nishkamprimaryschool
birmingham

Faith-Inspired
Virtues-led
Aspiring for Excellence

Science Progression of Knowledge & Skills

Reception Science Knowledge and Skills

Personal, Social and Emotional Development

NST EYFS Curriculum:

- Show some understanding that exercise, eating and sleeping habits and hygiene can affect health.

Early Learning Goal:

- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.

Understanding the World

NST EYFS Curriculum:

- Explore the natural world around them.
- Describe what they see, hear and feel whilst outside.
- Understand the effect of changing seasons on the natural world around them.
- Recognise some environments that are different to the one in which they live.

Early Learning Goal:

- 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.

Working Scientifically
look closely, observe, watch, touch, feel, smell, listen, same, different, compare, ask questions, record, sort, group

	Plants	Living things and their habitats	Animals including humans	Evolution and Inheritance	Seasons	Materials	Light	Forces	Earth and Space	Sound
EYFS Key Vocabulary	tree, bush, herb, names of plants they see (Reception - Living things and their habitats)	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment (e.g. beach, forest)	names of animals, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice, hair (e.g. black, brown, dark, light, blonde, ginger, grey, white, long, short, straight, curly), eyes (e.g. blue, brown, green, grey), skin (e.g. black, brown, white), big/tall, small/short, bigger/smaller, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend, family, boy, girl, man, woman	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment (e.g. beach, forest) (Reception - Living things and their habitats)	spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, flowers	ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back	Sun, sunny, light, shadow, shady, clouds, torch, see-through, not see-through, source, light source	float, sink, up, down, top, bottom, surface, move, roll, drop, fly, turn, spin, fall, fast, slow, faster, slower, fastest, slowest, further, furthest, wind, air, water, blow, bounce	Sun, Moon, Earth, star, planet, sky, day, night, space, round, bounce, float	sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder, high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working Scientifically	Progression of skills	• ask simple questions and recognising that they can be answered in different ways • observe closely, using simple equipment • perform simple tests • identify and classifying • use their observations and ideas to suggest answers to questions • gather and record data to help in answering questions.		• asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings		• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments.
	Progression of Knowledge	• Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science • Know that we can use magnifying glasses to observe objects closely • Know that we can test our questions to see if they are true • Know that objects can be identified or sorted into groups based on their observable properties • Know that we can write down numbers and words or draw pictures to record what we find		• Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science • Know that we can use magnifying glasses to observe objects closely • Know that we can test our questions to see if they are true • Know that objects can be identified or sorted into groups based on their observable properties • Know that we can write down numbers and words or draw pictures to record what we find		• Know that we can ask questions and answer them by setting up scientific enquiries • Know how to make relevant predictions that will be tested in a scientific enquiry • Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same • Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches • Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table • Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion • Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry • Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true • Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry • Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) • Know that they can draw conclusions from the findings of other scientists • Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry
	Key Vocabulary	observe, changes, patterns, grouping, sorting, compare, same, different, identify (name), measure, data, record results, drawing, picture, table, tally chart, present, pictogram, block chart, Venn diagram, ask questions, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, teaspoon, answer questions, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching using secondary sources		practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve		variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter	

