / not, carnivore / not*	**To know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, details of results and a conclusion** To know that data can be gathered and presented in a variety of ways, *e.g. recording findings using tables of increasing complexity, using scientific diagrams and labels, classification keys, scatter graphs, bar and line graphs*	**To know that data can be gathered and presented in a variety of ways to help answer questions** **To select the most appropriate recording method to present data** To include areas of improvement and further research questions to investigate when writing up a scientific enquiry

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CONCLUDE Explain Notice patterns AFTER ~ considering evidence and evaluating Analyse	**To understand some important processes and changes in the natural world around them,** including the seasons and changing states of matter (melting and freezing) i.e. begin to talk about what they have observed and show in simple drawings and state whether what they observed was what they expected Share ideas clearly with adults and peers. Begin to explain simple choices	**To use their observations and ideas to suggest answers to questions** To suggest an answer based on a real life experience Explain what they did Make simple comparisons identifying similarities and differences between living things, objects and events Begin to explain what was found out using previous knowledge and scientific vocabulary	**To know that they can use their observations and taught scientific knowledge to suggest plausible answers to questions** Say what results show and draw conclusions Say whether predictions are supported by the outcome of the investigation i.e. was what happened as expected ?	**To use results to draw simple conclusions and identify patterns in results that answer the investigation question based on their results** To draw a conclusion (provide explanations for observations and for simple patterns in recorded measurements) based on the relationship between the independent and the dependent variable, using a given frame, *e.g. 'the bigger the… the smaller the...'* To report on findings from enquiries, including verbal and written explanation, explaining what the evidence shows and whether it supports the prediction	**To be able to use simple scientific evidence to answer questions or to support their findings** **To draw a conclusion based on the relationship between the independent and the dependent variable, *e.g. 'the bigger the… the smaller the...'*** To use results to draw simple conclusions, suggest improvements and raise further questions To identify differences, similarities or changes related to simple scientific ideas and processes To ask and be able to plan further questions as a result of the enquiry	**To justify conclusions using scientific evidence** To use results to generate further questions, make predictions and set up further comparative and fair tests **To make conclusions that include noticing causal relationships** and explanations of and degree of trust in results	**To analyse and compare data, noticing patterns and relationships evaluating repeated results** To know how to, verbally, present brief findings from an enquiry, speaking clearly and with confidence and using notes where necessary; saying whether evidence supports predictions made; explaining patterns in results including results which don't fit a pattern To know how to identify conditions that were imperfectly controlled and explain how these might affect results using results to draw conclusions and make further predictions using scientific knowledge and understanding
VOCABULARY	guess, look, observe, magnifying glass, explore, same, different	properties, observe, test, object, record, equipment	investigate, measure, predict, conclude, data, sketch, label, results	prediction, measurement, enquiry, variable, fair test, present, similar, differences, diagram, key, chart, evidence	dependent variable, independent variable, comparative	relationship, controls, component, effect, interpret, justify, cause and effect	theory, hypothesis, repeatable, causal relationships, phenomena

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PLANTS							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	**To know that plants need water.** **To name key features of a plant e.g. seed, stem, root, leaf, flower, fruit, trunk, branch, bark.** **To identify and name simple plants in our EYFS/forest school environment e.g. tree, sunflower, lavender.** Looks closely at similarities, differences, patterns and change in nature Knows about similarities and differences in relation to places, objects, materials and living things Talks about the features of their own immediate environment and how environments might vary from one another Makes observations of animals and plants and explains why some things occur, and talks about changes Can talk about some of the things they have observed such as plants, animals, natural and found objects	**To identify and name at least 2 garden plants and two wild plants,** including deciduous and evergreen trees. **To identify leaves**, **flowers**, petals, fruit, **roots**, bulbs, seeds, **trunk**, branches, **stem.** To know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn. To know that flowering plants consist of roots, stem, leaves and flowers. To know that a tree's stem is called a trunk.	**To know that plants grow from seeds and bulbs.** **To know that plants need water, light and the right temperature**. To know that germination is when a seed starts to grow. To know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth). To know that plants that are deprived of light, food (water) or the right temperature will not grow and will die. To know that plants produce seeds that grow into new plants that are the same.	**To know the role of roots, stem, leaves and flower:** ▪ **To know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground.** ▪ To know that the stem holds up the leaves so that they can gather light to make food and holds up the flowers so that they can receive pollen and disperse their fruits. ▪ **To know that the stem also transports water and minerals from the roots to the other parts of the plant.** ▪ To know that the leaves make food by trapping light and using its energy to turn carbon dioxide and water into carbohydrates. ▪ To know that the function of a flower is reproduction, where flowers of the same kind exchange pollen. **To know that plants need air, light, water, nutrients from soil, and room to grow.** **To know that pollination leads to seed formation, then seed dispersal.**	*Taught in Living Things and their Habitats* To know what distinguishes plants as a group from animals (plants make their own food from sunlight; plants usually do not move around).	*Taught in Living Things and their Habitats* **To know that a plant begins as a seed, grows, and then produces seeds of its own.** To know that fertilisation is where flowers of the same kind exchange pollen. To know that pollen is made by an anther. To know that, during fertilisation, a structure in the flower's ovary - called an ovule - becomes a seed; the ovary then becomes a fruit, which helps the seed leave the plant in a process called dispersal.	
Possible Tasks	**Explore** the natural world around them **Describe** what they see, hear and feel whilst outside **Observe** plants growing from seeds: bean plant in a jar	**Label** the basic structure of a common/wild flowering plant	Planting bulbs in the school grounds Watching seeds germinate	How water is transported in plants: celery in blue food dye **(predict, observe, conclude)** **Draw a diagram** to show the stages of the life cycle of a flowering plant, including pollination, seed formation and dispersal	See Living Things and their Habitats	See Living Things and their Habitats	
Working Scientifically focus		**What's the most common plant?** **(observe, record, conclude)**	**What conditions are best for germinating seeds and growing plants?** Can a plant grow without light? Can a plant grow without water? **Full investigation:** measure size of plant using a ruler (cm)	**What happens to a plant with no leaves?** Take a plant and remove its leaves – how long will it survive without its leaves? **Full investigation:** measure using a ruler, including mm			

