High View Primary Learning Centre

Science Curriculum

Overview of Topics								
	FS1	FS2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	Autumn Time All about me – naming body parts.	Seasons Autumn Our environment	Earth and Space Seasonal Changes: Autumn	Animals inc Humans	Light and Seeing	States of Matter	Forces	Animals inc Humans
Autumn 2	Babies	Looking after ourselves- bodies, teeth, eyes	Earth and Space Seasonal Changes: Winter	Animal inc Humans	Forces, movement & magnets	Sound	Forces	Electricity
Spring 1	Winter Materials – keeping warm Predicting weather.	Winter Freezing and melting Transport	Properties of Materials Everyday Materials	Properties of Materials Uses of everyday materials	Animals Inc Humans	Electricity	Earth and Space	Light and seeing
Spring 2	Spring Baby Animals	Spring Growth and planting	Earth and Space Seasons: Spring	Properties of Materials	Rocks and Fossils	Living Things	Properties of Materials	Revision
Summer 1	Mini beasts	Looking after pets Animal facts Endangered animals	Plants	Plants	Plants	Animals inc Humans	Living Things	Evolution and Inheritance
Summer 2	Seasons: Summer Looking after ourselves	Seasons: Summer Keeping Fit	Animals inc Humans Seasons: Summer	Living Things	Plants		Plants	Living Things

Intent: In science, we intend to inspire pupils with a curiosity and fascination about the world around them. We will develop their scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. We will develop their scientific language, enabling children to talk about their methods and explain their findings and conclusions. The curriculum will motivate them to become effective communicators of scientific ideas, facts and data whilst enhancing their practical skills of scientific enquiry.

		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	**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	Soil, seed, bean, grow, shoots, leaves, stem, sunlight, water, air, roots,	Wild Plants – daisy, poppy, nettle, Garden Plants – daffodil, crocus, Flowering plants – Local Trees – deciduous and evergreen leaf/leaves flower blossom petal fruit, berry root bulb seed trunk branch stem bark stalk vegetable	seeds bulbs fully grown use comparatives e.g. hotter grow/growth healthy shoot seedling, wither/limp die dry/crispy soil earth mature plants, germinate/germination water light, damp/wet/dry, dark/light hot/warm/cool/cold temperature	part role leaf/leaves flower blossom, petal fruit berry root bulb seed trunk branch, stem bark stalk water, notice similarities observations identify differences light air nutrients soil, fertiliser damp/wet/dry dark/light hot/warm/ cool/cold use comparatives e.g. hotter grow/growth healthy temperature transported life cycle, pollination seed formation seed dispersal			
	Objectives	Explore the natural world around them. – look at plants; daffodils, crocus, bean plants, cherry blossom trees, sycamore, silver birch and conifers. Grow beans, grass, cress, strawberries and tomatoes to see what plants need to grow – water, air, sun. Also look at taking care of natural world.	Know the names of common plants – tulip, hyacinth, carnation, lily, daisy, and buttercup. Know the names of common trees – oak, elm, maple, silver birch, sycamore, horse chestnut, crack willow. Know how to identify them from leaves, fruit and shape. Be able to identify which trees in the grounds of High View PLC are deciduous and evergreen. Know the names of the basic parts of a plant and their function – **leaves, flower, stem, roots, and petals.** Observe how roots and stems grow.	Know the role of the roots, flowers and leaves and how nutrients are needed to keep plants and animals alive. Know that the flower is where the seeds are made. Know that bees and insects help this process by carrying **pollen** from one flower to another. This is called **pollination.** Know that plants grow from **seeds** or **bulbs**. Know that when a seed **germinates** it starts to grow. Know that seeds need the following to germinate – **water, oxygen, warmth.** Know that plants need the following to grow and be healthy – water, air, warmth, light, nutrients (food absorbed by the roots.)	Know that different parts of plants have one or more **functions** (jobs). Know that flowering plants are any plant that produces a flower head or fruit. Plants are **producers**, as they make their food. Know how water travels through a carnation, celery stem. **Pollination, seed formation and seed dispersal** Living things move, grow, consume nutrients and reproduce; that dead things used to do these things, but no longer do; and that things that never lived have never done these things. This is the process of **pollination, seed formation and dispersal.** Know the four methods of seed dispersal, **Wind dispersal**, **Water dispersal**, **Animal Dispersal**, **Explosion**			

