Ladywood Primary School

Science Curriculum

Overview of Topics							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	All About Me Autumn Woodland Animals or Space	physics– seasonal change - Autumn Biology - animals including humans	Biology – animals, including humans	Physics – forces	Chemistry – states of matter	Physics – earth and space	Biology – evolution and inheritance
Autumn 2	Polar Worlds Winter	Biology - animals including humans Physics -Seasonal change - Winter	Biology -all living things and their habitats	Chemistry - rocks	Chemistry – states of matter	Physics - Forces	Biology – all living things and their habitats
Spring 1	Journeys and Transport or Houses and Homes	Chemistry – everyday materials	Chemistry – everyday materials	Biology - plants	Physics – electricity	Chemistry – properties and changes in materials	Physics – light
Spring 2	Spring Growth and Life Cycles	Chemistry – everyday materials	Chemistry – everyday materials	Biology - plants	Physics - sound	Chemistry – properties and changes in materials	Biology – living things including human
Summer 1	Animals	Biology – plants Physics -Seasonal change - Summer	Biology - plants	Biology – animals including humans	Biology-all living things and their habitats	Biology-all living things and their habitats	Biology – living things including human
Summer 2	Keeping Healthy	Biology - plants	Biology - plants	Physics - light	Biology – animals including humans	Biology – animals including humans	Physics -Electricity

The intent of the Science Curriculum is to excite and stimulate pupils' curiosity about phenomena and events in the world around them, to prepare our pupils for life in an increasingly scientific and technological world. We intend learning in science to be through investigations of the physical, chemical and biological aspects of their lives that rely mainly on first hand experiences, leading to them being equipped to answer scientific questions about the world around them.

Plants

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum Objectives	Plant seeds and care for growing plants. Understand the life cycle of a plant.	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees	Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. Explore requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	See Living Things in Year 4 for plants role in the food chains.	See Living Things in Year 5 for plant reproduction.	See Living Things in Year 6 for plant classification.
Vocabulary	seed, plant, soil, water, stem, root, leaf, flower, grow, change	Garden plants- roses, tulips, daffodils, wild plants, - daisy, buttercup, dandelion, nettle. weeds, flower, fruit, vegetable trunk, branches, twigs deciduous, evergreen horse chestnut, oak, conifer.	Branches, petal, flowering, shoot, root, Crop, herb, weed, bulb edible, nutrients reproduce, sprout, scatter, broad bean, sun flower life cycle, Seed dispersal, germination	insects, sunlight, function, structure absorb, transported, anchor carbon dioxide, fertilization, germination, pollen, pollination, nectar, anther, ovule, stigma stamen, carpel, disperse Wind dispersal, Water dispersal, Animal Dispersal, Explosion	See Living Things in Year 4 for plants role in the food chains.	See Living Things in Year 5 for plant reproduction.	See Living Things in Year 6 for plant classification.
Objectives / Knowledge	The key features of the life cycle of a plant That plants have different parts That we need to care for plants by watering them	That a plant is a living thing that grows from the ground. The main parts of a basic plant are the roots, leaf, stem and petals and what they do. To identify some common garden plants- roses, tulips, daffodils, To identify some wild plants – daisy, buttercup, dandelion, nettle, The main parts of a tree are the trunk, root, leaves, branches. To identify some trees- horse chestnut, oak, conifer.	That plants require things such as water, warmth, nutrients from soil or they may stop growing. Plants can: move, grow, react to their surroundings, absorb nutrients, reproduce. -sun flower How plants germinate and grow- roots, stem and leaves – bean What plants need to germinate – oxygen, water, warmth.- bean The basic life cycle of a plant.- sunflower That some plants can be eaten.- underground -potatoes, carrots, onions Upwards - peas, wheat, tomatoes On trees - apples, pears, plums	The functions of different parts of flowering plants. The petals on a flower are usually bright - this is to attract bees and other insects so that they can collect pollen to make seeds. The seeds are then able to grow to make new plants.-germination. Leaves use carbon dioxide and sunlight to make food for the plant. The stem carries water and other nutrients from the roots to the rest of the plant. Leaves use this water to make food. Plants are producers, as they make their food from sunlight. To know how water is transported within plants -celery/ carnation To know the plant life cycle (tulip) including pollination, seed formation and seed dispersal. Pollination occurs when pollen from the anther is transferred to the stigma by bees and other insects. The pollen then travels down and meets the ovule. When this happens, seeds are formed - this is called fertilisation.			

