Being a Scientist

EYFS

Science is assessed as part of 'Understanding of the World', and the aim is to help children to make sense of the world around them. They will learn to develop their skills of observation, prediction, critical thinking and discussion. These topics have been taken from our EYFS long term plan but new topics can be added to our Medium term plan as we observe and follow the interests of the children. Science does not stand alone in Reception. Scientific knowledge and skills come through within lots of Development Matters outcomes including Physical, Maths and Communication and language, however for the purpose of this document, topics with a prodimnet science focus have been shared.

Understanding the World:

The Natural World

- Explore the natural world around them, making observations and drawing pictures of animals and plants;

- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;

- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

People, Cultures and Communities

- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps;

- Know some similarities and differences between different religious and cultural communities in this country, drawing on their experiences and what has been read in class;

- Explain some similarities and differences between life in this country and life in other countries, drawing on knowledge from stories, non-fiction texts and – when appropriate – maps.

Topic	Knowledge	Skills & Development matters links	Vocabulary
Autumn Understanding the World - *The Natural World*	**Identify and describe autumn weather changes and changes in our environment.** **Explain why animals hibernate**.	**Classification** I sort using instructions or pictures I group by familiar features	**Sunshine** **Clouds** **Snow**

	Link their observations to stories read in class.	**Explaining** I use appropriate pictures & words to label items I use science words during an activity with help I can describe what is happening using words and actions.	**Wind** **Daytime** **Night time** **Spring** **Summer** **Autumn** **Winter** **Hibernate** **Animals**
We are the Future Understanding the World – *People, Cultures and Communities*	**To be able to name occupations of people who help us and know how they can help / keep us safe.**	**Explaining** I use appropriate pictures & words to label items I can describe what is happening using words and actions.	**Job** **Police, army, nurse, doctor, fire fighters**
Christmas / Easter	**Recognise, describe and join in with Chrstmas / Easter traditions.** **Link their observations to stories read in class.**	**Explaining** I use appropriate pictures & words to label items I can describe what is happening using words and actions.	**Jesus** **Cross** **Easter** **Family** **Mother, father, brother, sister, aunty, uncle, gran, grandad** **Hair, eyes, tall, short**

Winter Understanding the World - *The Natural World*	**Identify and explain changes in our environment and weather. Describe the habitat of Polar animals.** **Link their observations to stories read in class.**	**Explaining** I use appropriate pictures & words to label items I use science words during an activity with help I can describe what is happening using words and actions. **Conclusions** I talk about changes that I observe during activities.	**Habitat** **Animals** **Weather – snow, ice, icy, windy, cloudy, sunshine, warm, cold.** **Trees, greenery, town, village, city**
Chicks Understanding the World - *The Natural World*	**To describe the life cycle of a hen. To know what a chick needs to grow.** **Link their observations to stories read in class.**	**Explaining** I use appropriate pictures & words to label items I use science words during an activity with help I can describe what is happening using words and actions.	**Life cycle** **Hen** **Grow, growth** **Egg, hatch, lay, nest, warmth**
Minibeasts Understanding the World - *The Natural World*	**To describe microhabitats and sort minibeasts by characteristics.** **Link their observations to stories read in class.**	**Classification** I sort using instructions or pictures I group by familiar features **Explaining** I use appropriate pictures & words to label items	**Minibeasts, legs, shell, colour, large, small, feelers**

		I use science words during an activity with help I can describe what is happening using words and actions.	
Our Wonderful World Understanding the World - *The Natural World*	**Explain and understand the life cycle of a plant. Know how to care for plants.** **Make observations of plants and other living things, drawing and labelling.** **Link their observations to stories read in class.** **Plant a seed and make predictions.** **To describe the different zones of the sea.** **UW - The World:**They make observations of animals and plants and explain why some things occur, and talk about changes.	**Classification** I sort using instructions or pictures I group by familiar features **Explaining** I use appropriate pictures & words to label items I use science words during an activity with help I can describe what is happening using words and actions.	**Grow** **Plant** **Flower** **Stem** **Root** **Sun** **Food** **Sea** **Zone** **Water** **Deep** **Shallow**

