



	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Ongoing
FS1	Science – how are rainbows made?	Science – nocturnal and diurnal animals		Science/DT – where does our food come from?	Science – minibeast classification and habitats	Science – floating and sinking -changes of state – water -marine animals	
FS2	Developing an understanding of growth and change			Choose to independently make observations of the natural world through comments / questioning, drawings and taking photographs Knows that environments vary	Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments		

					Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter		
Year 1		Animals including humans	Seasonal changes looking specifically the transition from Summer- Autumn- Winter (focus on vocabulary)	Plants	Materials	Time to consolidate learning with 'Big Questions'	Seasonal Changes Working scientifically linked to key questions.
Year 2	Animals including humans	Materials	Plants	Living things and their habitats	Introduction to forces.	Time to consolidate learning with 'Big Questions'	Seasonal Changes Working scientifically linked to key questions.
Year 3	Animals including humans	Light	Plants	Forces	Materials (Rocks) - Link with Castleton	Time to consolidate learning with 'Big Questions'	Working scientifically linked to key questions.
Year 4	Animals including humans	Materials (States of matter) Linked to Geography (water cycle)	Recap every day materials Sound	Living things and their habitats	Plants (objective moved from Y3)	Electricity	Working scientifically linked to key questions.
Year 5	Animals including humans	Forces and magnets	Living things and their habitats	Plants – these are the objectives from Living Things	Materials (properties and changes of materials)	Recap forces and magnets	Working scientifically linked to key questions.

				but broken down into plants separately.		Space – link to seasonal changes	
Year 6	Animals including humans	Living things and their habitats	Living things and their habitats – focus on plants	Light	Evolution and inheritance	Electricity	Working scientifically linked to key questions- plans and animals around the school grounds.

Biology Chemistry Physics

Bold - moved from a different year group within the same key stage.



Science - Animals Including Humans EYFS, KS1 and KS2

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants. * 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. * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>
National Curriculum	<p>Pupils Should be taught to:</p> <p>Year 1</p> <ul style="list-style-type: none">*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 <p>Year 2</p> <ul style="list-style-type: none">*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 <p>Year 3</p> <ul style="list-style-type: none">*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 <p>Year 4</p> <ul style="list-style-type: none">*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 <p>Year 5</p> <ul style="list-style-type: none">*describe the changes as humans develop to old age <p>Year 6</p> <ul style="list-style-type: none">*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

	Animals including humans	Skills	Key questions
<p>EYFS Understanding of the world</p> <p><i>Personal, Social and Emotional Development</i></p> <p><i>Creep, crawl and wriggle</i> <i>Marvellous me</i> <i>Ready, steady, grow</i> <i>Long ago</i></p>	<p>Know which parts of the body are associated with each sense.</p> <p>To know eyes are to see To know ears are to hear loud, quiet, volume To know the skin gives you the sense of touch warm, cold, smooth, rough To know the tongue gives the sense of taste. sour, sweet, To know the nose is used for the sense of smell.</p> <p>Know basic parts of the human body.</p> <p>To name the following body parts on themselves: head, eye, nose, teeth, ear, mouth, shoulder, elbow, hand, fingers, leg, knee, foot, toes</p> <p>To know the stages of the human life stages: baby, toddler, child, teenager, adult.</p> <p>To know the stages of the life cycle of a butterfly</p> <ul style="list-style-type: none"> - Egg - Caterpillar - Cocoon/ chrysalis - Butterfly <p>To know a caterpillar turns into a butterfly- what grows into what?</p> <p>Possible life cycle of a frog?</p> <p>To know what animals can be found in our local environment: caterpillar, butterfly, worms, spiders, frogs, lady birds</p> <p>To know how to keep your mouth and teeth healthy by:</p> <ul style="list-style-type: none"> - Brushing your teeth twice a day - Not eating too many sugary foods (including drinks) - Visiting the dentist 		

<p>1</p>	<p>Know and name a variety of common animals including fish (goldfish, tuna, shark) amphibians (frog, toad, newt) reptiles (snake, tortoise, lizard, alligator) birds (robin, flamingo, chicken, penguin) and mammals (human, mouse, dog, cow).</p> <p>Know and name a variety of common animals that are carnivore, herbivore and omnivore.</p> <p>To know a carnivore eats mostly other animals (meat) e.g snake, shark, lion, bat To know a herbivore eats only plants e.g cow, rabbit, horse, tortoise, To know an omnivore eats both animals and plants e.g goldfish, human, robin, bear</p> <p>Know and name the structure of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p><u>Fish</u> They breathe under water. They have scaly skin. They have fins to help them swim They breathe through gills.</p> <p><u>Amphibians</u> Live in the water as babies and on land as they grow older. They have smooth, slimy skin.</p> <p><u>Reptiles</u> Breathe air. They have scales on their skin.</p> <p><u>Birds</u> a beak two legs feathers wings.</p> <p><u>Mammals</u> breathe air grow hair or fur feed on their mother's milk as a baby</p>	<p>Comparative tests Is our sense of smell better when we cannot see?</p> <p>Identify & Classify How can we organise all the zoo animals? What are the names for all the parts of our bodies?</p> <p>Observation over time How does my height change over the year?</p> <p>Pattern Seeking Do you get better at smelling as you get older?</p> <p>Research Do all animals have the same senses as humans?</p>	<p>What do animals eat? Do all animals eat the same food? Which of our senses is the most accurate at identifying food? Do all animals hunt? Why are animals different colours and patterns?</p>
<p>2</p>	<p>Know that animals, including humans, have offspring that grow into adults. To know some animals give birth to live young To know some animals lay eggs which the young hatch from To know that young then develop into adults. To know some offspring look like their adult when they are born. To know some offspring do not look like their adult when they are born. To know the stages of the human life cycle: baby, toddler, child, teenager, adult. To know the stages of a frog's life cycle: frogspawn, tadpole, froglet adult frog.</p>	<p>Comparative tests Do amphibians have more in common with reptiles or fish? Do bananas make us run faster?</p> <p>Identify & Classify Which offspring belongs to which animal? How would you group things to show which are living, dead, or have never been alive?</p>	<p>How long do should my pets live for? Do all animals grow and live the same way? Do bigger animals live longer? Why are we all different heights?</p>

	<p>Know the basic needs of animals, including humans (water, food, air). To know that animals need air, water and food for survival. To know that diet is the food and water that an animal needs. To know that animals can eat a range of food types (protein, fruit and vegetables, carbohydrates and dairy) To know exercise is the physical activity to keep your body fit. To know exercise keeps our body and mind healthy. To know that germs are tiny living things that can cause disease To know that hygiene is how we keep the world around us clean. To know that nutrition is food needed to live.</p>	<p>Observation over time How does a tadpole change over time? How much food and drink do I have over a week? Pattern Seeking Which age group of children wash their hands the most in a day? Research What food do you need in a healthy diet and why? What do you need to do to look after a pet dog/cat/lizard and keep it healthy?</p>	<p>How and why do we grow and change?</p>
3	<p>Know that animals, including humans: need the right type and amount of nutrition cannot make their own food get nutrition from what they eat. To know living things need food to grow and to be strong and healthy. To know plants can make their own food, but animals cannot. To know that to stay healthy, humans need to exercise, eat a healthy diet and be hygienic. To know that animals, including humans, need food, water and air to stay alive. To know that food contains a variety of nutrients which all have a different role:</p> <ul style="list-style-type: none"> - Carbohydrates- provide energy - Protein- helps growth and repair - Fibre- helps you to digest the food that you have eaten - Fats- provide energy - Vitamins- keep you healthy - Minerals- keep you healthy - Water- moves nutrients around your body and helps to get rid of waste <p>Know that humans and some other animals have skeletons and muscles for support, protection, and movement.</p> <p>To know that the skeleton protects organs on the inside of the body, allows movement and supports the body to keep it upright. To know the skeleton is made of bones which grow as the animal grows. To know that bones come in all shapes and sizes: the largest being in the leg and the smallest in the ear. To know the names and placement of the following bones in the human body: skull, clavicle, scapula, ribcage, humerus, ulna, radius, pelvis, femur, tibia, fibula, patella. To know that calcium helps bones grow properly. To know that muscles are attached to the bones via tendons. To know that some muscles work without thinking about them (the heart) To know muscles often work in pairs. To know muscles contract (gets shorter) to move the bones and relax (returns to normal length) to put them back where they were.</p>	<p>Comparative tests How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh? How does the skull circumference of a girl compare with that of a boy? Identify & Classify How do the skeletons of different animals compare? Observation over time How does our skeleton change over time? (from birth to death) Pattern Seeking Do male humans have larger skulls than female humans? Research Why do different types of vitamins keep us healthy and which foods can we find them in?</p>	<p>Why do we need a skeleton? What types of skeleton are there? Are all skeletons the same? Can something survive without a skeleton? What happens if we break a bone? How do we move? Are bones that are bigger, stronger? Why do we need joints? Why do muscles get tired? Can we 'break' muscles?</p>

	<p>To know that to lower the arm, the bicep relaxes as the triceps contracts and to raise the arm the opposite happens.</p> <p>To know a joint is where bones meet to allow the bodies to move.</p> <p>To know the name and the placement of the following joints: elbow, hip, knee, ankle.</p> <p>To know that the amount of movement in a joint can vary: very flexible- hip and shoulder, less flexible- knee and elbow, little flexibility – spine and neck</p> <p>To know that protein help your muscles grow properly.</p> <p>To know that an endoskeleton is found inside the animal's body (Mammals, reptiles, birds, fish and amphibians)</p> <p>To know that an exoskeleton is found outside the animal's body (Grasshoppers, cockroaches, ants, bees, scorpions, lobsters, shrimp, snails and crabs)</p>		
4	<p>Identify the different types of teeth in humans and their simple functions</p> <p>To know that incisors bite and cut.</p> <p>To know canines tear and rip.</p> <p>To know molars grind</p> <p>To know premolars hold and crush</p> <p>To know that the types of teeth vary depending on the animal's diet</p> <p>To know that to limit tooth decay you should</p> <ul style="list-style-type: none"> - limit sugary food and drink; - brush teeth at least twice daily using a - fluoride toothpaste; - visit your dentist regularly <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>To know food enters the mouth and digestion begins.</p> <p>To know that teeth tear, cut and grind the food.</p> <p>To know saliva moistens food to make it easier to swallow.</p> <p>To know the oesophagus is a muscular tube which moves food from the mouth to the stomach.</p> <p>To know the stomach is an organ in the digestive system where food is broken down with stomach acid. The stomach muscles contract and churn the food around.</p> <p>To know the small intestine is where nutrients are absorbed into the body.</p> <p>To know the large intestine is where water is absorbed from the remaining food waste.</p> <p>To know faeces are formed in the large intestine.</p> <p>To know the rectum is where faeces are stored before leaving the body through the anus.</p> <p>To know the blood carries nutrients around the body.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>Comparative tests In our class, are omnivores taller than vegetarians?</p> <p>Identify & Classify What are the names for all the organs involved in the digestive system? How can we organise teeth into groups?</p> <p>Observation over time How does an eggshell change when it is left in cola?</p> <p>Pattern Seeking Are foods that are high in energy always high in sugar?</p> <p>Research How do dentists fix broken teeth?</p>	<p>What different types of food are there? Why do we need a variety of different foods? Do all organisms eat the same things? Why do some people need different diets? (weightlifter vs marathon runner) Why are teeth important? What happens to our food? What is our digestive system?</p>