Vocabulary	plant, water, life, change	energy, growth**,** deciduous, evergreen, flower, plant, tree, structure, roots, stem, leaf, trunk, flower, daisy, rose, daffodil	germination, reproduction, bulb, seed, survival, temperature	pollination, seed formation, dispersal, fruit, nectar, petal, pollen, stigma, style, stamen, function, dispersal		anther, ovary, ovule, exchange, fertilisation	

ANIMALS, including humans							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**

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Key Knowledge	**To know that some dinosaurs are herbivores because they eat plants.** **To know that some dinosaurs are carnivores because they eat meat.** **To know that carnivores are predators and hunt for food.** **To know that a palaeontologist looks for fossils of plants and animals that lived a long time ago.** **To know that reptiles have scaly skin and lay eggs.** To be able to identify and name at least three dinosaurs e.g. Tyrannosaurus, Stegosaurus, Triceratops, Pterodactyl, Velociraptor Knows about similarities and differences in relation to places, objects, materials and living things Makes observations of animals and plants and explains why some things occur, and talks about changes Can talk about some of the things they have observed such as plants, animals, natural and found objects	**To name at least one fish, amphibian, and reptile.** **To identify cow, dog, cat, pig, blackbird, sparrow.** **To identify simple differences between animals,** e.g. legs/no legs, wings, **feathers, fur**, scales, beaks, **what they eat** etc. To know that herbivores are animals that eat plants. To know that carnivores are animals that eat other animals. To know that omnivores are animals that eat both animals and plants. To know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone. To know that fish are different in that they have scaly skin and gills so that they can breathe underwater. To know that amphibians are different in that they begin their lives with gills but then develop lungs and breathe on land. To know that reptiles are different in that they breathe air and have scaly skin. To know that birds are different to other animals in that they have feathers and wings. To know that mammals are different to other animals in that they have fur/hair and they feed milk to their young.	<u>*Taught alongside Animals, including HUMANS*</u> **To know that animals have offspring (babies) that grow into adults**. **To know that animals need food, water and air to survive.**	<u>*Taught alongside Animals, including HUMANS*</u> **To know that animals cannot produce their own food.** **To know that different animals eat different sorts of food.** **To know that animals have skeletons to protect and support them.** To know that some animals (such as insects) have an exoskeleton. To know that an exoskeleton is a solid covering on the outside of the body. To know that many invertebrates (such as earthworms and slugs) have water held inside their bodies by muscles, which act like a skeleton.	**To understand that a food chain starts with the sun, then a plant, then an animal (usually herbivore, then carnivores).** To know that a food chain traces the path of energy through a habitat. To know that all energy for a food chain initially comes from the sun, which is absorbed and turned into energy by plants. To know that plants are called producers. To know that consumers take in energy by eating. To know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator. To know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and the third is called a tertiary consumer. To know that the arrows in a food chain show the direction that energy is travelling through a habitat.	See Living Things and their Habitats	See Living Things and their Habitats
Possible Tasks	**Observe** life cycles of animals: egg > caterpillar > butterfly / egg > chick/duckling	What common animals are carnivores, herbivores and omnivores? **Categorise** dinosaurs: carnivore, herbivore, omnivore	See Animas, including HUMANS	See Animas, including HUMANS	**Record** using labelled diagrams: food chains starting, with the sun **Record**: create a web of life to show how feeding relationships are connected		

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Working Scientifically focus	**Identify** changes over time	**Do all creatures that live in water have scales?** **Identify** and **classify** animals into groups			**Are humans producers, prey or predators?** **Do food chains exist underwater?**		
Vocabulary	infant, baby, adult	energy, growth, habitat, fish, amphibian, reptile, bird, mammal, offspring, carnivore, herbivore, omnivore, vertebrate, skeleton, organ			predator, prey, producer, consumer, primary, secondary, tertiary		

