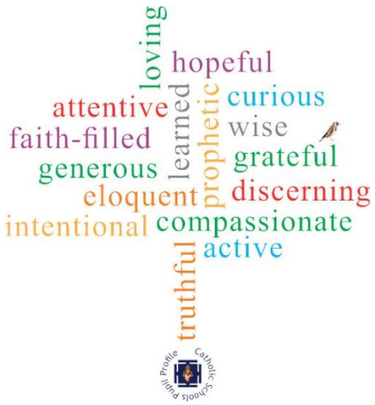
Science Curriculum: Intent

To equip pupils to be **active** scientists and nurture the children's scientific **curiosity.** Whilst being active and curious, children will develop essential scientific skills leading to excellent knowledge and understanding.



Science Curriculum: Implementation

At St. Mary's our Science curriculum supports the National Curriculum. Units are mapped across each year group, these being flexible in terms of time taken to rigorously cover the programmes of study and obtain the required knowledge. Supporting scheme, Grammarsaurus, provides the basis for our lessons but adaptations are made where required. Working Scientifically is interwoven with varying scientific enquiries and investigations taking place. TAPs resources are used to assess Working Scientifically skills, thus ensuring children's knowledge is developed alongside the skill of working scientifically in a range of contexts. This provides appropriate repetition and reinforcement helping to ensure retention.

Alongside this is a further focus on key vocabulary, which has been mapped out for each year group and subsequent unit to be covered. This is to be displayed in the classroom, built upon whilst teaching, investigating, and reviewed yearly for retention.

Key Features:

- detailed, science lesson plans providing lesson ideas, possible investigations and resources to support subject knowledge
- curriculum maps to follow ensuring progression in the key skill of Working Scientifically
- key vocabulary specific to year group and unit to be introduced, taught and reviewed for retention

At St. Mary's Scientist has…

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts, including fieldwork.
- A passion for science and its application in past, present and future technologies.

Year One	Seasonal Change Plants – brief discussion linked with time of year	Everyday Materials	Seasonal Change Plants – brief discussion linked with time of year	Seasonal Change Plants – brief discussion linked with time of year Plants Unit	Animals including humans	Science Week Activities Opportunity to be flexible for units.
	Maths Links necessary for Science Unit and TAPS Assessment * Vocabulary needed from time unit. This vocabulary will be taught before plants and seasonal units.					
Year Two	Living things and their habitats	Animals including humans Plants – focus on bulbs being planted.	Everyday Materials	Plants	Living things and their habitats	Science Week Activities Opportunity to be flexible for units.
	Maths Links necessary for Science Unit and TAPS Assessment * Block graphs taught before Animals Inc. Humans unit * Cm/Mm taught before Materials unit					
Year Three	Animals Including Humans	Rocks	Forces and Magnets Plants – springtime – opportunity to study plants at different time of the year.	Light	Plants Unit	Science Week Activities Opportunity to be flexible for units.
	Maths Links necessary for Science Unit and TAPS Assessment * Mm/Cm (to nearest cm) before Animals Inc. Humans unit * Ml/litres (to nearest 10ml) before Plants unit					
Year Four	Living things and their habitats	Electricity	Animals Including Humans Revisit - Living things and their habitats. Have habitats changed since autumn?	States of Matter	Sound	Science Week Activities Opportunity to be flexible for units.
	Maths Links necessary for Science Unit and TAPS Assessment * Ml/Litres before States of Matter Unit * Negative Numbers before States of Matter Unit * Tally charts/tables before Living things and their habitats					

Year Five	Living things and their habitats	Forces	Properties and changes of materials	Earth and Space	Animals Including humans	Science Week Activities Opportunity to be flexible for units.
	Maths Links necessary for Science Unit and TAPS Assessment * Line graphs before Animals Inc. Humans unit * Ml/Litres before testing Nappies TAPS (Material Unit) * Time before Forces unit (Seconds – stopwatches)					
Year Six	Animals Including Humans	Living things and their habitats	Electricity	Light	Evolution and inheritance	Science Week Activities Opportunity to be flexible for units.
	Maths Links necessary for Science Unit and TAPS Assessment * Tables/Graph/Line graphs before Animals Inc. Humans Unit					

Sequencing and why?

Year 1

• Seasonal Changes needs revisiting throughout

• Plants change during the year. Make links as studying Seasonal Changes

Year 2

• Habitats and plants can change during the year – opportunity to revisit these at different times of the year.

• Seeds and bulbs need to be planted at different times (seeds mainly in spring, bulbs in autumn)

Year 3

• Plants is best taught in the summer term when there is enough light to grow plants and seedlings

Year 4

• Living Things should be taught before Animals incl. Humans so there is first-hand experience when forming food chains

• States of Matter should be taught before Sound to understand the mediums sound can travel through

• Sound is challenging and should be taught later in the year

Year 5

• Living Things should be taught before Animals incl. Humans to support understanding of human life cycles

• Animals incl. Humans has less content than others do

• Materials has more content than others

• Forces should be taught before Earth and Space to understand how gravity relates to orbiting

• Earth and Space is challenging and should be taught later in the year

Year 6

• Evolution is challenging and should be taught later in the year

• Light is challenging and should be taught later in the year

Science progression of knowledge and skills

Biology

Year Group		Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Units		**The Potting Shed** **(Plants)**	**Into the Woods** **(Plants)**	**Plants**	**Plants**	**Plants**			
	NC end of Key Stage attainment targets	* Plant seeds and care for growing plants (UTW) * Understand the key features of the life cycle of a plant and animal (UTW) * Begin to understand the need to respect and care for the natural environment and all living things (UTW) * Talk about what they see, using a wide vocabulary (UTW)	Explore the natural world around them. (UTW) Describe what they see, hear and feel while they are outside (UTW) Recognise some environments that are different to the one which they live (UTW) Understand the effect of changing seasons on the natural world around them. (UTW) * Explore the natural world around them, making observations and drawing pictures of animals and plants.(UTW – ELG) * 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. .(UTW – ELG) * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter .(UTW – ELG)	• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees.	*Observe and describe how seeds and bulbs grow into mature plants. * Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	*identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers * explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant * investigate the way in which water is transported within plants * explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			

			* Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)						
	Prior Learning	Explore natural materials, indoors and outside. (Birth to three)		*Plant seeds and care for growing plants. (Nursery – Plants) * Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants) * Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Plants) * Explore the natural world around them. (Reception – Living things and their habitats) * Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)	* named different plants and trees and described the basic structure.	* named different plants and trees and described the basic structure. (Year 1) * studied how plants grow from seeds and bulbs in more detail. (Year 2) * identified what plants need to grow and stay healthy. (Year 2)			
	Knowledge	* begin to recognise and name a variety of different plants, not only the ones that they	* become familiar with, and be able to name, a growing number of	* identify what a plant is and select plants from a selection of objects.	* name a variety of different plants that we can eat.	* identify the different parts of the plants and explain their function			

		grow but native plants that may know, as weeds, need to be removed from their garden. * confidently talk about what a plant needs to thrive, including light, water and soil.	native plants and animals. * begin to use simple secondary sources to discover more about British woodlands.	* label the basic parts of a plant. * name a variety of plants that grow wildly and search for them in the school grounds/local area. * sort plants based on their features * identify plants that we can eat. * explain that trees are a type of plant and identify the basic features of a tree. * begin to identify deciduous and evergreen trees. * identify similarities and differences between different leaves.	* describe differences and similarities in different plant seeds. * identify what plants need to grow and explain what we need to do to keep them healthy. * explain how plants grow and change throughout their life cycle.	* identify where the roots are on different plants and explain their function. * identify the parts of a flowering plant that play a part in pollination. * explain how seeds are formed in flowering plants and describe the different ways in which they can be dispersed			
	Skills	Scavenger Hunt (TAPS) Theme: Outdoor Learning Theme: What is in my world? WS Focus – Doing/Sorting * Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (C&L)		Plant Structure (TAPS) WS Focus – Observe closely, using simple equipment. * sort leaves based on their appearance. WS Focus - identify and classify * explain that plants grow from different seeds and they continue to grow and change. WS Focus - observe closely * Do trees with bigger leaves lose their leaves first in autumn? WS Focus - using their observations and ideas to suggest answers to questions	Compare Growth (TAPS) WS Focus – Observe over time * Do all flowers have 5 petals? WS Focus – asking simple questions and recognising they can be answered in different ways.	Measuring Plants (TAPS) WS Focus – Making systematic and careful observations and measurements using standard units * plan and carry out an investigation to explore how water is transported through plants. WS Focus - setting up simple practical enquiries, comparative and fair tests			
Future Learning		In KS1, children will learn about the part that plants play in food chains and recognise	In KS1 children will learn to identify and name common plants and animals. They will	Year 2 – Children will study how plants grow from seeds and bulbs in more detail. They will also look at what plants need to grow and stay healthy.					