					Know the life cycle of a plant as follows – Germination, Growth, Pollination, Seed Formation, Seed Dispersal, and Germination.			
	Skills Working Scientifically	Talk about similarities and differences.	<u>Pattern Seeking –</u> Based on observations, encourage children to identify patterns – after comparing the size of leaves on different plants, children may suggest 'bigger plants have bigger leaves.'	<u>Observing over time</u> – measure change over time – plant growth. Select equipment needed. Comparative testing – How does the amount of water affect how seedlings grow?	<u>Observing over time</u> – systematic/careful observations. Use bar charts, pictograms and tables. What happens when I put this carnation in coloured water? <u>Patterns Over Time</u> – Investigate what happens when conditions are changed – more/less water, change in temperature, nutrients (Baby Bio vs other brands).			
		EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Animals inc Humans	**National Curriculum Objectives**	Physical Development – Make healthy choices about food, drinks and tooth brushing. Know and talk about the different factors that support their overall health and wellbeing. Understand the life cycle of an animal.	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	Food, healthy, fruit, vegetables, meat, fish, treats, exercise, fit, teeth, clean, brush, toothpaste, dentist.	wild animals pets Fish, Amphibians, reptiles, Birds, Mammals (including Humans), Farm animals, Woodland animals Herbivore, Omnivore, carnivore, tail wing claw fin scales feathers fur beak, body head senses ear = hear/hearing, eye = see/seeing, nose = smell/smelling mouth = taste/tasting, teeth, shoulder, elbow, hand, fingers, thumb = touch/touching, knee, leg, foot and toes.	offspring babies young grow, change adults, older/younger baby/toddler/child/teenager reproduction, life cycles/ life cycle develop, basic needs water food air breathing survival, exercise food types fruit and vegetable, bread, rice, potato, pasta, milk and dairy foods, fat or sugar, meat, fish, egg, beans, hygiene, clean, wash, healthy, medicine, drugs.	Nutrition nutrients food types fruit and vegetable, bread, rice, potato, pasta, milk and dairy foods foods high in fat or sugar meat, fish, egg, beans, carbohydrates protein vitamins and mineral fat dietary fibre water balanced skeleton, muscles support protection movement skull ribs spine/vertebra joints sockets bones tendons Similarities differences vertebrate/invertebrate diet	digestive system nutrition nutrients oesophagus (gullet) stomach small intestine large intestine rectum anus mouth teeth canines incisor molar pre-molar saliva tongue rip, tear, chew, grind, cut	Human, development, baby, toddler, child, teenager, adult, puberty, gestation, growth, life cycle, old age, life expectancy, adolescence, death	circulatory system heart blood blood vessels pumps oxygen carbon dioxide lungs diet exercise drugs lifestyle Nutrients water