Animals Including Humans	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Unit split into two **Animals (Half a term)** •Know that a trout is an example of fish, a frog is an example of an amphibian; a lizard is an example of a reptile; a robin is an example of a bird; a rabbit and a human are examples of a mammal •Know that herbivorous animals eats plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants •Know that a cat is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of omnivores (though not vegetarians) •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 •Know that fish are different in having gills so that they can breathe underwater and scaly skin •Know that amphibians are different in that they begin their lives with gills but then develop lungs and breath on land •Know that reptiles are different in that they breath air and have scaly skin •Know that birds are different to other animals in that they have feathers and wings •Know that mammals are different to other animals in that they have fur/hair and they feed milk to their young **Ourselves – (Half a term)** •Know that feet, legs, arms, hands, torso, head, skin, ears, eyes, nose, mouth and tongue are part so the body and identify them •Know that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch.	•Know that animals including humans, produce offspring that grow into adults. •Know that animals, including humans, need food, water and air to survive •Know the basic food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods •Know that more than half of our diet should be made up of carbohydrates, fruit and vegetables •Know that fats and sugary foods should be eaten rarely and in small amounts •Know that people need to exercise often to help their body stay strong and fit •Know that keeping clean, including washing and brushing teeth, is an important part of staying healthy	•Know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth) •Know that getting the right amount of each food group (including over half of the diet made up of fruit, vegetables and carbohydrates) is called a balanced diet •Know that lack of a nutrient can cause ill health. •Know that excess of a food group can cause ill health, such as tooth decay due to excess sugar •Know that excess fat from fatty foods such as butter and cheese - and created in the body from excess calories – builds up in the body and can cause obesity •Know that excess body fat can lead to heart disease and increases the strain on joints and growing bones •Know that animals, including humans, have a skeleton made up of solid objects. •Know that some animals (such as insects) have an exoskeleton – a solid covering on the outside of their body •Know that many invertebrates (such as earthworms and slugs) have water held inside by muscles which act like a skeleton •Know that skeletons provide support for muscles and protect the body; for example, the ribcage protects the vital organs in the human body •Know that human skeletons are made up of bones and cartilage •Know that muscles can only contract, so they must be arranged in pairs in the body so that as one contracts the other loosens	•Know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion •Know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body •Know that the process of digestion begins with food being chewed in the mouth by the teeth and saliva added •Know that a human has three types of teeth – incisors, canines and molars – and that these each perform different functions •Know that incisors slice food, canines tear food (especially meat) and that molars grind food •Know that children develop an initial set of teeth which are gradually replaced between the ages of 6 and 12 •Know that food is squeezed down the oesophagus towards the stomach in a wave-like action called peristalsis •Know that the stomach releases acid and enzymes to continue breaking down the food; the stomach is an organ; an organ is a part of living thing that is self-contained and has a specific important job •Know that further enzymes and bile break down the food further as it moves through the duodenum towards the small intestine •Know that the small intestine adds more enzymes and then absorbs the nutrients •Know that the large intestine absorbs water from the undigested food •Know that undigested food is stored in the rectum before being excreted through a muscle called the anus •Know that a food chain traces the path of energy through a habitat •Know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers •Know that consumers take in energy by eating •Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator •Know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and above it is called a tertiary consumer •Know that the arrows in a food chain show the direction that energy is travelling through a habitat	•Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants •Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again •Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again •Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again •Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again •Know that humans go through stages of development; they begin as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years) then into young children (roughly 2-12 years old); children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently	•Know that the heart and lungs are organs protected by the ribcage •Know that blood travels around the body transporting nutrients that have been absorbed into the blood stream from digestion; blood also carries oxygen around the body which is used to power the body; this use of oxygen to create energy is called respiration •Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins •Know that the heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it •Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates •Know that drugs are chemicals that have an impact on the natural chemicals in a person's; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused •Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller •Know that cannabis and cocaine are examples of illegal drugs that can have serious negative effects •Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease, respectively

	head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first- hand from each vertebrate group, parts of the human body including those within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ears, tongue	offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/chicken, kitten/cat, caterpillar/ butterfly), survive, survival, water, food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy) living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival (Y2 - Living things and their habitats)	nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, incisor, canine, molar, premolar, herbivore, carnivore, omnivore, producer, predator, prey	puberty, the vocabulary to describe sexual characteristics in line with the school's RSE policy life cycle, foetus, baby, child, adolescent, adult, reproduce, sexual, sperm, fertilises, egg, live young (Y5 - Living things and their habitats)	heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, cycle, circulatory system, diet, drugs, lifestyle