					Seeds are then dispersed so that germination can begin again. The different types of dispersal - wind dispersal, Water dispersal, Animal Dispersal, Explosion .			
	Skills Working Scientifically	Talk about the life cycle of a plant and can name the different parts – roots, stem, leaf, bud, flower, petal Label parts of a bean plant grown from seed – bean, seed, root, shoot, leaf	Grow a plant from a seed and record their observations.. Create a tally chart to show how many of each plant they have found and then use the information to answer questions. Go on a tree hunt and record what types of trees can you see. Label the different parts of the tree and make observations. Collect fallen leaves and identify which tree they came from using pictures to help you. Label the parts of a plant showing where the leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, and stems are.	Describe the growth of a plant Compare the growth of a plant with a plant (using the same bulb or seed) where one of the conditions is different (no water, no light, a smaller container). Investigate different ways to germinate seeds other than using soil. Describe the life cycle of a plant Identify and dissect a variety of fruits and locate where their seeds are. Measure and record the different heights of plants.	Predict and investigate the effect of different factors in plant growth (e.g. the amount of water, the amount of light and the amount of fertiliser). Explain what would make this a fair test. Observe and explain, using dyed water how plants transport water. Observe different fruit structures and use this to explain how seeds are dispersed. Identify and label each of the different plant parts that help with fertilisation. Explain the life cycle of a plant			
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals inc Humans (humans)	National Curriculum Objectives	Make healthy choices about food, drinks and self-care. Know and talk about the different factors that support their overall health and wellbeing, including the importance of regular tooth brushing (Links to Physical Development)	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 (lion, cats, bear), herbivores, (Horses, giraffes, rabbits) and omnivores (dogs, humans). Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Notice that animals (dog, fox, badger, horse, cow, owl, bear, bird) including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals (dog, fox, badger, horse, cow, owl, bear, bird), including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identify that animals (pigs, hedgehogs, chickens, lion, toad, snake, owl, horse, rabbit, zebra, gorilla), 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 animals have skeletons and muscles (bicep, tricep, and abdominals. Pectorals, hamstring) for support, protection and movement.	Describe the simple functions of the basic parts of the digestive system in humans. (How food passes through the body and how it removes nutrients needed and dispels waste). Identify the different types of teeth in humans and their simple functions. (Incisors, Canines, Premolars, molars and wisdom teeth). Construct and interpret a variety of food chains, identifying producers, predators and prey	Describe the changes as humans develop to old age. (through the stages, baby, toddler, child, teenager, adolescent, adult and pensioner) Focus on Puberty and link to PHSE.	Identify and name the main parts of the human circulatory system (consisting of heart, blood vessels, blood, veins, arteries, capillaries, oxygen, lungs and ribcage), 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.
	Vocabulary	life cycle, frog spawn, tadpole, grow, change, pond, change, egg, caterpillar, leaf, chrysalis, butterfly, egg, crack, chick, grow, bigger, change, nest exercise, wash, brush , teeth healthy, fruit, vegetables	Vertebrates, invertebrate, back bone, birds, fish, mammals, reptiles amphibian, carnivores, omnivores, herbivores cold – blooded warm blooded wild, pet Head, eyes, eyes, teeth, nose, tongue	life cycle, offspring, reproduce caterpillar, chrysalis, butterfly, pupa, egg (metamorphosis) baby, toddler, child, teenager, adult balanced diet, hygiene, exercise, bones, muscles	carbohydrates, protein, fibre, fruit, fats, mineral, vitamins water energy, saturated fat, unsaturated fat Skeleton, organs, Support, protect, Exoskeleton. Endoskeleton Skull, clavicle, scapula, rib cage, humerus, spinal column, pelvis, ulna, radius, femur, fibula and tibia Muscles, tendons, joints	Digestion, organ Mouth, tongue, teeth, oesophagus, liver, stomach, gallbladder, pancreas, duodenum, large intestine, small intestine, anus, rectum Absorb, faeces, waste, bloodstream, process Saliva, muscles, ingested	Sexual reproduction Development, Cell, embryo, gestation, sperm Foetus, Baby, Toddler, Child, Teenager, Adult, Old age, Death Menstruation, menopause, pre-natal, pensioner hormones, growth, genitals, adolescent, mature, adulthood, infancy, life expectancy	Circulatory system, pulmonary Heart, blood, blood vessels, lungs Arteries, veins, capillaries Oxygenated, deoxygenated Oxygen, carbon dioxide Atrium, ventricle, pulse Vena cava pumps, nutrient, alveoli, gas exchange , ventilation, villi, liver, kidneys