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Animals, including **HUMANS**							
	EYFS Puffins/Robins	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	**Know basic hygiene** - how to wash hands To name and identify ***head, hands, arms, legs, face, ears, eyes, hair, mouth, nose*** To know each part of the body has an important job **To know that we have 5 senses** **Know that people that are alive because they breathe and grow** Know some of the differences between babies and adults e.g babies can't talk or walk **To know why we have teeth.** **To know that sugar is bad for your teeth.** **To know how to look after our teeth.** **To know that the dentist helps us to care for our teeth.** **Name body parts - lungs, heart,**	**To name and identify further parts of the body:** neck, elbows, knees, **teeth, tongue.** To have an awareness that we also have parts inside our body: bones, heart, lungs, blood. **To know that eyes are associated with sight; ears with sound; nose with smell; tongue with taste; and skin with touch, and that these are known as our five senses.** To know how to keep our teeth clean, e.g. by brushing twice a day for 30 seconds on each section. To know that sleep, diet, exercise and being hygienic keeps our body healthy.	**To know that humans have babies** (offspring) **that grow into adults**. **To understand that, to stay healthy, humans need to exercise** to help their body stay strong and fit. **To understand that, to stay healthy, humans need to keep things clean,** including washing and brushing teeth. To understand that, to stay healthy, humans need to eat the right amounts of different types of food. **To know that humans need to eat good foods like vegetables, fruits, carbohydrates (like rice, bread and potatoes), protein, dairy, and not too much fat and sugar.** To know that the basic food groups are fruit and vegetables, protein, carbohydrates, dairy, fat and sugary foods. To know that more than half of our diet should be made up of fruit, vegetables and carbohydrates. To know that fats and sugary foods should be eaten rarely and in small amounts.	**To know that animals humans cannot produce their own food.** **To know that humans need to eat the right types and amount of food.** To know that getting the right amount of each food group is called a balanced diet. **To know that proteins are good for growth; carbohydrates are for energy; fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth).** To know that a lack of a nutrient or excess of a food can cause ill health, e.g. sugar and tooth decay; excess fat and calories can build up in the body and cause obesity, heart disease and strain on joints and growing bones. **To know that humans have skeletons to provide support for muscles and to protect the body,** e.g. the rib cage protects the vital organs in the human body. To know that human skeletons are made up of bones and cartilage. **To know that humans have muscles for movement.** To know that muscles can only contract and relax, so they must be arranged in opposite pairs and work together so that parts of the body can bend (flex) and extend.	To know that adult humans have 32 teeth. **To identify different types of teeth: incisors, canines, pre-molars and molars,** wisdom teeth. **To know what different types of teeth do:** **To know that incisors slice food, canines tear food (especially meat) and that molars grind food.** To know that children develop an initial set of teeth which are gradually replaced between the ages of 6 and 12. **To be able to label the different parts of the digestive system: mouth, tongue, teeth,** oesophagus, **stomach,** small **intestine**, large intestine. **To know that digestion is when food passes through the body with the nutrients being extracted and used, and the waste products being excreted.** ▪ To know that digestion involves breaking food down into simpler components that can be absorbed by the body. ▪ To know that digestion begins with food being chewed in the mouth by the teeth, where saliva is added. ▪ To know that food is squeezed down the oesophagus towards the stomach in a wave-like action called peristalsis. ▪ To know that the stomach releases acid and enzymes to continue breaking down the food. ▪ To know that further enzymes and bile break down the food further as it moves towards the small intestine. ▪ To know that the small intestine adds more enzymes and absorbs the nutrients. ▪ To know that the large intestine absorbs water from the undigested food. ▪ To know that undigested food is stored in the rectum before being excreted through a muscle called the anus. To know that an organ is a part of a living thing, and that it is self-contained and has a specific important job, e.g. stomach, small intestine.	<u>*RSHE Puberty link*</u> **To identify changes for humans as they age**, using a timeline. To understand that puberty prepares our bodies for being adult. To know that other animals age at different rates. **To know that humans go through stages of development:** ▪ **To know that humans begin as fertilised eggs and then develop into embryos, before developing into babies.** ▪ To know that once humans are born, they become infants (roughly 2 months to 2 years) and then become young children (roughly 2-12 years old). ▪ To know that children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction. ▪ To know that as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently.	**To identify heart, blood vessels,** veins, arteries. **To know that blood travels around the body transporting nutrients that have been absorbed into the bloodstream from digestion.** **To know that blood carries oxygen around the body, which is used to power the body; the use of oxygen to create energy is called respiration.** To know that the heart and lungs are organs protected by the ribcage. **To know that the heart beats, pumping blood around the body.** **To know that blood vessels carry blood: arteries carry blood away from the heart; veins carry blood towards the heart;** capillaries are tiny blood vessels that connect arteries and veins. To know that the aorta is the largest artery in the body and most major arteries branch off from it. To know that the heart is composed of four chambers: two atria and two ventricles. To know that the water we drink is absorbed by the intestines, and circulated throughout the body, in the form of bodily fluids such as blood. **To know that when we exercise, our heart beats more frequently so that the oxygen that is used can be replenished**; that it returns to a resting heart rate afterwards; that fitter people tend to have lower resting heart rates. **To describe one way that diet, exercise and drugs can affect the body positively and negatively.** **To know that drugs can be harmful or helpful, depending on what they are and how they are used.** ▪ To know that drugs are chemicals that have an impact on the natural chemicals in a person's body. ▪ **To know that all drugs can be harmful if overused.** ▪ To know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller ▪ To know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease.

	brain, skull, spine, ribs, jaw, teeth Knows about similarities and differences in relation to places, objects, materials and living things						

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Possible Tasks	Talk about what is the same and what is different about friends and family Talk about how we keep our teeth clean Visit from dental hygienist .	**Label** basic parts of the body/human torso **Label** which part of the body is associated with each sense	**Research** how do animals grow: describe changes Match animals/babies Explore food groups **Record** ways that exercise affects the body	Compare how plants and humans obtain food Identify and name bones using skeleton model Examine how muscles work Investigate pairs of muscles	How can we tell what an animal eats from its teeth? **Explain** the different purposes of teeth in animals and humans	**Describe** and **record** the changes of life from a baby and as we go through puberty **Draw** a life-cycle diagram for a human Create a picture collage labelling stages of development **Research** using secondary sources of information: gestation periods of different mammals compared to humans	**Draw diagrams** and **describe** ways in which nutrients and water are transported within animals, including humans **Describe** the short term effects that happen to your body through exercise **Describe** the long-term effects on our body through regular exercise
Working Scientifically focus		**Are all red apples sweet and green apples sour?** **Full investigation**	**How much sugar do different drinks contain?** **(predict, collate, record conclude)** **What is the effect of exercises on my body?** **(observe, record)**	**Does having a longer humorous mean that you can throw a ball further?** Standard measure: rulers (metres) **Does having a longer thigh bone mean that you can run faster?** stopwatches **Full investigation**	**How does sugar affect our teeth?** (used with eggshell to replicate if an old tooth can not be found) drop eggshell/tooth into water / coke / fruit juice **Full investigation**	**Do all lifecycles look the same?**	**How quickly does heart recover after exercise?** **Which types of exercises increase heartrate the most?** **Full investigation**: measure recover to resting heart rate
Vocabulary	head, hands, arms, legs, face, ears, eyes, hair, mouth, nose, healthy, clean, dirty	neck, elbows, knees, teeth, tongue, teeth, sight, hear, touch, smell, taste	reproduction, offspring, adult, survival, hygiene, exercise, vegetables, fruit, protein, fat, sugar	vitamin, dairy, carbohydrate, balanced diet, cartilage, invertebrate, contract, loosen, ribcage, skeleton, muscles	oesophagus, stomach, small intestine, large intestine, digestion, excretion, peristalsis, anus, duodenum, small intestine, large intestine, stomach, rectum, oesophagus, saliva, acid	*See RSHE planning for 'puberty' vocabulary*	heart, blood vessels, veins, arteries artery, aorta, atrium, capillary, circulatory system, vein, pulse, ventricle, replenished, resting heart rate, diet, oxygen, respiration, drugs