Year 1			
Topic and National Curriculum Statutory Objectives	**Knowledge**	**Skills**	**Vocabulary**
Animals including Humans Pupils should be taught to: ● Identify and name a variety of common animals that are birds, fish, amphibians, reptiles and mammals. ● Identify and name a variety of common animals that are carnivores, herbivores and omnivores. ● Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, 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.	● Know that a mammal has live babies, breathe air, warm blooded and have a backbone ● Know that a carnivore is an animal that eats meat and examples, lion, tiger, polar bears. ● Know that a herbivore is an animal that eat plant for examples; rabbit, giraffe. ● Know that an omnivore is an animal that eats both plants and animal; humans ● Know the key differences between humans, birds, amphibians, reptiles and mammals.	**Explaining Science** ● Remember some simple facts about science ● Use & remember science words during activity ● Add science word labels (help) to diagrams. **Classification** ● Sort using simple yes/no statements ● Group by difference or similarity	Animals, Invertebrate (worm, spider, insect (various), woodlouse, centipede), fish, amphibian, reptile, bird, mammal, carnivore, herbivore, omnivore, head, neck, arm, elbow, hand, leg, knee, foot, face, ear, nose, eye, hair, mouth, teeth, sight, hear, smell, touch, taste
Pushes and Pulls Pupils should be taught to: ● Recognise a push or a pull as a force needed to move an object. ● Recognise that a force can be bigger or smaller and acts in a particular direction. ● Explore how to push objects further with more force. ● Explore how to push/pull heavier objects with more force.	● Know that a push or pull force is a way an object can be moved. ● Know that sometimes forces can be bigger or smaller and this might make things move more or less. ● Know that some things are heavier and are more difficult to move.	**Explaining Science** ● Use & remember science words during activity ● Describe what is happening using science (help) ● Add science word labels (help) to diagrams **Designing Experiments** ● Suggest what might happen with help ● Notice risk (help) & list common dangers ● Follow short demo, spoken & picture instructions	Push, pull, force, movement, light, heavy, lighter, heavier, more, less, direction

Light and Shadows Pupils should be taught to: ● Observe the apparent movement of the sun during the day. ● Observe light coming from a light source. Observe light being blocked by an object to create a shadow. ● Investigate how to make a place lighter and darker. ● Know light and dark safety.	● Know that light can come from a light source (for example, the sun or an electrical bulb). ● Know that light being blocked by an object creates a shadow. ● Know how to stay safe in the light and dark (for example, sun glasses, sun cream, reflective/bright clothing).	**Explaining Science** ● Remember some simple science facts ● Use & remember science words during activity ● Describe what is happening using science (help) **Data, Tables & Graphs** ● Use a simple table by recording in words & numbers ● Add to block charts by counting up	Light, dark, lighter, darker, light source (various), light ray, shadow, day length
Identify Everyday Materials Pupils should be taught to: ● Distinguish between an object and the material from which it is made. ● Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. ● Describe 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.	● Know the name of the material that an object is made from. ● Know the uses of different materials: o Glass is used for windows (transparent). o Wood is used for furniture. o Metal is used for planes, cars, trains-strength. o Plastic is used to form any shape such as toys. Brick is used to build houses (strong).	**Explaining Science** ● Remember some simple science facts ● Use & remember science words during activity Add science word labels to diagrams **Classification** ● Sort using yes/no statements ● Group by difference or similarity ● Link properties of materials to an application	Solid, bending, squashing, twisting, stretching, similarity, difference, property, hard/soft, shiny/dull, bendy/not bendy, stretchy/stiff, transparent/opaque, rough/smooth, waterproof/not waterproof, absorbent/not absorbent, metal, plastic, glass, brick, paper, fabric, foil, elastic, wood
Plants Pupils should be taught to: ● Identify and name a variety of common plants, including garden plants, wild plants	● Know the parts of a plant including roots, stem, leaves, bud, flower, petals. ● Know that leaves can be many different shapes and they take in sunlight and use	**Explaining Science** ● Remember some simple science facts ● Use & remember science words during activity	Plant, roots, stem, trunk, branches, leaves, flower (petals), fruit, bulb, seed, evergreen, deciduous, vegetables, (variety of common