	Objectives	Look at and try a range of foods and decide which would be healthy and which need to be eaten in moderation. Effects of exercise – breathless and effect this has on you. Teeth cleaning – dentist visit, routines, how to guides. Cover pets, domesticated farm and wild life. Look at young – which animals come out of eggs.	Know that animals are grouped together in 'families' based on shared properties. Name the groups – fish, amphibians, reptiles, birds and mammals. Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone. Understand the difference between a pet and a wild animal. Sorting animals into the correct classification. Know that herbivorous animals eat plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants. Know the features of a fish, mammals, amphibians, reptiles, birds. Know that we have five senses – smell, taste, touch, sight, and hearing and why we need them. Know that the brain controls the body. Know the location of the brain.	Know the following animals and their babies and identify them in photos – Dog, puppy, fox – cub, badger – cub, Horse- foal, cow- calf, owl – owlet, bear- cub, Bird- chick. Know that animals grow and change over their lifetime. – Stage – Baby, toddler, child, teenager, and adult, elderly. Know the **life cycle** of a butterfly – **egg, caterpillar, pupa, butterfly** (know the term **metamorphosis.** <u>Know</u> that animals and humans need **water, food and air** to survive (relate to looking after pets). Know that humans need **exercise** to stay **fit** and **healthy.** Know the following terms – **muscles, flexible, strength and circulation**. Know that a balanced diet consists of the five food groups below. Know examples from each and the health benefit of each food group. **Carbohydrates, Protein**, **Dairy Products**, **Fruit and vegetables**, **Fats and sugars** – Know that we need to drink water to be **hydrated** and stay healthy. Know that a **germ** is 'a very small living thing that causes disease'.	Animals, including humans, need food, water and air to survive. Know that all animals are **consumers** and rely on a **balanced diet** to maintain their health. The food that animals eat gives them **nutrients** for body health and maintenance. Know that different food types Fruit and Vegetables, fibre, vitamins, meat and fish, calcium from dairy products provide different **benefits** for humans. <u>Know</u> what a human skeleton looks like. Name the key parts – **skull/cranium, rib cage, spine, pelvis, collar bone, spine, vertebra, patella/knee cap, cartilage.** Skeletons designed to help movement, as well as offer **protection** of **organs**. Know that humans have muscles and name them. Know that **muscles** are attached to the bones, and are **responsible** for **movement through** contraction and **relaxing.** Know that joints occur where two bones meet and are able to move together – knee, elbow.	The digestive system Know that **digestion** is the breaking down of food **mechanically** in the mouth before **chemically** in the stomach. Know that the **mouth, tongue, teeth, oesophagus, stomach, small and large intestine** make up the human digestive system. Know that there are different teeth for different purposes. **Incisors**, **Canines, (Premolars and) Molars**. Know that you get two sets of teeth during your lifetime – the first set is often called the milk or baby teeth. Know that it is important to look after teeth by brushing at least twice a day for two minutes at a time. It is important to use toothpaste which contains **fluoride** as this protects teeth from tooth decay.	Know that all humans grow and develop from the time they are born until old age. Know the terms – **baby, toddler, child, teenager, adolescent, adult** and **pensioner** and the periods with which they roughly refer. Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.	Know the **circulatory system** is the system that **circulates** blood through the body. Know that this consists of the **heart, blood vessels, blood, veins, arteries, capillaries, oxygen, lungs** and **ribcage.** There are four **chambers** with two **atria** and two **ventricles.** Know that deoxygenated means 'to be depleted of oxygen' Know that blood is red when oxygenated and deep purple or blue looking through skin when not. Know that diet can impact on lifestyle as fatty rich food can **clog** arteries and veins, preventing blood from delivering what is needed. Know that exercise can improve the health of a person by removing **fatty deposits** from the body. Know that some exercises are called **cardiovascular**, and are designed to improve the fitness of the overall circulatory system by **strengthening** the organs and **pulse rate.**
	Skills Working Scientifically		<u>Classifying</u> Classify animals that have seen – choosing their own criteria. Classify animals based on physical structure. Classify animals they have first-hand experience of based on what they eat (plants, other animals, both).	<u>Classifying</u> Based on the children's own criteria: Classify food items. Classify animals.	<u>Classifying</u> Based on children's own criteria: Classify food items (leading to sorting by nutrients). Classify animals (leading to sorting by whether or not they have skeletons).		<u>Research</u> Develop questions to ask an expert, a health visitor, doctor or nurse. Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.	<u>Research</u> Generate questions to research about the human circulatory system. (Children present what they've learned in different ways, create a model, write a song, write a story, and create a PPT. <u>Observing over time</u> Observe pulse rates before, during and after exercise.
		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,	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.