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ENVIRONMENT : LIVING THINGS AND THEIR HABITATS / ROCKS / EVOLUTION AND INHERITANCE							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	**To sort animals according to their features including mammal, reptile, fish and birds** **To know the names of some baby animals e.g. calf, foal, kitten** **To know what animals need to stay alive e.g. food, water, space, shelter** **To know key features of a life cycle** **To know that animals like humans have places that they like to live called habitats** **Know that things are alive and change over time** **To know what animals need to stay alive e.g. food, water, space, shelter** **To identify and name common minibeasts e.g. snail. woodlouse, butterfly** **To know that insects have 6 legs and 2 wings.**		**To identify if something is alive, dead, or never alive**: ▪ To know that living things move, grow, consume nutrients and reproduce. ▪ To know that things that never lived have never done these things. ▪ To know that dead things used to do what living things did, but no longer do. ▪ To know that dead things include dead animals and plants as well as parts of plants and animals that are no longer attached, e.g. leaves and branches, shells, fur, hair and feathers. **To know that a habitat provides food, water and shelter.** **To know that animals and plants live in a habitat to which they are suited**. To know that animals have suitable features that help them move and find food, e.g. polar bears, sharks; that plants have suitable features that help them grow well, e.g. cacti. **To know that within a habitat there are different microhabitats** (e.g. in a woodland, the leaf litter or on the bark of trees), **which have different conditions** (e.g. light / dark, damp / dry). **To know what a simple food chain is** and understand that the arrows on a food chain show the direction that the energy travels.	**To know that fossils are formed when something dies and is buried in rock or mud,** so that it cannot be rotted or eaten by scavenging animals; that in time layers of sediment build, squashing the mud and turning it to stone around the dead plant or animal. **To know that soil is a mixture of crumbled rock and dead plants and animals** broken down by the action of weather (weathering). To know that the Earth has a solid crust made up of tectonic plates with molten rock beneath. **To know that there are three kinds of rocks: igneous, sedimentary and metamorphic:** ▪ To know that igneous rocks form from molten rock below the Earth's crust, e.g. granite and basalt. ▪ To know that sedimentary rock is formed when small, weathered fragments of rock or shell settle and stick together, often in layers, e.g. limestone and sandstone. ▪ To know that metamorphic rocks form when rocks in the Earth's crust get squashed and heated in processes, such as when tectonic plates press against each other, e.g. marble and slate. To know that some rocks and stone are manmade and others are natural. To know that permeable means it allows liquids or gases to pass through it, e.g. limestone. To know that non-permeable means it will not allow liquids or gases to pass through it, e.g. clay.	To know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behaviour (e.g. herbivores, carnivores and omnivores). To know that a species is a group of living things, with many similarities, that can reproduce together and have offspring. To know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms. To know that a classification key uses questions and yes/no answers to sort and identify different living things. To know that human activity (such as climate change caused by pollution) can change the environment for many living things, endangering their existence. To understand that plants and animals can be affected if the environment changes, e.g. making it more difficult for animals to survive and reproduce, and in extreme cases this leads to extinction. To know that extinction is where an entire species dies.	**To name some differences between the groups mammal, amphibian reptile, insect and birds,** e.g. mammals are the only group that start as babies inside mothers and are fed milk by their mothers; or certain amphibians and insects have thousands of eggs. **To know that the life cycle of a living thing is a series of stages of development starting with a fertilised egg or a seed.** **To know that in most mammals a fertilised egg develops into an embryo, in the womb, and is then born and fed on milk before it is weaned onto the food that it has adapted to eat**; it then develops to maturity in a period called adolescence, after which it can reproduce and the cycle can begin again. **To know that in amphibians a fertilised egg develops into an embryo and then hatches; it then develops adult characteristics and metamorphoses into the adult form, after which it can reproduce and the cycle can begin again,** e.g. frog. **To know that in many insects a fertilised egg develops into a wingless feeding form** called a larva; the larva feeds then later becomes a nymph or a pupa with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult after which it can reproduce and the cycle can begin again, e.g. butterfly. **To know that in birds a fertilised egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly** (i.e. becomes a fledgling); **it then leaves the nest and grows into an adult, after which it can reproduce and the cycle can begin again.**	**To know the difference between vertebrates and invertebrates.** **To know the five vertebrate groups (fish, bird, mammal, reptile, amphibians).** To know some common invertebrate groups, e.g. insects, spiders, worms, snails. To know that an arthropod is an invertebrate with a hard, external skeleton and jointed limbs. ▪ To know that insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; that most insects also have a pair of antennae and a pair of wings. ▪ To know that an arachnid (e.g. spider) is a type of arthropod with eight legs and no antennae or wings. ▪ To know that a crustacean is a type of arthropod with two pairs of antennae (e.g. woodlouse). ▪ Know that a myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede). **To know that there are three types of microorganism: viruses, fungi and bacteria.** To know that germs are disease-causing bacteria <u>Evolution and Inheritance:</u> **To know that living things produce offspring of the same kind** by passing on genetic information (inheritance). **To know that offspring are similar to but not identical to parents (variation).** **To understand that variation has meant that living things have changed over time.** **To understand that variation means that animals become more or less able to survive where they live**. **To know that animals and plants, that are able to survive, have adapted to suit their environment**. **To know that living things change over time and that this gradual change is called evolution.** To know that the process of adaptation leads to evolution. **To know that fossils tell us about living things from millions of years ago.**