			Leg – thigh, calf Arm, Shoulder, elbow Hand, finger, thumb, finger nail Neck, chest, knee Foot, heel, toe, toe nail		Contract, relax	canine, pre- molar , molar, incisor, wisdom decay, enamel, plaque, fluoride, grinding producers, predators and pray consumer, primary, secondary		Lifestyle, drugs, alcohol, obesity, heart disease, cardiovascular.
Objectives/ Knowledge	The key features of the life cycle of a frog, butterfly and hen To use all of their senses when exploring natural materials To know the names of common animals and their young To understand the simple life cycle of an animal: butterfly, frog and chick Know where different animals live and their habitats: farm, jungle, minibeasts and pets Identify and name a variety of common animals and match adults to their young	That vertebrates are animals that have a backbone. There are five groups of vertebrates: Mammals, fish, birds, reptiles, amphibians. And give an example. The key features of each group. That animals that only eat meat are called carnivores.- (lion, cats, bear), Animals that only eat plants are called herbivores. (Horses, giraffes, rabbits) Animals that eat plants and meat are called omnivores. (dogs, humans). We are human beings and in the group of mammals There are 5 human senses: The different parts of the body and what they do. We smell using our nose. We taste using our tongue. We touch using parts of our body, like our hands. We see using our eyes. We hear using our ears	That every living thing grows into an adult. (Dog, puppy, fox – cub, badger – cub, Horse- foal, cow- calf, owl – owlet, bear- cub, Bird- chick) That a life cycle is the series of changes that an animal (butterfly/ human) passes through from the beginning of its life until its death. Explain he life cycle of a human, frog (egg) and caterpillar. Baby, toddler, child, teenager, and adult, elderly. egg, caterpillar, pupa, butterfly All animals need water, air and food to survive. To keep healthy, humans need: to eat a balanced diet , get some exercise to keep their bodies healthy and to keep good hygiene by washing regularly, having clean clothes, brushing teeth and hair	Animals can not make their own food and have to eat to get nutrition. (pigs, hedgehogs, chickens, lion, toad, snake, owl, horse, rabbit, zebra, gorilla), What types of foods make a balanced diet – carbohydrates, protein fibre, fruit, fats, (and give examples of these) and what minerals, vitamins and water What jobs these groups do for us. That all vertebrates have skeletons and know what an exoskeleton and endoskeleton is. That skeletons do three important jobs: protect organs inside the body; allow movement; support the body and stop it from falling on the floor. Some of the bones in the skeleton.- Skull, clavicle, scapula, rib cage, humerus, spinal column, pelvis, ulna, radius, femur, fibula and tibia Know how muscles work and name bicep, trice,, and abdominals. Pectorals, hamstring	That digestion is the way the body breaks down the food we eat into smaller parts that can be used to give the body energy. The organs of the digestive system and their functions (mouth, tongue, teeth, oesophagus, stomach, small and large intestine) The types of teeth – canines, incisors, pre –molars, molars, wisdom. that canines are pointed and grab food, incisors are for snipping and cutting, molars and pre molars for holding and crushing moles for grinding. How to keep teeth healthy and avoid tooth decay, What a food chain is and identify producers, predators and prey	The main stages of a human life , (baby, toddler, child, teenager, adolescent, adult and pensioner) That puberty is the change that happens in late childhood and adolescence where the body starts to change because of hormones. What changes occur to boys and girls	The main parts of the circulatory system ((consisting of heart, blood vessels, blood, veins, arteries, capillaries, oxygen, lungs and ribcage), That the heart pumps the blood through the blood vessels so that food and oxygen can get to all the parts of the body. To know that the blood vessels carry the blood around the body. To know the three types of blood vessels – veins, arteries and capillaries: The arteries, which carry the blood away from the heart, the capillaries, which enable the actual exchange of energy between the blood and the tissues, The veins, which carry blood from the capillaries back toward the heart. To know that the blood carries oxygen and food around the body. How a good or bad lifestyle can affect the heart: exercise, diet, smoking, drugs, obesity etc
Skills Working Scientifically	Talk about the life cycle of a frog, butterfly and hen To match adults to their young To notice growth and change in themselves over time	Use observations in the local environment to compare animals or through videos and photographs. Describe how to identify and group animals Group animals according to what they eat. Research how to take care of animals taken from the local environment and how to return them safely. Label the different parts of the body and describe what each part does. Participate in a sensory experience where you taste, feel, look at and see different foods and compare and contrast. Compare different textures, sounds and smells. Discuss activities where you might use more than one sense (e.g. playing football).	Compare the differences between humans at different stages in their lives. Find out more about the life cycle of a different animal. Record a food diary and make observations on it. Collect information and present it in a pictogram or bar chart. Overserve and record the effects on exercise on the body.	Compare and contrast the diets of different animals and notice similarities and differences. Research what a balanced diet is and find meals that promote this. Group animals with and without skeletons and compare the ways in which they move. Measure, compare and show using tables and bar charts the lengths of bones Investigate and explain how a muscle works.	Explain how the digestive system works including using labelled diagrams Explain the functions of different types of teeth including using labelled diagrams Research the different teeth of different animals- herbivores, omnivores and carnivores and how and why they differ. Plan and carry out fair investigation the amount of sugar in drinks, how sugar leads to an increase in plaque and how this destroys tooth enamel. Gather data, record results and explain findings of experiment	Research the gestation periods of other animals and comparing them with humans and present findings to the class. Collect data around school about height and hand span of different age ranges of pupils. Record in different graphs and tables to show findings. Compare the growth pattern of humans to other animals. Record results in different ways show what the similarities and differences are	Explain the circulatory system using words and scientific diagrams Plan an investigation to see how your pulse change with exercise using repeat readings. What is the most efficient way of presenting this data and results. Investigate which exercise produces the fastest pulse? Use more than one variable. How would you make this a fair test? Research and present findings of problems of the heart with one aspect of a bad lifestyle
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Living Things