		that plants form an important part of a habitat. In KS2 they will need to be able to describe the function of different parts of a plant and to investigate the variety of ways that seeds are dispersed from the parent plant	also need to recognise that different plants and animals are suited to different habitats and begin to understand how different habitats meet the needs of different animals. They will also need to be able to talk about simple food chains	Year 3 – Children will learn about the functions of the different parts of the plant, find out how flowers play a part in the life cycle of the plant and investigate how water is transported in plants. Year 5 – Children will look at the life cycle of a plant including the life process of reproduction. KS3 – Children will study plants in much closer detail, observing the cell structure and how plants create their own food through photosynthesis.					
Vocabulary		Bulb, Compost, Flower, Fruit, Grow	fox, rabbit, squirrel, deer, owl, spider, lion, wolf, monkey Recognise and name a few native trees (such as oak, hazel and beech) help them to learn that they are also a type of plant. Recognise some other plants such as ivy, bluebells and honeysuckle	wild plants, garden plants, weed, deciduous, evergreen, trunk, branches, leaves, flowers, petals, fruit, roots, bulb, seed, stem	germination, sprout, shoot, seed dispersal, survival, sunlight, water, temperature, nutrition, life-cycle	roots, stem, leaves, flowers, nutrients, evaporation, petal, stamen, carpel, fertilisation, seed dispersal, pollen, nectar			
Misconceptions		Some children may think: • trees are not plants • there is a young plant inside a seed or bulb • bulbs are big seeds • big plants grow from big seeds and big bulbs • fruit and vegetables come from the supermarket • plants grow at night or when we are not watching them.		Children may not realise that plants are living things and that they can die. They may only think things with faces and brains are alive. Children may not know that plants have roots in the ground that help the plant.	Children may think that all seeds look the same, so we need to make sure that we allow them to explore and observe a variety of seeds and bulbs.				

		Save The Gingerbread Man **(Animals, including Humans)**	**Pets and Vets** **(Animals, including humans)**	**Animals, including humans**	**Animals, including humans**	**Animals, including humans**	**Animals, including humans**	**Animals, including humans**	**Animals, including humans**
NC end of Key Stage attainment targets		* Make healthy choices about food, drink, activity and tooth brushing (PD) * Begin to understand the need to respect and care for the natural environment and all living things (UTW) * Talk about what they see, using a wide vocabulary (UTW)	Explore the natural world around them. (UTW) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)	* 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	* notice that animals, including humans, have offspring which grow into adults * find out about and describe the basic needs of animals, including humans, for survival (water, food and air) * describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	* 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. * identify that humans and some other animals have skeletons and muscles for support, protection and movement.	* describe the simple functions of the basic parts of the digestive system in humans * identify the different types of teeth in humans and their simple functions * construct and interpret a variety of food chains, identifying producers, predators and prey	*describe the changes as humans develop to old age	* 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.
Prior Learning		* Explore natural materials, indoors and outside. (Birth to three) * Make connections between the features of their family and other families. (Birth to three) * Notice differences between people. (Birth to three)	Understand the key features of the life cycle of a plant and an animal. (Nursery) • Begin to understand the need to respect and care for the natural environment and all living things. (Nursery) * Use all their senses in hands-on exploration of natural materials. (Nursery) • Begin to make sense of their own life-story	* explored different animals during EYFS. *learnt the names of di-fferent animals and their features. * looked at the similarities and differences between themselves and their classmates	Year 1 * looked at different parts of the human body and the related sense	Year 2 * studied animals and their offspring and the basic needs that animals need to survive.	Year 3 * learnt about healthy diets and nutrition.		

			and family's history. (Nursery) • Understand the key features of the life cycle of a plant and an animal. (Nursery) • Begin to understand the need to respect and care for the natural environment and all living things. (Nursery)						
	Knowledge	* how materials change due to mixing and heating * use their senses to explore ingredients and to develop their knowledge of common materials used to make kitchen utensils and equipment. * learn about different animals in the story, researching information about life processes and life cycles.	* begin to realise that humans are a type of animal that has the same needs as other animals * think about the importance of exercise, food and health care for all animals	* identify the names of common animals and begin to identify the group to which it belongs based on its features * identify the similarities and differences between some common animals using key scientific words to describe features. * identify that animals do not all eat the same thing. * begin to identify animals that are herbivores, omnivores and carnivores. * name different parts of the human body and locate them on themselves when asked. * discuss the five sense and identify the body part associated with each sense.	***** identify and explain the basic needs that humans need to survive. * identify the offspring of key animals. * explain how animals have babies and that they grow and change into adults. * explain why it is important for humans to exercise regularly. * describe a healthy diet for humans and explain the importance of eating a healthy diet. * explain how humans can have good hygiene and the importance of good hygiene. * identify things we can do to prevent illness and explain what we can do to feel better if we do become ill	***** identify the names of some of the bones in the human body and understand that we need bones for support, protection and movement. * identify how humans use muscles and understand that we need muscles for support, protection and movement. * identify differences in the skeleton in different animals. They will also be able to group animals based on whether they have a backbone. * identify the 5 main food types that humans need in order to have a healthy balanced diet	***** name twelve main parts of the digestive system and describe their basic functions. They will be able to label a diagram and use scientific vocabulary for description. ***** name different teeth and relate the shape of the teeth to the function. ***** construct and interpret a variety of food chains. They will be able to use the terms herbivore, carnivore and omnivore accurately and identify animals in each of these groups. They will construct food chains and be able to identify the producer, prey and predator in each chain. ***** construct food chains. After playing the game, children will be able to identify the producer and prey or predator in each food chain	***** name and describe the main stages of the human life cycle. * explain how the foetus grows in the womb at different stages. * explain what puberty is and how human bodies change during puberty. * explain what it means to be a senior and describe the changes we might face.	*****to name the main parts of the human circulatory system and explain how the system works. ***** name the main parts of the heart and explain how the heart pumps blood. ***** explain how the blood plays a role in transporting nutrients and water around the body. ***** describe how we can keep healthy by exercising, eating a healthy diet and taking care of our hygiene. ***** identify different things that people do that can lead to them being unhealthy.

	Skills	Scavenger Hunt (TAPS) Theme: Outdoor Learning Theme: What is in my world? WS Focus – Doing/Sorting * Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (C&L)	Taste Tests (TAPS) Theme: Our Senses WS Focus: Evaluating * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use talk to work out problems and organise thinking and activities. (C&L) *Explain how things work and why they might happen. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)	Animal Classification (TAPS) WS Focus – Use observations and ideas to suggest answers to questions Body Parts WS Focus – Identify and classify	Handspans (TAPS) WS Focus – Observe and answer questions * plan and carry out an investigation to answer a given question. WS Focus – gather and record data	Investigating Skeletons (TAPS) WS Focus - Ask relevant questions and use different types of scientific enquiries to answer them * investigate a chosen question by planning what they will do, gathering data and presenting their results. (Longer legs and arms) I can set up a simple practical enquiry. I can communicate my results.	Teeth in liquid (TAPS) WS Focus – Use results to draw simple conclusions, suggest improvements and raise further questions.	Growth Survey (TAPS) WS Focus - Take measurements, using a range of scientific equipment	Heart rate (TAPS) WS Focus - Use test result to make predictions to set up further comparative and fair tests
Future Learning		In Key Stage 1 children will learn about the properties of different materials, such as wood, metal and plastic. This follows on from learning in Foundation Stage to recognise and name different materials. In Key Stage 2, children develop their understanding of change due to heat	In Key Stage 1 children will need to find out about and describe the basic needs of animals, including humans, for survival. They will also need to know that all animals have offspring that grow into adults. In Key Stage 2 they will need to know that all animals need the right types of food and nutrients to keep healthy. They will also learn that living things can be classified into broad groups according	**Year 3** – Children will study the importance of nutrition in humans and other animals. **Year 4** – Children will study the seven life processes again and explore digestion in humans. **Year 5** – Children will study life cycles and reproduction. **Year 6** – Children will study healthy and unhealthy habits. **KS3** – Children will study reproduction in more detail.					