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	They should naturally initiate conversations and ask frequent 'what', 'where', and 'why' questions to explore their environment and check understanding.						
Possible Tasks	**Explore** an area of the school grounds **How many different animals can we find in one place? (predict, observe, record)** **Identify** different animals that are found		**Draw** arrows on a food chain to show what eats what (specific living things). **Draw** diagrams of food chains **Explain** how animals get their food **Identify** plants and animals in at least one micro-habitat and one larger habitat **Compare** difference between things that are living, dead or never been alive	**Classify:** Put rocks into groups e.g. colour, hard, soft, *crumbly, hard, grainy*, have *crystals*, have *fossils* in them How many different types of rocks are there? **Group** different rocks based on their appearance and properties **Research** and **explain** how fossils are formed when things that have lived are trapped within rocks **Compare** fossils to the animals they belong to **Explain** how is soil formed	Follow a key to identify animals and plants **Observe** animals and plants in a local habitat What would happen if there were no insects? Access environmental dangers in the local habitat; **research** endangered and extinct species Use a classification key to identify living things **Create** a classification key to sort plants on the school premises	**Draw** a life cycle diagram for another mammal, an amphibian, a reptile, an insect, a bird **Compare** the life cycles of amphibians and insects **Observe** changes in frogspawn: frog development	Children will **research** information on Edward Jenner using secondary sources of information **Sort** given animals into the right group Give **reasons** for classifying plants and animals based on specific characteristics **Explain** how have living things changed over time Why do offspring look like their parents? **Observe** inheritance and variation by looking at photographs of children and their parent. What traits have they inherited? **Research** and **discuss** plants and animals that live and survive in different habitats
Working Scientifically focus			**Is a leaf alive when its attached to a plant? What about when it isn't attached? Is a feather alive? (predict, discuss, explain)** **What conditions do woodlice prefer? Full investigation**	**Are all rocks permeable?** (possible to measure in ml) **Full investigation**	**Is it safe to eat after 5 seconds?** Link to bacteria. **Full investigation** Test a single food type. 1. Control, 2. picking one up immediately, 3. after five seconds 4. after 10 seconds. Seal all pieces inside separate, labelled sandwich bags. Observe the food over time. Record any changes.	**How do our bodies change as we get older?** **Does a baby human develop in the same way as a baby frog?** Long term study, using graphs to record changes **(predict, observe record)**	**How do living things change over time and place?** **What are the variable that affect mould growth?** **What are the variables that affect yeast growth?** **Full investigation**
Vocabulary	worms, woodlouse, ladybirds, butterfly		living, dead, life cycle, birth, decay, suited, suitable, basic needs, food, food chain, source, nutrients, consumption, habitat (e.g. pond, woodland etc.), microhabitat (e.g. under logs, in the bushes), environment, adapt, shelter	igneous, metamorphic, sedimentary, palaeontologist, weathering, molten rock, crust, tectonic plates, scavengers, fossil, permeable, non-permeable, natural, manmade	predator, prey, producer, environment, extinction, endangered kingdom, classification key, species, fungi, bacteria, climate change, characteristics, offspring, extinction, pollution	reproduce, life cycle, life span, embryo, womb, weaned, adolescence, metamorphosis, pupa, larva, nymph, chrysalis, caterpillar, tadpole, hatchling, fledgling, insect	microorganism, virus, thorax, arthropod, abdomen, arachnid, antenna, jointed limbs evolution, natural selection, variation, advantageous, inheritance

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MATERIALS / PROPERTIES AND CHANGES OF MATERIALS / STATES OF MATTER							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	**To know that objects are made of materials** **Recognise and name plastic, glass, wood, metal, fabric, paper and stone as materials** **Know about similarities and differences in relation to materials (hard, soft, smooth, rough)** **To know that shiny materials reflect light.** **To know that some metals are magnetic.** **Know some objects float and some objects sink** **To know that gravity pulls objects down.** **To know that up thrust is a force that pushes up.** Knows about similarities and differences in relation to places, objects, materials and living things	**To name objects and then say what they are made of (wood, plastic, glass, metal, water and rock**, brick, paper, fabric). To know there is a difference between an object and the material it is made from. To know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; that these descriptions denote the properties of a material. **To say whether a material is hard/soft;** stretchy/stiff; shiny/dull; rough/smooth; **bendy/not bendy**; **waterproof/not waterproof**; absorbent/not absorbent.	To know that applying forces **(e.g. bending, squashing and twisting)** to objects can change their shape. To know that rigid means something that will not bend without breaking. To know that flexible is something that can bend without breaking. **To link a property to how suitable the materials are for particular uses**, e.g. bricks used for houses cannot be squishable; material used for windows must be transparent. To know that materials can have useful properties that make them suitable for a given job (including being waterproof, flexible, rigid, opaque and transparent). To know that many types of plastic are **waterproof;** that metal is usually **strong**; that rock is usually hard and **rigid;** that some plastics are **flexible**.		**To know that things are composed of a material in one of three states of matter: solid, liquid or gas.** To know that things are made of particles (tiny building blocks) and that these are organised differently in different states. To know that materials can change state when temperature changes. To know that there are bonds between the particles (building blocks) in a solid; as temperature increases, these bonds are somewhat overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature, the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas. **To know that materials can change state when heated or cooled.** **To know that when solids turn into liquids, this is called melting and that the reverse process is called freezing.** To know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation. **To know that water changes state at about 0°C and 100°C.** **To know that evaporation is different from boiling.** To know that evaporation is more rapid at higher temperatures. **To know that water flows around our world in a continuous process called the water cycle.** To know that rain condenses in clouds and falls to earth as rain, snow or hail in a process called precipitation. To know that, along with evaporation, water on the Earth's surface moves to the air in a process called transpiration in which water turns into water vapour (gas) on the surface of leaves on plants.	**To know that something is soluble when it is able to be dissolved, especially in water:** ▪ To know that when something is dissolved it is mixed completely with the liquid, e.g. sugar in hot water. ▪ To know that a solution is when one thing is dissolved in another (in some solid materials the bonds between particles break when surrounded by a liquid, and this allows the liquid to absorb the solid). ▪ **To understand that when a solid does dissolve in a liquid it is described as being soluble** (e.g. sugar in water); that when it cannot dissolve it is insoluble (e.g. sand in water). ▪ **To understand that that some materials are soluble in water and some not.** ▪ To know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is saturated. ▪ To know that when a solvent is evaporated from a solution, the original solute is left behind (the remaining solid will often form crystals: the slower the solvent evaporates, the larger the crystals that will be formed). **To know methods of separating materials, e.g. filtering, sieving and evaporating**. **To know that a reversible change is one that can be reversed** and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place. **To know that an irreversible change is one that cannot be reversed** and that examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg, the reaction of bicarbonate of soda and acid) **To know that filtering allows solids and liquids to be separated.** **To know that sieving allows solids, made up of different sized parts, to be separated.** **To understand properties: hardness, transparency, conductivity (thermal and electric), and magnetic.** **To know a property and the associated use of metals, wood and plastic.** To know that the various properties of different materials make them suitable for a given function. To know that the different properties of materials can be tested through acting upon them, including testing to find out whether materials are magnetic, thermally conductive or electrically conductive.	