				using the idea of a simple food chain, and identify and name different sources of food.				
Vocabulary	Autumn, spring, summer, winter, mini beasts, worm, woodlice, ladybird, spider, fly and caterpillar. Care/caring, living, respect, pets, dog, cat, rabbit, guinea pig.				fish amphibians reptiles birds mammals vertebrates invertebrates classify sort group classification keys environment carnivore herbivore omnivore producer consumer predator prey food chain life cycle reproduction sexual asexual mammal amphibian insect bird fish reptile eggs live young pollination seed formation seed dispersal pollen germination stamen stigma plantlets e.g. spider plant runners e.g. strawberry plant	organism micro-organisms fungus mushrooms flowering/non flowering, habitat, wind/animal pollinated, deciduous or evergreen, endoskeleton or exoskeleton **n** classification keys environment fish amphibians reptiles birds mammals vertebrates invertebrates, arachnid mollusc insect crustacean	Linnaean system Carl Linnaeus Homo-sapiens Classification Species Genus Family Order Class Phylum Kingdom Sexual reproduction Cycle
Objectives	How do we respect and care for mini-beasts and the animals we meet in everyday life (pets, wild life)? Impact of litter on the environment and how you can have an impact on this. Worm pick up – taking care of the natural world.			Know which items, including those made from a variety of materials, fit into each category and place them in a table under the headings **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).** Know that living things move, grow, consume nutrients and reproduce; that dead things used to do these things but no longer do; and that things that never lived have never done these things. Know that a species of animal or plant that is extinct no longer has any living members in the world – dinosaurs, dodo. Know that all creatures need air, food, shelter and water to survive. Link to food chains for how they depend on each other to survive. Know the terms **omnivore, carnivore** and **herbivore** to describe the eating habits of animals in the food chain. Know that the arrows on a food chain show the direction that the energy travels. Use the terms **Solar Energy, Producer, Consumer, Prey,** and **Predator** to describe a food chain and use the terminology to organise and create food chains.		Know the names and features of animals found in or near the sea. **Mammals**, **Crustaceans**, **Fish, Cephalopod, Birds.** Know the names and features of animals found in or near rivers and canals, **Mammals, Fish, Birds, Insects**, **and Amphibian**. Know that animals and plants can be put into different groups this is called **classification.** (Plant classifications = with seeds or without seeds, flowering plants, conifers, ferns and mosses). Animals can be classified **according to different physical characteristics**, 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). Know that plants can be classified into **flowering** and **non-flowering plants**. Flowering plants such as **grasses** and non-flowering plants such as **ferns, mosses.** Discuss the key features of each plant group.	Know that an **ecosystem** is 'all the plants and animals that live in a particular area together and the relationship between them and the environment'. Know that a tropical rainforest is an **ecosystem** consisting of '**wet, warm forest all year round**'. Understand the term **biodiversity** as 'the variety of animals and plant life in a particular **ecosystem'.** In biology, an adaptation is defined as 'the process of change by which an organism or species becomes better suited to its environment. Revise the seven life processes (from Y2) are **Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion and Nutrition**.	Know that there are millions of species of living things on our planet. Know that it would be difficult to describe and name each one individually. Know that while species can be very different from each other, many of them have similar features that allow us to put them into groups. Know that grouping things helps scientists identify gaps in their research and they get an idea of what to investigate next. **Know some modern classification systems.** Know that the scientific name for modern human beings is '**homo sapiens**'. Know that homo means 'man' and sapiens means 'wise'. Know that a genus is a class of similar things, especially a group of animals or plants that includes several closely related species. Know that a **species** is a class of plants or animals whose members have the same main characteristics and are able to breed with each other. Know that sexual reproduction in plants happens in a cycle-like pattern.

						Know that humans can impact positively and negatively on the environment. Positive – Pollinate and help spread crops. Negative – produce greenhouse gases, destroy crops, littering and pollution.		
	Skills Working Scientifically	<u>Pattern Seeking</u> Where in the playground do mini beasts tend to live? Where does litter accumulate in the playground?		<u>Pattern Seeking</u> Some questions can be answered by looking for links between variables where there is no causal relationship. Do small seeds germinate more quickly?		<u>Pattern Seeking</u> Some questions can be answered by looking for links between variables where there is no causal relationship. Do animals with …… have …….? Do plants with ….. have ……..?	<u>Pattern Seeking</u> Children generate questions such as: Do larger mammals have longer gestation periods? Do larger animals live longer? Do smaller animals lay more eggs?	<u>Classifying</u> Classify animals according to Carl Linnaeus' system. Classify plants into flowering, mosses, ferns and conifers, based on specific characteristics. Create a branching database/dichotomous key to classify a set of living things.
		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							suited/suitable environment suited adapted/adaptation Offspring evolution characteristics vary/variation inherit/inheritance fossils
	Objectives							Know that **characteristics** are passed from parents to their **offspring**. Know that **variation** in **offspring** over time can make animals more or less able to survive in particular environments. **Charles Darwin** Know that the theory of evolution states that evolution happens by **natural selection.** Know the story of Darwin's finches and how the shape of their beaks helped Darwin to develop his theories.