National Curriculum Objectives	Begins to understand the need to respect and care for the natural environment and all living things. Explore the natural world around them.	See Animals including Humans	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.	See Plants in Year 3 for objectives.	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 specific habitats.	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.
Vocabulary	animal, respect, care for, look after, home, habitat, camouflage, food, farm, jungle, pond, environment		Depend, survive, life processes Habitat, micro habitat, environment ocean, forest, river, pond, tundra, woodland, tundra, vegetation, Source, Mini beast, Food chain		organisms vertebrates (fish, reptiles, birds, mammals, amphibians) and invertebrates (insects, arachnids, molluscs) life processes: movement, respiration, sensitivity, growth, reproduction, excretion, nutrition classification key. criteria environment, habitat	Mature, sexual, asexual, fertilisation, fertilise, egg, adult, reproduce Anther, ovary, ovule, petal, stamen, style, stigma, pollen, Pollination, bulb, seed dispersed, gamete	classify, classification, characteristics, distinguishing features Species, Genus, Family. Order Class, Phylum, Kingdom Micro organisms Dust mites, bacteria, fungi, virus mould
Objectives/ Knowledge	That we need to care for and respect our natural environment To notice growth and change in themselves over time that minibeasts live in our school ground and name some of these whilst exploring. some of the creatures they would find in the. Farm. Jungle and pond habitat.		That animals can be split up into three groups: living (tree, person, animal, fish, grass) dead (paper, bunch of flowers, cotton shirt, wooden table), and things that have never been alive (plastic, chair, pen, window, stone, metal). That a habitat is a place where living things, such as animals and plants, can find all of the things they need to survive. This includes food, water, air, space to move and grow and shelter. Some habitats are large, like the ocean, and some are very small, such as under a log. Know the habitats – ocean, forest, river, pond, tundra, woodland, tundra . Microhabitats are very small habitats where minibeasts may live and light to grow and if they do not have one or more of these. That animals and plants depend on each other for survival and this can be shown as a food chain. Know some well known food chains such as: dead leaves, birds, worms.		That animals can be grouped in to vertebrates (fish, reptiles, birds, mammals, amphibians) and invertebrates (insects, arachnids, molluscs). All living things, which can also be called organisms, have to do certain things to stay alive. These are the life processes: movement, respiration, sensitivity, growth, reproduction, excretion, nutrition. Know and use a classification key can identify different living thingsin groups such as body covering (e.g., hair, fur, feathers, scales, shells), body shape (e.g., two main features, three main features), appendages (e.g., arms, legs, wings, fins, tails), and method of movement (e.g., walking, crawling, flying, swimming). (flowering and non flowering plants)	That a life cycle shows how things are born, how they grow and how they reproduce. Life cycle of a mammal . Life cycle of an insect Life cycle of a bird Life cycle of a fish That reproduction is living things creating other living things, that animals have babies, and plants have seeds, which turn into new plants. What asexual and sexual reproduction is Sexual reproduction in plants - when the Pollen from one flower joins the Egg of the new flower and a seed or many seeds are formed. Asexual reproduction in plants-this is when a small part of a plant breaks off and it starts to grow until it is the same size as the plant it came from and this is repeated.	That animals can be grouped in to vertebrates and invertebrates and each group of these: Fish Amphibians, Reptiles, Birds, Mammals, Insects, Arachnids, Molluscs. To know distinguishable features of each group. Who Carl Linnaeus was and his system for grouping animals. That microorganisms are very tiny organisms where a microscope has to be used to see them. The examples of microorganisms include dust mites, bacteria and fungi, such as mould. That some microorganisms can be helpful in certain situations. Others can be harmful, and their spread needs to be controlled or contained.

						How habitats can be changed through human and environmental effects		
	Skills Working Scientifically	Look after our school grounds and know some of the things we need to do to respect our natural environment – respecting natural habitats, not dropping litter, the need to recycle, watering plants Investigate what creatures we can find in a school habitat.		Group animals according to whether they are alive, dead or never living Group animals according to their habitat Observe and identify animals in a microhabitat in school Compare two different habitats and explain what animals and plants can be found there. Go on a minibeast hunt. Create a tally chart or pictogram to show your results. Answer questions such as 'Why would a polar bear not survive in the desert?' Create simple food chains that begin with a plant.		Group animals in different groups depending on the features –body parts, what they eat, where they live etc Use criteria to sort living things in a Carroll and Venn diagram. Use a classification key to identify animals and plants Carefully observe minibeasts in a microhabitat and use a classification key to identify them. Research examples of human impact (both positive and negative) on environments.	Explain and use scientific diagrams to explain different life cycles Compare the life cycles of mammals, amphibians, insects and birds. conclude what is similar about their life cycles? What is different? Compare and present what you already know about David Attenborough, and compare his work to another naturalists. Investigate into growing new plants from different parts of a parent plant (e.g. seeds, stem, root cuttings etc.) Record and measure results.	Use classification systems and keys to identify some organisms in the immediate environment. Record these in a variety of ways (e.g. Venn and Carroll diagrams, tables) Research unfamiliar organisms from a broad range of other habitats and decide where they belong in the classification system. Research the work of Carl Linnaeus and present your work to the class. Investigate the different factors that help / prevent microorganisms form growing. Research scenarios where microorganisms might be helpful (e.g. yeast in baking) or harmful; (e.g. infectious diseases).
		FS2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Evolution and Inheritance	National Curriculum Objectives							Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
	Vocabulary							Evolution, offspring, generations, species, survival of the fittest natural selection characteristics, physical inheritance, variation, mutations, identical, traits, evolve, fossils adaption, adapted, environment advantage, disadvantage,
	Objectives / Knowledge							That evolution is a process of change that takes place over many generations, during which species of animals, plants, or insects slowly change some of their physical characteristics. This is because offspring are not identical to their parents.