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Possible Tasks	**Identify** what the different materials that we use are **Identify** what objects are made of **Does all wood float?** Link to floating and sinking	**Group** materials according to their properties	**Classify** and **group** materials according to how easily they can be *squashed, bent, twisted and stretched* What are the uses of everyday materials? Classify and group the uses of everyday material Classify the suitability of different materials Who discovered new materials? Find out about people who have developed new materials, by learning about John McAdam		**Draw** a diagram of the water cycle **Investigate** how we sort materials into solid, liquid and gas, using fizzy drinks to investigate how much gas weighs **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)	**Group** materials by these properties: hardness, solubility, transparency, conductivity (thermal and electric), and magnetic **Conduct** two irreversible chemical changes to make new materials **Explore** and **conclude**: How can solids be separated? (sieving) How can solids be separated from liquids? (filtering) How can solids that have dissolved be reversed? (evaporation) **Experiment** with different materials to predict and discover which are reversible and non-reversible	
Working Scientifically focus		**Would you use the same materials to make an outfit to wear in summer as you would for an outfit in winter?** **Full investigation**	**Would a house made out of plastic and metal be as good as a house made out of bricks, wood and glass?** **Full investigation**		**How does temperature affect how quickly something dries?** Measure using a thermometer **(conduct, record and conclude)**	**How can I separate sand, salt and stones?** Explore how to separate a mixture of sand, salt and small stones by sieving followed by dissolving in water (so the salt is absorbed), followed by filtering to remove the sand from the mixture, followed finally by evaporation of the water to recover the salt. **Full investigation** **What is the best material to make a lunchbox, when it needs to have several properties** (insulation, strength, wipeable)**?** **Full investigation**	
Vocabulary	wood, plastic, stone, glass, float, sink, light, heavy	bendy/not bendy, waterproof/not waterproof, absorbent/not absorbent, property, metal, water, rock, hard, soft, strong, weak, heavy, light, solid, runny, smooth, rough	squashed, bent, twisted and stretched, suitable, waterproof, flexible, rigid		condensation, evaporation, reversible, boiling point, melting point, liquid, gas, thermometer, water cycle, continuous precipitation	hardness, solubility, transparency, conductivity (thermal and electric), and magnetic, irreversible, dissolve, soluble, insoluble, solvent, solution, filter, sieve, saturation, crystallization, thermal, chemistry .	

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FORCES AND MAGNETS							
	EYFS	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	See Materials		*Taught alongside Materials* **To know that a force is used to bend and squash materials.**	**To know that a force can be thought of as a push or a pull.** **To understand that the roughness of a surface affects how things move.** To know that friction is a force between two surfaces in contact. **To know that objects move differently on rough and smooth surfaces.** **To know that objects resist movement more on rough surfaces because there is higher friction as the object moves.** **To know that magnets attract and repel each other.** **To know that magnets have two poles called north and south.** **To know that north and north repel; south and south repel; north and south attract.** To know that there is a magnetic field around a magnet, which is strongest at each pole. **To know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic.**		**To know that a force is measured in a unit called Newtons (**named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move). To know that pull forces can be measured using a device called a force meter. **To identify forces and their effects: air resistance, water resistance, friction.** ▪ **To know that air resistance, water resistance and friction act between moving surfaces in contact.** ▪ To know that air resistance is a force felt by an object as it moves through the air (it slows it down). ▪ To know that water resistance is a force felt by an object as it moves through water. ▪ To know that the shape of an object determines how much air resistance or water resistance it experiences. ▪ To know that shapes of objects that experience little air resistance or water resistance are described as *streamlined* To know how to draw a force diagram with arrows representing the different forces acting on an object. To know that gears, levers and pulleys are simple machines that used to allow a smaller force to have a greater effect. ▪ **To understand that levers and pulleys make lifting easier.** ▪ To know that a lever is a rigid length resting on a pivot which can be used to move a heavy or firmly fixed load. ▪ To know that a pulley is a wheel with a grooved rim around which a cord passes, which can be used to raise heavy weights. ▪ To know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear, so that turning one gear turns an adjacent gear in the opposite direction. **To know that the amount of matter (stuff things are made of) in an object is its mass.** **To know that unsupported objects fall because of gravity between earth and the object.** **To know that gravity is a force that acts between all objects in the universe,** but that it acts much more strongly between objects that have more mass and that are close together. To know that acceleration is a change in speed and that unbalanced forces acting on an object cause it to accelerate.	
Possible Tasks				**Research** different types of forces acting on objects **Test** which everyday materials are magnetic		**Explore** how does gravity cause objects of the same size and shape but of different mass to fall	
Working Scientifically focus				**What surfaces have more friction?** (measured by speed or distance travelled) **Investigate** the speed of a toy car over different surfaces		**What variables might affect the speed at which a parachute falls?** (Parachute experiment / air resistance, e.g. mass/ surface area/ height dropped from) **Full investigation** **Does the area of an object affect whether it floats or sinks?** (Boat race investigation / water resistance) **Full investigation**	
Vocabulary				magnetic, non-magnetic, pole, north, south, sliding friction, static friction, elastic, resist, attraction, repulsion		acceleration, air resistance, buoyancy, effort, force meter, fulcrum, gravity, load, mass, mesh, Newton, pivot, rigid, streamlined, terminal velocity, unsupported, water resistance, weight	