	<p>To know a food chain is a sequence which shows the links between living things and what they eat.</p> <p>To know that arrows are used in a food chain to show the transfer of energy.</p> <p>To know a food chain begins with a producer.</p> <p>To know what eats the producer can be known as a primary consumer (also prey).</p> <p>To know it a secondary consumer will eat the primary consumer (then tertiary and quaternary if needed)</p> <p>To know what a carnivore, herbivore and omnivore is (recap learning)</p> <p>To know that a producer is an organism, such as a plant, that produces its own food.</p> <p>To know a predator is an animal that hunts and eats other animals.</p> <p>To know prey is an animal that gets hunted and eaten by another animal.</p>		
5	<p>Describe the changes as humans develop to old age</p> <p>To know that different animals develop at different rates.</p> <p>To know that puberty is something we all go through.</p> <p>To know puberty is a process which prepares bodies for being adults, and reproduction.</p> <p>To know that to reproduce means to produce young.</p> <p>To know that asexual reproduction is where one parent produces new life.</p> <p>To know that sexual reproduction is where two parents – male and female- are required to produce new life.</p> <p>To know hormones control changes, which can be physical and/or emotional.</p> <p>To know that fertilisation is when male and female sex cells fuse together.</p> <p>To know that prenatal is the stage where the cells develop and grow into a foetus inside the mother's uterus.</p> <p>To know that infancy is when children learn to walk/talk and it is a period of rapid growth and development.</p> <p>To know that childhood is when children learn new skills and become more independent.</p> <p>To know adolescence is when the body begins to change. This is when puberty usually begins.</p> <p>To know early adulthood is when the human body is at its peak.</p> <p>To know middle adulthood is when the ability to reproduce decreases and hair may turn grey.</p> <p>To know late adulthood is when health and fitness starts to decline.</p>	<p>Comparative tests How does age affect a human's reaction time? Who grows the fastest, girls or boys?</p> <p>Identify & Classify Can you identify all the stages in the human life cycle?</p> <p>Observation over time How do different animal embryos change?</p> <p>Pattern Seeking Is there a relationship between a mammal's size and its gestation period?</p> <p>Research Why do people get grey/white hair when they get older?</p>	<p>What do humans look like? Do all animal embryos look the same? How do humans change? Why do humans change? What causes puberty? What changes do we go through during puberty? Are there any patterns between vertebrate animals and their gestation periods?</p>

	<p>Puberty: To know that during puberty, both boys and girls will:</p> <ul style="list-style-type: none"> - Grow taller - Produce more sweat in sweat glands - All body parts will grow - Pubic hair will grow - Hair will grow on arms and legs and armpits - Skin can become more oilier <p>Girls:</p> <ul style="list-style-type: none"> - Menstruation begins – this is when the female body discharges the lining of the uterus and it happens approximately once a month. - Breasts start to grow and develop <p>Boys:</p> <ul style="list-style-type: none"> - Scrotum, testes and penis develop - Facial hair may grow - Larynx grows 		
6	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>To know that mammals have hearts with four chambers. To know the circulatory system is made up of: heart, blood, blood vessels and To know that blood from the body to the heart is deoxygenated. To know that blood from the lungs is oxygenated. To know the heart pumps blood to the lungs to get oxygen. This is then pumped around the body. To know a blood vessel is a tube-like structures that carry blood through the tissues and organs. To know capillaries are the smallest blood vessel. This is where the exchange of water, nutrients and carbon dioxide takes place. To know arteries carry oxygenated blood away from the heart. To know veins carry deoxygenated blood towards the heart. To know that blood carries nutrients around the body. To know that blood is made up of:</p> <ul style="list-style-type: none"> - Plasma that is the liquid which contains all of the other components of blood. It is mostly composed of water and is pale yellow in colour. Plasma absorbs the waste products from cells, especially carbon dioxide. - Red blood cells which carry oxygen that they have absorbed from the lungs and carry it around the body. - Platelets which are broken pieces of cells which prevent or stop bleeding by clotting. - White blood cells which are part of the immune system. They attack and destroy any foreign material (infections) which could threaten the body (bacterial and viruses) 	<p>Comparative tests How does the length of time we exercise for affect our heart rate? Can exercising regularly affect your lung capacity? Which type of exercise has the greatest effect on our heart rate? Do all animals have the same circulatory system as humans?</p> <p>Identify & Classify Which organs of the body make up the circulation system, and where are they found?</p> <p>Observation over time How does my heart rate change over the day? How much exercise do I do in a week?</p> <p>Pattern Seeking Is there a pattern between what we eat for breakfast and how fast we can run?</p> <p>Research How have our ideas about disease and medicine changed over time?</p>	<p>Why do we need oxygen? How do we breathe? Do fish and plants breathe? Do all living things need oxygen? How does the size of a person's lungs affect their lung capacity? Are there ways to increase/decrease our lung capacity? Is lung capacity fixed? Why do we have blood? How does our heart work? How does size of muscle affect our pulse rate? How does exercise effect our pulse rate? How might the circulatory system of an elephant, a</p>

Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function

To know that a **drug** is a **substance** containing **natural** or **man-made chemicals** that has an effect on your body when it enters the system.

To know that alcohol is a **drug** produced when **fermenting** grains, fruit or vegetables.

To know that **drugs**, **smoking** and **alcohol** have a **negative** effect on your body.

To know that a healthy lifestyle includes eating the right types of nutrients in the right amounts.

To know regular **exercise** is important because it can:

- **strengthens muscles** including the heart muscle
- improves **circulation**
- increases the amount of **oxygen** around the body;
- releases brain **chemicals** which help you feel calm and relaxed;
- helps you **sleep** more easily;
- **strengthen** bones

Describe the ways in which nutrients and water are transported within animals, including humans

RECAP YEAR 4 DIGESTION – name the main parts of the digestive system and their functions.

Link to the blood.

To know the blood contains nutrients which travel around the body.

To know humans have a **double circulatory system** as the blood goes through the heart twice.

To know humans have a **closed circulatory system** as the blood is contained in vessels.

To know that fish have **gills** instead of lungs and that oxygen in water moves into their blood via their gills.

To know a fish has a three part circulatory system: heart -> gills (to pick up oxygen) -> rest of the body to drop off oxygen. **Single circulatory system.**

To know that insects don't have lungs or gills. They have tiny tubes that run into their bodies to collect oxygen.

To know insects have an **open circulatory system** where the blood moves freely around their organs.

hummingbird, or a polar bear differ?
Is the air you breathe out, the same as that you breathe in?

National Curriculum objectives – year group as outlined in the national curriculum

National Curriculum objectives- moved to a different year group within the key stage.

Additional knowledge – *Additional knowledge moved to a different year group.*

Knowledge/objectives taken from a different strand (living things and their habitats) – see that overview for knowledge and skills



Science - Electricity EYFS, KS1 and KS2

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants. * 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. * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>		
National Curriculum	<p>Pupils Should be taught to:</p> <p>Year 4</p> <ul style="list-style-type: none"> *identify common appliances that run on electricity *construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers *identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery *recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit *recognise some common conductors and insulators, and associate metals with being good conductors. <p>Year 6</p> <ul style="list-style-type: none"> *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. 		
	Electricity	Skills	Key questions
EYFS Understanding of the world			
1	<ul style="list-style-type: none"> -To know that appliances may need electricity to work. -To know that some appliances need to be plugged in to work and some run on a battery. -To know electricity can sometimes be dangerous. 		
2			
3			
4	<ul style="list-style-type: none"> • Know some common appliances that run on electricity. 	Comparative:	What would life be like without electricity?

- To know that electricity is a form of energy.
 - To know that electricity can be carried by wires
 - To know that electrical energy can be converted into other types of energy such as light, heat, movement or sound.
 - To know that sources of light and sound may need electricity to work.
 - To know that a battery is a store of energy.
 - To know that electricity is generated using energy from natural sources (also known as fuel sources) such as the sun, oil, water and wind.
- **Know the parts of a simple series circuit, including cells, wires, bulbs, switches and buzzers.**
 - To know a circuit is a loop which allows electrical current to flow through wires.
 - To know a circuit contains a battery (cell), wires and an appliance which requires electricity to work (bulb, motor or buzzer).
 - To know a circuit needs a power source such as a battery with wires connected to both positive (+) and negative (-) ends.
 - To know a battery is made from a collection of cells together.
- **Know whether or not a bulb will light in a simple series circuit (based on whether or not the lamp is part of a complete loop with a battery).**
 - To know that when objects are placed in a circuit they may or may not allow electricity to pass through.
 - To know a series circuit contains components attached to one another.
 - To know that objects made from materials (such as copper, iron and steel) which allow electricity to pass through a complete circuit are known as electrical conductors.
 - To know that objects made from materials (such as plastic, wood, glass and rubber) which do not allow electricity to pass through a complete circuit are known as electrical insulators.

Compare the thickness of a conducting material to see how this affects the brightness of the lamp.

Compare different metals to find which is the best conductor of electricity.

Identify and classify:

Group electrical devices together based on where electricity comes from.

Observation over time:

Observe how long different batteries light a torch for and compare which is the best battery.