			to observable characteristics.						
Vocabulary		Add, Change, Cool, Dough, Heat, Hot, Ingredients, Measure, Mix, Pull, Push, Rolling pin, Scales, Soft, Squeeze, Stir, Stretch, Weigh.	Amphibians, Animal, Birds, Fish, Invertebrates, Life cycle, Mammals, Medicine, Mini-beasts, Reptiles	amphibians, birds, fish, mammals, reptiles, carnivores, herbivores, omnivores, sight – eyes, hearing- ears, touch- skin, taste – tongue, smell – nose	offspring, growth, adult, survival, pupa, baby, toddler, child, teenager, exercise, nutrition, reproduce,	nutrients, energy, saturated fats, unsaturated fats, vertebrate, invertebrate, muscles, tendons, joints	digest, oesophagus, stomach, small intestine, large intestine, rectum, herbivore, carnivore, omnivore, producer, predator, prey, energy, waste	gestation period, fertilisation, reproduce, adolescence, life-cycle, puberty, adulthood, life-expectancy	circulatory system, heart, blood vessels, villi, nutrients, drug, alcohol, alveoli, gas exchange
Misconceptions		Some children may think: • all animals lay eggs • the young animal is fully formed inside an egg and just waiting to hatch • the young animal is fully formed inside an egg and just grows until it is big enough to hatch • animals are assembled from body parts within the egg • all animal young are just small versions of the adult and get bigger • animals such as cows and hens “make” milk and lay eggs for us [humans] • humans are not animals. * babies are in a mummy’s stomach.	Some children may think: • animals are furry and have four legs • a bee is not an animal because it is an insect • animals adapt to their surroundings, e.g. a brown bear turns white and becomes a polar bear • animals living in the soil breathe by coming to the surface • dragons and other mythical creatures are real animals. * sons look like their fathers and daughters look like their mothers.	Children might think that all animals eat the same thing. They may not realise that animals eat different things. There may also be misconceptions about animals eating humans e.g. sharks eat humans. This needs to be discussed that no animals hunt humans and that we do not live in the same habitat.	Children might need a thorough explanation of the difference between a “need” and a “want” – needs are things that humans cannot survive without. Children may have heard the word diet in a negative way when someone is trying to lose weight. Children need to be told that diet just means the food that someone eats. Children may not understand that medicine must only be taken when you are ill and a trusted adult has given it to you. Certain medicines might taste nice but you cannot digest them if you are not ill.	Children may have misconceptions about the bones in our body and where they are. They may think we have fewer bones and that the bones do not cover our whole body. Children may also think that animals have the same skeleton as humans. Children may have misconceptions about muscles. Some children think that only males have muscles but children need to understand that all humans have muscles in order to move. Children may have misconceptions about the word diet. We need to explain that a diet just means what an animal eats e.g. a shark’s diet is smaller fish. Some children may have heard this term used when people want to lose weight.	Children may think that their stomach is where their belly button is and that all food is digested there. However, although some simple foods such as sugar are digested, most foods travel to the small intestine for further digestion and to be absorbed into the blood. Children may think that food goes down one tube and liquids go down another. They may also think that the air we breathe goes down the same tube as the food and water. When drawing food chains, children may get confused by the direction of the arrow.	Children may have misconceptions about being an adult and that you stop learning as well as stop growing. Children will need to understand that our bodies can still change when we are an adult. Children may know what will change with their body during puberty but may not know about the opposite sex. Children may also think that a baby grows inside its mother’s stomach where food goes. They will learn about the womb during lesson 2.	Children may think that oxygenated blood is red whilst blood with no oxygen is blue. Children need to know that blood is never blue, but some scientific diagrams show it as blue so we can distinguishbetween the different types of blood. Children may not realise that exercise is needed to keep the heart healthy and you should aim to complete at least 30 minutes of exercise a day that increases your heart rate.

Units	**Save The Gingerbread Man** **(Living things and their habitats)**	**Into the Woods** **Dinosaurs** **(Living things and their habitats)**		**Living things and their habitats**		**Living things and their habitats**	**Living things and their habitats**	**Living things and their habitats**
NC end of Key Stage attainment targets	* Make healthy choices about food, drink, activity and tooth brushing (PD) * Begin to understand the need to respect and care for the natural environment and all living things (UTW) * Talk about what they see, using a wide vocabulary (UTW)	Explore the natural world around them. (UTW) Recognise some environments that are different to the one which they live (UTW) * Explore the natural world around them, making observations and drawing pictures of animals and plants.(UTW – ELG) * 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. .(UTW – ELG) * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter .(UTW – ELG) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L)		* 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 4589+ .animals in their habitats, including microhabitats * describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food		* 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	* 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 how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals * give reasons for classifying plants and animals based on specific characteristics

		* Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)						
Prior Learning	Explore natural materials, indoors and outside. (Birth to three)	* Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Begin to understand the need to respect and care for the natural environment and all living things		Year 1 * studied different animals and grouped them based on their features and diet. * compared differences between living and non-living things.		Year 2 * explored the differences between living and non-living things; identified that most living things live in habitats that they are suited to and understand how living things in that habitat depend on each other. * name some of the living things in their local area and construct basic food chains. Year 3 * explored the part flowers play in the life cycle including pollination, seed fertilisation and seed dispersal.	Year 4 * consolidated their understanding of habitats and learnt how to use a basic classification key.	
Biology	**Knowledge**	**Save the Gingerbread Man Unit** * how materials change due to mixing and heating * use their senses to explore ingredients and to develop their knowledge of common materials used to make kitchen utensils and equipment. * learn about different animals in the story, researching information	**Into The Woods Unit** * become familiar with, and be able to name, a growing number of native plants and animals. * begin to use simple secondary sources to discover more about British woodlands. **Dinosaurs Unit** * develop their understanding of grouping dinosaurs according to criteria		***** identify living things and things that have never been alive. * identify different microhabitats in their local area and identify living things that might live there * identify large habitats around the world, * identify differences and identify living things that might live there. * identify characteristics that some living things have that make them		***** name each of the seven life processes using the acronym MRS GREN. * explain how animals and plants complete each of the life processes and be able to distinguish living from non-living objects using this knowledge. * name the five main animal groups. * use the terms herbivore, omnivore and carnivore correctly	***** name each of the seven life processes using the acronym MRS GREN. * explain how animals and plants complete each of the life processes and be able to distinguish living from non-living objects using this knowledge. * name the five animal groups and understand that the way each of those groups reproduce may be different.	***** sort animals into groups using different criteria; e.g. nutrition (omnivore, carnivore or herbivore; animal group (fish, amphibian etc.) Vertebrate/invertebrate. * use a classification key to identify animals and create a key using yes/no questions to identify animals. * select criteria to use to sort plants into groups. * research information about plants and sort

		about life processes and life cycles.	such as teeth, claws, spikes and wings. * develop their ability to find out information about dinosaurs, including their habitat, camouflage and ideas about how they became extinct. * learn that we know dinosaurs existed because people have found their remains as fossils, bones and fossilised dinosaur poos (coprolites), thus introducing children to early ideas of evidence as well as specific types of scientists, such as palaeontologists.		best suited to the environment they live in. * identify what some living things from a habitat eat and how they are linked in a food chain.		and sort animals according to their diet. * create own criteria to sort and group animals. * sort groups of animals into vertebrates and invertebrates. * explain differences between vertebrate and invertebrate animals. * use a classification key to identify living things. * construct own key to identify living things found in their local area – link to TAPS assessment * understand the effect that human activity has on the environment.	* explain how mammals reproduce and understand that the gestation periods for different mammals may vary. * name the five animal groups and understand that the way each of those groups reproduce may be different. * explain which groups of animals lay eggs and which do not and compare groups of animals that look after their young with those that don't. * explain the process of pollination and fertilisation. * label parts of a flower and understand the purpose of each part. * explain what seed dispersal is and name some seed dispersal methods. * describe the differences and similarities in the life cycles of mammals, amphibians, reptiles, insects and birds. * describe and order the stages in the life cycle * compare similarities and differences between the two cycles	them into groups based on their characteristics. * explain that microorganisms are living things. * name the five main groups scientist use to classify microorganisms. * give examples of some of the characteristics and features of each group
	Skills	Scavenger Hunt (TAPS) Theme: Outdoor Learning Theme: What is in my world? WS Focus – Doing/Sorting			Nature spotters (TAPS) WS Focus – Identify & Classify * plan and carry out an investigation to find out which conditions woodlice prefer. WS Focus - observe closely		Local Survey (TAPS) WS Focus – Gather, record and classify data	Life Cycle Research (TAPS) WS Focus - Report and present findings from enquiries, in oral and written forms such as displays and other presentations, using appropriate scientific language.	* explain who Carolus Linnaeus was and why he is an important scientist, creating a presentation about his life and work. – research (* conduct an experiment to prove that yeast respires and is

		* Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (C&L)			and use observations to answer questions.				therefore a living microorganism)
Future Learning		In Key Stage 1 children will learn about the properties of different materials, such as wood, metal and plastic. This follows on from learning in Foundation Stage to recognise and name different materials. In Key Stage 2, children develop their understanding of change due to heat	Understanding about dinosaurs in EYFS provides the foundation for children in Key Stage 1 to identify and group animals, describe and compare the structure of animals and compare things that are living, dead and have never been alive. In Key Stage 2, children learn about fossils and living things that inhabited the Earth millions of years ago		Year 3 – Children will study the importance of nutrition in humans and other animals. Year 4 – Children will study the seven life processes again and explore digestion in humans.		Year 5 – Children will study life cycles and reproduction.	Year 6 – Children will study healthy and unhealthy habits.	KS3 – Children will study reproduction in more detail.
Vocabulary		Add, Change, Cool, Dough, Heat, Hot, Ingredients, Measure, Mix, Pull, Push, Rolling pin, Scales, Soft, Squeeze, Stir, Stretch, Weigh.	**<u>Into the Woods</u>** **<u>Dinosaurs</u>** Bones, Dinosaurs, Dinosaur poo, Earth, Eggs, Excavate, Extinct, Footprints, Fossils, Magnifying glasses, Museum, Paintbrushes, Palaeontologist, fossils, Skeleton, Spikes, Swamp, Tail, Trees.		living, dead, never been alive, habitats, micro-habitats, food chain, food sources, life processes, life, depend,		living, dead, never been alive, habitats, micro-habitats, food chain, food sources, life processes, life, depend,	sexual reproduction, asexual reproduction, reproduction, mammal, amphibian, bird, life-cycle, metamorphosis, pollination	invertebrates, vertebrates, classification, distinguish, taxonomy
Misconceptions		Some children may think: • shells are only found at the beach	Some children may think: • trees are not plants		Children may not fully understand that some of the food we eat used to be living animals that are now dead. Children may have		Snakes have exoskeletons that they shed. This is not true; snakes are vertebrate animals that shed their skin (not an	Children may confuse mating and reproduction. Reproduction is the combining of genetic material from a male	Some children may think that all microorganisms are harmful and make you ill. It is important to highlight that some microorganisms are

		• feathers are from dead birds.	• trees are not living as they do not seem to change or grow • weeds are bad plants.		misconceptions about where animals live as they may have only seen some of these animals in the zoo so might not realise where their habitat would be in the wild		exoskeleton). Children may think fish breathe in water; however, it is not water that the fish take in when they breathe but the oxygen mixed in with the water. Children may assume that all changes to habitats are negative. Children may find it dicult to distinguish the difference between reptiles and amphibians.	and female part to produce new life. Both animals and plants reproduce sexually however animals have to mate in order for them to reproduce. Children may think that the first stage of each life cycle is the egg; every life cycle begins with the egg. Labelling the 'egg' as the first stage would be incorrect as the stages in a life cycle are repeated and there is no first or last stage. When discussing how mammals reproduce (and humans in particular) children may think that babies are conceived in the stomach. It is important that the children understand that stomachs are for food, not babies. Fertilisation takes place naturally in the fallopian tube (oviduct) of the female reproductive system and the fertilised egg, which develops into a ball of cells over time, develops in the uterus (womb) of the female to become a baby.	useful and play an important part in decomposition. They may also think that microorganisms are all the same size; however, although all microbes cannot be seen with the naked eye, there is a huge variance in the size of microbes (e.g. in general, viruses are much smaller than bacteria). Children may think that mushrooms are a type of plant. They are not, they are classified as fungi.

									Evolution and Inheritance
NC end of Key Stage attainment targets									* 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
Prior Learning									KS1 * learnt that most living things live in habitats to which they are suited and be able to describe how different habitats provide the basic needs of different kinds of animals and plants. * identify animals and plants from a variety of environments. * noticed that animals have offspring that grow into adults. KS2 * In the Rocks and Soils topic (Y3), children have learnt how fossils are formed

	Knowledge								* explain what adaptation is. * explain how their chosen animal is adapted to its environment * explain what natural selection is using the peppered moth as an example. * understand how adaptation and natural selection lead to species changing (evolving) over time in order to survive. * explain that genetic traits are passed on from parents to offspring. * explain how fossils tell us about evolution. * explain how adaptations lead to evolution
	Skills								Fossil habitats (TAPS) WS Focus - Identifying scientific evidence that has been used to support or refute ideas or arguments. Which beak is better adapted to pick up each seed? WS Focus - plan and investigate to answer the question.
Vocabulary									fossils, adaptations, evolution, variations, offspring, inheritance, habitat, natural selection, adaptive traits, inherited traits

Misconceptions									That evolution happens quickly and that individual species adapt rapidly to changes in their environment. This is not the case, evolution happens over time. Children think that if you believe in evolution then you can't believe in God; however many evolution scientists also believe in God and have a religious background. Just because you believe in one, doesn't mean you can't believe in the other. Children may have heard that humans came from monkeys. Humans do belong to the same family as the great apes and the closest known living relative to Homo sapiens is the chimpanzee. However, this does not mean humans 'evolved from monkeys'. Humans share a common ape-like ancestor with old world monkeys and have very little connection to new world monkeys, which branched o the phylogenetic tree nearly 40 million years ago.

Science progression of knowledge and skills

Chemistry

Year Group	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Units	**Save the Gingerbread Man** **Frozen** **Superhero Materials** **Slimy Things** **Pirates** **(Materials)**	**Socks** **(Materials)**	**Everyday Materials**	**Uses of everyday materials**		**States of Matter**	**Properties and changes of materials**	
	Mud Glorious Mud **(Outdoor area – Mud Kitchen)**							
NC end of Key Stage attainment targets	*Use all their senses in hands-on exploration of natural materials. (UTW) *Explore collections of materials with similar and/or different properties. (UTW) * Talk about what they see, using a wide vocabulary. (UTW) * Talk about the differences between materials and changes they notice (UTW) * Talk about what they see, using a wide vocabulary (UTW)	Explore the natural world around them. (UTW) Describe what they see, hear and feel while they are outside (UTW) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard	* 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	* identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses * find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching		* 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	*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	

		and ask questions to clarify their understanding. (C&L ELG)					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	
Prior Learning	* Explore materials with different properties. (Birth to three) • Explore natural materials, indoors and outside. (Birth to three	Use all their senses in hands-on exploration of natural materials. (Nursery) • Explore collections of materials with similar and/or different properties. (Nursery) • Talk about the differences between materials and changes they notice. (Nursery)	EYFS * explored different materials in EYFS. * discussed the textures of different materials and used different materials during model making activities	Year 1 * looked at different objects and the material from which they are made. * identified a variety of everyday materials and described their properties such as wood, plastic, glass, metal, water and rock. * compared and grouped together a variety of objects made from different materials		KS1 * Learnt to compare and group materials on the basis of their simple properties. * explored how to change the shape of solids by bending, twisting, squashing and stretching..	Year 4 * learnt to compare and group materials according to whether they are solids, liquids or gases. * observed that some materials change state when heated or cooled and measured or researched the temperature at which this happens in degrees Celsius. * identified the part played by evaporation and condensation in the water cycle and associated the evaporation rate with temperature.	

Knowledge	**<u>Save the Gingerbread Man Unit</u>** * how materials change due to mixing and heating * use their senses to explore ingredients and to develop their knowledge of common materials used to make kitchen utensils and equipment. * learn about different animals in the story, researching information about life processes and life cycles. **<u>Frozen Unit</u>** * observe changes over time as they explore what happens when water is cooled and ice is warmed. * talk about their ideas, perform simple tests and compare their results **<u>Superhero Materials Units</u>** * develop their ability to work scientifically as they are supported to sort and group materials, carry out simple tests and talk about their findings. * begin to identify everyday materials and describe their physical properties. * start to distinguish between an object and	* learn the names and properties of different materials. * develop the ability to classify according to their own and given criteria (e.g. warm, smooth, rough and stretchy). * Understanding of cause and effect is developed through exploring forces, where children change the shape of the socks by stretching them. * carry out simple comparative tests	* identify different materials. * describe the properties of different materials. * name objects and name the material from which they are made * sort materials based on their physical properties.	* identify and describe different materials *identify a variety of everyday items and the material from which it is made * identify different materials that we can change by squashing, bending, twisting and stretching.		* identify and group solids, liquids and gases. * describe the characteristics of each state of matter including how the particles are organised. * take accurate measurements using a thermometer. * use their knowledge to make sensible predictions about temperature. * explain the water cycle and identify the part played by evaporation and condensation in the cycle. * identify the key variables when planning a fair test and state which variable will change and which variables will be controlled/kept the same. * draw conclusions and communicate their results.	* name examples of solids, liquids and gases, identifying the properties of each type of material. *understand how states of matter change and name some of these processes *describe the properties of materials using scientific vocabulary * know that some materials dissolve in a liquid to make a solution. * explain the process of dissolving using scientific vocabulary (soluble, insoluble, solution) and understand that solutions have a saturation point. * understand that they can separate some mixed materials through various processes (evaporation, filtering, sieving or using magnets). * predict how they could separate mixtures depending on the properties of the mixed materials * identify the difference between irreversible and reversible change. Give examples of each type of change.	