and trees, and those classified as deciduous and evergreen. ● Identify and describe the basic structure of a variety of common flowering plants, including roots, tem/trunk, leaves and flowers.	water and food from the roots to make the plant grow. ● Know the parts of a tree and their function- the trunk is the main body of the tree and the trunk is covered with bark which protects it from damage. ● Know the names of a variety of common wild and garden plants. ● Know the names of a variety of common trees. ● Know the difference between deciduous and evergreen trees.	● Add science word labels to diagrams (help) **Classification** ● Sort by using yes/no statements ● Group by difference or similarity	plant names, e.g. geranium, dandelion, oak, bean)
Seasonal changes Pupils should be taught to: ● Observe the apparent movement of the sun during the day ● Observe changes across the four seasons ● Observe and describe weather associated with the seasons and how day length varies.	● Know that in the UK we have four seasons. Summer is the hottest, winter is the coldest. ● Know that the shortest day is in the winter and the longest day is in the summer. ● Know seasons change throughout the year because of the way the earth travels around the sun. ● Know deciduous trees change throughout the year, with trees shedding their leaves in autumn.	**Explaining Science** ● Remember some simple science facts ● Use & remember science words during activity ● Describe what is happening using science **Data, Tables & Graphs** ● Use a simple table by recording in words & numbers ● Use a frame to add to pictograms ● Add to block charts & pictograms by counting up	Season, sun, sky, autumn, winter, spring, summer, year, month, week, day, weather (various), temperature, weather, rainfall, daylength, sun, shadow

Year 2			
Topic and National Curriculum Statutory Objectives	**Knowledge**	**Skills**	**Vocabulary**
Animals including Humans Pupils should be taught to: ● Notice that animals, including humans, have offspring which grow into adults. ● Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). ● Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	● Know humans have offspring that look like them. Compare animal caterpillars to butterflies. ● Know that humans and animals need water, food and air to survive. ● Know keeping healthy means caring for our body so we have enough energy to learn, play and grow. ● Know that food contains nutrients (link to living things) which we need for our body to stay active. - What does 5 a day mean/look like? ● Know that sugary foods are bad for your health. ● Know that we should have 30-60 minutes of exercise each day.	**Explaining Science** ● Remember relevant science facts with confidence ● Use & remember science words over time ● Add science labels & information (help) to diagrams **Data, Tables & Graphs** ● Measure with labelled divisions ● Use a simple table; record in numbers (tally) ● Construct block charts	Growth, reproduction, offspring, life-cycle (stages for examples, e.g. human, frog, butterfly, etc), baby, offspring, toddler, child, teenager, adult, water, food (nutrition), air (breathing, respiration), diet, balanced, obesity, starvation, exercise, fitness (heart rate/pulse), hygiene, microbes (bacteria, fungi, viruses)
Building Circuits Pupils should be taught to: ● Identify appliances that run on electricity ● Recognise the need for a power source (mains, battery, rechargeable, renewable, etc) and a circuit to make an appliance work. ● Identify both the component and its symbol in a simple circuit. ● Build simple closed series circuits. ● Know electrical safety.	● Know that some objects need a power source to be able to work. ● Able to identify appliances that need electricity to work. ● Know how to stay safe when using electricity and be able to spot dangers. ● Know the components needed to make a working electrical circuit. ● Know that an electrical circuit needs to be closed to be able to work.	**Classification** ● Group by difference, similarity or change ● Link properties of materials to an application **Designing Experiments** ● Suggest what might happen ● Notice risk & know common dangers ● Follow a spoken or written instructions	Circuit, appliance, main supply, battery, wire, bulb, buzzer, component, connector, closed, (series), electricity, flow/transfer

Living Things and their Habitats Pupils should be taught to: ● 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.	● Know that living things grow, reproduce, produce waste (excrete) and need nutrition. ● Know a habitat is a natural environment or home of a variety of plants and animals-it provides the animal with food, water and shelter. ● Able to name some different habitats and some animals you would find there. - A microhabitat is a very small habitat, for example for woodlice under stones, logs or leaf litter. ● Know what a food chain is. ● Able to name different sources of food.	**Explaining Science** ● Remember simple science facts with confidence ● Use & remember science words over time ● Add science labels & information (help) to diagrams **Classification** ● Use a spider key with obvious differences ● Group using differences, similarities or changes	Living, dead, non-living, movement, making energy (respiration), sensitivity, growth, reproduction, getting rid of waste (excretion), nutrition, habitat, microhabitat, adapted, adaptation, conditions, light, temperature, water, humidity, food chain
Use of Everyday Materials Pupils should be taught to: ● Identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard. ● Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	● Able to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. ● Able to find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	**Classification** ● Group by difference, similarity or change ● Link properties of materials to an application **Designing Experiments** ● Use a range of equipment correctly ● Notice risk & know common dangers ● Follow short spoken & written instructions	Material types (e.g. wood, metal, plastic, wool, cotton, paper, cork, rock, etc), solid, liquid, gas, waterproof, hard, soft, flexible, stretch, bend, twist, squash, shiny, dull, warm, cold, colour, more, less, fluid, flow