Materials	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Everyday Materials •Know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock •Know that an object is made from/of a material •Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material •Know that matter (stuff) is made from tiny building blocks	**Uses of Everyday Materials** •Know that materials can have useful properties for a given job (including being waterproof, strong, hard, soft, flexible, rigid, light or heavy.) •Know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy, •Know that when objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller •Know that applying forces to objects can change their shape	**Rocks** •Know that there are three kinds of rocks: igneous, sedimentary and metamorphic •Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath •Know that granite and basalt are types of igneous rock and that igneous rocks form from molten rock below the Earth's crust •Know that limestone and sandstone are types of sedimentary rock which form when small, weathered fragments of rock or shell settle and stick together, often in layers •Know that marble and slate are types of metamorphic rock which form when rocks in Earth's crust get squashed and heated in processes such as when tectonic plates press against each other •Know that fossils form when a plant or animal dies and is quickly covered with silt or mud so that it cannot be rotted by microbes or eaten by scavenging animals; in time layers of sediment build, squashing the mud and turning it to stone around the dead plant or animal; the materials in the body are replaced by minerals that flow in water through the rock, leaving a rock in the shape of the animal or plant that was once there •Know that soil is made from tiny particles of rock broken down by the action of weather (weathering)	**States of Matter** •Know that things are composed of a material in one of three states of matter: solid, liquid or gas •Know that things are made of particles (tiny building blocks) and that these are organized differently in different states •Know that materials can change state when temperature changes •Know that there are bonds between the particles (building blocks) in a solid; as temperature increases, these bonds are somewhat overcome as the particles absorb energy and solids can change into liquids; with a further increase in temperature, the particles become even more energetic and the bonds are overcome entirely so the liquid changes into a gas •Know that when solids turn into liquids, this is called melting and that the reverse process is called freezing •Know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation •Know that when a solid turns into a gas without passing through the liquid state, this is called sublimation •Know that the melting point of water is 0o C and that the boiling point of water is 100o C •Know that water flows around our world in a continuous process called the water cycle •Know that, along with evaporation, water on the Earth's surface moves to the air in a process called transpiration in which water turns into water vapour (gas) on the surface of leaves on plants •Know that rain condenses in clouds and falls to earth as rain, snow or hail in a process called precipitation •Know that water flows across the land in rivers and streams in a process called surface run-off and under the ground as groundwater	**Properties and Changes of Materials** •Know that materials can be sorted in a variety to ways based on their properties •Know that in some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water) •Know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is said to be saturated •Know that when a solvent is evaporated from a solution, the original solute is left behind; the remaining solid will often form crystals – the slower the solvent evaporates, the larger the crystals that will be formed •Know how to dissolve and a solute in a solvent and then how to evaporate the solvent to recover the solute •Know that a reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place •Know that an irreversible change is one that cannot be reversed and that examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg, the reaction of bicarbonate of soda and acid) •Know that filtering allows solids and liquids to be separated and that sieving allows solids made up of different sizes parts to be separated •Know how to separate a mixture of sand, salt and small stones by sieving (to remove the small stones), followed by dissolving in water (so the salt is absorbed), followed by filtering to remove the sand from the mixture, followed finally by evaporation of the water to recover the salt. •Know that materials' different properties can be tested through acting upon them, including testing to find whether materials are magnetic, thermally conductive and electrically conductive; know that the various properties of different materials make them suitable for a given function •Know how to explain orally and in writing the reasons why various materials are suited or unsuited to a function	