	the material from which it is made **<u>Slimy Things Unit</u>** * experience a range of liquids and semi-liquids, helping them to understand differences in consistency and how they behave, e.g. how runny (viscous) they are. * opportunity to compare similarities and differences **<u>Pirates Unit</u>** * Floating and sinking, through problem solving to make pirate boats and rafts. * Sorting and identifying materials, through sifting and using magnets. * Sorting and identifying animals, particularly from habitats such as the sea and rainforest. * Supporting the development of children's understanding of different foods and changes in materials during cooking, by designing and cooking pirate food							

Skills	Browning Apples (TAPS) Theme: Healthy Me WS Focus : Predicting * Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (C&L) * observe changes over time as they explore what happens when water is cooled and ice is warmed. * talk about their ideas, perform simple tests and compare their results * sort and group materials, carry out simple tests and talk about their findings.	Incy Wincy Spider Test (TAPS) Theme: Properties of Materials WS Focus: Explore and Perform Simple Tests Frozen Balloons (TAPS) Theme: Changing materials WS Focus: Observe closely * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use talk to work out problems and organise thinking and activities. (C&L) *Explain how things work and why they might happen. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG) *classify according to their own and given criteria * carry out simple comparative tests	Floating and Sinking (TAPS) WS Focus - Perform simple tests * investigate which materials are waterproof, light and strong	Rocket Mice (TAPS) WS Focus – Perform simple tests * identify the best material to make a house by comparing different materials		Drying Materials (TAPS) WS Focus – Set up a fair test * explain that heating and cooling can change the state of materials. Investigate melting point of chocolate. Draw conclusions and write a report. Measuring Temperature. WS Focus – Take accurate measurements using standard units, using a range of equipment including thermometers and data loggers	Insulation layers (TAPS) WS Focus - Use test results to make predictions to set up further comparative and fair tests Dissolving. WS Focus - Plan different types of scientific enquiry, including recognising and controlling variables (* predict, test and group materials according to their magnetic properties.)	

Future Learning		**Frozen Unit** In Key Stage 1 children will observe changes across the four seasons and describe weather associated with the seasons. They will describe the properties of a variety of everyday materials. In Key Stage 2, they will learn about 'states of matter' and find out that materials can be classified as being either 'solid', 'liquid' or 'gas'. They will learn that some materials change state when they are heated or cooled and measure the temperature at which this happens **Slimy Things** In this unit, children begin to develop their understanding of different materials, cause and effect and their ability to observe similarities and differences. This provides a foundation for further learning in Key Stage 1, where children identify and compare materials and find out how materials can be changed by physical forces **Pirates** An important element of science in the Early Years is supporting children to talk about what they are doing and thinking. Laying good foundations will require practitioners to consciously model language such as, idea, test, time, record, measure, change, question, happen, which	Children progress sorting using one criterion (e.g. colour/size/pattern) to several (e.g. colour, stretchiness and size). Then, in Key Stage 1, children are able to group according to names of materials and their properties, e.g. opaque, transparent and flexible. In Key Stage 2 children classify according to specific properties, such as thermal or electrical conductivity.	Year 2 – Children will look at the suitability of a variety of everyday materials.	Year 3 – Children will study rocks in more detail looking at the properties of different types of rock. Year 4 – Children will study 'States of Matter' where they will look at a variety of solids, liquids and gases.		.Year 5 – Children will study 'Properties and Changes of Materials' where they will explore deeper into states of matter and reversible and irreversible changes.	KS3 – Children will study 'States of Matter and Changes' in more depth as well as focusing on the use of different metals, polymers, ceramics and composites	

		are key words used in Key Stages 1 and 2. **<u>Superhero Materials</u>** In KS1 children need to 'describe the simple physical properties of a variety of everyday materials'. They begin to do that in this unit. Although they may find it hard to understand the term 'properties' at first, they will benefit from hearing you use it alongside ideas they are already familiar with, such as: 'Which can be used to soak up water?' and 'Which is best at keeping the potato warm?' to introduce the idea. **<u>Save the Gingerbread Unit</u>** In Key Stage 1 children will learn about the properties of different materials, such as wood, metal and plastic. This follows on from learning in Foundation Stage to recognise and name different materials. In Key Stage 2, children develop their understanding of change due to heat							
Vocabulary		**<u>Save the Gingerbread Man</u>** Add, Change, Cool, Dough, Heat, Hot, Ingredients, Measure, Mix, Pull, Push, Rolling pin, Scales, Soft, Squeeze, Stir, Stretch, Weigh. **<u>Frozen</u>**	Cold, Compare, Cool, Different, Dries, Elastic, Fabric, Fastest, Feel, Feet, Material, Senses, Similar, Sort, Stretch, Warm, Wet.	Object, Materials, Hard, Soft, Stretchy, Shiny, Dull, Rough, Smooth, Stiff, Bendy, Waterproof, Absorbent, Opaque, Transparent	Properties, Suitability, Compare		States of matter, Solids, Liquids, Gases, Water vapour, Temperature, Celsius, Boils, Melts, Freeze, Evaporate, Condense, Precipitation	Materials, Solids, Liquids, Gases, Melting, Freezing, Evaporating, Condensing, Dissolved, Separating	

		Antarctic, Arctic, Cold, Defrost, Freeze, Frost, Frozen, Ice, Melt, North Pole, Snow, South Pole, Water, Warm, Winter. **<u>Superhero Materials</u>** Materials: texture (Hard, Smooth etc.), properties (Waterproof, Flexible, See-through etc.), names (Tin Foil, Fur, Fabric, Bubble wrap etc.). **<u>Slimy Things</u>** Change, Different, Dry, Expand, Hard, Liquid, Material, Mix, Ooze, Pour, Runny, Same, Similar, Slimy, Slippery, Soak, Soft, Squash, Thick, Water, Wet. **<u>Pirates</u>** Float, sink, sort, identify, magnet, sifting, habitats.							
Misconceptions		Some children may think that: • a material is better to use because it is 'bigger' not thicker, rigid etc. • the material is 'box' not cardboard.	Some children may think: • material only means fabric • all plastic/wood etc. is the same.	Children may think of the word 'material' meaning fabric. Children need to know that material refers to the matter from which something is made. Children may also have misconceptions about different materials. They may think that if something is hard then it must be strong or if something is soft then it must be fragile. Glass is hard but very fragile whilst fabric is soft but can be strong.			Children may think that all gases smell. This is not true; some gases do smell but not all. Children may confuse steam with water vapour. Children may also think that clouds are a gas. This is not true; clouds are droplets of water that have condensed around dust particles. Children find condensation difficult to explain. It is important to point out everyday examples of condensation throughout the school year e.g why is there water on the inside of the windows. How did the water get there?	Children often use the word 'disappear' when describing dissolving and teachers often think this is a misconception. However, children may be using the word 'disappear' to describe that they can no longer see it BUT understand that the substance is still in the liquid. It is important to ask the children what they mean by using the word 'disappear'. Whether they think that the soluble substance has gone (i.e. no longer in the water; this is a misconception) or they realise the substance is still in the liquid, but we cannot see it. They need	

								to be encouraged to use the word dissolved to accurately describe what happened	
					Rocks				
NC end of Key Stage attainment targets					* 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 * recognise that soils are made from rocks and organic matter.				
Prior Learning					**KS1** – Rocks and soils are only covered briefly in other topics in KS1. Children will have learnt about soil during plant topics.				
	Knowledge				* identify what a rock is and group together rocks based on their appearance. * discuss the three different types of rock and begin to explain how they are formed. * describe the different layers of the Earth. * identify different types of soils and describe their properties. * explain what a fossil is and describe how a fossil is formed in rock.				

