Joseph Turner Primary Progression in Science

Skills Progression - Working Scientifically

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Ask questions about what they notice and observe in the world around them • show curiosity about similarities and differences between living things and materials • use what they have noticed or observed to answer questions • make observations using all their senses, using context-specific vocabulary to describe them • use magnifiers to look more closely • make comparisons • follow simple instructions to carry out simple comparative tests • use practical resources provided, including water droppers • use sorting hoops to group materials and objects using their own and given criteria • use simple ID sheets to identify living things • gather first-hand data from a variety of sources • record their observations in words and labelled pictures (drawn and photos); simple prepared tables and pictograms; block and paper strip bar charts • use simple scientific language to describe their observations and answer questions • use their data to recognise and rank differences	• Ask questions about how things are similar and different, materials' suitability and how things change • begin to recognise that there are different ways to answer scientific questions, including naming things, sorting them and comparing them • make more systematic observations of features and changes • take measurements using non- standard units (string, blocks), and then cm • learn that a thermometer is used to measure temperature learn to only change one thing in a comparative test to make sure it is fair	• Suggest questions they could investigate • learn the names of different types of enquiry • state what science they did to answer the question plan observing over time enquiries, making some decisions about what observations and/or measurements they will need to make and when • plan simple comparative tests, making some decisions about what to change and what to measure • make some decisions about which practical resources to use learn to use a data logger or light meter app, stopwatch, weighing scales (digital), rulers • make observations using a digital microscope • use standard units for measurements • make systematic and careful observations gather evidence from a range of sources including first hand observation and experimental	• Decide how to gather evidence to answer a scientific question • use a range of question stems • answer questions posed by the teacher identifying the type of enquiry they have used to answer the question •use the terms variable and control variable • use a fair test planner to identify variables to change, measure and keep the same to answer a question • plan and carry out a fair test • plan and carry out a comparative test • follow instructions to carry out a pattern seeking enquiry learn to use a thermometer • use standard units for measurements • use senses to make detailed observations • become more systematic and accurate in data collection learn to use branching keys	• Identify independent and dependent variables and use these to generate fair and comparative test questions • identify the important variables to control when carrying out a comparative or fair test • research secondary sources to find answers to questions • justify selection of enquiry type • learn to use a force meter • measure liquids accurately using measuring cylinders • make decisions about whether repeat readings are required to get accurate data create tables to collect data • draw and label line graphs, scatter graphs and bar charts with the variables on the correct axis, choose a suitable scale with equal intervals and plot data correctly • draw labelled diagrams of mechanisms and structure • use test results gathered or knowledge acquired to make predictions • pose further questions	• Make planning decisions about where and how to collect information (recognising and controlling variables, deciding what observation or measurements to make over time and for how long, using suitable samples to identify patterns) • recognise how secondary sources can be used to answer questions that cannot be answered through practical work • ask and write enquiry questions • construct data collection tables • select measuring equipment to give the most precise results including force meters with a suitable scale, ruler or tape measure, • make decisions about whether further research (secondary sources) is required • construct and use a range of ways to record and sort data • create branching keys with four or more items