	object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, 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	opaque, transparent, translucent, reflective, non- reflective, flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, types of soil (e.g. peaty, sandy, chalky, clay) (Y3 - Rocks) magnetic force, magnet, attract, magnetic material, metal, iron, steel (Y3 - Forces and magnets)	solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle electrical conductor, electrical insulator, metal, non-metal (Y4 - Electricity)	thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non- reversible change, burning, rusting, new material	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	•Know a rose bush, a sunflower and a dandelion by sight •Know an oak tree, a birch tree and a horse chestnut tree by sight •Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn •Know that a flowering plants consist of roots, stem, leaves and flowers, and that a tree's stem is called a trunk	•Know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth) •Know that plants that are deprived of light, food or air will not grow and will die.	• Know that different parts of plants have one or more functions (jobs) •Know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground •Know that the stem holds up the leaves so that they can gather light to make food and holds up the flowers so that they can receive pollen and disperse their fruits; know that the stem also transports water and minerals from the roots to the other parts of the plant •Know that the leaves make food by trapping light and using its energy to turn carbon dioxide and water into carbohydrates •Know that the function of a flower is reproduction, where flowers of the same kind exchange pollen – made by an anther – in a process called fertilisation, and a structure in the flower's ovary called an ovule becomes a seed; the ovary then becomes a fruit which helps the seed leave the plant in a process called dispersal			
	leaf, flower, blossom leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, names of trees in the local area, names of garden and wild flowering plants in the local area	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling names of plants in local habitats and micro-habitats (Y2 - Living things and their habitats)	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport	classification, classification keys (Y4 - Living things and their habitats)	life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings (Y5 - Living things and their habitats)	flowering, non- flowering, mosses, ferns, conifers (Y6 - Living things and their habitats)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Living things and their habitats		**Unit split into two** **Living things –(Half a term)** • 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 polar bears are an example of an animal adapted to its environment – thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice. •Know that sharks are another example – smooth skin and streamlined shape for quick swimming; and gills for breathing underwater •Know that cacti are an example of a plant adapted to its environment – thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water •Know that pine trees have thick bark and pine cones to protect against cold winters •Know that woodlice live under logs – an example of a microhabitat - as they need somewhere dark and damp so that they do not dry out •Know that frogs can live in ponds – an example of a microhabitat - as they water in which to lay their eggs (frogspawn) •Know that plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals. •Know that the arrows on a food chain show the direction that the energy travels **Habitats – Split into half a term term)** •Know that polar bears are an example of an animal adapted to its environment – thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice. •Know that sharks are another example – smooth skin and streamlined shape for quick swimming; and gills for breathing underwater •Know that cacti are an example of a plant adapted to its environment – thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water •Know that pine trees have thick bark and pine cones to protect against cold winters		• Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behaviour (e.g. herbivores, carnivores and omnivores) •Know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms •Know that a species is a group of living things have many similarities that can reproduce together produce offspring •Know that a classification key uses questions to sort and identify different living things •Know how to use a classification key to identify living things •Know how to create a classification key to sort plants/ animals •Know that changes to the environment can make it more difficult for animals to survive and reproduce; in extreme cases this leads to extinction, where an entire species dies •Know that human activity – such as climate change caused by pollution - can change the environment for many living things, endangering their existence •*Know that the polar bear is a famous example of climate change endangering the existence of a species; as the climate changes and gets warmer, the sea ice on which polar bears live reduces in amount making it harder for them to survive and reproduce*	• Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants •Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again •Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again •Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again •Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again	• Know that there are three types of micro-organism: viruses, fungi and bacteria; of these three, viruses are often not really considered to be alive by many scientists mainly because they don't have the 'machinery' to reproduce inside them •Know that germs are disease-causing bacteria •Know that an arthoropod is an invertebrate with a hard , external skeleton and jointed limbs •Know that insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings •Know that an arachnid (e.g. spider) is a type of arthropod with eight legs and no antennae or wings •Know that a crustacean is a type of arthropod with two pairs of antennae (e.g. woodlouse) •Know that a myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede)