Pattern seeking:

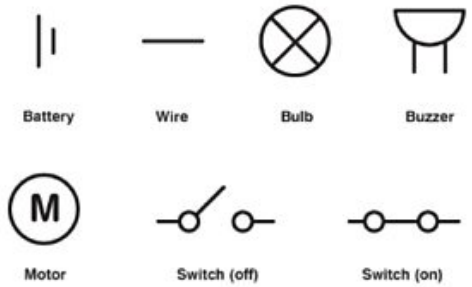
Look to see which rooms have the most electrical sockets in a house/school and discuss why they think this may be.

Research:

How has electricity changed the way we live?

How does a light bulb work?

- What sorts of things use/need electricity?
- What electricity do I use?
- In which ways can we 'get' electricity?
(mains/plugs/batteries/wireless)
- How do we make electricity?
- How do batteries work?
- How quickly can batteries run out? Does this make a difference depending on number of components?
- How does the number of batteries added to the circuit affect a device?
- What materials can carry electricity?
(conductors/insulators)

	<ul style="list-style-type: none"> • Know that a switch opens and closes a circuit (and this affects whether or not a lamp will light in a simple series circuit). <ul style="list-style-type: none"> - To know that a switch can break or reconnect a circuit - To know a switch controls the flow of the electrical current. - To know when a switch is off, the current cannot flow. - To know that an incomplete circuit is not the same as a switch when it is off. • Know the symbols for components used in a series circuit. <div style="text-align: center;">  <p>Battery Wire Bulb Buzzer</p> <p>Motor Switch (off) Switch (on)</p> </div> 		
5			
6	<ul style="list-style-type: none"> • Know that the brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit. <ul style="list-style-type: none"> - To know that power is a measure of how fast electrical energy is turned into another type of electrical energy, such as heat or light. - To know that by adding more electrical energy into a circuit, you can increase the brightness of a bulb. - To know the force (electro motive force), which makes electrons flow around a circuit, is measured in units called volts (V). • Know that there are variations in how components function, including the brightness of bulbs, the 	<p>Comparative: How does the voltage of the batteries in a circuit affect the brightness of the lamp? How does the voltage of the batteries in a circuit affect the volume of the buzzer? Which make of battery lasts the longest? Which type of fruit makes the best fruity battery?</p> <p>Identify and classify: How would you group electrical components and appliances based</p>	<p>Do all batteries push as hard as each other?</p> <ul style="list-style-type: none"> • What is electricity? • How does the voltage of a battery affect how much current is pushed? • How does the length of time I leave the current flowing for affect the brightness of the bulb? • How does number of bulbs affect the brightness of a bulb? • Are all types of wires as good as conducting electricity?

	<p>loudness of buzzers and the on/off position of switches.</p> <ul style="list-style-type: none"> - To know the length of wires in a circuit can affect how the components function. - To know that increasing the battery voltage does two things: it increases the energy and it also drives the charge around the circuit at a greater rate. - To know that by adding more components into a circuit increases the resistance in the circuit so slows down the flow of electricity. - To know the voltage of a power supply is a measure of the energy it gives to the charge moving around the circuit. - Watts is the measure of how quickly a component will transfer energy 	<p>on what electricity makes them do?</p> <p>Observe over time: How does brightness of bulb change as the battery runs out? How can we measure how quickly a battery is used up?</p> <p>Pattern seeking: Does the temperature of a light bulb go up the longer it is on?</p> <p>Research: How has our understanding of electricity changed over time?</p>	<ul style="list-style-type: none"> • Why are wires insulated in plastic? Does type of material make a difference? • Does length of wire make a difference? • Does the type of circuit affect how the components work/long the battery lasts? • What renewable ways can we generate electricity? • How does current affect heat? • What are the dangers of a short circuit?
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National Curriculum objectives – year group as outlined in the national curriculum

National Curriculum objectives- moved to a different year group within the key stage.

Additional knowledge – *Additional knowledge moved to a different year group.*



Science – Forces and Magnets EYFS, KS1 and KS2

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants. * 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. * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>		
National Curriculum	<p>Pupils Should be taught to:</p> <p>Year 3</p> <ul style="list-style-type: none"> * compare how things move on different surfaces * notice that some forces need contact between two objects, but magnetic forces can act at a distance * observe how magnets attract or repel each other and attract some materials and not others * compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials * describe magnets as having two poles * predict whether two magnets will attract or repel each other, depending on which poles are facing <p>Year 5</p> <ul style="list-style-type: none"> * explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object * identify the effects of air resistance, water resistance and friction, that act between moving surfaces * recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 		
	Knowledge	Skills	Key questions
EYFS Understanding of the world Nursery: vehicles	<p><i>To know that pushing and pulling can make things move faster or slower. (nursery)</i></p> <p><i>To know pushing and pulling can make things move. (nursery)</i></p> <p><i>To know a bigger push or pull has a bigger effect. (nursery)</i></p> <p><i>To know and identify when some objects float</i></p> <p><i>To know and identify when some objects sink</i></p>		

1			
2	<p>There is no set objective for KS1</p> <p>To know pushing and pulling can make things move or stop.</p> <p>To know a push is a force to move something away.</p> <p>To know a pull is a force to move something towards you.</p> <p>To know things can move in different ways.</p> <p>To know larger masses take bigger pushes and pulls to move or stop them.</p> <p>To know pushing and pulling can change the shape of things.</p> <p>To know bigger pushes and pulls have bigger effects</p> <p>To know that some objects float and some sink.</p>	<p>Comparative tests</p> <p>Identify & Classify Which materials will float and which will sink?</p> <p>Observation over time Would a paper boat float forever?</p> <p>Pattern Seeking How does changing the force change the speed of a toy car?</p> <p>Research Why do objects float or sink?</p>	<p>How can we move objects? How can we change the way an object moves? How does a material affect how fast a ball rolls down a slope? How does the length/steepness of a slope affect how far a ball/car/tin will roll off the end? What it a push or a pull that makes it go further? How does how hard/long I press a pop-up toy for affect how high it jumps? On what surface do objects roll the best on? Is it the same for sliding? Which material would be best for a teddy bungee cord? How does length of an elastic band affect how elastic it is? Which sock is the most elastic? Which tights are the most elastic (denier)? Which recipe play dough needs the greatest push to squash it? • How does the height an egg is dropped from affect how big the splat pattern is? (you could use wet tissue paper balls)</p>
3	<p>To know that a force is a push or pull acting on an object.</p> <p>To know some uses of magnets in everyday life (keeping doors closed, moving heavy objects)</p> <p>To know if two forces are balanced, it means the forces are the same size but are acting in opposite directions.</p> <p>To know if two balanced forces are acting on an object, that object will not change its motion. If it</p>	<p>Comparative tests How does the mass of an object affect how much force is needed to make it move? Which magnet is strongest? Which surface is best to stop you slipping?</p> <p>Identify & Classify Which materials are magnetic?</p>	<p>What are magnetic materials? How can we find out? Can I make a magnetic material non-magnetic? How far away does a magnet have to be before it attracts a magnetic material? How far away can the magnetic attraction between two magnets be experiences? Is the repulsive force the same size?</p>

is still, the object will stay still or if it is moving, it will continue moving in the same direction and at the same speed.

To know that when two forces acting on an object are not equal in size, we say that they are **unbalanced** forces. Unbalanced forces do change the way something is moving.

To know that a force can make objects start to move, speed up, slow down or change direction.

Compare how things move on different surfaces

To know that when an object moves across a **surface**, **friction** acts as an **opposite** force.

To know that **friction** is a force which holds back the motion of an object.

To know that **friction** is a force between two different surfaces which slide against one another.

To know that some surfaces create more friction (rougher ones).

To know that more **friction** means objects move slower.

To know that forces can make objects speed up, slow down, stop or start moving.

To know that friction can be **useful** (car tyres, shoes)

Describe magnets as having 2 poles

To know magnets have a **north** and a **south pole**.

To know that you can have different types of magnet (bar, u shaped, ring and horseshoe)

To know the poles are the **strongest** part of a magnet.

Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.

To know that **opposite poles** will **attract** (pull together) together

Observation over time

If we magnetise a pin, how long does it stay magnetised for?

Pattern Seeking

Do magnetic materials always conduct electricity?

Does the size and shape of a magnet affect how strong it is?

Research

How have our ideas about forces changed over time?

How does a compass work?

How is the magnetic attraction of repulsion force affected by putting materials between the magnets?
Are bigger magnets stronger?
How could you use magnets to measure the number of pages in a book?

	<p>To know that the same pole will repel (push apart) one another. To know magnets don't need to be touching to attract or repel; they just need to be near one another.</p> <p>Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others. To know a magnet has a magnetic field around it and this is invisible. To know that some forces can act at a distance, such as magnetism. To know that for some forces to act, they must be some contact.</p> <p>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. To know that some metals are magnetic but not all are. To know that magnets cannot pull or push anything made of wood, plastic and some other materials. To know magnets are metals that attract to some other metals.</p>		
4			
5	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>To know that weight is measure of the force of gravity on an object.</p> <p>To know that mass is a measure of how much matter (or 'stuff') is inside an object.</p>	<p>Comparative tests How does the angle of launch affect how far a paper rocket will go? How does the surface area of an object affect the time it takes to sink?</p> <p>Identify & Classify</p>	<p>What is a force? How can a force act on an object? How can we see forces? How can we measure forces? How does the saltiness (salinity) of water affect the water resistance? How does the length of a piece of a paper helicopter's wings affect the time it takes to fall?</p>

To know that **gravity** is a force which pulls things to the ground and acts from a distance.
To know that because of gravity, the Earth and other planets orbits around the sun.
To know everything is pulled to the Earth by gravity.

Identify the effects of air resistance, water resistance and friction, that act between moving surfaces

To know that **water and air resistance** is a form of friction which is sometimes helpful (**streamlined**) and not.

To know there is **friction** between your skin and the **water particles**. This is known as **water resistance**.

To know that **upthrust** is a force that **pushes** objects up, usually in water

To know that **buoyancy** can cause an object to float. This is because the weight of the object is **equal** to the **upthrust**.

Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

To know a **mechanism** is a device that allows a small force to increase to a larger force; the payback is that it requires a greater movement.

To know that a **pulley** can be used to make a small force lift a heavier load.

To know that more wheels in a pulley will mean less weight is needed to lift a weight.

To know that **gears or cogs** can be used to changed the speed, force or direction of a motion.

To know that when two gears connect they turn in **opposite** directions.

To know that leavers can be used to make a small force lift a heavier load.

To know a lever always rests on a **pivot**.

Can you label and name all the forces acting on the objects in each of these situations?

Observation over time

How long does a pendulum swing for before it stops?