	Skills				Rock Report (TAPS) WS Focus – Reporting on findings from enquiries * plan and carry out an investigation in order to group rocks together based on their physical properties. WS Focus - Reporting on findings from enquiries **Ensure investigations from Grammarsaurus don't overlap with investigation for TAPS Activity.**				
Future Learning					**UKS2 –** Rocks and soils are not studied again in KS2. **KS3 –** Children will study rocks in more detail. They will look at the rock cycle and how the different rocks are formed.				
Vocabulary					Igneous rock, Magma, Sedimentary rock, Lava Metamorphic rock, Sediment, Permeable, Impermeable, Fossilisation, Erosion, Tectonic plates, Solidify, Dissolve				
Misconceptions					Children may think that all rocks are the same and all soils are the same. Children may not know that rocks are formed over time, they might just think that they have always been there. Children may not think that the Earth is made fully of different types of rock. Children may struggle to grasp that the centre of the Earth is molten rock as they will				

					only understand rocks as being hard and strong.				

Science progression of knowledge and skills

Physics

Year Group	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Units	**Frozen** **(Seasonal Change)**	**Zarg's World** **(Seasonal Change)**	**Seasonal Change**					
	Whatever the Weather **(Outdoor Area)** * notice and talk about change over time. * make simple comparisons about the temperature and weather conditions. * supported to make and record simple measurements							
NC end of Key Stage attainment targets	* Begin to make sense of their own life-story and family's history. (UTW) * Talk about what they see, using a wide vocabulary (UTW)	Explore the natural world around them. (UTW) Describe what they see, hear and feel while they are outside (UTW) Recognise some environments that are different to the one which they live (UTW) Understand the effect of changing seasons on the natural world around them. (UTW) * Explore the natural world around them, making observations and	* observe changes across the four seasons * observe and describe weather associated with the seasons and how day length varies					

		drawing pictures of animals and plants.(UTW – ELG) * 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. .(UTW – ELG) * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter .(UTW – ELG) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)						
Prior Learning	Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants & Animals, excluding humans)		Children have explored different seasons during EYFS. * learnt the different characteristics and weather associated with each season					

Knowledge	* observe changes over time as they explore what happens when water is cooled and ice is warmed. * talk about their ideas, perform simple tests and compare their results	* observe carefully, using all of their senses. * understand that there are many other planets in our own Solar System and beyond. *understand that there are some things that scientists currently do not know	* identify the key characteristics of spring. * identify the key characteristics of summer. * identify the key characteristics of autumn. * identify the key characteristics of winter. * explain how the length of the day changes throughout the year					
Skills	Making Butter (TAPS) Theme: Changes in our world Theme: How can we make changes happen? WS Focus: Recording and communicating * Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (C&L)	* observe carefully	Seasonal Change (TAPS) WS Focus – Observe, gather and record data (To be completed at the end of Seasonal Changes teaching) * explain what rain is and investigate the best material to keep someone dry in the rain. WS Focus – Identify and Classify					
Future Learning	In Key Stage 1 children will observe changes across the four seasons and describe weather associated with the seasons. They will describe the properties of a variety of everyday materials. In Key Stage 2, they will learn about	In Key Stage 1, children will find out about the seasons. In Key Stage 2 they will learn that the Sun is the star at the centre of our Solar System and will find out about the other planets that share our Solar	Year 4 – Children will study the water cycle and how rain is formed. Year 5 – Children will look at the Earth and how it rotates and tilts causing different weathers and seasons. KS3 – Children will study the water cycle in more					

		‘states of matter’ and find out that materials can be classified as being either ‘solid’, ‘liquid’ or ‘gas’. They will learn that some materials change state when they are heated or cooled and measure the temperature at which this happens	System and about our own Moon.	detail as well as studying how the Earth’s tilt can affect seasons and length of day.					
Vocabulary		Antarctic, Arctic, Cold, Defrost, Freeze, Frost, Frozen, Ice, Melt, North Pole, Snow, South Pole, Water, Warm, Winter.	Astronaut, Earth, Moon, Names of planets in our Solar System, Orbit, Planet, Rocket, Solar System, Space, Star, Sun.	Seasons, Autumn, Daylight, Weather, Sun, Wind, Rainbow, Cloud, Rain, Leaves, Shorter, Growth, Winter, Change, Spring, Sunshine, Summer, Sun, Warm, Longer, Safe, Sunlight					
Misconceptions		Some children may think: • it always snows in winter • it is always hot in the summer • all babies and young animals are born in spring • plants only have flowers in the spring and summer • animals sleep during winter • it rains to help the plants grow • when it is hotter, it is because the Sun is closer • God controls the weather.		Children may not realise that seasons are different across the world. Children will need to understand that the weather associated with the season may not always happen (e.g. it may not always be sunny in summer)					
		Slimy Things **Pirates** **(Forces)**	**Socks** **(Forces)**			**Forces and Magnets**		**Forces**	
NC end of Key Stage attainment targets		* Explore and talk about different forces they can feel (UTW)	Explore the natural world around them. (UTW) * Learn new vocabulary. (C&L)			* compare how things move on different surfaces * notice that some forces need contact between		* explain that unsupported objects fall towards the Earth because of the force of gravity acting between	

		* Talk about what they see, using a wide vocabulary (UTW)	* Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)			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 * describe magnets as having two poles * predict whether two magnets will attract or repel each other, depending on which poles are facing		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	
Prior Learning		Repeat actions that have an effect. (Birth to three)	Explore how things work. (Nursery) • Explore and talk about different forces they can feel. (Nursery) • Talk about the differences between materials and changes they notice. (Nursery)			Year 2 * explored different forces before, during the 'Uses of everyday materials' topic in Year 2 whilst investigating how some materials can be changed by bending, squashing, twisting and stretching. * be able to link those movements to simple pushes and pulls. Magnets are not studied at all in Key Stage 1. However, children may have come across magnets in everyday life and seen that they 'stick together' (attract) in		Year 3 * explored simple pushes and pulls as an introduction to forces. * explored how the texture of an object, or the surface it is on, can act the way the object moves. * further investigated pushes and pulls by experimenting with di-fferent magnets and exploring how they can pull (attract) and push (repel) too, but at a distance with no contact.	

						objects such as bags, toys or kitchen appliances			
	Knowledge	**Slimy Things Unit** * experience a range of liquids and semi-liquids, helping them to understand differences in consistency and how they behave, e.g. how runny (viscous) they are. * compare similarities and differences **Pirates Unit** • Floating and sinking, through problem solving to make pirate boats and rafts. • Sorting and identifying materials, through sifting and using magnets. • Sorting and identifying animals, particularly from habitats such as the sea and rainforest. • Supporting the development of children's understanding of different foods and changes in materials during cooking, by designing and cooking pirate food	* learn the names and properties of different materials. * develop the ability to classify according to their own and given criteria (e.g. warm, smooth, rough and stretchy). * Understanding of cause and effect is developed through exploring forces, where children change the shape of the socks by stretching them. * carry out simple comparative tests			* describe pushes and pulls as a type of force and give examples. * explain how different objects move using these forces. *explain that there are forces that require contact and forces that do not. * describe magnetic force as non-contact and that it acts at a distance * identify a range of magnetic and non-magnetic materials that they have identified from their explorations. * describe magnets as having two poles - North and South. * explain how opposite poles attract and the same poles repel		* describe the force of gravity and talk about the work of Sir Isaac Newton. *understand that friction is a force that acts between two surfaces or objects that are moving. * identify scenarios in which friction is a useful force and scenarios where friction is an unhelpful force. * understand that air resistance is a type of frictional force that slows an object down when travelling through air. * explain that water resistance is a type of frictional force. * describe how mechanisms use a smaller force to have a greater effect. * identify gears, levers and pulleys and give everyday examples for each.	

	Skills	Making Butter (TAPS) Theme: Changes in our world Theme: How can we make changes happen? WS Focus: Recording and communicating * Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" (C&L) * compare similarities and differences	* classify according to their own and given criteria * carry out simple comparative tests			Cars Ramps (TAPS) WS Focus - Gather, record and present data (in a table or bar chart) to help in answering question. (discuss how the object moved on diff-erent surfaces. – set up simple practical enquires * explain how they planned a fair test - I can plan and conduct a fair test to compare how objects move on different surfaces.) * describe how not all magnets have the same strength. WS Focus - I can record my findings using simple scientific vocabulary. I can use my results to draw simple conclusions.		Aquadynamic (TAPS) WS Focus - Explain degree of trust in results. * plan an investigation to answer the question – whose shoe has the greatest friction? WS Focus - * plan different types of scientific enquiries to answer questions, including recognising and controlling variables. * take measurements using a range of scientific equipment. * plan a fair test to answer the question; do objects fall at the same rate? WS Focus - * plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. * take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. * record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and graphs. * plan an investigation to determine who can make the best plane. WS Focus -	

								* Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary * Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	
Future Learning		**<u>Slimy Things</u>** In this unit, children begin to develop their understanding of different materials, cause and effect and their ability to observe similarities and differences. This provides a foundation for further learning in Key Stage 1, where children identify and compare materials and find out how materials can be changed by physical forces **<u>Pirates</u>** An important element of science in the Early Years is supporting children to talk about what they are doing and thinking. Laying good foundations will require practitioners to consciously model language such as, idea, test, time, record, measure, change, question, happen, which are key words used in Key Stages 1 and 2.	Children progress sorting using one criterion (e.g. colour/size/pattern) to several (e.g. colour, stretchiness and size). Then, in Key Stage 1, children are able to group according to names of materials and their properties, e.g. opaque, transparent and flexible. In Key Stage 2 children classify according to specific properties, such as thermal or electrical conductivity.			Children will study forces again in Year 5. * build upon their knowledge of simple pushes and pulls from Y3 by exploring more difficult concepts such as gravity, friction and air resistance. Magnets are briefly looked at again in Y5 'Properties and changes of materials', where they compare and group materials based on their response to magnets.		KS3 * extend their understanding of forces by describing motion (speed = distance ÷ time) and use time and distance graphs. * use force arrows in diagrams, adding forces in one dimension. * explore balanced and unbalanced force; opposing forces and equilibrium e.g. weight held by stretched spring or supported on a compressed surface. * extend their understanding of the difference between weight and mass and how gravity affects weight.	