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ELECTRICITY							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	**To identify things at home and school that run on electricity.** To know to be careful with plug sockets, not to put fingers in them.				**To identify the following things in a circuit: cell, wire, bulb, switch, buzzer, lamp.** **To know how to construct a simple circuit using components.** **To know that there must be a complete loop for electricity to flow.** **To know that exposure to high levels of electrical current can be dangerous.** **To know that electrical current flows well through some materials, called electrical conductors, (most metals) and poorly through other materials, called electrical insulators (wood, plastic).** To know that electrical conductivity (how well a material conducts electricity) is an example of a property. To know that wires, which contain a conductor inside them, usually made of metal, can allow electrical current to flow around a circuit. To know that when electrical current flows through a circuit's components within that circuit (such as buzzers which make a noise and bulbs, which emit light) begin to work. To know that a switch functions by completing or breaking a complete circuit; that an open switch stops the electricity and a closed switch lets it flow. To know that a circuit with everything in a single loop is called a series circuit. To know that a battery is a device that stores chemical energy and converts it to electrical energy.		**To use the circuit symbols for bulb, switch, cell, wire** motor and buzzer. **To know that in a series circuit more cells make lights brighter or buzzers sound louder.** To know that more cells provide greater voltage and therefore more energy. To know that voltage is a measure of the power of a cell to produce electricity; that it is a measure of the 'push' of electric current, not the size of the electric current. **To know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer).** To understand that an open switch stops the electrical energy flowing to the bulb or buzzer. To know that current electricity is the flow of charged particles called electrons around a circuit. To know that two bulbs in a circuit can be wired up to create a series circuit or a parallel circuit. ▪ To know that if one bulb blows in a series circuit the other will not shine, as the circuit has been broken; that in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine. To explain the advantages of using parallel circuits, e.g. in the lighting in homes.
Possible Tasks	To identify what uses electricity: identify things that need to be plugged in (constantly) or have batteries (phone/iPad) that can be charged.				**Investigate** building circuits containing different components **Create** a simple circuit, create the circuit with a switch, create the circuit with a switch and a buzzer, testing insulators and conductors **Predict** if the components in a simple circuit will work (show incomplete circuits and ones with switches that are open)		**Construct** circuits with a bulb, switch, motor and buzzer **Make** a bulb brighter, making a burglar alarm and pressure pad **Build** a parallel and series circuit, explain how they work, place a build in different places within the circuit and investigate the effect **Predict** how components will function in a given circuit, depending on whether or not there is a cell to provide electrical current to the circuit **Investigate** how parallel and series circuits can affect the components in the circuit
Working Scientifically focus					**Which material is the best conductor?** **Full investigation**		**How can I make my bulb shine brighter?** **Full investigation**
Vocabulary	electricity, battery, phone, iPad, computer				circuit, appliance, charge, electron, battery, cell, bulb, buzzer, flow, series, complete circuit, switch, wire, current, electricity, negative terminal, positive terminal, chemical reaction		series circuit, parallel circuit, resistance, voltage

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LIGHT AND SOUND							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	**To know that they must not look at the sun directly; that light from the sun can be dangerous.** To know all objects have a shadow (in the daytime) and that their shadows can change e.g. different size / shapes To know that the sun gives us light.	See Seasonal Changes		**To know that we need light to see and that darkness is the absence of light.** To know that light travels in straight lines **To know that sunglasses can protect eyes from sunlight, but looking at the sun directly - even with sunglasses - can damage the eyes.** **To know that light is reflected,** when it travels from a light source and then 'bounces' off an object. **To know that we get shadows when light is blocked by an opaque object.** ▪ To know that we do not get shadows from transparent objects as light passes through them. ▪ To know that opacity/transparency and reflectiveness are properties of a material. ▪ To know that opaque means that something cannot be seen through and light cannot pass through it, e.g. wooden fence. ▪ To know that transparent means that something can clearly be seen through and light completely passes through it, e.g. glass. **To know that as objects move towards a light source, the size of the shadow increases.** To know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes. To know that many light sources give off light and heat, e.g. filaments in traditional bulbs heat up until they glow. To know that the sun is a light source, but that the moon is not and is merely reflecting light from the sun. **To know how to draw a diagram with straight lines representing light** (being blocked to form shadows or being reflected).	**To know that sounds are made by something vibrating**; that when an object vibrates, some of the energy from the vibrating object is transferred to the air, making the air particles move. **To know that sounds travel through a medium** (e.g. particles in the air) **to get to our ears**. To know that sound is a form of energy that transfers in a longitudinal wave, e.g. like that seen in a slinky - not a transverse wave, like that seen in water ripples. To know that longitudinal sound waves are detected in the ear by humans and that the brain interprets this as the sounds we hear. **To know that pitch is how high or low a sound is and that this is determined** by how many vibrations per second are being made **by the vibrating object.** To know that the faster the vibration, the higher the pitch. To know that the number of vibrations per second is called the frequency. **To know that the volume of a sound depends on the strength of the vibration producing it.** **To know that the volume of a sound is quieter if the listener is further away from the object.**		**To understand that we see a light because it sends light to our eyes.** **To know that light appears to travel in straight lines**. **To 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.** To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them To know how to draw a diagram to show why the shape of a shadow will match the shape of an object. **To understand that we see other objects because light hits them and they reflect it to our eyes.** To know that translucent means that some light passes through something, but the light is scattered, so you can't see clearly through it, e.g. frosted glass. To know that refraction is when light passes from one medium to another and it changes direction, e.g. light passing from air to water. To know that white light comprises of all colours in the colour spectrum. To know that a spectrum is when white light is refracted by two surfaces in a prism and spreads out so that all of its colour components can be seen. To understand that a spectrum occurs because the different colours of the white light travel at different speeds.

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Possible Tasks	**Is my shadow the same shape as me?** **Observe** their shadow on a sunny day. Is it the same shape as their body? Do their arms / legs look longer or shorter than in real life? Shadow spotting. Can you spot the shadows of things that are outside? Can they find anything without a shadow? **(observe, conclude)**			**Investigate** how shadows are formed and change **Explain** what a shadow is Use a data logger to **record** light levels and that this can be plotted on a graph to show how this changes over the course of a day	How do we hear different sounds? **Investigate** vibrations and the link between the size of vibration and the loudness of sound. Cover the base of a can or container covered with plastic and secure with a band, so the surface it tight. Sprinkle salt or sand on the surface, strike the tuning fork which is then held at an inch height over the drum. What happens as the vibrations from the tuning fork reach the drumhead?		Refraction of light through glass, water and air with the disappearing coin and the reversed arrow experiments Splitting white light into the colour spectrum using prisms and torches on black card Finely spraying a hose pipe in sunlight to create a rainbow
Working Scientifically focus				**How does the closeness of the light source to the object affect the size of the shadow?** **What is the relationship between how opaque/transparent an object is and the strength of its shadow?** **(conduct, record, conclude)**	**How does sound travel?** Explore which materials sound travels well in and which it does not **Full investigation**		**Does light always travel in a straight line?** How do we show that light travels in a straight line to explain why shadows have the same shape as the objects that cast them? **Full investigation**
Vocabulary	shadow, light, sun, bigger, smaller, longer, shorter			mirror, reflect, shadow, light source, image, beam, solid, opaque, transparent, translucent object, source, data logger	particle, vibration, percussion instrument, wind instrument, string instrument, frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum		angle of reflection, refraction, spectrum, translucent, medium,