								Know that in biology, an a**daptation** is defined as *'the process of change by which an organism or species becomes better suited to its environment.'* Know that **fossilisation** is the process that forms fossils.
	Skills Working Scientifically							<u>Pattern Seeking</u> Use different pieces of equipment, chopsticks, toothpicks, cutlery, to look for patterns linking the suitability of bird beaks for the available food, rice, grapes, raisins.
		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. Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.	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. 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.	**Low stake retrieval tasks throughout the years.**

	Vocabulary		wood, plastic, glass, metal, water and rock. object material wood plastic glass metal water rock brick paper fabrics elastic foil card/cardboard rubber wool clay hard soft stretchy stiff bendy/floppy waterproof absorbent breaks/tears rough smooth shiny dull see through not see through	suitable/unsuitable use/useful object material property wood plastic glass metal water rock brick paper fabrics elastic foil card/cardboard rubber wool clay hard soft stretchy rigid flexible waterproof absorbent strong/weak shape changed push/pushing pull/pulling twist/twisting squash/squashing bend/bending stretch/stretching pinch/pinching poke/poking roll/rolling squeeze/squeezing	rock stone pebble boulder soil fossils grains crystals hard/soft texture absorb water let water through marble chalk granite sandstone slate sandy soil clay soil chalky soil peat	states of matter solid liquid gas air oxygen powder grain/granular crystals change state ice/water/steam water vapour heated/heating cooled/cooling temperature degrees Celsius melt freeze solidify melting point molten boil boiling point evaporate/evaporation condense/condensation water cycle precipitation transpiration	hard soft stretchy rigid flexible waterproof, absorbent strong/weak rough smooth reflective non reflective, transparent, opaque, translucent solubility, electrical conductivity thermal conductivity, magnetic melting states of matter solid liquid gas change state, dissolve solution soluble insoluble solute, solvent particle, mix/mixture, condensing, gas given off, filtering sieving decanting, evaporating residue not usually reversible new material reversible changes burning rusting	
	Objectives	Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice. Join different materials and explore different textures.	Know that matter (stuff) is made from tiny building blocks. This comes in three forms - **solids, liquids** and **gases**. Know that many materials are **solid** and have different **properties**. Know that some materials are **natural** and others are **man-made**. Identify different items and name what material or materials they are made from. Describe materials using key property vocabulary: **WORKING SCIENTIFICALLY** Test a range of materials and identify which properties they have. Group materials based on similar properties.	**Identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass).** **Think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials.** **Find out about people who have developed useful new materials, John McAdam.** **Work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.**	Know the three natural types of rocks: **igneous**, **sedimentary** and **metamorphic**. Know that the Earth has a solid **crust** made up of **tectonic plates** with **molten rock** beneath. <u>FOSSILS</u> Know that a fossil is the hard **remains** of a **prehistoric** animal or plant that are found inside a rock. Know that fossils are comprised of **body fossils** (animal **bones**) and **chemical** fossils (that contain **carbon** and prove life once existed such as imprints in the ground and leave **trace** fossils behind) and understand how fossils are formed. Know that fossils are only found in **sedimentary** rock and go through the same process of **compression** and **cementation** in the ground over long periods of time. <u>SOIL</u> Know that soil is a **mixture** of air, water, broken down rock **matter** and other **organic** material (dead or living animal **tissue)** Know the names of common soil types: sand, clay and silt. Know that sandy soil is dry and gritty, and does not hold onto water.	Know that everything is made up of tiny **particles**. The properties of a **substance** depend on what its particles are like, how they move, and how they are arranged. Most substances can exist in three **states**: **solid**, **liquid** and **gas**. The particles of a substance are the same in each state, but their **arrangement** and movement change Know that air is a collection of gases (not a single gas) and it contains - 78% **nitrogen**, 21% **oxygen** and a small amount of other gases including **carbon dioxide**. <u>Water Cycle</u> (links with geography curriculum) The study of the water cycle is part of the discipline of **physics,** (the hydrologic cycle) – the study of the processes that shape our world and how we use it**.** Know the term for each part of the water cycle: **evaporation, condensation, precipitation, Runoff.** Know that about 70% of the earth's surface is water. Identify solids, liquids and gases at room temperature – know that room temperature means neither heated nor cooled.	Know how to compare materials based on the properties of **hardness, solubility** (how easily dissolvable it is), **transparency, magnetism, conductivity of thermal** (heat) and **electricity.** Know that different materials will have different purposes, based on their properties. Know that solubility is the ability of a substance to dissolve. Know that dissolving is when a solid material mixes with a liquid and is no longer visible. Reversible and Irreversible Changes Know that **reversible** changes are changes that are not **permanent**. **Dissolving, mixing and altering states** are reversible changes. Water can be altered from solid to liquid, to gas and back.	
	Skills Working Scientifically		<u>Comparative Testing</u> Test objects made of different materials to see how effective they are. Umbrellas, hats, coats for waterproofness, cloths/nappies for absorbency, socks for elasticity, bounciness of balls, sunglasses for protection from	<u>Comparative Testing</u> Test materials for different uses. Which material can you use to make an aeroplane? Which fabric would you use for curtains? Which materials are best for Cinderella's mop? Which fabric would you choose for Elastigirl's costume? Which paper can be used for a	<u>Comparative/Fair Testing</u> Test the hardness of different rocks. Test what happens when rocks are put in water. Test how quickly water runs through different types of soil.	<u>Observing over time</u> Watch ice melt (ice hands). Watch hand prints dry, water hand prints on coloured paper towel. Watch frozen liquids melt.	<u>Comparative Testing</u> – the variable that is being changed is categorical. <u>Fair Testing</u> – the variable being changed is quantifiable – can be counted or measured. How does the type of sugar affect how quickly it dissolves? How does the volume of water affect how much salt can be dissolved in it?	