Vocabulary		**Slimy Things** Change, Different, Dry, Expand, Hard, Liquid, Material, Mix, Ooze, Pour, Runny, Same, Similar, Slimy, Slippery, Soak, Soft, Squash, Thick, Water, Wet. **Pirates** Float, sink, sort, identify, magnet, sifting, habitats.	Astronaut, Earth, Moon, Names of planets in our Solar System, Orbit, Planet, Rocket, Solar System, Space, Star, Sun.			Forces, Friction, Contact, Magnet, Magnetic Poles, Magnetic field, Attract, Repulsion (repel)		Forces, Gravity, Weight, Mass, Friction, Air resistance, Water resistance, Buoyancy, Streamlined, Mechanism, Earth's gravitational pull	
		Some children may think: • big objects sink • heavy objects sink • an object such as an ice cube which is partially submerged is floating and sinking at the same time	Some children may think: • all light objects float and all heavy objects sink • objects made of the same material will always float or sink			Children may think that all metals are magnetic. This is false, as only iron, nickel and cobalt are magnetic. Children might think that all silver-coloured objects are attracted to a magnet. This is not true, as aluminium is silver in colour but is not attracted to a magnet. Children might think that bigger magnets are stronger than smaller magnets. This is not true, as the size of the magnet is not directly related to its strength.		The word 'force' can have different meanings in the English language e.g. may the force be with you… a forceful character. Many common uses of the word 'force' may give children the impression that it is intrinsic to human activity rather than a concept in physical science. Children may also think that an object needs a constant force to keep it moving; this is true but only because of friction. Children may think that forces only act in one direction.	
Units			**Light Magic** **(Light)**			**Light**			**Light**

NC end of Key Stage attainment targets		Explore the natural world around them. (UTW) Describe what they see, hear and feel while they are outside (UTW) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)			* 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
Prior Learning		• Explore how things work. (Nursery) • Talk about the differences in materials and changes they notice. (Nursery)			KS1 Children do not study light as a separate topic. However, as part of seasonal changes topic, children will have observed and talked about changes in the weather and the seasons and will have talked about the dangers of looking at the Sun directly. Year 2 - children have observed the effect of light on plant growth			**Year 3** * recognise that they need light in order to see things and that dark is the absence of light. * learnt to identify light sources; explore what happens when light reflects off mirrors or other reflective materials and know that the Sun can be damaging to our eyes. * investigated patterns in the way the size of shadows changes.

Biology	Knowledge		* learn that dark is the absence of light. * experience the effects of light only travelling in straight lines and be encouraged to talk about this. * begin to learn that light originates from a light source and that shiny surfaces work by reflecting, rather than by creating, light. * opportunities to experiment with colour.			* identify natural and man-made light sources; explain what darkness is and sort light sources according to criteria * identify reflective materials and understand how light is reflected.. * explain why the Sun can be harmful to our eyes if we look at it directly. * identify ways in which we can protect ourselves from sun damage. * explain how mirrors reflect light. Through their explorations, they will have an understanding of how light behaves when it is reflected.			* identify light sources and draw an annotated, scientific diagram to explain how light travels in straight lines from a light source. * explain how light, from a light source is reflected from an object and enters the eye. * name/ label parts of the eye (and talk about their functions). * explain why objectsin water appear to be bent. * explain the difference between reflection and refraction. * explain how mirrors reflect light. Through their explorations, they will understand how light behaves when it is reflected. * draw a diagram to show the path of reflected light.
	Skills					Making shadows (TAPS) WS Focus – Gather and record data to answer questions. * talk about the relationship between the height/ angle of the light source and the length of the shadow. WS Focus – * find patterns * Make systematic and careful observations and where appropriate, taking accurate measurements			Investigating shadows (TAPS) WS Focus - Take accurate measurements and record data on a graph * predict which materials make good reflectors and discuss the properties of these materials. WS Focus predict which materials make good reflectors. * plan a fair investigation to answer the question - how do shadows change

						using standard units, using a range of equipment * Using results to make simple conclusions.			during the day? WS Focus - draw a conclusion using data collected
Future Learning			Although children in KS1 do not study light, they will have experience of exploring a variety of materials and thinking about how their properties suit them for different purposes, such as transparent glass for windows and reflective fabric on clothing to wear at night. In KS2 they will need to know that light is needed in order to see, that light travels in straight lines and is reflected off shiny surfaces. They will also learn that shadows are formed when a solid object blocks light from a light source			Year 6 * consolidate previous learning by exploring the way that light behaves, including light sources, reflection and shadows. * make predictions and investigate the relationship between light sources, objects and shadows and understand how the eye works.			**KS3** * human sight is based on the ability to see red, blue and green light and that the colour of an object depends on the colours of light that it absorbs and scatters. * Light travels at 300 million metres per second in a vacuum and different colours of light have different frequencies. * The path that light takes can be bent (refracted) and that transparent materials can be shaped into lenses and prisms to alter the path of light by refraction (convex and concave lens).
Vocabulary			Dark, Glow, Light, Light source, Reflective, Shade, Shadow, Shine, Shiny, Sun, Torch.			Dark, Light, Light source, Reflection, Reflect, Reflective, Ray, Pupil, Retina, Opaque, Shadow, Translucent, Transparent			Light, Light source, Reflection, Incident ray, Reflected ray, Shadow, Translucent, Transparent, Opaque, Refraction
Misconception			Some children may think: • shadows are only caused by the Sun • all shadows are black.			Children may think that the Moon and other shiny/reflective objects are light sources as they appear to shine however, they are not. The Moon reflects light from the Sun			Children may think that the moon and other shiny/ reflective objects are light sources as they appear to shine however, they are not. The Moon reflects light from the Sun (it does

						(it does not give o- its own light) and cat's eyes, mirrors, reflective material on clothing also only reflect light (they are not light sources). Children may think that you see things because light comes out of your eyes. Misconceptions about shadows often centre around the position of the object, light source and shadow. The shadow always forms on the opposite side of the object from the light source; the shadow is a similar shape as the object and the base of the shadow always touches the object.			not give off its own light) and cat's eyes, mirrors, reflective material on clothing also only reflect light (they are not light sources). Children may think that you see things because light comes out of your eyes. Misconceptions about shadows often centre around the position of the object, light source and shadow. The shadow always forms on the opposite side of the object from the light source; the shadow is a similar shape as the object and the base of the shadow always touches the object.
							Electricity		**Electricity**
NC end of Key Stage attainment targets							* 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		* 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.

							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		
Prior Learning							Electricity is not taught as a discrete topic in KS1 However some children may have looked at which items use electricity in other curriculum areas such as Toys in history.		Year 4 * sort common electrical appliances into battery and mains powered; construct simple series circuits containing a variety of components. * identify whether or not a bulb will light in a simple series circuit and put forward ideas to fix incomplete circuits. * conducted investigations to discover which materials make good insulators * designed and tested switches.
	Knowledge						* recognise and group which electrical appliances run off mains electric and which are battery powered. * understand how mains electricity is transported from power stations and know why batteries run out of charge. * construct a variety of simple circuits using different components. * predict which circuits will work and which won't. * provide an explanation as to why a circuit will or won't work and make		* construct and draw a variety of circuits using scientific symbols to represent each component. * look at a drawing of a circuit and work out if it will work or not. * plan and conduct a fair test investigation to determine variations in how components function in a circuit. * write a clear conclusion using the data collected in their investigation * produced a leaflet to explain renewable and non-renewable energy

							suggestions how a circuit canbe fixed. * explain how switches affect a circuit. * design and make a switch to control the flow of electricity in a series circuit and light a bulb.		
	Skills						Does it conduct Electricity? (TAPS) WS Focus – Report on findings from enquires, including oral and written explanations, displays or presentations of results and conclusions. Predict if a circuit will light up – WS Focus asking relevant questions and using different types of scientific enquiries to answer them		Bulb brightness (TAPS) WS Focus - Plan a scientific enquiry to answer a question, recognising and controlling variables.
Future Learning							In Y6 * learn to 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.		**KS3** * study electricity in more depth, including; current and static electricity, parallel and series circuits. * learn how current is measured and work out potential differences; calculate differences in resistance between conducting and insulating components (quantitative).