	names of garden and wild flowering plants in the local area (Y1 - Plants) head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first- hand from each vertebrate group (Y1 - Animals, including humans) weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length (Y1 - Seasonal changes)	living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro- habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and micro-habitats studied light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling (Y2 - Plants) offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/chicken, cat/kitten, caterpillar/butterfly) (Y2 - Animals, including humans)	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (e.g. wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport (Y3 – Plants)	classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate herbivore, carnivore, omnivore, producer, predator, prey (Y4 - Animals, including humans)	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, cuttings	vertebrates, fish, amphibians, reptiles, birds, mammals, warm- blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering, non- flowering, mosses, ferns, conifers

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal Changes (Year 1) Year 5 Earth and Space (Year 5) Evolution and inheritance (Year 6)	**Seasonal Changes** •Know that days are longer in the summer and shorter in winter •Know that weather changes through the year, getting hotter in the summer and colder in the winter •Know that the winter is likely to bring ice on the ground when water freezes due to the cold •Know that the Earth orbits the Sun with one orbit constituting a year of 365/366 days				**Earth and Space** • Know that the universe comprises all matter and space in existence •Know that a celestial body is a large object in the universe •Know that a star is an exceptionally hot ball of gas, originally made from hydrogen and helium •Know that the Sun is a star •Know that a planet (e.g Earth) is defined as a spherical celestial body that orbits a star and that has cleared the neighbourhood of its orbit of other objects, some of which crash into the planet and others that become moons of that planet •Know it was once thought that everything orbited the Earth, but that scientists like Copernicus and Galileo used telescopes and measurement to show that the Earth orbited the Sun •Know that there are eight major planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune •Know that the universe is utterly vast and that our solar system makes up a tiny fraction of the universe •Know that a satellite orbits a planet and that moons are natural satellites •Know that the Moon orbits the Earth roughly every 28 days •Know that as the Moon orbits the Sun, different parts of it are lit up by the Sun, which is why we see a different shape lit up on the Moon as the lunar cycle progresses •Know that humans have sent man-made satellites into orbit that assist with telecommunication •Know that all the planets in the solar system orbit the Sun and that the further away they are from the Sun, the longer their orbit •Know that the Earth spins around an imaginary line through its centre called an axis and that this axis is tilted relative to the Earth's orbit •Know that night and day are the result of the Earth rotating on its axis •Know that the tilt of the Earth towards and away from the Sun's light as the Earth orbits the Sun leads to the seasons as during winter the light is spread over a wider area •Know that a solar eclipse occurs when the Moon is between the Sun and the Earth, casting a shadow on the Earth; a lunar eclipse occurs when the Earth is between the Sun and the Moon, casting a shadow on the Moon	**Evolution and inheritance** •Know that all life on Earth began from a single point around 4.5 billion years ago •Know that living things changes over time and that this gradual change is called evolution •Know that natural selection is the cause of this change; natural selection works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce - these characteristics are passed down to their offspring; members of a species with less advantageous characteristics do not survive and reproduce – these characteristics are not passed down to offspring •Know that offspring are vary and are not identical to their parents •Know that Charles Darwin posited this theory of evolution by natural selection •Know that the gradual change of species over millions of years can be observed by looking at examples of fossil
	weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud (Y1 - Plants)	light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling (Y2 - Plants) living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold (Y2 - Living things and their habitats)	light, light source, Sun, sunlight, dangerous (Y3 - Light) photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (e.g. wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil (Y3 - Plants) soil, fossil, bone, flesh, minerals (Y3 - Rocks)	environment, habitat, human impact, positive, negative, migrate, hibernate (Y4 - Living things and their habitats) herbivore, carnivore, omnivore, producer, predator, prey (Y4 - Animals, including humans)	life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings (Y5 - Living things and their habitats)	offspring, sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sound (Year 4) Light (Year 3 and Year 6)			**Light** •Know that light is a form of 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 when it travels from a light source and then 'bounces' off an object •Know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes •Know that the Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun •Know that many light sources give off light and heat •Know that the Sun gives off light and heat when hydrogen turns into helium •Know that filaments in traditional bulbs heat up until they glow, giving off light and heat •Know that fluorescent bulbs glow when electricity adds energy to a gas within the bulb •Know that sunglasses can protect eyes from sunlight but looking at the Sun directly – even with sunglasses – can damage the eyes •Know that opaque objects block light creating shadows and that light passes through transparent objects •Know that opacity/transparency and reflectiveness are properties of a material •Know that as objects move towards a light source, the size of the shadow increases •Know how to show the changing of shadow size by drawing a diagram with straight lines representing light •Know that a data logger can keep track of light levels and that this can be plotted on a graph to show how this changes over the course of a day	**Sound** •Know that sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move •Know that energy comes in different forms and can be neither created nor destroyed, only changed from one form to another •Know that sound is a form of energy that transfers in a longitudinal wave - like that seen in a slinky - not a transverse wave - like that seen in water ripples •Know that sound travels through a medium (e.g. particles in the air) and thus sounds does not travel through a vacuum which has no particles in it at all •Know that longitudinal sound waves are detected in the ear by humans and that the brain interprets this as the sounds we hear •Know that sound travels at different speeds through different objects; it travels at around 340 metres per second in air, much slower than light travels; this is why we often hear thunder after we see lightning as the light reaches our eye before the sound reaches our ears •Know that pitch is how high or low a sound is and that this is determined by how many vibrations per second are being made by the vibrating object; the number of vibrations per second is called frequency •Know that volume is how loud or quiet a sound is and that this is determined by the amount of energy in the wave (e.g. from how hard or soft a percussion instrument is hit) •Know that the volume of a sound is quieter if the listener is further away from the object		**Light** •Know that translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that an something seen through a translucent object is not clearly defined •Know that when light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media. •Know that white light comprises all the colours of light •Know that white light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum; it happens because the different colours of that constitute white light travel at different speeds. •Know how to draw a diagram to show why the shape of a shadow will match the shape of an object •Know that when light reflects off an object, the angle of incidence is equal to the angle of reflection •Know that a periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown to a viewer
	senses, hear, ear (Y1 - Animals, including humans) shiny, dull, see-through, not see- through (Y1 - Materials)	opaque, transparent, translucent, reflective, non-reflective (Y2 - Uses of everyday materials)	light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous	sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, quiet, loud, insulation		straight lines, light rays