Plants Pupils should be taught to: ● Observe and compare 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	● Know that trees and shrubs take in water and carbon dioxide and give out oxygen - link to humans. ● Know that trees can live for a very long time- the oldest known tree is over 5000 years old. ● Know that trees get their food and water from their roots in the ground. A trunk is the main body of the tree and is covered with bark to protect the tree. Leaves take in sunlight. ● Know what plants need to grow.	**Designing Experiments** ● Suggest what might happen ● Suggest an idea to test from observations ● Follow short spoken & written instructions **Making Conclusions** ● Describe simple patterns in data, charts ● Describe changes that have happened ● Suggest a different way to do things	Grow, seed, bulb, (tuber), leaf, root, stem, flower, fruit, germination, seedling, water, light, temperature, reproduction

Year 3			
Topic and National Curriculum Statutory Objectives	**Knowledge**	**Skills**	**Vocabulary**
Animals including Humans Pupils should be taught to: ● Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat ● Identify that humans and some animals have skeletons and muscles for support, protection and movement	● Know how nutrients, water and oxygen are transported within animals and humans. ● Know and recognise that different species have different nutritional requirements, e.g. human, cat, dog. ● Know the importance of a balanced diet. ● Be able to say some of the foods that will fit into each food group, e.g. pasta, rice, bread, vegetables and fruit, milk, cheese, meats, fish, crisps, chocolate etc. ● Become familiar with the 'eat well' plate and nutrition pyramid. ● Know the purpose of the skeletal system in the body. ● Know how the skeleton is connected through joints, types of joint and begin to understand their movement. ● Know the purpose of muscles and be able to identify some more familiar muscle by name. ● Know how muscles are connected to our bones for movement. ● Know that muscles work in pairs and begin to describe how they help the body to move. ● Know that there are different types of skeletons, e.g endo, exo and hydrostatic.	**Explaining Science** ● Remember science words used before ● Begin to use science models to describe ● Add labels & information to diagrams **Data, Tables & Graphs** ● Use a frame to construct simple tables ● Draw bars on bar charts	Nutrition, nutrients, diet (balanced/unbalanced), sugar, protein, fat, vitamins, minerals, water, energy, oxygen, feeding, eating, photosynthesis, circulation, blood, heart, vertebrate, invertebrate, skeleton (simple examples of bones), support, protection, movement

Forces and Magnets Pupils should be taught to: ● Compare how things move on different surfaces. ● Notice that some forces need contact between two objects and some forces 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.	● Recognise forces as a push or a pull. ● Know that forces can be balanced and unbalanced. ● Know that gravity is a force within the earth and has a north and south pole. ● Know that magnets have a north and south pole and opposites attract while same repel. ● Know that some metal materials are magnetic, while other materials are not.	**Explaining Science** ● Remember simple science words used before ● Begin to use science models to help describe ● Add labels & information to diagrams **Designing Experiments** ● Predict cause & effect ● Select suitable equipment (know use) ● Follow written instructions	Force, push, pull, contact force, distance force, gravity, force arrow, movement (associated terminology), magnetic, magnetism, poles (north, south), attract, repel, non-magnetic
Light Pupils should be taught to: ● 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 object.	● Know darkness is the absence of light. ● Know that light is needed to be able to see and reflect off surfaces. ● Know the difference between natural and man-made light sources and be able to give examples, e.g torch, sun, stars, lights, fires. ● Know that shadows are formed when the path of light is blocked by an opaque object and can change size and shape according to distance from the light source. ● Recognise opaque, transparent and translucent objects and the effect of light on them.	**Explaining Science** ● Remember science words I have used before ● Begin to use a science model to describe ● Add labels & information to diagrams **Designing Experiments** ● Predict cause & effect ● Follow short written instructions	Light, dark/darker/darkest, bright/brighter/brightest, dim, light source (various), eye, reflect, reflective, shiny, dull, shadow, block (transparent, opaque)