Pattern Seeking

Do all objects fall through water in the same way?

How does surface area of parachute affect the time it takes to fall?

Research

How do submarines sink if they are full of air?

How does the changing the shape of a piece of plasticine affect water resistance?

How does adding holes to a parachute affect the time it takes to fall?

How does the amount/depth of tread affect the friction between a shoe and a surface?

How can we use levers to lift heavy objects?

What is the most effective way to move an object?

How do see-saws work?

Can you create a pulley system to life a given load?

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National Curriculum objectives- moved to a different year group within the key stage.

Additional knowledge – *Additional knowledge which has moved from another year group.*



Science - Light EYFS, KS1 and KS2

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants. * 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. * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>		
National Curriculum	<p>Pupils Should be taught to:</p> <p>Year 3</p> <ul style="list-style-type: none"> *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. <p>Year 6</p> <ul style="list-style-type: none"> *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. 		
	Light – Key Knowledge	Skills	Key questions
EYFS Understanding of the world	To know the names and key vocabulary to describe/talk about/ discuss light. - bright, dull,		
1	Know that light from the sun can be dangerous and that there are ways to protect their eyes. To know that sunglasses and a hat can <u>protect</u> the eyes.		

	<p>To know that sun cream protects the skin from the sun's rays</p> <p>To know that moving into the shade protects your self from the sun</p> <p>To know that I need to drink more liquids when it is warmer</p> <p>To know some clothes are more suitable for protecting myself from the sun.</p>		
2			
3	<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>To know we cannot see anything in complete darkness.</p> <p>To know that some objects (the sun, candles, light bulb) are sources of light.</p> <p>To know some sources of light are natural (sun, fire) and some can be man-made/artificial (light bulb).</p> <p>To know that objects are easier to see the more light we have.</p> <p>Know that the dark is the absence of light.</p> <p>Notice that light is reflected from surfaces</p> <p>To know that when light hits an object, it reflects (bounces off).</p> <p>To know that when reflected light hits our eyes, we can see the object.</p> <p>To know some surfaces and materials reflect light well (smooth, shiny and flat) and some don't.</p> <p>To know what reflective surfaces/ materials can be useful (hi-vis, cat's eyes on the road).</p> <p>To know that a mirror reflects light well so it creates a clear image.</p> <p>To know an image in a mirror appears to be reversed.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object</p>	<p>Comparative tests</p> <p>How does the distance between the shadow puppet and the screen affect the size of the shadow?</p> <p>Identify & Classify</p> <p>How would you organise these light sources into natural and artificial sources?</p> <p>Observation over time</p> <p>When is our classroom darkest?</p> <p>Is the Sun the same brightness all day?</p> <p>Pattern Seeking</p> <p>Are you more likely to have bad eyesight and to wear glasses if you are older?</p> <p>Research</p> <p>How does the sun make light?</p>	<p>A coin is lost, what would be the best way to find it? (Turn the lights out and see it shine? Use a torch to see it reflect?)</p> <p>How does distance from a light source affect how bright it looks?</p> <p>How does being in darkness affect your sense of hearing?</p> <p>What colour would be the best to make a safety jacket from?</p> <p>How does the colour of a material affect how reflective it is?</p> <p>What would be the best material to make a blind for a baby's room?</p> <p>How does thickness of a material affect how much light can pass through it?</p> <p>How many pieces of tracing paper are as translucent as a single piece of white paper?</p> <p>How does the shape of a mirror affect how the light reflects?</p> <p>How can we change the darkness, size and shape of a shadow?</p>

	<p>To know a shadow is an area of darkness where light has been blocked by an opaque object. To know opaque describes an object which does not let any light through. To know translucent describes an object which lets some light through but scatters the light so we cannot see through it clearly. To know transparent describes objects which lets light travel through easily, meaning you can see through the object.</p> <p>Find patterns in the way that the size of shadows change</p> <p>To know a shadow is larger when it is closer to the light source and smaller the further away from the light source. To know when the light source is directly above the object, the shadow will be directly underneath. To know when the light source is to one side of an object, the shadow will appear on the opposite side</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>To know the pupil is the black part of the eye which lets light in. To know the retina controls the amount of light entering the eye. To know that if too much light enters the eye then it can damage the retina.</p> <p>Know that light appears to travel in straight lines.</p>		
4			
5			
6	<p>Know that light appears to travel in straight lines-recap learning.</p>	<p><u>Comparative tests</u></p>	<p>How does the size of an object affect the size of a shadow?</p>

To know light travels as a **wave** from sources of light.
To know that light does not need a medium to travel through – so can travel through a **vacuum** (an airless space).
To know light rays/ beams travel in **straight** lines.
To know that whenever light is **reflected** from a surface, the **law of reflection** states that the **angle of incidence** is equal to the **angle of reflection**.
To know the angle of reflection is the angle between the **normal line** and the **reflected ray of light**.
To know the angle of incidence is the angle between the normal line and the **incident ray of light**.

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

To know light reflects from all objects (apart from black)
To know that non shiny surfaces **scatter** light so we don't see the **beam**.

use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

To know a shadow is always the same shape as the object that casts it.
Recap learning – **opaque, translucent and transparent**.
To know shadows can be **elongated** or shortened depending on the **angle** of the light source.
Recap- to know a shadow is larger when the object is closer to the light source.

How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?
Which material is most reflective?

Identify & Classify

Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?

Observation over time

Does the temperature of a light bulb go up the longer it is on?
How does my shadow change over the day?

Pattern Seeking

Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom?

Research

Why do some people need to wear glasses to see clearly?
How do our eyes adapt to different conditions?

How does the distance between the light and the object change the size of a shadow?
How does the distance between the object and the size of the screen affect the size of a shadow?
How would a solar eclipse be different if:
- The moon was a different size?
- The earth spun faster or slower?
- The sun was larger or smaller?
- If the earth and moon were the same size but further away in the solar system?
How does the amount of aluminium foil crumpled affect how much light is scattered?
How does the amount of polishing affect how well a piece of metal scatters light?
How perfect are our mirrors? Do some scatter light more than others?
What happens to light when it is shone through water? How is this affected by putting glitter, salt or talc in the water?
How does a periscope/microscope/telescope work?

	To know light bends when it moves from air to water – this is <u>refraction</u> . Scientist: Isaac Newton and the spectrum of colour.		
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Additional knowledge – *Additional knowledge which has moved from another year group.*



Science – Living Things and their Habitats EYFS, KS1 and KS2

<p>ELG</p>	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding. Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. Understanding the World - The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants. * 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. * Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>		
<p>National Curriculum</p>	<p>Pupils Should be taught to:</p> <p>Year 2</p> <ul style="list-style-type: none"> *explore and compare the differences between things that are living, dead, and things that have never been alive * identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other * identify and name a variety of plants and animals in their habitats, including 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. <p>Year 4</p> <ul style="list-style-type: none"> *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. <p>Year 5</p> <ul style="list-style-type: none"> *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. <p>Year 6</p> <ul style="list-style-type: none"> *describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals *give reasons for classifying plants and animals based on specific characteristics. 		
	<p>Living things and their habitats</p>	<p>Skills</p>	<p>Key questions</p>

<p>EYFS Understanding of the world</p> <p><i>Personal, Social and Emotional Development</i></p> <p>EYFS FRAMEWORK</p>	<p>Begin to understand the need to respect and care for the natural environment and all living things- framework.</p> <p><i>To name if something is dead or alive</i></p> <p><i>To know that something was alive but now it is dead</i></p> <p><i>To know that some animals live in different places: pond, woodland, ocean, polar regions</i></p> <p><i>To know that in a pond you might find: frogs, tadpoles and fish</i></p> <p><i>To know that in a woodland you might find: squirrel, badger, foxes, hedgehogs, owl</i></p> <p><i>To know that in the ocean you might find: shark, dolphin, fish and jellyfish, turtle</i></p> <p><i>To know that in a polar region you might find: penguins, whales, polar bears, arctic fox</i></p> <p><i>To know some animals eat meat.</i></p> <p><i>To know some animals eat plants</i></p> <p><i>To know some animals eat both plants and meat.</i></p>		
<p>1</p>	<p>Continuation of recognising the living things in our local environment.</p> <p>Identify and name a variety of plants and animals in their habitats,- continued in Y2 and expanded</p> <p>To name a variety of animals and plants including:</p> <p>nettles, daisies, dandelions and buttercups, insects, slugs and snails, foxes, pigeons and rats.</p> <p>shrubs, flowers and grasses, insects, worms, slugs and snails, bats, mice, squirrels, badgers, foxes and deer.</p> <p>worms, slugs, snails, dragonflies, frogs, toads, Birds are usually found near the pond: ducks</p>		
<p>2</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <ul style="list-style-type: none"> - To know that life processes are things that all living things do: move, breathe (respire), sense, grow, make babies (reproduce), get rid of waste(excrete) and get their energy from food (nutrition). - To know that things which are living have all the life processes - To know that things which are dead were once living. They did have all the life processes but don't now. - To know things which are never living are made out of metal, plastic or rock. They never have the life processes. 	<p>Comparative tests</p> <p>Which pets are the easiest to look after?</p> <p>Is there the same level of light in the evergreen wood compared with the deciduous wood?</p> <p>Identify & Classify</p> <p>How would you group these plants and animals based on</p>	<p>How do animals eat?</p> <p>Do all animals eat the same thing?</p> <p>Which animals hunt, and which animals are hunted? Why?</p> <p>What animals live in our school environment?</p> <p>How are animals and plants 'adapted' to live in their habitats</p>

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

- To know a **habitat** is the **natural place** something lives.
- To know a **habitat** provides living things with everything they need to **survive: food, water and shelter**.
- To know that animals live in different habitats for example: **woodland, urban, coastal, rainforest, arctic, desert, ocean, river, mountains**.
- To know **microhabitats** are very small habitats in places such as: **under a rock, under leaves, or on a branch, flowers, inside rotting wood**.
- To know **minibeasts** live in **microhabitats**.
- To know **microhabitats** have everything they need to **survive**.