								That this occurs when there is competition to survive. This is called natural selection. That inheritance is when characteristics are passed on from generation to the next and mutations in characteristics are not inherited from the parents and appear as new characteristics. That we get evidence of evolution from fossils. That adaptation is when animals and plants have evolved so that they have adapted to survive in their environments. That some environments provide challenges yet some animals and plants have adapted to survive there and sometimes adaptations can be disadvantageous.
	Skills Working Scientifically							Research the work of Charles Darwin or Alfred Russel Wallace. Investigate genetic traits of family member – eye / hair colour, tongue rolling etc Describe and draw different fossils and explain how they are made, Research how an animal or plant identifying how it has adapted to its environment and how it has evolved to survive.
		FS2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Properties of Materials	National Curriculum Objectives	Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	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. Distinguish between an object and the material from which it is made.	Identify and compare the suitability of a variety of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Compare and group 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	Compare and group materials together, according to whether they are solids, liquids or gases. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 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)	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 layering, decanting, 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.	Revision of all aspects learnt

							Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Vocabulary	Change, mix, watch, observe, discuss, question, predict, freeze, melt, heat, cold, temperature, playdough, porridge, cook, change, clay, water, hardens, softens, magnets, attract, materials	stretchy, dull, stiff, rough, smooth, bendy, transparent, opaque, waterproof, absorbent properties, material Liquid, surface, object Natural, Man made	Stretching, twisting, bending, squashing Elastic, recyclable, hard- wearing, flexible, light, light weight, heavy, hard, strong, fragile, inflatable Suitable, unsuitable, Macdamisation Fabrics, rubber, tarmac	Sedimentary, Metamorphic, Igneous Crumbly, hard, skeleton Sediment, lava, magma, molten Permeable, impermeable, layers, permeates, density Erosion, erodes, palaeontology, fossilisation, fossil, imprint, weathered Decay, crystallise, pressure Topsoil, subsoil, baserock –sandy soil, clay soil, chalky soil, peat Minerals, organic, air	Solid, liquid, gas Particles, state of matter Process. Properties Ice, water, water vapour Condensation, cooling Evaporation, heating Freezing. freezing point Melting, melting point. Temperature, boiling point Celsius (°C) precipitation water cycle oxygen, carbon dioxide, helium, neon, nitrogen	hardness, solubility, properties, transparency, conductivity, magnetic, flexibility, permeability, dissolving, separating, mixture, solution, soluble, insoluble, substances filtering, sieving, reversible, irreversible product, burning	
Objectives/ Knowledge	I know that materials can change – mixing water with sand, mixing water with soil I know that the temperature can affect the state of a material – the sun melting ice, the cold freezing water, clay hardening when left out and gets moist when water is added	That materials can be made out wood, paper, rock, metal, plastic, water, brick, fabric, leather, plastic. know that words like: hard, soft, shiny, stretchy, dull, stiff, rough, smooth, bendy, transparent, opaque, waterproof, absorbent are used to describe the properties of the material. If they are man-made or natural.	materials that objects are made from. (develop and extend from year 1- (foil, copper, steel, iron, ceramic, glass, wool, cotton, silk, rubber). That some words to describe materials (develop and extend from year 1) Elastic, recyclable, hard-wearing, flexible, light, light weight, heavy, hard, strong, fragile, inflatable That materials are made from different purposes based on the properties. Glass is used for a window because it is transparent, fabric is used for clothes because its soft and flexible. Metal is used for a bike because its strong and hard.) That the shape of some materials can be changed when they are stretched, twisted, bent and squashed. Know some famous people who developed new materials- John Dunlop, Charles Macintosh John McAdam	That there are 3 types of rock- Sedimentary, Metamorphic, Igneous. -Sedimentary usually crumbly and allow water through them. They are made of layers of sediment and been pressed down hard and sticking together. They can contain fossils within their layers. Metamorphic are usually hard. They set out as one of the other types but have changed due to pressure or heat. Igneous rocks are very hard and formed from lava or magma What a fossil is and how it is formed. An animal dies, its skeleton settles on the sea floor and is buried by sediment. The sediment surrounding the skeleton thickens and begins to turn to stone. The skeleton dissolves and a mould is formed. Minerals crystallise inside the mould and a cast is formed. The fossil is exposed on the Earth's surface. Types of soil – sandy soil, clay soil, chalky soil, peat Soil is made of minerals, organic matter, water, air..	That materials fall into 3 categories – solids, liquids and gases and they are the 3 states of matter. The properties of each state. Give examples of each state. The different changes of state for ice, water, water vapour and what temperatures this happens at. The names of the processes of this –freezing, melting, condensation and evaporation. To know what happens with other materials are heated and cooled (chocolate, candle wax,) The water cycle and its part it plays in changing state.	A range of materials and their properties based on hardness, solubility, transparency, conductivity, magnetic. that dissolving is when the particles of a solid mix with the particles of a liquid and the result is a solution. Different soluble (sugar) and insoluble (sand) substances. That a reversible change is a change that can be reversed by filtering, sieving or evaporation. That an irreversible change can not be changed back and creates a new product.	