	• begin to plan simple tests independently • learn how to set up an observation over time enquiry • predict a result using prior experience and knowledge select their own sorting criteria • use observable features to classify living things using ID cards • use prepared tables to classify living things and materials • construct simple bar charts using templates • add labels to diagrams identify patterns in their data • use data collected in enquiries to inform their answers to questions • begin to develop explanations based on evidence collected and previous experience and knowledge	data, and secondary sources of information, to answer scientific questions • use tally charts • construct tables • draw labelled diagrams with keys • construct simple food chains • use scientific language in writing and orally • make some decisions about how to record observations • use prior knowledge or data collected in lessons to predict outcomes of tests, • use evidence collect in a range of methods and their current knowledge to formulate simple conclusions, • begin to evaluate effectiveness of tests. • use different ways to report enquiry findings: posters, writing explanatory sentences, labelled diagrams, oral presentation, drama • identify differences and similarities they have observed in data they have collected at first hand or from secondary sources, and relate them to simple scientific ideas and processes they have learned about	• learn to draw a bar chart, labelling axes and choosing a scale with suitable intervals • use (non-standard) symbols to represent an electrical circuit • sequence flow charts • learn to use Venn and Carroll diagrams • make detailed observational drawing • begin to make choices about how to report enquiry findings • use appropriate scientific vocabulary consistently and accurately • identify a simple pattern between two data sets • use test results to propose solutions to problems se evidence to generate comparative statements • begin to identify causal relationships • use simple models to represent scientific processes use data they have collected to answer questions • use scientific knowledge from secondary sources to answer questions	• use data gathered to identify causal relationships • explain how to increase the accuracy and precision of measurements • use key vocabulary accurately and consistently • make decisions about salient and relevant data to present • recognise that there are many different ways to report findings: scales, charts, reports, annotated diagrams, graphs, charts, inventor's notebooks, multimedia presentations such as website pages and television advertisements • draw valid conclusions from data collected • draw upon test data to construct an explanation • use observations and test data to provide evidence to support or refute ideas or argument	• draw circuit diagrams using recognised symbols recognise when further tests and observations are needed to answer question • analyse scatter graphs • recognise that in a pattern seeking enquiry it is important to have as much data as possible • use scientific language to communicate findings from a range of enquiries in written, oral, dramatic and multimedia presentations • use and evaluate models to represent systems and processes • evaluate methods used, control of variables, precision of measurements, credibility of secondary sources • justify trust in data. • evaluate limitations of data collected or from secondary sources • explain why scientists do not always agree • differentiate between fact and opinion

		• refer to own data when answering questions			
Key Vocabulary bar chart classify diagram group identify magnifier observe/ observation pattern rank test	**Key Vocabulary** accurate bar chart classify comparative test diagram effect enquiry explain/ explanation fair group identify measure/ measurement observe/ observation observing order pattern pattern seeking predict/ prediction rank results temperature thermometer	**Key Vocabulary** classify comparative test conclude/ conclusion data data logger diagram enquiry evidence explain/ explanation identify identifying and classifying investigate measure/ measurement microscope observe/ observation observing pattern predict/ prediction research sensor stopwatch test value	**Key Vocabulary** accurate bar chart branching key Carroll diagram classify comparative test conclude/ conclusion control data data logger degree diagram enquiry evaluate evidence explain/ explanation fair fair test identify identifying and classifying investigate measure/ measurement model observe/ observation observing over time	**Key Vocabulary** accuracy accurate comparative test conclude/ conclusion control criterion data dependent variable diagram enquiry evaluate evidence explain/ explanation fair test independent variable line model observe/ observation pattern precise predict/ prediction refute scale secondary source	**Key Vocabulary** anomaly branching key classify comparative test control data information dependent diagram enquiry evaluate evidence explain/ explanation fair test identifying and classifying independent variable line graph model observe/ observation observing over time pattern pattern seeking predict/ prediction refute sensor standard support