Identify and name a variety of plants and animals in their habitats, including microhabitats

- To know that humans are special because they can change their **habitat** (grow animals and plants for food, build houses for **shelter**, use pipes for water into homes)
- To know that in **urban** habitats, animals and plants are there usually because humans have put them there (parks, plants and trees).
- To know animals and plants usually found in **urban** areas include: nettles, daisies, dandelions and buttercups, insects, slugs and snails, foxes, pigeons and rats.
- To know animals and plants usually found in **woodland** areas include: English oak, ash, beech, hawthorn and birch, deciduous plants shrubs, flowers and grasses, insects, worms, slugs and snails, bats, mice, squirrels, badgers, foxes and deer.
- To know animals and plants usually found in **ponds** include: worms, slugs, snails, damselflies, dragonflies, mayflies, water beetles, frogs, toads, newts. Birds are usually found near the pond: ducks, moorhens and kingfishers.

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

- To know a **food chain** shows how each animal gets its food.
- To know that food chains are one of the ways living things **depend** (they need each other for different things) on each other to stay alive.
- To know the arrows in a food chain show **'is eaten by'**
- To know that a **food source** is a place where a living thing's food comes from- these are plants.

what habitat you would find them in?

Observation over time

How does the school environment change over the year?

Pattern Seeking

What conditions do woodlice prefer to live in?

Which habitat do worms prefer – where can we find the most worms?

Research

How are the animals in Australia different to the ones that we find in Britain?

How does the habitat of the Arctic compare with the habitat of the rainforest?

Why do animals and plants like to live in different places?

How do seasons affect our animals and plants?

Which animals hibernate and why?

Why do snails hibernate, but slugs do not?

How do habitats change over our school year?

Is a flame alive?

Is a deciduous tree dead in winter?

Why do you think you might find foxes in the woodland and an urban habitat?

3	<ul style="list-style-type: none"> - RECAP FROM Y1 ANIMALS INCLUDING HUMANS: - To know animals are divided into two main groups: vertebrates that have a back bone and invertebrates who do not have a backbone. - To know that vertebrates are divided into five groups: fish, amphibians (frogs and toads), reptiles (snakes and crocodiles), birds, mammals (humans, dogs and dolphins) - To know some invertebrates have soft bodies (jellyfish, worms and molluscs – slugs) and some have hard bodies (insets, crustaceans and spiders) 		
4	<p>Recognise that living things can be grouped in a variety of ways</p> <ul style="list-style-type: none"> - To know animals can be grouped based on characteristics. - To know classification is where animals and plants are placed into groups based on their similarities. - To know characteristics are distinguishing features or qualities that are specific to a species. - To know that a taxonomist is a scientist who classifies different living things into categories. <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <ul style="list-style-type: none"> - To know classification is putting things into groups. - To know that living things are classified by looking at similarities and differences between the way they look and behave. - To know a key is a set of questions about the characteristics of living things. - To know the answer to the first question gives you another question to answer and so on and as you answer more questions you narrow down your living thing until eventually the last question tells you what it is. <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p> <ul style="list-style-type: none"> - To know our environments are always changing. - To know sometimes these changes are natural and can't be avoided, but humans are also causing some changes that aren't good for the planet. - To know that deforestation means cutting down trees and what impact that is having on habitats for animals. 	<p>Comparative tests Does the amount of light affect how many woodlice move around? How does the average temperature of the pond water change in each season?</p> <p>Identify & Classify Can we use the classification keys to identify all the animals that we caught pond dipping?</p> <p>Observation over time How does the variety of invertebrates on the school field change over the year?</p> <p>Pattern Seeking How has the use of insecticides affected bee population?</p> <p>Research Why are people cutting down the rainforests and what effect does that have?</p>	<p>What food chains and webs are there in our local habitat? How does energy move through the food chain? How does removal of one species from an environment, affect others? How does environmental change affect different organisms? What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers) How does human activity affect our environment (transport, industry, consumption- fast food)?</p>

	<ul style="list-style-type: none"> - To know it is important to look over the environment and this is called conserving. - To know that farming, mining, landfill and urban housing is affecting the environment. 		
5	<p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the changes as humans develop to old age (animals including humans)- THIS SHOULD HAVE ALEADY BEEN COVERED SO PUPILS CAN RECAP THIS KNOWLEDGE AND COMPARE THAT WITH OTHER ANIMALS.</p> <p>To know that a lifecycle is the different stages of life for all living things, including humans.</p> <p>To know the life cycle of a mammal (dog) embryo- young- adult.</p> <ul style="list-style-type: none"> -Starts as an embryo which grows inside the mother, where it is completely reliant upon the mother. - It then becomes young (puppy) where this is the main period of growth and developing independence from other parents. - It then becomes an adult where it usually seeks company from the opposite sex and mates. <p>To know the life cycle of an amphibian (frog) egg – tadpole – froglet – frog</p> <ul style="list-style-type: none"> - Egg: 	<p>Comparative tests How does the level of salt affect how quickly brine shrimp hatch?</p> <p>Identify & Classify Compare this collection of animals based on similarities and differences in their lifecycle.</p> <p>Observation over time How do brine shrimp change over their lifetime?</p> <p>Pattern Seeking Is there a relationship between the size of a mammal and the gestation period?</p> <p>Research</p>	<p>What is a life cycle? What types of life cycles are there?</p> <p>Are life cycles the same?</p> <p>How does metamorphosis differ in the frog, butterfly and dragonfly's life cycle?</p> <p>What is the role of the larva, the pupa and finally the adult in the insect's (butterfly) life cycle?</p>

The female lays a **mass of eggs (frogspawn)** which are **fertilised** by the male.
This usually happens in spring.

- Tadpole:

Tadpole breathes through **gills**.

At an early stage, Tadpole has no legs, but later at this stage only it develops two back (hind) legs.

It has a long tail. With the help of its tail, It swims like a fish.

Tadpoles eat small water plants and algae.

- Froglet:

Froglet develops two fore(front) legs.

The Tail of the Froglet shrinks.

Froglet develops **lungs** and gills disappear.

Froglet became a young frog.

- Adult Frog:

It can leave the water and live on the land.

The frog's tail disappears completely.

It starts eating insects.

The mother frogs lay eggs

To know the life cycle of a bird (chicken) egg- chick – adult

Egg:

Eggs are **laid** by the mother.

They are **fertilised** by a rooster.

They care for the egg until it hatches by keeping it warm and turning it/them regularly.

The chick will **absorb** the **nutrients** from the egg then hatch.

Chick:

The young bird is fed until it is old enough to find its own food.

The chick is kept warm by the mother.

Adult:

It will grow feathers

It will feed itself

It will go in search of a mate.

To know the life cycle of an **insect** (complete **metamorphosis** butterfly). Egg – larva – pupa – metamorphosis

Eggs are laid by the female insect.

What are the differences between the life cycle of an insect and a mammal?

Do all frogs go through the stages at the same time?

What factors can influence their life cycle?

	<p>The egg hatched into a larva. This varies depending on the species. Common forms are caterpillars, maggots and grubs.</p> <p>The pupa is usually where a hard case is formed around the larva.</p> <p>The pupa of butterflies is also called a chrysalis.</p> <p>It metamorphoses (changes) into the adult.</p> <p>To know the life cycle of an insect (incomplete metamorphosis dragonfly). Egg- nymph- adult</p> <p>Egg hatches into a nymph. This varies depending on species. Nymph looks like a small adult. In some cases, it lives in water.</p> <p>Egg hatches into a nymph. This varies depending on species. Nymph looks like a small adult. In some cases, it lives in water.</p> <p>Eggs are laid by the female insect. Sometimes this is in water.</p> <p><u>Describe the life process of reproduction in some plants and animals - THIS OBJECTIVE HAS BEEN MOVED TO BE TAUGHT AS PLANTS SEE YEARLY OVERVIEW.</u></p>		
6	<p>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</p> <p>To know there are billions of different kinds of living things (or organisms) on earth.</p> <p>To know that a characteristic is a special qualities or appearances that make an individual or group of things different to others.</p> <p>To know that to classify is to sort things into different groups.</p> <p>To know that a taxonomist is a scientist who classifies different living things into categories.</p> <p>To know that living things are grouped into three main groups: animals, plants and micro-organisms.</p> <p>To know microorganisms are viruses, bacteria, moulds and yeast.</p> <p>To know a micro-organism is an organism that can only be seen using a microscope, e.g. bacteria, mould and yeast and that they can be found in and on our bodies, in the air, in water and on objects around us.</p> <p>To know some microbes are helpful such as: bacteria (cheese), yeast (bread) penicillium (antibiotics)</p> <p>To know that some microbes can be harmful such as: bacteria (salmonella, plaque) virus (chicken pox and flu) and fungi (athlete's foot, mould).</p>	<p><u>Comparative tests</u> How does the temperature affect how much gas is produced by yeast? Which is the most common invertebrate on our school playing field?</p> <p><u>Identify & Classify</u> How would you make a classification key for vertebrates/invertebrates or microorganisms?</p> <p><u>Observation over time</u> What happens to a piece of bread if you leave it on the windowsill for two weeks?</p> <p><u>Pattern Seeking</u> Do all flowers have the same number of petals?</p>	<p>Why do we need to classify living things? How do we classify? What are the difficulties with classification? (penguins, whales, platypus) How do animals change over time? Why does variation exist? What happens if animals of different species breed? (hybrids) What happens to house plants outside? What are microorganisms? How can we prevent the spread of disease?</p>

	<p>To know biologists have devised ways of naming and classifying living things according to their similarities and differences. To know the system most scientists use puts each living thing into seven groups (or taxons).</p> <p>The groups are organised from most general to most specific. To know from largest to smallest, these groups are: 1. Kingdom 2. Phylum 3. Class 4. Order 5. Family 6. Genus 7. Species</p> <p>To know there are 5 kingdoms (animals, plants, prokaryotes, protoctists, fungi) To know species are the smallest groups- a species consists of all the animals of the same type, who are able to breed and produce young of the same kind. To know the work of Carl Linnaeus .</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p> <p>To know there are a variety of ways to classify animals. To use they key words: invertebrate, vertebrae, fish, amphibians, reptiles, birds, mammals, soft/hard bodied</p>	<p>Research What do different types of microorganisms do? Are they always harmful?</p>	<p>Why do animals and plants compete – and what for?</p>
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National Curriculum objectives – year group as outlined in the national curriculum

National Curriculum objectives- moved to a different year group within the key stage.