• Find patterns in the way that the size of shadows change	• Know that some animals are nocturnal and how their eyes differ from that of humans. • Know how to protect oneself from direct sunlight and the dangers of looking directly at the sun.	• Select suitable equipment	
Plants Pupils should be taught to: • Identify & describe the functions of different parts of flowering plants: roots, stem, leaves and flowers • Explore the requirements for plant 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	• Know the different parts of a flowering plant and their function in relation to keeping the plant alive. • Know the conditions required for successful plant growth, and begin to explain the effects when needs are not met, e.g. water, light, air. • Know how water is transferred around a plant. • Identify different methods of seed dispersal. • Use diagrams and explanations to describe the life cycle of a flowering plant.	**Explaining Science** • Remember science words I have used before • Begin to use science models to describe • Add labels & information to diagrams **Making Conclusions** • Describe simple patterns in data, charts & graphs • Describe my results by linking cause & effect	Grow, seed, bulb, (tuber), leaf (petiole), root (root hairs), stem, flower (petals, sepals, stamens, ovary, pollen, eggs), fruit, germination, seedling, water, light, temperature, nutrients, reproduction, pollination (wind, insect), fertilisation, seed, dispersal
Rocks Pupils should be taught to: • 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.	• Know that rocks have different attributes. • Know that rocks have been used by humans for millions of years, to make early tools and weapons. • Know when magma cools and solidifies it forms igneous rock. Examples are granite and pumice. • Explain that sediment deposited over time, often as layers at the bottom of lakes and oceans, forms sedimentary rocks.	**Explaining Science** • Remember science words used before • Begin to use science models to describe • Add labels & information to diagrams **Classification** • Use large spider key with obvious differences • Create groups for sorting	Rock (types), smooth, shiny, rough, crumbly, grainy, crystals, hard, soft, cold (etc), fossil (types), sediment, layers, pressure, soil, organic matter, vegetation, compost

		• Combine properties of materials required for an application	

Year 4			
Topic and National Curriculum Statutory Objectives	**Knowledge**	**Skills**	**Vocabulary**
Animals including Humans (Digestive System) Pupils should be taught to: ● Describe the simple functions of the basic parts of the digestive system in humans ● Identify the different types of teeth in humans and their simple functions. ● Construct and interpret a variety of food chains, identifying producers, predators and prey	● Know the names and functions of the following parts of the digestive system: mouth, tongue, teeth, oesophagus, stomach, and small and large intestines. ● Know the three types of teeth in carnivores and herbivores and the specific jobs that they do. ● Know that teeth are covered in enamel which protects them. ● Know how to keep teeth healthy, recognising which foods can be harmful to teeth. ● Know the difference between carnivores, omnivores and herbivores. ● Be able to give an example of a food chain that includes a producer, predator and prey. ● Recognise and give examples of food chains within the local area.	**Explaining Science** ● Use simple science words correctly ● Use simple models to help me describe ● Annotate diagrams **Making Conclusions** ● Describe patterns, trends & relationships ● Use science to explain	Teeth, incisor, canine, molar, pre-molar, acid, bacteria, plaque, enamel, digestion, mouth, gullet (oesophagus), stomach, small intestine, large intestine, anus (liver / pancreas), food chain, producer, consumer, predator, prey, carnivores, herbivores, omnivores.
Electricity Pupils should be taught to: ● Identify common appliances that run on electricity ● Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. ● Identify whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of a complete loop with a battery	● Name common appliances that run on electricity. ● Know how to construct a simple series electrical circuit. ● Able to identify and name parts of a circuit including cells, wires, bulbs, switches, buzzers. ● Know that a switch opens and closes and circuit. ● Name a common conductor and a common insulator. ● Know that metals are good conductors. ● Draw a picture of an electrical circuit. ● Explain how to work safely with electricity. ● Talk about patterns they notice such as bulbs getting brighter when more cells are added and that some materials can and some cannot be used to close the gap in a circuit.	**Explaining Science** ● Use science words correctly ● Use science models to describe ● Annotate diagrams **Making Conclusions** ● Describe patterns, trends & relationships ● Use science to explain	Electricity, energy, source, renewable/non-renewable, circuit, component, battery/cell, bulb, buzzer, motor, series, connector/wire, switch, conductor, insulator,

• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors			
Living Things and their Habitats Pupils should be taught to: • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise that environments can change and that this can sometimes pose dangers to living things	• Know that living things can be grouped in different ways and know how to sort animals in different ways. • Know that classification keys can be used to help group, name and identify living things. • Know what animals would be found in different habitats. • Know that habitats can change over time and this in turn, can have an impact on living things.	**Classification** • Use spider keys with fine differences • Create appropriate groups for sorting • Describe properties required for an application **Data, Tables & Graphs** • Construct simple tables • Construct bar charts • Plot coordinates in first quadrant	Environment, habitat, micro-habitat, key, classification (genus, species), (binomial name), animal, vertebrate, fish, amphibian, reptile, bird, mammal, invertebrate, snails, slugs, spiders, woodlice, insects, worms, plants, trees, flowering plants (grasses, etc), non-flowering plants (conifers, ferns, mosses)
Sound Pupils should be taught to: • 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	• Explain that sound is made when something vibrates. • Explain that those vibrations travel through the air to the ears so it can be heard. • Know the correlation between pitch and the object producing a sound. • Know the correlation between volume of a sound and the strength of the vibrations that produced it. • Know that a sound gets fainter as it travels away from a sound source.	**Explaining Science** • Use science words correctly • Use science models to describe • Annotate diagrams **Designing Experiments** • Make a prediction (trend)	Sound, vibration, volume, pitch, high/low, quiet/loud, tension

• 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.		• Plan a fair test (select variables) • Identify the data range & interval	
States of Matter Pupils should be taught to: • Compare and group materials together, according to whether they are solids, liquids or gases • Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• Know that the sun heats rivers, lakes and seas. • Know that water then evaporates into the air and is called water vapour. • Know that the water vapour rises, cools and condenses to form clouds. • Know that the droplets in the clouds become too heavy and fall as rain, snow or hail, which runs into the rivers, lakes, seas and the whole process starts again. • Name the three states of matter and give examples of each. • Know solids hold a shape, liquids form a pool and gasses escape. • Explain how water changes when it is heated and cooled. • Explain the effects of temperature of substances such as chocolate, butter and cream (to make cakes)	**Explaining Science** • Use science words correctly • Use a science model to describe • Annotate diagrams to help describe **Designing Experiments** • Make a relationship prediction (trend) • Notice obvious risks & describe safe use • Plan a fair test (select variables)	State, solid, liquid, gas, characteristic, property, particle, heat, energy, (bond/attraction), heating, cooling, melting, freezing, evaporating, condensing, water cycle

Year 5			
Topic and National Curriculum Statutory Objectives	**Knowledge**	**Skills**	**Vocabulary**
Animals including Humans Pupils should be taught to: ● Describe the changes as humans develop to old age (link to school policy on sex education)	● Draw a timeline to indicate stages in the growth and development of humans. ● Know and describe some of the changes experienced in puberty. ● Compare the gestation periods of other animals and compare them with humans. ● Know and describe what happens when people get old and the changes to their bodies.	**Explaining Science** ● Use complex science words ● Use science model to describe/explain ● Draw & annotate diagrams **Data, Tables & Graphs** ● Measure in & convert standard units ● Construct complex tables ● Construct charts & graphs	Baby, toddler, child, adolescent, adult, offspring, puberty, pubic hair, egg, sperm, testes, ovaries, oviduct, uterus, cervix, vagina, vulva, sperm duct, foreskin, scrotum, glands, erection, ejaculation, intercourse, fertilisation, gamete
Earth and Space Pupils should be taught to: ● 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.	● Know that the sun is considered to be an average size star. ● Know that the Earth is the third planet from the sun and is the only world known to support an atmosphere with free oxygen, oceans of liquid water on the surface and life. ● Know that the Earth and other planets orbit the Sun. ● Know that the Earth's position and whereabouts on the earth in relation to the Sun gives us day and night. ● Know that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).	**Explaining Science** ● Use complex words ● Use science model to describe/explain ● Draw & annotate diagrams **Making Conclusions** ● Describe patterns & trends ● Use data in conclusions ● Use relevant science to explain	Solar system, planets (names), star, sun, Earth, moon, gravity, orbit (elliptical), rotation, axis, poles, equator, northern/southern hemisphere, shadow, day, (lunar) month, year, leap year, eclipse, luminous, non-luminous, phases (names)