	Skills Working Scientifically	Make own porridge and observe changes that take place Observe what happens to clay when this left out Observe what happens to clay when water is added to it To make own playdough and observe changes that take place Explore magnets	Identify and group what different materials are made form Describe the materials using words like hard, soft, shiny, stretchy, dull, stiff, rough, smooth, bendy, transparent, opaque, waterproof, absorbent. Ask questions to identify different materials Identify materials that are man-made or natural, umbrella etc. Identify the best material for something – e.g. a window	Group materials in different ways according to their properties Compare the uses of everyday materials found in school to other places Group and compare materials which are natural and which are man-made Explain why these materials are used for a particular product. Plan, carry out and record a simple investigation to see which materials are best to use Investigate and observe how some objects can be changed by squashing, bending, twisting and stretching.	Identify and sort different types of rocks based on their properties, giving reasons to justify their group. Investigate what happens when different types of rocks are rubbed together, Explain how different types of rocks are formed. Investigate different properties of rocks. Explain how a fossil is formed. Research the different living things whose fossils are have found. and compare the different kinds of soils, you can find in the local environment.	Explain what a change of state is and the particle structure of solids, liquids and gases. Group and sort materials according to their states, giving reason to justify this. Use and read a thermometer accurately. Investigate how different factors affect melting or evaporation. Observe, describe and present these changes in other materials –(ice, candle wax, ice cream. Research what temperatures things melt at Compare their melting points and place them in a table/ graph Analyse and interpret different forms of data (tables, graphs) to show the effects of temperature on states of matter. Explain and present the water cycle and how where these processes are seen in it	Identify, classify and describe materials based on fair tests using their properties. Investigate thermal insulators and measure the temperature over time and plot these on a line graph. Plan an experiment that investigates dissolving - consider which variables you could change. Investigate which substances dissolve and which do not. Use filtering, sieving and evaporation to separate mixtures and explain the process you did. Observe, explain and compare the irreversible changes – example: when cakes are baked or bicarbonate of soda mixes with vinegar.	
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Earth and Space	National Curriculum Objectives	Understand the effect of changing seasons on the natural world around them. .	Observe changes across the four seasons (Expectation to revisit across academic year) Observe and describe Weather associated with the seasons and how day length varies. (Expectation to revisit across academic year)				Describe the movement of the Earth and other planets relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
	Vocabulary	Seasons, winter, spring, summer, autumn, months, Earth, planets, sun, moon, globe	Autumn – September, October, November Winter – December, January, February Spring – March, April, May Summer– June, July, August Temperature Weather, Thunderstorm, hemisphere				Earth, sun, moon, planet, galaxy, star, solar system, universe Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune Dwarf planets, Pluto, Milky Way Asteroids, comet, meteoroid, Time zones, satellite Axis, orbit, spin, gravitational pull, day, gravity, Approximately, leap year Sphere, spherical, rotating astronomer	
	Objectives / Knowledge	The effect of the changing seasons on the world around them Describe what they see, hear and feel whilst outside in the different seasons. Know that seasonal changes occur throughout the year	That there are 4 seasons called Autumn, Winter, Spring and Summer. That the months that are in these seasons. . Know that the seasons occur in a cycle.				That the sun is a star at the centre of our solar system. The solar system has eight planets; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.	