Additional knowledge – *Additional knowledge moved to a different year group.*

Knowledge/objectives taken from a different strand (living things and their habitats/animals including humans) – see that overview for knowledge and skills



Science - Materials EYFS, KS1 and KS2

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World* Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>* 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.</p> <p>* Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>
National Curriculum	<p>Pupils Should be taught to:</p> <p>Year 1</p> <ul style="list-style-type: none">* 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. <p>Year 2</p> <ul style="list-style-type: none">* 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 <p>Year 3 (rocks)</p> <ul style="list-style-type: none">* 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. <p>Year 4 (states of matter)</p> <ul style="list-style-type: none">* 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. <p>Year 5 (properties and changes of materials)</p> <ul style="list-style-type: none">* compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets* know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution* use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating* give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

	<p>* demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>* 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.</p>		
Chemistry	<p>Materials</p> <p>Y1/ Y2 – Everyday materials</p> <p>Y3- Rocks</p> <p>Y4- States of matter</p> <p>Y5- Properties and changes of materials</p>	Skills	Key questions
<p>EYFS</p> <p>Marvellous me Splash</p>	<p>To use the words to describe how different objects feel: rough, smooth, bumpy, sharp,</p> <p>To use the words to describe how different objects look: shiny, dull, colours, bright</p> <p>Know the names of a variety of everyday materials, including wood, plastic, metal, water and rock.</p> <p>To know that some materials are waterproof: wellies, umbrellas, coat</p> <p>To know that some materials/objects have similar properties (look and feel): pinecone, twig, rocks</p> <p>To know and name some examples of a liquid: fizzy drink, water and milk</p> <p>To know and name some examples of a solid: table, door, cup</p> <p>To know that water turns (freezes) into ice when it cold</p> <p>To know that ice melts into water when it warmed up</p> <p>To know that some things can melt when warmed up: ice, chocolate, ice lollies, ice cream</p> <p>To know if something has melted/ frozen</p>		

1

Distinguish between an object and the material from which it is made

To know an object is something that you can touch.

A material is what the object is made from.

To know the same object can be made from different materials (wooden ruler, plastic ruler)

To know the names of the objects and the materials they are made from around our school.

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

Rough- If something is rough, it feels and looks uneven or bumpy.

Compare and group together a variety of everyday materials on the basis of their simple physical properties

To know and use these words to describe and group:

Hard- not easily broken or bent.

Soft- easy to cut, fold or change the shape of.

Stretchy- can be pulled to make it longer or wider without breaking.

Shiny- reflects light easily.

Dull- doesn't reflect light. Doesn't look bright or shiny.

Smooth- Smooth objects have no lumps or bumps.

Bendy- can be bent easily into a curved or folded shape.

Not bendy- it can't be bent easily into a curved or folded shape.

Waterproof- keeps water out. It keeps things dry.

Not waterproof- let water in.

Absorbent- it soaks liquid up.

Not absorbent- it does not soak up liquid.

Comparative tests

Which materials are the most flexible?

Which materials are the most absorbent?

Identify & Classify

We need to choose a material to make an umbrella. Which materials are waterproof?

Observation over time

What happens to materials over time if we bury them in the ground?

What happens to shaving foam over time?

Pattern Seeking

Is there a pattern in the types of materials that are used to make objects in a school?

Research

How are bricks made?

Which materials can be recycled?

Buildings

• Which rocks are the least crumbly?

• Which materials absorb the most water?

• Which type of brick would be the easiest to drag to make a pyramid?

• Which material would be the strongest to use as a floor tile?

Toys & Nice things

• Which fabric would make the softest blanket?

• The baby has spilt her drink, which material would absorb the drink the best?

• We want to make a really slippery slide; which liquid would be best to use?

• Which chocolate will melt the fastest on a warm plate

• Which wrapping papers are strong enough to wrap and send a present?

Clothing & Materials

• Which material could be used to make a waterproof hat for the teacher when they are on the playground at playtime?

• Which plastic would be flexible enough to make a belt?

• Which material could I wrap my ice egg / snowman in to stop it melting, or would it make it melt quicker?

• What could I wrap a chicken egg in to keep it warm when it is waiting to hatch?

• What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?

2

Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses

To know **properties** are what **materials** are **like** and **how** they behave (bendy, stretchy)

To know **suitability** means having the properties which are right for a specific **purpose**.

To know these properties of materials:

Wood: **hard**, **stiff**, **strong**, **opaque** and can be **carved** into any shape

Plastic: **waterproof**, **strong**, can be made **flexible** or **stiff**, **smooth** or **rough**.

Paper: **lightweight**, **flexible**

Fabric: **soft**, **flexible**, hard-wearing, can be **stretchy**, **warm** and **absorbent**.

Glass: **waterproof**, **transparent**, **hard**, **smooth**.

Metal: **strong**, **hard** and **easy** to wash

Cardboard: **strong**, **light**, **stiff**

Rubber: **hard-wearing**, **elastic**, **flexible** and **strong**.

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

To know you **squash** an object by **pushing** both hands together

To know you **bend** an object by **grabbing** both ends and bringing them **inwards**

To know you **stretch** an object by **pulling apart** your hands slowly.

To know you **twist** an object by turning your hands in **opposite** directions.

Comparative tests

Which shapes make the strongest paper bridge?

Which material would be best for the roof of the little pig's house?

Identify & Classify

Which materials will float and which will sink?

Which materials are shiny and which are dull?

Observation over time

How long do bubble bath bubbles last for?

What will happen to our snowman?

Pattern Seeking

How do materials change with heat? *leave outside in sunshine/windowsill/radiator*

How does amount of water affect the strength of a kitchen towel?

Research

How have the materials we use changed over time?

How are plastics made?

Is it better to have wooden window frames or plastic?

3

[LINK TO GEOGRAPHY CASTLETON](#)

Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties

To know the **crust** is the **Earth's outer layer** and is made of rocks.

To know a rock is a **naturally occurring** solid material **composed** of one or more **minerals**.

To know rocks are made when **mineral grains** grow or are **fused** together. Every rock is made up of one or more minerals.

To know there are three types of **naturally occurring** rocks.

To know an **igneous** rock (examples include **obsidian**, **granite**, **basalt**) is rock that has been formed from **magma** (**molten rock** that remains **underground**) or **lava** (**molten rock** that comes out of the ground is called lava).

To know **sediment** is a **natural solid** material that is moved and dropped off in a new place by water or wind, e.g. sand.

To know **sedimentary** rock (examples include **chalk**, **sandstone** and **limestone**) is rock that has been **formed** by **layers** of **sediment** being pressed down hard and sticking together. You can see the **layers** of sediment in the rock.

To know **metamorphic** rock (examples include **marble**, **quartzite**, **slate**) started out as **igneous** or **sedimentary** rock but changed due to being **exposed** to extreme heat or **pressure**.

To know there are **human-made** rocks including: **concrete**, **bricks**, **mock rock**

Describe in simple terms how fossils are formed when things that have lived are trapped within rock

To know **fossilisation** is the **process** by which fossils are made.

To know **palaeontology** is the study of fossils.

Comparative tests

How does adding different amounts of sand to soil affect how quickly water drains through it?

Which soil absorbs the most water?

Identify & Classify

Can you use the identification key to find out the name of each of the rocks in your collection?

Observation over time

How does tumbling change a rock over time?

What happens when water keeps dripping on a sandcastle?

Pattern Seeking

Is there a pattern in where we find volcanos on planet Earth?

Research

Who was Mary Anning and what did she discover?

How are the soils different?

Which do you think has best drainage?

Which is more likely to lead to flooding?

How many soil types have we found?

Where might you find more?

How might the soil be different in different countries?

What rock is best for a kitchen chopping board? What might be the issues with various materials and what they must withstand?

What types of rocks are there in our local area?

How do rocks change?

What would grow best in your soil?

Why do you think worms are important to the creation of soil?

How can we use composting to make our own soil?

How long do you think this process will take and why?

How are fossils created?

Why do fossils help us find out about historical events?

If you could fossilise an object what would it be?

To know a fossil is the preserved remains or traces of a dead organism.

To know how fossils are formed:

- An animal dies. It gets covered with sediments which eventually become rock.
- More layers of rock cover it. Only hard parts of the creature remain, e.g. bones, shells and teeth. The soft parts will decompose and rot away.
- Over thousands of years, sediment might enter the mould to make a cast fossil. Bones may change to mineral but will stay the same shape.
- Changes in sea level take place over a long period.
- As erosion (when water, wind or ice wears away land) and weathering take place, eventually the fossil becomes exposed.

Recognise that soils are made from rocks and organic matter

To know soil is the uppermost layer of the Earth.

To know soil is a mixture of tiny particles of **dead and rotting plants and animals, rock, air and water**.

To know there are different types of soil:

- **Sandy soil** is pale coloured and has large particles. These create lots of small air gaps. Water drains through them easily so it usually feels dry.
- **Clay soil** is usually sticky and has small particles. They contain very few air gaps and water does not drain through it easily.
- **Chalky soil** is a light brown soil. Water drains through it quickly.
- **Peat** does not contain any rock particles. It's made from very old, decayed plants and is dark, crumbly and rich in the useful chemicals that plants need called **nutrients**.

Link to forces and magnets (organising every day materials based on if they are magnetic)

4

Compare and group materials together, according to whether they are solids, liquids or gases (recap, this has been moved to Y2 everyday materials)

To know that materials can be one of three states: solid, liquid or gas.

To know that some materials can change from one state to another and back again.

To know a solid:

- Keeps its shape unless a force is applied
- Can be hard, soft and even squishy
- Take up the same amount of space no matter what has happened to them
- Particles are close together and cannot move they can only vibrate

To know liquids:

- Take the shape of their container
- Can change shape but do not change the amount of space they take up
- They can be flowed or be poured
- Particles are close together but can move around each other easily

To know gases:

- Can spread out completely
- Can fill a container or a room
- Do not have a fixed shape but they do have a mass
- Particles are spread out and can move very quickly in all directions.

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)

To know when water and other liquids reach a certain **temperature**, they **change state** into a solid or a gas. The temperatures that these changes happen at are called the **boiling**, **melting** or **freezing** point.

To know if a solid is **heated** to its **melting point**, it **melts** (this is when a solid changes to a liquid) and **changes** to a liquid. This is because the particles start to move faster

Comparative tests

How does the mass of a block of ice affect how long it takes to melt?

How does the surface area of water affect how long it takes to evaporate?

Does seawater evaporate faster than fresh water?

Which liquid moves faster? (water, honey, milk, salad cream)

Identify & Classify

Can you group these materials and objects into solids, liquids, and gases?

How would you sort these objects/materials based on their temperature?

Observation over time

Which material is best for keeping our hot chocolate warm?

How does the level of water in a glass change when left on the windowsill?