			predict/ prediction rank refute research scale sensor sequence support temperature test thermometer variable Venn diagram Volume weight	support variable	variable
Animals Including Humans - Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Humans are mammals. The main parts of the human body are head, arms and hands, torso and legs and feet. Humans have five basic senses which help us to make sense of the world around us: sight, touch, hearing, smell and taste. Although humans are all the same generally, they vary in, for example, their skin, hair, eye colour, shoe size and fingerprint. 5: Animals (vertebrates) Vertebrates are animals that have a backbone. There are five vertebrate groups in the animal kingdom – mammals, amphibians, reptiles, birds and fish. Features of reptiles: eggs, claws, teeth, scaly skin and living on land Features of birds: eggs, feathers, beaks, claws and wings. Features of amphibians: eggs, water and land living, changes to them as they grow. Features of fish: water living, scales, gills, teeth, fins and eggs. Features of mammals: hair or fur covering their bodies; give birth to live young; produce milk for their offspring; nurture offspring; look like a	Animals grow and change throughout their lives. All animals need food, water and air to survive. Humans need to eat food from the four main food groups each day: fruit and vegetables; dairy; meat, fish, pulses and eggs; and starchy foods including bread, potatoes, pasta and rice. Humans needs to stay clean and hygienic to be healthy. Regular	The different types of food we eat contain different nutrients. These are useful for our bodies in different ways. A healthy diet contains a balance of different nutrients. Some of the bones in our skeleton protect our vital organs. Other bones provide support so that our body can remain upright. Our joints allow us to move our bones so that our bodies can move. Muscles work in pairs to move the bones in our skeleton. Vertebrate bodies are supported by an internal bony	The digestive system breaks down food we eat into smaller pieces that our body can use for energy and growth and gets rid of waste. The main parts of the digestive system are the mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus. Humans have different types of teeth: incisors, canines and molars. Teeth have different shapes to break up different foods. Incisors are used for cutting food, canines for tearing and molars for grinding. Food is chemically broken down in the	All living things have a life cycle which includes growth and reproduction, eventually ending in death and decay. Most animals reproduce sexually. This involves two parents, a male and a female. The sperm from the male fertilises the female egg inside her body. Female birds lay eggs with hard shells. These may or may not be fertilised. Mammals reproduce by sexual reproduction. Female mammals give birth to live young and produce milk to feed their young. Amphibians reproduce	From before they are born to puberty, humans go through distinct periods of development: gestation, infancy and childhood. The female body changes as it goes through puberty, from about age 12. There is a fast period of growth and the changes occur that prepare women to have babies. The male body changes as it goes through puberty, from about age 12. There is a fast period of growth and sexual organs develop. The human body changes as it gets older. The human life cycle

younger version of their parent; and range of movement. Animals can be groups by what they eat as carnivores, herbivores and omnivores	physical activity is important for good health.	skeleton including a spine (made of many vertebrae). Invertebrates have no bony skeleton. Vertebrate skeletons all have a spine. The bones vary in size and shape	stomach and small intestine, the large intestine absorbs water and the rectum stores poo. A food chain shows how energy and nutrients pass from one living thing to another as they eat or get eaten by each other. A producer (a plant) makes the food using water, air and the energy of the sun. This is passed to the consumer (a herbivore) that eats it. It is then passed to any animal (a carnivore) that eats the consumer. Animals have teeth appropriate to the food they eat. Carnivores have sharp slicing teeth for eating meat. Herbivores have flat topped teeth for crushing plant matter	by sexual reproduction. Amphibian females' eggs are fertilised outside her body. Some amphibians go through a process of metamorphosis. The majority of insects go through a process of complete metamorphosis. Some insects go through a process of incomplete metamorphosis. Flowers contain male sex organs called stamens and female sex organs called carpel. Pollen must be moved to a part of the carpel called the stigma for reproduction to take place. This process is called pollination. Seeds are the product of sexual reproduction. The plant that grow from them are not identical to the parent plants. Asexual reproduction creates new plants that are identical to the parent.	has different stages: gestation, infancy, childhood, puberty, adulthood, ageing and death.
Animals Including Humans - Skills					
- identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense - identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals - identify and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals	- 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,	- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat - identify that humans and some other animals have skeletons and muscles for support, protection and movement	- 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 - recognise that living things can be grouped in a variety of ways explore and use	- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals - describe the changes as humans develop to old age	- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood describe the ways in which nutrients and water are transported within animals, including humans - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function