Vocabulary							Current, Electricity, Appliances, Circuit, Conductor, Insulator, Component		Symbol, Circuit, Cell/battery, Voltage, Component, Resistance
Misconceptions							Children may think that electricity is only bought from a shop. Although batteries are, children need to be taught that mains electricity comes to our homes in cables from a PowerStation. Children may think that the bigger the battery, the more electricity is contained in it and will make a bulb shine brighter. Although it is true to say a battery's voltage does affect the brightness of a bulb, the size of the battery isn't always related to the voltage e.g. a 1.5V battery can come in 4 different sizes.		Children may think that the bigger the battery, the more electricity is contained in it and will make a bulb shine brighter. Although it is true to say a battery's voltage does affect the brightness of a bulb, the size of the battery isn't always related to the voltage e.g. a 1.5V battery can come in 4 different sizes. When adding several components to a circuit, children may think that the bulb is the brightest or the first buzzer makes the most noise. This misconception often arises from the idea that electricity comes out of the battery so the first is the brightest and the last is the dimmest. In fact, all the bulbs would be the same level of brightness (the electricity is 'shared' between the components).
		Sound Collectors **(Outdoor Area)**					**Sound**		
NC end of Key Stage attainment targets		* Talk about what they see, using a wide vocabulary (UTW)	Explore the natural world around them. (UTW) Describe what they see, hear and feel while they are outside (UTW)				* identify how sounds are made, associating some of them with something vibrating * recognise that vibrations from sounds		

			Recognise some environments that are different to the one which they live (UTW) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L) * Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)				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.		
Prior Learning		Explore how things work.				**KS1** – sound is not taught as a separate topic in KS1 science however children may have someknowledge of pitch and volume through their music lessons. **KS2** – children continue to explore sound through music (in their music lessons) and in the topicon light, children may compare how fast sound travels compared to light.		
	Knowledge	* we hear sounds with our ears. * learn how they can manipulate sound to make it louder and quieter, higher and lower.				***** explain how sound is made and identify what		

		* experience activities to support their developing ideas that different materials make different sounds. *begin to recognise that when a sound is made something vibrates				is vibrating when sounds are made. ***** explain how vibrations from sounds travel through either solids, liquids or gases to the ear. * use their knowledge of particle structure to explain why sound travels more quickly through solids when compared to gases. * describe the parts and functions of the outer, middle and inner ear. * used a variety of instruments to explore how they can alter the volume. * used a data logger to record volume in decibels and be able to describe the relationship between the volume of a sound and the strength of the vibration. (string telephone from TAPS) * plan and conduct an investigation in response to the question – which material is the best at muffling sound. * communicate their findings.		
	Skills					Investigating Pitch (TAPS) WS Focus – Ask relevant questions and use different types of scientific enquiries to answer them		

							Which material is best at muffling sound? WS Focus * Whilst working scientifically, setting up simple, practical enquiries and comparative and fair tests. • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.		
		This unit provides the foundation for the development of concepts in Key Stage 2 relating to how sound is made; pitch and volume; that sounds travel through a medium to the ear and that sounds get fainter the further they are from the sound source					**KS3 –** children will extend their understanding of sound by exploring frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound. They will build upon knowledge of how sound travels through a		

						medium and explore the auditory range of humans and animals.		
Vocabulary		Collect, Drums, Ears, Hear, Hearing, High, Loud, Loudest, Low, Noise, Pattern, Quiet, Quietest, Senses, Sound				Vibrates, Volume, Amplitude, Pitch, Soundproof, Absorb sound, Sound waves		
		Some children may think: • sounds do not travel through solids and liquids				Children will often confuse volume with pitch. Hitting an object harder gives a higher pitch – this is not true; hitting an object harder will produce a louder sound as the vibrations created are stronger but won't affect the pitch. Sound moves faster in air than in solids (air is "thinner" and forms less of a barrier) - this is not true. Sound moves faster through solids as the particles are closer to one other another. As sound waves move, the air moves along with them. This is not true. The vibration is passed from air particle to the next air particle		
			Zarg's World **(Earth and Space)**				**Earth and Space**	
NC end of Key Stage attainment targets			Explore the natural world around them. (UTW) * Learn new vocabulary. (C&L) * Ask questions to find out more and to check what has been said to them. (C&L)				* 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	

			* Articulate their ideas and thoughts in well-formed sentences. (C&L) * Describe events in some detail. (C&L) * Use new vocabulary in different contexts. (C&L) * Make comments about what they have heard and ask questions to clarify their understanding. (C&L ELG)					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.	
Prior Learning			Explore and respond to different natural phenomena in their setting and on trips. (Birth to three)					KS1 – seasonal change * observed changes across the seasons and observed/described weather changes. * learnt that the Sun is a light source. Earth and Space is not taught at KS1 as a discrete topic. Year 3 * learnt about the Sun as a light source (in the Light topic) * observed that shadows are formed when an opaque object blocks out light and that the Sun's position in the sky appears to change through the day.	
	Knowledge		* observe carefully, using all of their senses. * understand that there are many other planets in our own Solar System and beyond. *understand that there are some things that scientists currently do not know					* name the planets in the solar system based on their distance from the Sun. * understand that the Sun is a star (not a planet). * know some facts about a chosen planet. * describe the Earth as a spherical body.	

								* understand how it was discovered that the Earth was round and not flat by the Greek Philosopher; Aristotle. * describe the movement of the Earth, and other planets relative to the Sun. * understand that a year is the amount of time it takes for a planet to orbit the Sun once, and it is different for each planet. * complete a maths activity that links to the time taken for each planet to orbit the sun. * describe the movement of the Moon in relation to the Earth. * know that the Moon is the largest object that orbits the Earth and that we only see one side of the Moon from Earth. * explain why there is day and night on Earth. * plan a fair investigation to answer the question – What happens to the Sun during the day? * make predictions and draw conclusions using scientific knowledge. * explain why the Moon appears to change shape. * describe the movement of the Moon relative to Earth and name some of the phases of the Moon.	

	Skills		* observe carefully, using all of their senses.						Craters (TAPS) WS Focus – Gather and record data using tables and graphs Solar System Research (TAPS) Incorporate an element of Research using TAPS activity as guidance. WS Focus - Report and present findings from enquiries using appropriate scientific language to answer their questions about space? Why is there day and night on Earth? WS Focus planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • identifying scientific evidence that has been used to support or refute ideas or arguments	

			In Key Stage 1, children will find out about the seasons. In Key Stage 2 they will learn that the Sun is the star at the centre of our Solar System and will find out about the other planets that share our Solar System and about our own Moon.					KS3 * extend their knowledge of gravity as a force (learning formulae) and that gravity is different on other planets and stars. * consolidate knowledge that the Sun is a star, and that there are other stars in our galaxy and other galaxies. * extend their knowledge of seasons and the Earth's tilt, day length at different times of year, in different hemispheres and learn that a light year is a unit of astronomical distance.	
Vocabulary			Astronaut, Earth, Moon, Names of planets in our Solar System, Orbit, Planet, Rocket, Solar System, Space, Star, Sun.					Sun, Star, Moon, Planet, Spherical bodies, Solar, Orbit, Axis, Rotating, Gravitational	
Misconceptions			Some children may think: • the Earth is flat • the Moon and Sun are discs • stars are a pointed 'star' shape • the Moon appears only at night • at night, the Sun is turned off • at night, the Sun goes behind the clouds.					When considering day and night, some children may think that the Sun disappears or goes behind a cloud. This is not true; day and night occur as the Earth is rotating on its axis. Because the Sun appears to move across the sky, it can be difficult for the children to comprehend that it is the Earth moving NOT the Sun. Another common misconception is that the Moon actually changes shape (as this is what they observe from Earth) and	

								that there is no gravity on the Moon. Some children may also think that the Moon 'disappears' in the daytime however it is still in the sky but the sunlight is too bright (much of the time) to see it.	