Pattern Seeking

Is there a pattern in how long it takes different sized ice lollies to melt?

How does evaporation rate change as you add more salt to your water?

Research

What are hurricanes, and why do they happen?

How does the amount of water added to flour affect its state?

How does the amount of detergent added to water affect how slippery it is?

How does the temperature affect how viscous a liquid is (use cooking oil)?

Place a peach in a glass of lemonade and watch it spin. Why does it behave that way, and can you prove it?

How does the material sprinkled on ice and snow affect how quickly it melts?

What chocolate would be best to smuggle? How does the type of chocolate affect its melting temperature?

What is the melting temperature of ice and how does it compare with the freezing temperature of water?

Is the melting temperature of wax the same as its freezing temperature?

and faster until they are able to move over and around each other.

When **freezing** (liquid turns to a solid during the freezing process) occurs, the particles in the liquid begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a solid **structure**. To know **evaporation** (turn a liquid into a gas.) occurs when water turns into water **vapour**. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle **evaporating** in the warm air.

To know **condensation** is when water **vapour** is cooled down and turns into water. You can see this when droplets of water form on a window. The **water vapour** (this is water that takes the **form** of a gas) in the air cools when it touches the cold surface.

To know that water can be one of three states.

Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

To know:

1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**. Water from plants and trees also enters the atmosphere. This is called **transpiration**.
2. This **water vapour** rises, then cools down to form **water droplets** in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as **rain, sleet, hail** or **snow** (**precipitation**- liquid or solid particles that fall from a cloud as rain, sleet, hail or snow).
4. When water falls back to Earth as **precipitation**, the water may fall on oceans, lakes, rivers or on the ground (**collection**).
5. Water that falls on the ground is either **absorbed** into the soil, and is used as drinking water for animals and plants, or it runs over the ground and collects in the oceans, lakes and rivers.

	<p>6. This water is then evaporated and the cycle starts all over again</p>		
5	<p>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</p> <p>To know a conductor is a material that heat or electricity can easily travel through.</p> <p>To know most metals are both thermal (heat) and electrical conductors.</p> <p>To know an insulator is a material that does not let heat or electricity travel through them (wood and plastic)</p> <p>To know soluble means it can dissolve in liquid.</p> <p>To know dissolve means the material mixes with the water to make a transparent liquid.</p> <p>To know a transparent object lets light through so can be looked through (e.g glass and windows)</p> <p>To know magnetism is a strong, invisible force that acts on iron and steel.</p> <p>To know any substance that is used to make something is a material.</p> <p>To know natural materials such as stone, wood and cotton are used or worked with in the way they are found in nature.</p> <p>To know synthetic or human-made materials are made from natural materials, but are altered with the help of heat or chemicals. Some examples include plastics, polyester and Kevlar.</p> <p>To know a material is magnetic if it is attracted to a magnet.</p> <p>To know something is transparent if you can completely see through it</p> <p>To know that is a material is permeable it allows liquids to go through.</p>	<p>Comparative tests How does the temperature of tea affect how long it takes for a sugar cube to dissolve? Which type of sugar dissolves the fastest</p> <p>Identify & Classify Can you group these materials based on whether they are transparent or not?</p> <p>Observation over time How does a container of saltwater change over time? How does a sugar cube change as it is put in a glass of water?</p> <p>Pattern Seeking Do all stretchy materials stretch in the same way? How does temperature affect how much solute we can dissolve?</p> <p>Research What are microplastics and why are they harming the planet?</p>	<p>What are mixtures? What does dissolve mean? Which of the following dissolve in water: sugar, bicarbonate of soda, oil, chocolate, coffees, dark vinegar and wax? How does the amount of water used affect how much sugar will dissolve in it? Which sweets dissolve in water? How can we separate mixtures? How can we clean our dirty water?</p>

To know that a material is flexible if it will bend without breaking.

To know that a material is hard if it is not easily scratched.

Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

Metals: strong, hard and shiny. They are good **conductors** of heat and **electricity** and some are **magnetic**. Their properties make them useful for objects such as cutlery, saucepans, cars and coins.

Wood: It is **strong**, flexible and long-lasting. It is an insulator of heat and electricity. It's used to make things such as furniture.

Glass: It is normally **transparent** and can be made into different shapes. Thick glass can be strong, but thin glass breaks easily. It's used for objects that need to be **transparent**, such as windows and spectacles.

Plastics: Strong and waterproof. They can be made into any shape by applying heat. Plastics are not **magnetic**. They are good **insulators** and don't **conduct** heat or **electricity**. They're used to make things like bags, bottles and toys.

Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

Demonstrate that dissolving, mixing and changes of state are reversible changes

Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating

To know a solution is made when solid particles are mixed with liquid particles.

To know that materials which will dissolve are known as soluble- sugar

	<p>To know that materials which won't dissolve are known as insoluble- sand</p> <p>To know a reversible change is when materials can be changed back to how they were before the reaction took place and examples include:</p> <ul style="list-style-type: none"> - Sieving- smaller materials are able to fall through the holes in the sieve, separating them from larger particles. - Filtering - the solid particles will get caught in the filter paper but the liquid will be able to get through. - Evaporating - the liquid changes into a gas, leaving the solid particles behind. <p>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</p> <p>To know that irreversible changes often result in a new product being made from the old materials.</p> <p>To know chemical changes involve reactants and products.</p> <p>To know the reactants are the materials that you start off with, before the chemical change happens.</p> <p>To know the products are the materials that are formed in the chemical change.</p>		
6			



Science - Plants EYFS, KS1 and KS2

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World* Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>* 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.</p> <p>* Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>
National Curriculum	<p>Pupils should be taught to:</p> <p>Year 1</p> <p>*identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>*identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Year 2</p> <p>*observe and describe how seeds and bulbs grow into mature plants</p> <p>*find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p> <p>Year 3</p> <p>*identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>*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</p> <p>*investigate the way in which water is transported within plants</p> <p>*explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>

	Plants	Skills	Key questions
<p>EYFS Understanding of the world</p> <p>Ready, steady grow Sunshine and sunflowers</p>	<p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <ul style="list-style-type: none"> - To know and identify the parts of a plant/tree: roots, stem, leaves, flowers, petals, seed <p>To know the names of these common plants: sunflower, daisy, dandelion, tree, blossom, bean, nettles</p> <p>To know how to care for a plant by:</p> <ul style="list-style-type: none"> - Water it - Place it in the sun (sunlight) - Being careful near it/gentle when handling it. <p>To know plants grow from a seed or bulb</p> <p>To know that plants grow at different rates.</p>		
<p>1. Grow a sunflower this will take time so this could be done right at the start of the unit as a recap from FS2.</p>	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>To know a wild plant seed grows where it falls</p> <p>To know wild plants don't need to be planted or cared for</p> <p>To know the names of these common wild plants: dandelion, daisy, ivy, buttercup, clover, nettles, brambles</p> <p>To know garden plants are plants people choose to have in their garden.</p> <p>To know the names of these garden plants: rose, sunflower, lavender, pansy,</p> <p>To know a weed is a wild plant that grows in a place where people don't want them.</p>	<p>Comparative: Which type of compost grows the tallest sunflower? Which tree has the biggest leaves?</p> <p>Identify and classify: Collect leaves from the local environment and then sort them.</p> <p>Observation over time: How does a daffodil bulb change over the year? How does my sunflower change each week? How does the oak tree change over the year?</p> <p>Pattern seeking:</p>	<ul style="list-style-type: none"> • How do plants grow? • What do plants need to grow? • Do all plants need water? • Are all plants green? • Why do seeds look different? • Can plants grow as big in the shade? • What is the biggest/smallest/smelliest (etc) tree/flower/plant on the planet?

	<p>To know a deciduous tree loses its leaves each year.</p> <p>To know an evergreen tree keeps its green leaves all year round.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>To know and identify the parts of a plant/tree: roots, stem, leaves, flowers, petals, fruit, seed, bulb</p> <p>To know the roots take in water and nutrients from the soil and keep the plant in the ground</p> <p>To know the leaves catch sunlight to help the plant make its own food</p> <p>To know flowers attract insects and birds</p> <p>To know petals are the colourful part of the flower</p> <p>To know the fruit contains the plant's seeds</p> <p>To know seeds and bulbs grow into new plants</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats. (Living things and their habitats)</p>	<p>Do trees with bigger leaves lose their leaves first in autumn?</p> <p>Is there a pattern in where we find moss growing in the school grounds?</p> <p>Research: What are the most common British plants and where can we find them?</p>	
<p>2 Grow cress inside and outside.</p>	<p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>To know plants grow at different speeds</p> <p>To know plants grow from either a bulb or seed</p> <p>To know seeds need planting at different times of the year.</p> <p>To know the life cycle of a plant and the different stages:</p> <ul style="list-style-type: none"> - A seed gets planted (by humans, animals or blown by the wind) - During germination, the seed will grow roots and shoots. 	<p><i>To grow cress and look at how plants can be edible.</i></p> <p>Comparative: Do cress seeds grow quicker inside or outside?</p> <p>Identify and classify: Go for a walk and identify the different trees in the environment.</p> <p>Observation over time: What happens to my bean after I have planted it?</p>	<ul style="list-style-type: none"> • Do cress produce seeds, how could we find out? • Do all plants produce flowers and seeds? • What is different between freshly cut and planted flowers? • Do plants flower all year round? • What are flowers for? • What happens to a plant after it has produced seeds?

	<ul style="list-style-type: none"> - The roots will grow deeper to find more water. - The shoots will grow up to find more light. - The shoots will grow stem and leaves above the ground. - Some plants will grow fruits and make their own seeds – these seeds will then be transported (by humans, animals or the wind) and the reproduction process will start again. <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p> <p>To know plants need water, light and warmth to grow and survive.</p> <p>To know the amount of these needed can differ from plant to plant.</p> <p>To know flowers make seeds to reproduce more plants</p> <p>To know plants are important for the environment</p> <p>To know we need plants to survive (clean air and to eat)</p> <p>To know we can eat different parts of a plant (leaves, stem, roots, seeds, fruit)</p> <p>To know that not all plants are edible and care should be taken when handling plants</p>	<p>Pattern seeking: Do bigger seeds grow into bigger plants?</p> <p>Research: How does a cactus survive in a desert with no water?</p>	
3	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>To know:</p> <ul style="list-style-type: none"> - Roots anchor the plant to the ground and absorb water and nutrients from the soil. - Stem (or trunk of a tree): holds the plant up and transports water and nutrients from the soil to the leaves. - Leaves: make food for the plant using sunlight, water and carbon dioxide from the air. 	<p>Comparative: How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals? Which conditions help seeds germinate faster? Grow two different plants, in different environments and compare their growth and what they need to survive.</p> <p>Identify and classify: How many ways can you group our seed collection?</p>	<p>How do plants reproduce?</p> <ul style="list-style-type: none"> • Do all flowers look the same? • How do insects know which flowers to pollinate? • Why do flowers smell? • What do seeds do? • Can a plant live without its leaves? • Do grass/trees make flowers? • What conditions are perfect for a seed to grow? • Where do weeds come from? • How does the space between seeds affect how well they grow? • Does seed size match plant size?