			the sun, picnic plates for stiffness, door mats for wiping your feet, different papers for writing on/painting etc.	book, fabrics for a child's dungarees, and materials for aeroplanes?).			<u>Classifying</u> Based on the children' own criteria: Classify the materials themselves, samples of wood, metal and plastic. After observing what happens when solids are added to liquids, classify materials based on the outcomes.	
		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) Seasonal Changes in Year 1				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,	season spring summer autumn winter weather hot/warm cool/cold sun/sunny cloud/cloudy wind/windy rain/rainy snow/snowing hail/hailing sleet frost fog/mist ice/icy rainbow thunder lightning storm light/dark day/night				Earth planets Sun solar system geocentric model heliocentric model Moon Mercury Venus Mars Jupiter Saturn Uranus Neptune Pluto 'dwarf' planet, orbit revolve. geocentric model heliocentric model celestial body sphere/spherical rotate/rotation spin night and day shadow clocks sundials astronomical clocks	
	Objectives	Seasons boards 4 across the year using school environment to show changes. Describe what they see, hear and feel whilst outside in the different seasons. Autumn, conkers, leaves acorns, sycamore keys. Spring, dafodils, hyacinth, crocus – flowers in classroom. Summer – sun hats, cream, glasses. Winter – coat, hat, scarf, gloves, snow balls, ice, frost.	Know that there are 4 **seasons** - **Autumn**, **Winter**, **Spring** and **Summer**. Know that the seasons occur in a cycle. Know that the length of **daylight** varies with Winter having the shortest daylight hours and Summer having the longest. **WORKING SCIENTIFICALLY** Know how to gather information on wind speed, rainfall and temperature at each season.				<u>Sun, Moon, Earth</u> Know that the Earth, sun and moon are approximately **spherical bodies** in space. Know that the Earth **rotates** once every 24 hours. Know that this creates **day and night** as the Earth takes 24 hours to complete one spin on its **axis**. Know that it is not safe to look directly at the Sun, even when wearing dark glasses Know that the sun appears to rise in the east and sets in the west. <u>Moon</u> Know that the moon is not a **light source** it reflects the light from the sun. Know that the moon orbits our Earth every 28 days, and this is called the **lunar cycle**. <u>Solar System</u> Know the names of the planets in our solar system in order from the sun - **Mercury, Venus,**	