		Items to discover: Autumn, conkers, leaves acorns, sycamore keys. Spring, daffodils, hyacinth, crocus – flowers in the school grounds. Summer – sun hats, ice cream, sun glasses. Winter – coat, hat, scarf, gloves, snow balls, ice, frost.	Know that the length of daylight varies with Winter having the shortest daylight hours and Summer having the longest. What the weather and temperature is like during these seasons. That the seasons happen at different times depending why you are in the world.				The Earth orbits (goes around) the Sun. The Earth takes one year (365 and a quarter days) to orbit the Sun. The Earth is held in its orbit round the Sun by the Sun's gravitational pull. The Moon orbits the Earth. It takes about 28 days for the Moon to orbit the Earth. It is held in its orbit round the Earth by the Earth's gravitational pull. We see the different phases of the moon depending on where it is in its orbit. The Moon's gravity causes high and low tides. The Earth spins on its own axis and takes 24 hours (1 day) to do this. The side of the Earth facing the Sun is in daytime. The side of the Earth facing away from the Sun is in night time. The sun does not move but because the Earth is rotating, the Sun appears to move across the sky as the day goes on	
	Skills Working Scientifically	Talk about what I see using a wide range of vocabulary Discuss changes we can see and feel as the seasons change throughout the year Draw observations	Observe the weather and temperature in the different seasons Describe and record key features of each season Investigate and compare seasons in the Southern and Northern Hemisphere.				Research facts, figures and measurements of the planet and use in scaled models Explain and demonstrate how the sun, earth and moon work together. Observe and record, using labelled diagrams, the phases of the moon Compare the time of day at different places on Earth	
		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Light and Seeing	National Curriculum Objectives				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 a solid (opaque) object. Find patterns in the way that the size of shadows change.			Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Vocabulary				light, dark, object Pupil, retina, Light sources, sun, ray, electric Reflected, reflective, blocked Shadow, opaque UV Midday, midnight, length			Light waves, source, surface Emit, Law of reflection Reflection, incidence, angle Reflect, incident, ray Refraction, bends shadow, opaque, shorten, elongate prism,
Objectives				That we need light in order to see things. That A light source is something that makes its own light. That there are light sources and things that reflect the light. That light travels in a straight line but when light hits an object, it is reflected. That light bounces off some materials better than others and shiny objects reflect light well. That t is not safe to look straight at the sun. you should wear sunglasses. When light from a source is blocked by an opaque object, you get a shadow. That a shadow is larger when it is close to the light sources because it blocks more of the light.			That all light travels in a straight line. That light travels as a wave and doesn't need anything to travel through. That we see because the light from the sun or source hits objects and then is reflected and bounces to our eyes. That reflection is when light bounces off a surface - this changes the direction in which the light travels. That understand that the angle of reflection is always equal to the angle of incidence. That light bends in water and is called refraction. That the size of a shadow changes as the light source moves and that the angle of the object can shorten or elongate shadows too.
Skills Working Scientifically				Predict, test and conclude which surfaces reflect light well. Investigate how mirrors reflect light and explain how mirrors work Explore and observe which objects form shadows when light is shone on them. Investigate and explain how can you change the size and shape of shadows by using the same object? Observe and explain how the time of the day affects the shadows made by the sun			Explain, using research and draw labelled diagrams to show how we see. Explain and demonstrate that because light travels in straight lines, when there is an opaque object blocking the light, a shadow is formed. These shadows have the same shape as the objects that cast them. Investigate what happens to light in water and present findings Research and present findings on how different optical instruments work and are used.– a telescope, mirror, etc Design an experiment to measure shadow length by changing a variable. Show your results in a line graph. Explore and present different contexts in which light travels including rainbows, colours on soap bubbles and coloured filters.
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Forces, Movement & Magnets

National Curriculum Objectives	Explore and talk about the different forces they can feel.			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.		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.	
Vocabulary	Magnet, attract, pull, explore, find, sort			Push, pull, slow down, speed up Forces, friction Surfaces, motion Magnet, magnetic, non magnetic, magnetic forces, Poles, repel, attract, resist North pole, south pole Aluminium, copper, iron, steel		forces, friction, gravity, air resistance, water resistance, gravitational pull, buoyancy Motion, effects, surface, streamlined, Levers, pulleys, gears, springs, mechanisms	
Objectives	To know about the different forces they can feel To name the forces push and pull			That forces are pushes and pulls. These forces change the motion of an object and they will make it start to move or speed up, slow it down or even make it stop. That friction is a force that slows down objects and different surfaces create different amounts of friction. Magnets produce an area of force around them called a magnetic field. When objects enter this magnetic field, they will be attracted to or repelled. When magnets repel, the push each other away and when magnets attract, they pull together. Objects that are magnetic, are attracted to magnets. Metals such as Iron and steel are magnetic. Aluminium and copper are non-magnetic. Ends of a magnet are called poles. One end is called the north pole and the other end is called the south pole. Opposite poles attract, similar poles repel		That forces are pushes and pulls that change the motion of an object. They will make it start to move or speed up, slow it down or even make it stop. That gravity is the force that pulls objects to the centre of the Earth. That Friction is a force - it is the resistance of motion when one object rubs against another, discovered by Isaac Newton. That air resistance slows down moving objects, because air slows you down as you move through it. That water resistance slows down moving objects, because water slows you down as you move through it. That levers allow us to do heavy work with less effort, pulleys also allow us to do heavy work That objects are attached to ropes and pulley wheels, and so instead of lifting heavy object upwards, we can pull on the pulley rope downwards, That gears are toothed wheels and their 'teeth' can fit into each other so that when the first wheel turns, so does the next one. This allows forces to move across a surface	