	<ul style="list-style-type: none"> - Flowers: make seeds to grow into new plants. Their petals attract pollinators to the plants. Sometimes these can be edible. - Nutrients: substances needed for living things to grow and survive. These are found in the soil. Plants also make their own food in the leaves. Pollen: produced by the male part of the plant. <p>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 To know a cacti needs little water to survive. To know rice requires a lot of water to survive To know that you can experiment with different plants to find out what plants require.</p> <p>Investigate the way in which water is transported within plants To know the roots absorb water from the soil The stem transports water to the leaves Water evaporated form the leaves and this evaporation causes more water to be sucked up the stem (like a straw)</p>	<p>What plants do we have in our local environment – does this change with the season?</p> <p>Observation over time: What happens to celery when it is left in a glass of coloured water? How do flowers in a vase change over time? What happens to plants over time when the leaves or roots are removed?</p> <p>Pattern seeking: What colour flowers do pollinating insects prefer? Do plants grow faster in _____ or _____?</p> <p>Research: What are all the different ways that seeds disperse? How does a cacti survive in it's environment?</p>	<ul style="list-style-type: none"> • Do plants take in water through their roots? • How does water move through the plant? • How do plants make their food? • How does light affect plant growth? • How does a plant get carbon dioxide?
4	<p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal- MOVED FROM YEAR 3. Children will a have already learned that environments are changing so can link with how this affects seed dispersal. Recap parts of a plant from y3 and their functions.</p> <p>To know that pollination is to fertilise the plant with pollen. To know fertilisation is when the male (stamen) and female (carpel/pistil) parts of the flower have mixed in order to make seeds for the new plants.</p>	<p>Comparative:</p> <p>Identify and classify:</p> <p>Observation over time: Which plants attract more bees?</p> <p>Pattern seeking:</p> <p>Research: How is the decreasing bee population affecting seed dispersal?</p>	

	<p>To know the stamen is made up of the anther and the filament.</p> <p>To know the filament hold the anther and the anther makes the pollen.</p> <p>To know the carpel is made up of the stigma, style and ovary.</p> <ul style="list-style-type: none"> - Style: holds up the stigma - Stigma: collects pollen <p>To know that pollen is a fine powder produced by flowers.</p> <p>To know pollen fertilises other flowers of the same species.</p> <p>To know petals (which are the brightly coloured part of the flower) attract pollinators to the plant.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)</p>		
5 – plant	<p>Describe the life process of reproduction in some plants and animals. (Living things and their habitats)</p> <p>RECAP THE PARTS OF A PLANT</p> <p>To know asexual reproduction only requires one plant to make a replica of itself, such as the reproduction of fungi and daffodil bulbs, strawberry plants and potatoes.</p> <p>To know sexual reproduction in plants requires both female and male gametes in order to make a new plant.</p> <p>To know that pollen needs to be transferred onto ovules for sexual reproduction.</p> <p>To know the steps of fertilisation:</p> <ul style="list-style-type: none"> - Most plants contain both the male sex cell (pollen) and female sex cell (ovules) but most can't fertilise themselves. - The pollen from the stamen of one plant is transferred to the stigma of another (same species). 	<p>Comparative tests</p> <p>To all plants reproduce in the same way? Do all insects pollinate plants? How do plants who rely on wind pollination differ from those that rely on pollinators?</p> <p>Identify & Classify</p> <p>Which plants in our local environment reproduce sexually/asexually?</p> <p>Observation over time</p> <p>How does a bean change as it germinates?</p> <p>Pattern Seeking</p> <p>Is there are relationship between number of petals and number of stamens?</p> <p>Research</p> <p>Why are bees important in our world? Which plant is the most attractive to insects?</p>	<p>Do plants reproduce in the same ways as us? How do plants spread their seeds?</p>

	<ul style="list-style-type: none"> - The pollen then travels down a tube to the style and fuses with an ovule. - <p>To know about the different types of pollination: <u>Insect:</u></p> <ul style="list-style-type: none"> - Insects land on plants to search for food pollen sticks to them. - They travel to the next plant for food, the pollen that is stuck to their body gets transferred onto the stigma. - Key pollinators include a variety of bees, flies and beetles. - Plants that rely on insects for pollination have: brightly coloured petals; scented nectar; sticky or spiky pollen grains; firmly attached internal anthers for insects to brush against; an internal, sticky stigma which pollen grains stick to when that all important insect brushes past. <p><u>Wind pollination:</u></p> <ul style="list-style-type: none"> - Pollen is very light and can travel for long distances on the wind. - Wind-blown pollen or seeds are normally dry and dust-like. - Wind-pollinated plants are often plain, with less colourful or fragrant flowers. This is because they don't need to attract insects or animals. 		
6	<p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and, plants and (Living things and their habitats) To know you can classify plants based on these characteristics:</p> <ul style="list-style-type: none"> - Algae are simple plants that do not have roots, stems or leaves. Most algae live in water. 	<p><u>Comparative tests</u></p> <p><u>Identify & Classify</u> Which plants produce seeds and which do not?</p> <p><u>Observation over time</u> Does our classification of plants change throughout the school year?</p> <p><u>Pattern Seeking</u></p>	<p>What happens to house plants outside? Why do animals and plants compete – and what for?</p>

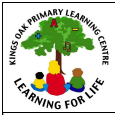
	<ul style="list-style-type: none"> - Mosses and liverworts are plants with very simple leaves or a leaf-like form. Some have root-like structures that help in anchoring the plant. - Ferns are flowering green plants with true roots. - Stems and leaves. They produce spores during reproduction. Seed-bearing plants can be divided into two broad groups, conifers and flowering plants. Conifers produce their seeds in cones. - Flowering plants produce seeds protected inside fruits. - Lichens are a special kind of living thing. They are an alga and a fungus living together <p>Give reasons for classifying plants and animals based on specific characteristics. (Living things and their habitats)</p>	<p>Do all flowers have the same number of petals?</p> <p><u>Research</u></p>	
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National Curriculum objectives – year group as outlined in the national curriculum

National Curriculum objectives- moved to a different year group within the key stage.

Additional knowledge – *Additional knowledge moved to a different year group.*

Knowledge/objectives taken from a different strand (living things and their habitats) – see that overview for knowledge and skills



Seasonal Changes

ELG	<p>Communication and Language - Listening, Attention and Understanding Make comments about what they have heard and ask questions to clarify their understanding.</p> <p>Personal, Social, Emotional Development - Managing Self Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p> <p>Understanding the World - The Natural World* Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>* 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.</p> <p>* Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>
National Curriculum	<p>Pupils should be taught to:</p> <p>Year 1</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none">• observe changes across the 4 seasons• observe and describe weather associated with the seasons and how day length varies

	Seasonal Changes – Knowledge	Skills	Questions
<p>EYFS Understanding of the world</p>	<p><i>To know weather changes day to day.</i></p> <p><i>To name the weathers: rain, snow, fog, wind, cloudy, sunny</i></p> <p><u>Autumn- to know:</u></p> <ul style="list-style-type: none"> - The weather begins to get colder. - The leaves start to fall from the trees. <p><u>Winter- to know:</u></p> <ul style="list-style-type: none"> - The weather is much colder - Sometimes it is cold enough to freeze, leaving frost and ice on the ground. - Sometimes it snows. - Many trees have bare branches as the leaves have fallen off. <p><u>Spring- to know:</u></p> <ul style="list-style-type: none"> - The weather gets warmer - Leaves start to grow on trees. - Plants begin to grow again and may blossom. - You may see baby animals (lambs). <p><u>Summer – to know:</u></p> <ul style="list-style-type: none"> - The weather gets hotter. - The trees are full of leaves and there are lots of flowers. <p>Know there are 4 seasons.</p> <ul style="list-style-type: none"> - To know the 4 seasons: winter, spring, summer and autumn. <p>To know how leaves change through out the seasons. To order the seasons To know that summer is usually warmer than winter. To know (compare seasons)</p>		

Observe changes across the 4 seasons

Observe and describe weather associated with the seasons and how day length varies

Autumn- to know:

- The weather begins to get **colder**.
- The leaves start to fall from the trees.
- The amount of **daylight** is less.
- Day times are shorter and nights are longer.

Winter- to know:

- The weather is much **colder**
- Sometimes it is cold enough to **freeze**, leaving frost and ice on the ground.
- Sometimes it **snows**.
- Many trees have bare branches as the leaves have fallen off.
- The day times are the **shortest** and the night times are the longest.

Spring- to know:

- The weather gets **warmer**
- Leaves start to grow on trees.
- Plants begin to grow again and may **blossom**.
- You may see baby animals (lambs).
- They daytimes start to get longer

Summer – to know:

- The weather gets hotter. (**temperature**)
- The day time is longer and the nights are shorter.
- The trees are full of leaves and there are lots of flowers.
- To know that the **length** of a day is **longest** during mid-summer
- To know the length of a day is shortest in mid- winter

Comparative tests

In which season does it rain the most?

Identify & Classify

How could you organise all the objects in the solar system into groups?

Observation over time

How does the colour of a UV bead change over the day?

Pattern Seeking

Does the wind always blow the same way?

Research

Are there plants that are in flower in every season? What are they?

Why do more frequent days of rain saturate the ground?

How long does it take for the ground to dry after it has been raining?

Does more rain take longer to dry?

Do countries with higher temperatures have less rain?

How does rainfall and temperature change over time in our school grounds?

Which leaf is the strongest/best shade cover/best at directing water?

What do you notice about different leaves?

What purpose to leaves serve for a tree?

Why do you think leaves turn brown in Winter?

What colours can we find outside? Does this change across the seasons?

What effect does rain have on the environment?

What would happen if there was too much rain?

What would happen if there wasn't enough rain?