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SEASONAL CHANGE / EARTH AND SPACE							
	EYFS **Puffins/Robins**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
Key Knowledge	<u>Seasonal Change – Autumn</u> **Know there are 4 seasons: Autumn, Winter Spring, Summer.** **Know that Autumn starts warm then gets colder** **Know that leaves change colour.** <u>Seasonal Change - Winter</u> **Know it is cold in winter and there is sometimes snow and ice** **To know that water freezes to ice when it is cold.** **To know that ice melts to water when it is warm.** **To know that wind is a force that we can feel and can be observed in the environment around us e.g. leaves** **To know that some animals hibernate in winter because there is less food e.g. hedgehogs, bears** <u>Seasonal Change - Spring</u> **Know spring starts cool then gets warmer.** **Know that Spring is a time for new life e.g. bulbs growing, lifecycles** <u>Seasonal Changes – Summer</u> **Know it is often warm in summer.** **Know how to keep ourselves safe in the sun** e.g. sun cream, sun hat, t-shirt, hydrate, sun glasses, seek shade. Bug club book - slip, slap, slop! **To know they must not look at the sun directly.**	**To say what differences there are between the four seasons.** To know that the sun gives us warmth and light To observe and describe weather associated with the seasons and how day length varies. To know that days are longer in the summer and shorter in winter. To know that weather changes through the year, getting hotter in the summer and colder in the winter. To know that the winter is likely to bring ice on the ground, when water freezes due to the cold.				**To know that we live on a planet.** **To know that there are eight planets in our solar system***:* Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune. **To know that planets orbit a star and that the Earth orbits the sun**. ▪ To know that an orbit is a repeating path that one object in space takes around another. ▪ To know that a star is an exceptionally hot ball of gas. ▪ To know that all the planets in the solar system orbit the Sun and that the further away they are from the Sun, the longer their orbit. **To know that the Earth spins around an imaginary line through its centre called an axis** and that this axis is tilted relative to the Earth's orbit. ▪ **To know that night and day are the result of the Earth rotating (turning) on its axis.** ▪ **To know that the sun does not move – it just seems to because the earth is rotating.** ▪ To know that the tilt of the Earth - towards and away from the Sun's light - as the Earth orbits the Sun, leads to the seasons. ▪ To know that a solar eclipse occurs when the Moon is between the Sun and the Earth, casting a shadow on the Earth. To know that a lunar eclipse occurs when the Earth is between the Sun and the Moon, casting a shadow on the Moon. **To know that the Earth, Moon and Sun are roughly spherical.** **To know that planets may have moons orbiting them.** **To know that the Moon orbits the Earth roughly every 28 days.** To know that as the Moon orbits the Sun, different parts of it are lit up by the Sun, which is why we see a different shape lit up on the Moon as the lunar cycle progresses. To understand that our solar system makes up a tiny fraction of the universe. To know that humans have sent man-made satellites, that assist with telecommunication, into orbit.	
Possible Tasks	**Explore** the natural world around them **Describe** what they see, hear and feel whilst outside	How does the weather change in Summer? What happens in Spring? How does the weather change in Spring? What happens in Summer?				Sun, Earth and Moon: what is moving? Video lapse of shadows moving/day and night	

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Science Progression

	Identify how the clothes they wear at different times in the year change	How much rain falls over 2 weeks? **Record** data in a table				Can we show the rotation of the Earth?	
Working Scientifically focus		How does the weather change across the seasons? Describing the weather changes across the seasons. Seasonal walks **Monitor** seasonal changes to **observe** differences				**Why does the sun appear to move across the sky?** **Observe** the different phases of the Moon Monitor the changes of the moon phases over a period of 28 days and **record**	
Vocabulary	cold, warm, autumn, spring, summer winter, snow	snow, rain, wind, day length, hot, cold, seasons freezing, melting, Sun, clouds, wind, snow, ice, spring, summer, autumn, winter, rainfall, temperature				planet, satellite, sphere, solar system, eclipse, star, universe, constellation, axis, Moon, rotating, lunar, solar, telescope, rotation Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, orbit, rotate	

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Science Progression

Unit overview: what and when

		YEAR 1 / 2		YEAR 3 / 4		YEAR 5 / 6	
	EYFS	**Y1** (Year B)	**Y2** (Year A)	**Y3** (Year B)	**Y4** (Year A)	**Y5** (Year A)	**Y6** (Year B)
Autumn 1	Seasonal change - Autumn Animals including HUMANS	Seasonal change - Autumn & Winter (Y1)	Properties of materials (Y1 & Y2)	Animals including humans (Y3)	Living things and their habitats (Y4)	Earth & Space (Y5)	Evolution & inheritance (Y6)
Autumn 2	Seasonal change – Winter Living things and their habitats	Animals including HUMANS (Y1 & Y2)		Forces (Y3)	States of matter (Y4)	Forces and magnets (Y5)	Light (Y6)
Spring 1	Properties of materials Animals including HUMANS		ANIMALS including humans (Y1 & Y2)	Magnets (Y3)	Animals including humans (Y4)	Properties & changes of materials (Y5)	Electricity (Y6)
Spring 2	Seasonal change – Spring ANIMALS including humans	Plants (Y1 & Y2)		Rocks & soils (Y3)	Sound (Y4)	Living things & their habitats (Y5)	Animals including humans (Y6)
Summer 1	Living things and their habitats Plants		Living things and their habitats (Y2)	Plants (Y3)	Electricity (Y4)		
Summer 2	Seasonal change – Summer Light Floating and sinking	Seasonal change – Spring & Summer		Light (Y3)	Electricity (Y4)	Animals including humans (Y5)	Living things & their habitats (Y6)