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Forces (Year 3 and Year 5)			**Forces and Magnets** •Know that a force can be thought of as a push or a 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). •Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves •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 •Know that magnets have two poles called north and south •Know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other •Know that there is a magnetic field around a magnet which is strongest at each pole •Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic		**Forces** •Know that a force is measured in a unit called Newtons, named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move •Know that pull forces can be measured using a device called a force meter •Know that the amount of matter (stuff) in an object is its mass •Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together •Know that unsupported objects are pulled towards the Earth by the force of gravity •Know that acceleration is a change in speed and that unbalanced forces acting on an object cause it to accelerate •Know that air resistance is a force felt by an object as it moves through the air; it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences •Know that a falling object will accelerate until its air resistance matches the gravitational force pulling it down; at this point, the object will continue to move at this speed (called its terminal velocity) without getting any quicker or slowing down •Know that a parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal velocity •Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles •Know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined •Know how to draw a force diagram with arrows representing the different forces acting on an object •Know that a lever is a rigid length pivoting around a fulcrum •Know that a pulley is a wheel with a fulcrum that supports a moving cable or belt •Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that turning one gear turns an adjacent gear in the opposite direction	
		flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching (Y2 - Uses of everyday materials)	force, push, pull, twist, contact force, non- contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole		force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Electricity (Year 4 and Year 6)				• Know that electrical energy is one of many forms of energy •Know that static electricity is an imbalance of charged particles on a material; it does not operate by flowing around a complete circuit •Know that current electricity is the flow of charged particles called electrons around a circuit •Know that electrical current flows well through some materials, called electrical conductors, and poorly through other materials, called electrical insulators •Know that conductors have free electrons and that when electrical current flows around a conductor the electrons move •Know that electrical conductivity (how well a material conducts electricity) is an example of a property •Know that metals are good electrical conductors •Know that a chemical reaction inside a cell produces the charged particles that can flow around a circuit •Know that more than one cell lined up to work together is called a battery •Know that electrical current can flow if there is a complete circuit •Know that wires – which contain a conductor inside them, usually made of metal – can allow electrical current to flow around a circuit •Know that when electrical current flows through a circuit components within that circuit – such as buzzers which make a noise and bulbs which emit light – begin to work •Know that a switch functions by completing or breaking a complete circuit •Know how to construct a simple circuit using components •Know that exposure to high levels of electrical current can be dangerous		• Know that voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, not the size of the electric current •Know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer) •Know how to draw simple circuit diagrams •Know the recognized symbols for a battery, bulb, motor, buzzer and wire •Know how to predict whether components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to the circuit •Know that two bulbs in a circuit can be wired up to create a series circuit or a parallel circuit; if one bulb blows in a series circuit the other will not shine as the circuit has been broken; in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine; use this knowledge to explain the advantages of using parallel circuits (e.g. in the lighting in homes)
				electricity, electrical appliance/device, mains, plug, electrical		circuit diagram, circuit symbol, voltage