	Skills Working Scientifically	Discuss the different forces they feel – how water pushes up when they try to push a plastic boat under it, how elastic can be stretched, how a magnet can attract or repulse Use a variety of different materials when exploring magnets			Observe and describe different forces I see around me. Construct an investigation the find the amount of friction created by different surfaces. Use measures (such as length and time) to show how far or fast and object travels and record this. Observe and record how a magnetic field attracts iron filings by using a bar magnet. Research how magnets are used in everyday life. Predict and investigate which materials are magnetic and sort them into groups and share my conclusion. Investigate if the size of a magnet affects how strong it is (using chains of paper clips of varying lengths).and present my findings.		Draw labelled diagrams to show how objects move down ramps, through the air and through water, using arrows to show the direction of the forces. Investigate and explain the effects of friction on motion and find out how it slows or stops moving objects. Plan and investigate, using repeat readings, how surface area affects air resistance and gravity. Record and present results in a range of ways. Design, make and draw conclusions from products that use levers, pulleys, gears and/or springs and explore their effects	

		FS2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Electricity	National Curriculum Objectives					Identify common appliances that run on electricity. (Washing Machines, mobile phone, lawn mower, toaster, microwave, tablet, television, fan, sewing machine, iron, hairdryer). Construct a simple series electrical circuit identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Identify whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of complete loop with a battery Recognise some common conductors and insulators, and associate metals with being good conductors.		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.
	Vocabulary					Electricity, natural mains, battery power Fuel sources, appliances, flow Renewable, non renewable Circuit, positive, negative Electrical component, gap, generate Power sources, bulb, cell, switch,		series circuit, symbol, component, current Battery, cell, bulb, motor, buzzer lamp, switch, motor, resistor, wires, voltmeter Brightness, loudness, voltage, current, amps, resistance, electrons

						buzzer, motor, wires, battery Electrical conductors, insulators, metals, iron, copper, steel		
	Objectives					That electricity is generated using energy from natural sources such as the Sun, oil, water and wind. And are called fuel sources. That many everyday appliances use mains electricity and this can be harmful. That some appliances are used by batteries, Electricity can flow through the components in a Complete electrical circuit. A circuit always needs a power source, such as a battery, with wires connected to both the positive (+) and negative (-) ends. A circuit can also contain other electrical components, such as bulbs, buzzers or motors, which allow electricity to pass through. You can use a switch in a circuit to create a gap in a circuit. When objects are placed in the circuits, they may or may not allow electricity to pass through. Objects that allow electricity to pass through are called electrical conductors. Objects that do not allow electricity to pass through are called electrical insulators. Good conductors are metals, such as iron, copper and steel		The symbols for parts of an electrical circuit -blubs, motors, buzzers, switches, cells, voltmeter. When a circuit will and will not work. What a series circuit is. That the more cells that are used in a circuit, the brighter the bulb or louder the buzzer. If one cell is used, the higher its voltage, the more powerful the cell is. If the wires are shorter, the bulb will be brighter as there is less resistance To know that you can use a switch in a circuit to create a gap in a circuit.
	Skills Working Scientifically					Group appliances into battery powered and mains electricity, giving justified reasoning. Predict and make a variety of circuits, investigating which circuits work and why. Record my work by drawing labelled diagrams Naming the basic parts. Make my own switch in a circuit. Predict, investigate and conclude which materials are electrical conductors and insulators.		Set up my own working circuit using a range of parts. Draw a labelled diagram of an electric circuit using symbols. Predict and investigate what happens when you add more bulbs / batteries to a circuit. Predict and investigate what happens when the voltage of the battery changes. Predict and investigate what happens when the length of the wires changes. I can give conclusions using explanations and research from my investigations.

		FS2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sound and Hearing	National Curriculum Objectives					Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases		
	Vocabulary	sense, sound, hearing, loud, louder, quiet, quieter, listen, ear				Sound waves, vibrations, source Travel, transmit, particles, medium, Ear drum, brain Pitch – low, high Volume- loud, quiet Amplitude, decibel, frequency, Soundproof, absorb, sound		
	Objectives	To know the difference between loud and quiet sounds To use musical instruments when exploring how to make sounds louder and quieter				That sound happens when something vibrates. That the vibration makes the air around the object vibrate and the air vibrations enter your ear. These are called sound waves. If an object is making a sound, a part of it is vibrating, even if you cannot see the vibrations. Sound waves travel through a medium (such as air, water, glass, stone, and brick) The sound waves travel to the ear and make the eardrums vibrate. Then messages are sent to the brain which recognises the vibrations as sounds. The pitch of a sound is how high or low it is. The volume of a sound is how loud or quiet it is. High pitch sounds are created by short sound waves. Low pitched sounds are created by long sound waves. The closer you are to the source of the sound, the louder the sound will be. The further away you are from the source of the sound, the quieter the sound will Be.		

	Skills /Working Scientifically					Investigate, observe and record where I see different vibrations Explain how we hear sounds using secondary sources and labelled diagrams. Fill identical jars with different volumes of water. Which one creates the highest pitch? Predict, investigate and give conclusions on how to change the volume and pitch of a sound. Plan, carry out and conclude which material would make the best sound defender?		