	eating the right amounts of different types of food, and hygiene		classification keys to help group, identify and name a variety of living things in their local and wider environment		
Key Vocabulary classify diagram group identify pattern rank brain hearing mammal sense sight smell taste torso touch feature structure adult amphibian carnivore diet fish herbivore mammal omnivore reptile vertebrate classify group identify bird	Key Vocabulary record birth healthy hygiene/hygienic invertebrate life cycle classify diagram group identify observe adult amphibian bird diet fish insect mammal reptile survive vertebrate	Key Vocabulary balanced contract diagram internal key protect support system data evidence investigate sequence calcium carbohydrate cartilage energy exoskeleton fat fibre fluid heart invertebrate joint mineral nutrient organ protein ribs skull spinal cord spine	Key Vocabulary contract flow function grind key model anus canine chemicals constipation decompose diarrhoea digestion extinct food web incisor jaw large intestine mechanical milk teeth molar oesophagus predator prey rectum saliva small intestine stomach vomit	Key Vocabulary ageing milestone stage system abdomen Adam's apple breasts childhood genitals gestation infancy menstruation/having a period newborn pregnancy puberty pubic hair reproduction sweat teenage umbilical cord uterus vagina	Key Vocabulary circulate contract flow pump system transport aorta arteries atrium blood blood vessels capillaries cell deoxygenated blood hormone oxygenated blood plasma platelets pulmonary artery pulse red blood cells valve veins ventricle white blood cells evaluate model secondary source amphibian bird brain

		sugar tendon vitamin X-ray invertebrate mammal reptile vertebrate			breathe carbon dioxide chemicals digestion fish gas heart large intestine lungs mammal mechanical nutrient organ oxygen reptile small intestine vertebrate
Plants - Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
The names of the parts of a flowering plant that grow above the ground are stem, leaf and flower. Roots grow under the ground and different plants have different roots. Some trees are flowering plants which have roots, stems, leaves and flowers. There are differences between deciduous and evergreen trees. There are similarities and differences between flowering plants.	Germination is when a seed starts to sprout and grow. Seeds need certain conditions to germinate. All require water, some require warmth, and most do not need light. Seeds come in a variety of sizes. The size of the seed does not determine how tall the mature plant that grows from it will be. Mature plants can grow from either	Leaves capture sunlight. The energy from the sunlight is used to produce the plant's food. Some of this food is used to make the plant grow. Roots anchor the plant into the soil. Roots absorb water and minerals from the soil. This water is transported to the leaves and flowers via small tubes within the stem. The stem also provides support for the plant and holds the leaves and flowers up. Leaves have tiny holes in them which allow air into the plant. The energy from the sunlight is used to	-	All living things have a life cycle which includes growth and reproduction, eventually ending in death and decay. Flowers contain male sex organs called stamen and female sex organs called carpel. Pollen must be moved to a part of the carpel called the stigma for reproduction to take place. This process is called pollination. Seeds are the product of sexual reproduction. They are genetically different to the parent plants. Asexual reproduction creates plants that	-

	seeds or bulbs. 6: Growing healthy plants Seeds germinate into seedlings and then grow into mature plants. Mature plants need light and water to grow healthily. Different mature plants require different temperatures to grow healthily depending on the type of plant.	turn air and water into the plant's food. When plants are overcrowded, they compete with each other for sunlight, water and nutrients. Plants which are able to get more sunlight, water and nutrients will grow faster and bigger than the others. Different plants live in different habitats. Plants are adapted to the habitat that they live in. 6: Flowering plants life cycle The flower produces the plant's seeds. A flower has: a female part (called the carpel) which includes the ovary, which contains ovules; male parts (called stamen) which produce pollen; petals which surround the male and female parts; and sepals which cover the flower when it is in bud. Pollination is when the pollen from one flower is transferred to another flower. Animals, called pollinators, can transfer the pollen. Some flowers' pollen is transferred from one plant to another using the wind. After pollination, a fruit develops from the flower. The ovary swells up and becomes the fruit. Fruits contain at least one seed. Seeds are moved away from the plant		are genetically identical to the parent.	