	• Know that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). • Know that day and night are a result of the Earth's rotation/position.		
Forces Pupils should be taught to: • Explain that unsupported objects fall towards the earth because of the force of gravity acting between earth and the falling object. • Identify the effects of air resistance, water resistance and friction that act between moving surfaces. • Recognize that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	• Know that all forces are either a push or a pull. • Know that gravity is a pulling force acting between Earth and a falling object. • Know that a frictional force is any force that is caused due to friction. • Know that surface resistance is the force on objects moving across a surface such as an ice skater, skating on ice. • Know that air resistance is the force on an object moving through air. • Know that water resistance is the force on objects floating on or moving in water. • Know that a magnetic force is an invisible force created by electrons. Magnetic force controls magnetism and electricity. • Know that some forces can be measured using a newton metre. • Able to list the different uses of a pulley, lever and springs.	**Explaining Science** • Use complex words • Use science model to describe/explain • Draw & annotate diagrams **Data, Tables & Graphs** • Construct a complex table • Construct charts & graphs • Join coordinates	Force, contact, non-contact, push, pull, friction, air resistance, water resistance, up-thrust, drag, gravity, balanced, unbalanced, force arrow, accelerate, decelerate, Newton, force meter, mass, multiplier, lever, pulley, gear, pivot, fulcrum, effort, load, machine
Living Things and their Habitats Pupils should be taught to: • 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 (sexual/asexual)	• Many insects have four stages in their life cycle: egg or the unborn stage; larva – young stage; pupa – inactive (no feeding) stage; and adult stage. • Know that the life cycles of plants and animals have three basic stages including a fertilised egg or seed, immature juvenile, and adult. However, some organisms may have more than three life cycle stages, and the exact names of each stage can slightly differ depending on the species (mammal, amphibian and insect).	**Explaining Science** • Use complex science words • Use science models to describe/explain • Draw & annotate diagrams **Designing Experiments**	Life cycle (various, associated terminology), reproduction (internal / external), gamete, petals, sepals, carpel, stigma, ovary, anther, stamen, pollen, pollination, fertilisation, dispersal

	• Know the difference between sexual and asexual reproduction in plants.	• Use K&U to explain prediction • Plan fair test (range, interval, readings) • Write an ordered method	
Properties and Changes of Material Pupils should be taught to: • Compare and group together everyday materials on the basis of properties (e.g. their hardness, solubility, transparency, conductivity (electrical/thermal) and response to magnets • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • 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	• Know that irreversible changes, like burning cannot be undone. Reversible changes, like melting and dissolving can be changed back again. • Know that mixtures can be separated out by methods like filtering and evaporating. A change is called irreversible if it cannot be changed back again. • Know examples of: reversible changes: Melting is when a solid converts into a liquid after heating. An example of melting is turning ice into water. Freezing is when a liquid converts into a solid. - A cooked egg cannot be changed back to a raw egg again. • Know mixing substances can cause an irreversible change. For example, when vinegar and bicarbonate of soda are mixed, the mixture changes and lots of bubbles of carbon dioxide are made. • Know that burning is an example of an irreversible change.	**Explaining Science** • Use complex words • Use science models to describe/explain • Draw & annotate diagrams **Designing Experiments** • Select suitable equipment (scale) • Plan fair test (all variables) • Collect sufficient repeat readings (>5)	Material (types), properties (types), solid, liquid, gas, solution, mixture, particle, energy, dissolve (solute, solvent, saturation), filtering, sieving, evaporating, reversible, irreversible

Year 6			
Topic and National Curriculum Statutory Objectives	**Knowledge**	**Skills**	**Vocabulary**
Animals including Humans Pupils should be taught to: ● Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ● Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ● Describe the ways in which nutrients and water are transported within animals, including humans	● Know the main parts of the circulatory system and their functions (heart, blood vessels, blood and lungs). ● Know that the heart will beat around 115,000 times each day, pumping around 2,000 gallons of blood. ● Know that the entire trip around the body only takes blood about 20 seconds in total. ● Know the ways in which nutrients and water are transported in animals, including humans. ● Know who William Harvey was. ● Know that the circulatory system is vital for fighting diseases and maintaining temperature. ● Know that the heart affects every part of the body and the impact that diet, exercise, drugs, alcohol, overall lifestyle and emotional well-being can have on it. ● Know that because the heart is crucial to human survival, it is essential that it is kept healthy with a well-balanced diet, regular exercise and the avoidance of things that can damage it, such as smoking.	**Explaining Science** ● Use complex science words correctly ● Use science models to explain ● Draw diagrams to describe/explain **Designing Experiments** ● Use K&U to generate a hypothesis ● Plan for repeat readings (>3) ● Write a reliable ordered method	Organs (various), circulatory system, circulation, blood, plasma, red blood cells, oxygenated, deoxygenated, exchange, artery, vein, heart, heart chambers, pulse, recovery time, drugs (various), alcohol, nicotine, tar
Electricity Pupils should be taught to: ● Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit	● Know that the brightness of a bulb is associated with the voltage. ● Compare and give reasons for variations in how components function. ● Use recognised symbols when representing a simple circuit in a diagram. ● Construct simple series circuits.	**Explaining Science** ● Use complex science words correctly ● Use a science model to explain ● Draw diagrams to help describe/explain	Circuit, electricity, energy, cell, battery, positive terminal, negative terminal, voltage (V), Amps (A), current, wire, insulator, resistance, resistor, filament, lamp, buzzer,