							Earth, Mars, Jupiter, Saturn, Uranus, Neptune, (Pluto). Know that recently Pluto has been designated as a **dwarf planet** and is no longer included as a planet in the solar system. **Solar System Models** Know the way that ideas about the solar system have developed. Know how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. **Planets** Know that the planet names are derived from **Roman** and **Greek** mythology, except for the Earth which is Germanic and Old English in **origin.** **Space Exploration -**Know key facts about space exploration – first man, dog, moon landing. **Time Zones -**Know that there are different time zones across the world because of the rotation of the earth.	
	Skills Scientific Enquiry		**Observing over time.** How does the tree change over time? Using observations and ideas to provide answers to simple questions. Take weather measurements and make observations over the year. Record/photograph what children are wearing (jumper, coat, hats, scarves). Make observations of daylight hours – send a diary and toy bear home with one child each day and ask the child to record their activities, but the bear needs to go to bed when it gets dark and the children must record the time this happens. (this gathers evidence, over time, that day length changes and so do activities).				**Pattern seeking** Do larger planets rotate more slowly? **Observing over time** Measure shadows throughout the day.	
		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 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.

					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.			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				physics, energy, absence of light, light, darkness, reflected, surfaces, man-made, reflection, bioluminescence, filaments, fluorescent, gas, ultraviolet, blindness, separated, prism, indigo, violet, spectrum, opaque, block, transparent, translucent			Light, light source names of light sources, torch, dark/darkness, direct/ direction, reflect, reflective, Mirror, transparent opaque translucent shadow block absorb
	Objectives				Know that light is a form of **energy.** Know that energy is needed to make things happen. Every movement or change, no matter how small, requires energy. Know that energy comes in different forms and can be neither created nor destroyed, only changed from one form to another. Know that we need light to see things and that darkness is the **absence of light.** Know that light travels in straight lines. Know that light is **reflected** from **surfaces** (smooth, shiny surfaces reflect light more efficiently), and is not the producer of the light source itself. **Reflection** of light is when we can see the light on another surface. **Transparent** and **translucent** objects let light through, creating no clear shadows. **Opaque** = you cannot see through it, wood, stone, metal.			Know that **light travels** in **straight lines** from its **source**. Know that some light sources are **natural** (stars, sun, fire, lightning, bioluminescence) and some are **man-made (torch, light bulb, digital screen, laser pointer).** Know that light either travels in a straight line **directly** from the source or by **reflecting** off a **surface** into our eye. Know how to draw arrows to show light entering the eye from a light source or reflection. Know that all objects reflect light; smooth and shiny surfaces reflect all the rays of light at the same angle, rather than **scattering** the rays of light like rough or dull surfaces. **Shadows-** Know that a shadow is formed when light is blocked by an **opaque** object. **The Eye =** Know that the amount of light entering the eye is controlled by the **pupil**, which is surrounded by the **iris** – the coloured part of the eye. Know that the pupil **dilates** when it is darker to let more light into the eye. The pupil **constricts** when it is bright to reduce the amount light entering the eye.
	Skills Working Scientifically				**Comparative and Fair Testing** – Fair test, the variable being changed is quantifiable. How does the distance of the light source from screen affect the size of the shadow produced? **Identifying and Classifying**			**Comparative and Fair Testing** – Fair test, the variable being changed is quantifiable. Investigate the shape pf shadows and link this to light travelling in straight lines.

					Some questions can be answered by naming things and/or sorting them into groups. To do this, it may be necessary to carry out a simple test or use secondary sources. Which materials are transparent, translucent and opaque?			
		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				force push/pushing, pull/pulling, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnetic, material, metal, iron, steel, non-magnetic material, poles, north pole, south pole, attract, repel.		magnetic force magnet attract fall Earth gravity air resistance water resistance friction moving surfaces mechanisms levers pulleys gears force transfers weight, mass	
	Objectives	How do you make a toy move? Push or pull, spin, twist. Playground activities pushing and pulling, balls, outdoor			Know the types of forces push and pull. Know that there are three types of **contact** force: **impact** forces (when two surfaces **collide**), **frictional** forces (when two surfaces are already in contact) and **strain** forces (when an elastic material is stretched or squashed). <u>FRICTION -</u> Know that the **texture** of a **surface** will affect how another object moves along that surface. Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force. **Magnetism**		Know that the **force** that pulls things to the ground on Earth (and other planets) is called **gravity**. Know that the force of gravity also exists on the Moon but it is not as strong as it is on Earth. Know that objects with greater **mass** have a stronger force of gravity. Know the difference between mass and weight. <u>Friction, Air Resistance and Water Resistance</u> Know that **friction** occurs when objects move through water or air. **Air resistance** is a type of friction between air and another material (this is sometimes called **drag**).	