		that produced them, and this is called seed dispersal. They are moved away so they do not compete for space, sunlight, water and nutrients. Seeds are dispersed by wind, water, animals eating fruit, seeds becoming attached to an animal, and through explosions of a seedpod (fruit)			
		Plants - Skills			
- can name two of each type of plant (wild, garden, deciduous and evergreen) that they have learnt about in this module mentions key features such as colours when they are describing a plant understands that a tree is a plant. - can describe the difference between evergreen and deciduous trees. - can name and identify the stems, roots, leaves and flowers of any plant studied - can recognise that a tree's trunk is a stem and explain that plants have roots, even when they cannot be seen - can compare plants and state their similarities and differences (for example, they can say that this plant has many small leaves while this one has much larger leaves)	- can name two of each type of plant (wild, garden, deciduous and evergreen) that they have learnt about in this module mentions key features such as colours when they are describing a plant understands that a tree is a plant. - can describe the difference between evergreen and deciduous trees. - can name and identify the stems, roots, leaves and flowers of any plant studied - can recognise that a tree's trunk is a stem and explain that plants have roots,	- can describe that a leaf captures sunlight and air and explain that these are both required for the leaf to make the plant's food - can explain that the amount of light received by a plant has an effect on how quickly it grows - can describe that a stem holds the plant upright and that the stem contains tubes which transport water from the roots to the rest of the plant - can describe that the roots absorb water and nutrients from the soil and anchor the plant in the ground - can explain the functions of a plant's parts (stems, roots and leaves) and how they help it survive in a particular habitat	-	- can name the parts of the flowering plant involved in sexual reproduction can describe ways in which flowering plants can reproduce asexually. an define what a mammal is and describe its life cycle - can define what an amphibian is and describe its life cycle can define what a bird is and describe its life cycle - can define what an insect is and describe its life cycle - can compare the difference between life cycles of different animal groups.	-

	even when they cannot be seen - can compare plants and state their similarities and differences (for example, they can say that this plant has many small leaves while this one has much larger leaves)				
Key Vocabulary different compare describe similar texture bark roots stem trunk	Key Vocabulary compare describe record accurate comparative test effect enquiry explain/explanation fair observing over time bulb conditions germinate/germination mature seedling	Key Vocabulary compare compete supply feature function space transport research adaptation habitat adapted anchor capture nutrient	Key Vocabulary -	Key Vocabulary dissect anther asexual breeding embryo filament female fertilisation gestation larva male mate metamorphosis ovary ovule propagation pupa reproduction seed dispersal stamen stigma style thorax	Key Vocabulary -
Environmental - Knowledge					

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
here are different types of weather: rain, sun, wind, fog, snow, cloudy. There are four seasons across the year. Each season has its own weather patterns and natural events, which happen each year. In autumn, the weather becomes colder, leaves change colour and drop and daylight hours become shorter. Winter is the season that comes after autumn. It has the coldest weather of the year. Some animals hibernate. In spring, the temperature and the number of daylight hours begin to increase, plants begin to grow and hibernating animals emerge. Summer is the warmest season of the year. The sun is highest in the sky in the summer. Many flowering plants produce fruits.	all things are either living, dead or have never been alive. Living things include plants (including seeds) and animals. Things that were once alive include dead animals and plants and parts of plants and animals that are no longer attached. Things made of rock, metal and plastic have never been alive. A habitat provides the basic needs of the animals and plants in it: shelter, food and water. There are different types of habitat. Animals and plants live in a habitat to which they are suited. Animals obtain their food from plants and other animals. Feeding relationships in a habitat can be shown in a food chain.	-	Litter is things that have been thrown away and that are lying on the ground. Some waste materials can be processed so that they can be reused. Decomposition is when dead plants and animals break down into very small pieces that can be used to help other living things grow. Worms, bacteria and fungi help organic materials to decompose. Some materials including plastics and glass cannot decompose. They are not biodegradable. Pollution is the introduction of non-biodegradable materials into the environment. Pollution can result in habitat destruction and cause harm to animals.	-	-
<u>Environmental- Skills</u>					
- can describe some features of their surroundings and how it changes over the seasons.	- can identify living things, things that once lived and things		- can identify context specific ways in which humans might		