• 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	• Answer questions about what happens when different components are used: switches, bulbs, buzzers and motors. • Know that electricity travels at the speed of light. • Know that electricity can come from power stations, the wind, the sun, water and even an animal's waste. • Know that coal is the biggest source of energy for producing electricity. • Know that electric fields can either attract or repulse.	**Designing Experiments** • Use K&U to make a hypothesis • Plan a reliable fair test • Plan to minimise risk & act on safety suggestions	motor, switch, series, Voltmeter, Ammeter
Evolution and Inheritance Pupils should be taught to: • 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	• Know that evolution is a scientific theory used by biologists. It explains how living things changed over a long time, and how they have come to be the way they are. • Know that living things have changed over time because we see their remains in rocks. • Know that animals and plants of today are different from those of long ago. • Know that evolution is ongoing and is still being actively researched by biologists today. • Know about Charles Darwin and the Galapagos Islands case study concerning finches.	**Explaining Science** • Use complex science words correctly • Use a science model to explain • Draw diagrams to describe/explain **Data, Tables & Graphs** • Construct a complex table • Construct charts & graphs • Draw trend lines	Fossil, extinction, variation, inheritance, feature, adaptation (various), species, natural selection, evolution
Light Pupils should be taught to: • 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	• Know that light travels in straight lines. • Know and understand that because light travels in straight lines, objects are seen because they give out or reflect light into the eye. • Know that we see things because light travels from light sources to objects then to our eyes. • Know that light travels in straight lines and therefore shadows have the same shape as the objects that cast them.	**Explaining Science** • Use complex science words correctly • Use science models to explain • Draw diagrams to describe & explain **Making Conclusions**	Light source, luminous, non-luminous, energy, absorbed, reflected, transmitted, scattered, shiny, opaque, reflective, transparent, translucent, image, plane, concave, convex, mirror, shadow.

• 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	• Know that light will travel in a completely straight line until it hits an object that will reflect it. • Know that light doesn't travel as fast when it has to pass through mediums that are different, such as: air, water or glass. • Know the light that we see from the sun actually leaves the sun ten minutes before we see it. • Know that light can be controlled and produced in so many ways. • Know that light is a type of energy named electromagnetic radiation.	• Describe changing patterns, trends & relationships • Use primary / secondary data in my conclusions	
Living Things and their Habitats Pupils should be taught to: • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics.	• Know how to classify living things into broad groups according to observable characteristics and based on similarities and differences. • Know how living things have been classified. • Able to give reasons for classifying plants and animals based on specific characteristics. • Know that an invertebrate is an animal that does not have a backbone; 97% of all animal species are invertebrates. • Know that vertebrates tend to be much more intelligent than invertebrates. • Know that vertebrate animals can be either warm or cold-blooded (a cold-blooded animal cannot maintain a constant body temperature as this is determined by its outside surroundings). • Know that a wide range of ocean animals are invertebrates: sponges, corals, jellyfish and starfish are some examples. • Know about the Linnaean system of classification. • Know that the genus and species of humans is homo sapiens.	**Explaining Science** • Show secure K&U of science • Use complex science words correctly • Draw diagrams to describe/explain **Classification** • Construct spider & number keys • Group & sub-group by fine observations	Classification, binomial, kingdom (phylum, class, order, family, genus, species), vertebrate, invertebrate, microorganisms, bacteria, fungi, virus, (protist), classification characteristics (various), spider/number key, diversity, variation