					Know that a magnet is a piece of iron or other material which **attracts** some metals towards it. Know that a magnet has 2 poles. Know the magnetic and non-magnetic materials.		It's the same for an object moving through water. If you go swimming, there is friction between your skin and the water particles. This is known as **water resistance**. <u>Levers, Pulleys and Gears</u> Know that **levers, pulleys and gears** are mechanisms that allow a small force to have a greater effect. Know how to label a diagram showing a lever, **load**, **effort** and a **fulcrum** or **pivot**. Know that **gears** are toothed wheels that lock together and turn each other. Know that a **pulley** is a device consisting of a wheel over which a rope or chain is pulled in order to lift heavy objects.	
	Skills Working Scientifically				<u>Researching</u> Find out how magnets are used in everyday life.		<u>Comparative/fair testing</u> Compare friction – trainers or weighted match box pulled with force meter, balloon rockets, CD hovercraft, balloon cars. Compare water resistance, boast in a gutter of water, plasticine in a cylinder of water (easier with a more viscous liquid – bubble bath). Compare air resistance – spinners, parachutes, sailing boats, straw rockets. Compare levers, pulleys and gears.	

		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		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.

						the lamp is part of complete loop with a battery. Recognise some common conductors and insulators, and associate metals with being good conductors.		
	Vocabulary					electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, connect/connection, buzzer, motor, series circuit, terminal, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, fast(er)/slow(er), conductor, insulator, metal/non metal		Electricity, appliances/device, electrical circuit, complete circuit, circuit diagram, circuit symbol, components, cell, battery, positive/negative, terminal, connect/connection, increase Decrease, loose connection, short circuit, wire, crocodile clip, bulb, bright/dim, switch, buzzer, volume, motor, fast(er)/slow(er), conductor, insulator, metal/non-metal, voltage, current resistance, series circuit, Circuit symbol, cell, buzzer, motor, switch, wire, resistor, lamp
	Objectives					Know that electricity is **dangerous**, and know how to be **safe** using it. Know how **electricity** travels through a **circuit**, and the various **components** that create a circuit Know **appliances** that run on electricity in school and at home and those that do not. Know how to create simple circuits using a battery, a bulb and a switch. Know that the word **current** describes the flow of electricity in a circuit Know that **conductors** allow electricity to pass through them and that **insulators** prevent the passage of electricity.		Know that electricity is created by **generators** which can be powered by **gas, coal, oil, and wind or solar**. Know that the electrical energy can be **converted** into other types of energy such as light, heat, movement or sound. Electricity is dangerous, so be careful when using electrical appliances. Know that electricity can **flow** through the **components** in a complete electrical **circuit**. Know that a circuit always needs a power source, such as a battery, with wires connected to both the **positive** (+) and **negative** (-) ends.
	Skills Working Scientifically					**Classifying.** Based on the children's own criteria, classify household appliances and/or toys (leading to electrical/not electrical, batteries/mains). Test materials to classify into insulators and conductors.		**Comparative/Fair Test** Investigate the effect of adding more bulbs to a circuit, more cells, more buzzers, more motors to a circuit.

		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					Sound, sound source, noise, vibrate/vibration, tune, travel, solid/liquid/gas, instrument, percussion, strings, brass, woodwind, tuned instrument, high/low, pitch, volume, loud/quiet, fainter, muffle, strength of vibrations, insulation		
	Objectives					Know sounds are made when something **vibrates**. Know that sound travels in longitudinal waves as each particle pushes the particles next to it. Sound cannot travel through space as there is no air. This is called a **vacuum**. Demonstrate that sound can travel through gas and liquid. Know the **structure**/ anatomy of the human ear. Know that the ear consists of the **outer ear** and **inner ear**. Know that the **eardrum** is a thin piece of stretched skin inside the ear which vibrates. Know that **pitch** is how high or low a sound is. Know that the **volume** of a sound is how loud or quiet a sound is.		
	Skills Working Scientifically					<u>Comparative and Fair Testing</u> In a fair test, the variable that is being changed is quantifiable, can be counted or measured.		

						How does the length of a plucked string affect the pitch of the note produced? How does the number of layers of fabric wrapped around a buzzer affect its volume? Explore pitch through a carousel of activities using milk bottles, straw pipes, rulers, elastic band guitars.		