- can name the four seasons and describe the weather in different seasons over a year	that have never lived, and explain how they know - can identify what makes a habitat suitable for a living thing, refer to basic needs in their responses and give some explanation linked to dependency - can name and identify six animals they observed in the grassy and woody habitats. - can talk about how the plants and animals within a specific habitat food chain are dependent on each other - can make a specific habitat food chain with three steps to make the links between foods and consumers (and do this for at least two different examples of food chains) - can use arrows in a simple food chain correctly.		impact, positively or negatively, on environments - can identify context specific potential harm that any changes might make to habitats and living things		
Key Vocabulary Compare	Key Vocabulary Compare	Key Vocabulary	Key Vocabulary Compare	Key Vocabulary	Key Vocabulary

Describe Different Match record similar identify observe berry bird bud deciduous evergreen flower fruit insect leaf nest nut petal plant seasons seed tree	Feed Move record order alive breathe consumer dead decay decomposer depend food chain habitat never been alive once alive producer shelter survive		Litter Evaluate Variable Biodegradable Compost Decompose environment filter fungi micro-organism organism pollution		
<u>Evolution - Knowledge</u>					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					A species is a group of organisms that can reproduce and have offspring which can also have offspring. There are similarities and differences between organisms from different species and between individuals of the same species. This is called variation. Any feature of an organism which helps it survive is called an

					adaptation. Organisms are adapted to live in specific habitats. If a habitat changes then an animal's adaptations may no longer help it to survive. If all the animals of the same species die out then they have become extinct. Fossils provide evidence of organisms that lived millions of years ago. Some of the fossil species became extinct while others evolved into new species. Over millions of years, many organisms have changed. Evolution is the process where one species develops into another. Offspring are similar but not identical their parents. If a habitat changes, those organisms which are best suited to the new habitat are more likely to reproduce. Their offspring are more likely to have the survival adaptations of their parents. This process is called natural selection. Charles Darwin and Alfred Wallace both proposed a mechanism for evolution which is called natural selection
Evolution - Skills					
-	-	-	-	-	
Key Vocabulary -	Key Vocabulary -	Key Vocabulary -	Key Vocabulary -	Key Vocabulary -	Key Vocabulary Anomaly camouflage

					evolution extinction inherited migrate natural selection offspring variation classify evidence explain/explanation model adaptation adapted fossil habitat organism predator reproduction species
Classification– Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
-	-	-	Living things are classified into five groups. These include animals and plants. Classification is the process of grouping living things together based on how they look and how they're related to each other. Vertebrates are classified into five main groups: mammals, fish, amphibians, reptiles and birds. Vertebrates have an internal backbone for support. Invertebrates are classified into three main groups: arthropods, molluscs	-	Living things are classified into five groups, which are called kingdoms. They are plants, animals fungi, protista and monera. Plants are divided into four smaller groups: flowering plants, ferns, mosses and conifers. Animals are divided into two groups: vertebrates and invertebrates. Vertebrates are split into five smaller groups: mammals, birds, amphibians, reptile and fish. Invertebrates are split into five smaller groups: molluscs,

			and annelids. Using branching keys helps us to identify and name familiar and unfamiliar living things.		arthropods, flatworms, echinodermata and annelids. Arthropods are split into four smaller groups: myriapods, insects, arachnids and crustaceans.
Classification – Skills					
			- can identify common observable characteristics by which plants and animals might be grouped and can name others with similar observable characteristics can name the subgroup to which a plant or animal belongs - can explain their reasoning, by saying what observable characteristics are common to a particular type of plant or animal. - can group flowering plants according to similarities and identify differences - can use a branching key effectively to help identify and name the flowering plants provided.		- can describe how organisms (living things) are assigned to five broad groups (kingdoms) - can recognise the need to divide very large groups, like plants or vertebrate animals, into subgroups can identify common observable characteristics that are similar between animals, which mean that they are grouped together - can suggest differences between, for example, birds and fish or between arachnids and insects. - can use branching keys to explain why a specific plant or animal is part of one group or another based on common observable characteristics can refer to wider subject knowledge in explaining classification (for example, non-flowering plants do not have flowers as part of their life cycle but reproduce in different ways such as seeds in cones for conifers).
Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary

			characteristic feature internal segment branching key annelid arachnid cold-blooded crustacean flowering plant mollusc myriapod non-flowering plant organism warm-blooded		characteristic common observable cone conifer echinodermata fern flatworm monera moss mould needle protista spore taxonomy
Materials - Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Everything around us is made from materials. Some materials are natural materials, naturally sourced materials that are used without modification. Some materials are manufactured materials, made by changing natural source materials. Different materials have different characteristics. Materials should be used carefully and can often be reused or recycled. Objects can be sorted according to their source material. 4: Properties and uses of materials Objects can be made from more than one	Objects can be tested and sorted according to the properties of the materials they are made from. Inventors discover new uses for materials and create new materials. 5: Changing materials Squashing, bending, stretching and twisting can change the shape of some materials. Different properties allow the shapes of materials to be changed in different ways. Objects are made from materials with properties that make them fit for purpose	Rocks can be compared and grouped according to their appearance and simple properties. Rocks change over time depending on their physical properties. Soils are made from rocks and organic material. Specific properties of different soils affect whether they absorb and hold water or not. Fossils are formed when living things are trapped within rock. Human knowledge of the living world has been developed through the lives and work of fossil scientists such as Mary Anning.	Solid holds its shape. Liquids can be poured and will spread out. Both solids and liquids have a fixed volume. Water freezes at zero degrees Celsius. Freezing/solidifying is when a liquid changes state into a solid. Melting is when a solid changes state into a liquid. Different materials melt at different temperatures. Melting and freezing are reversible processes. Air is a gas. Gases have substance (take up space) and have weight. Gases change in shape and volume to fill the space they are in. When water changes state from liquid into	Materials have physical properties that make them fit for certain purposes. Weathering, wear and tear can occur over time and this will have an impact upon a material's fitness for purpose. The properties of liquids include having a fixed weight, a fixed volume, an ability to flow, a level of viscosity; and they take on the shape of a container. The viscosity of a liquid describes how thick or thin it is and how fast or slowly it will flow. A thermal insulator is a material that does not transmit heat through it well. A	-

material, including recycled materials. Materials have physical properties that make them useful for different purposes.			gas it becomes water vapour. This process is called evaporation. Liquids other than water evaporate too. Steam is the invisible gas produced by boiling water. When water vapour changes state from gas into liquid it becomes water. This process is called condensation. The Earth's water can be a liquid (water), a gas (vapour) and a solid (ice). Water in the environment evaporates into the air then the warm air cools as it rises, leading to condensation and the formation of clouds. Water droplets in the clouds fall as rain (or as snow or hail if cooled below freezing point). The water returns to the sea via streams, lakes and rivers to continue the water cycle	thermal conductor is a material that transmits heat through it very well. A thermal insulator keeps hot things hot and cold things cold. Materials can be absorbent and can soak up and take in liquid. Some materials are permeable and let water pass through. Some materials are waterproof and do not let water pass through. 5: Separating mixtures and changing materials Solid, dry mixtures of materials can be separated by sieving. Some solids dissolve in water while others do not. Solids that do not dissolve can be separated from a liquid by filtering. Solids which dissolve can be retrieved from a solution if the liquid is evaporated. Some changes of state are reversible, and others are non-reversible. Non-reversible changes result in the formation of new materials.	
Materials - Skills					
- can identify the same material when made into different objects - can identify objects in the same category, for example 'these are bottles', when made from different materials	- can name objects whose shape can or cannot be changed by bending, stretching, squashing or twisting - can identify materials which are flexible, rigid, elastic or stiff can select materials with suitable properties to make particular objects and explain why their choice of material is fit for purpose	- can use appropriate vocabulary to describe the properties and appearance of rocks - can make observations and carry out simple tests to confirm those properties - can identify a rock by the description of its properties.	- can use appropriate vocabulary to describe the properties of solids, liquids and gases - can make observations and carry out simple tests to confirm those properties can identify a solid, liquid or gas	- can accurately describe the meaning of a range of properties -can give similarities and differences between materials based on properties that can be tested can give properties that are opposites	

- can identify an object by material and category, for example 'this is a plastic bottle' - can name the different materials in an object that is made from more than one material - can make observations of different materials using their senses of sight, touch and hearing - can describe observations using sensory and context-specific vocabulary (for example, rough, smooth, shiny, dull, see-through)	- can describe and use push and pull actions (squashing, bending, twisting and stretching) to change the shape of an object or material.	- can describe how a fossil is formed. - can explain that soils are made from rocks and also contain living/dead matter. - can observe and describe features of soil - can describe ways in which rock is broken down to form soil.	by the description of its properties. - can identify which changes are caused by heating and which by cooling - can identify which are the changes of state, and describe which state the material is changing from and to, and how they can tell that the change is taking place - can recognise changes of state that involve materials other than water can identify which changes are taking place at cold, warm and hot temperatures - can state the freezing and boiling point of water and identify materials with higher or lower melting or boiling points. - can define evaporation and condensation - can describe how water evaporates from the surface of a body of water (sea, lake, reservoir, river) to form water vapour in the air - can describe how clouds are formed by water vapour cooling as it rises and condensing into small drops of water can state that evaporation increases with increase in temperature (or decreases with decrease in	- can recognise which materials have a particular property. - can describe the link between the specific functions of objects and the properties of the materials they are made from - can choose a suitable material for a purpose by considering its properties. For example: identify the properties of materials used for the different purposes in the structure of a building - can recognise that metals and plastic are categories of materials; the individual materials have common properties but also have differences that make them suited to different uses.	

			temperature), and may also refer to other factors, such as wind - can state that boiling happens at a specific temperature and evaporation happens across the temperature range.		
Key Vocabulary compare describe different record similar sort suitable use magnifier test absorb/absorbent manufactured material natural property recycle reuse transparent	Key Vocabulary action discover/discovery fit for purpose invent/inventor pull push suitable use	Key Vocabulary appearance compare drain flood Layer Similar Structure texture identifying and classifying microscope crystal/crystalline erosion fossil hardness organic palaeontologist remains rock sediment weathering	Key Vocabulary cool empty flow heat horizontal pace vertical control variable degree Celsius (°C) fair test interval model scale variable volume air boil boiling point carbon dioxide change of state cloud compress condense/condensation evaporate/evaporation expand freeze freezing point gas	Key Vocabulary Construction Design Disassemble Dispose Flow invent/invention leak pour structure dependent variable independent variable survey brittle ductile fragile impermeable malleable/malleability permeable thermal conductor thermal insulator viscosity/viscous wear and tear	Key Vocabulary -

			granule/granular heat-sensitive helium ice liquid melt melting point oxygen powder rain snow solid solidify steam viscous water vapour		
Light - Knowledge					
		Light comes from light sources. Dark is the absence of light. Nothing can be seen if there is no light. Objects are easier to see when there is more light. Shiny materials and objects are good reflectors of light. When there is less light more reflective materials are easier to see than less reflective ones. Shadows are formed when light is blocked. Objects made from opaque materials cast the darkest shadows. Shadows are the same shape as the objects that cast them. Light from the sun can be dangerous so we need to protect our eyes. The size			Light appears to travel in straight lines. We can see a light source because some of the light from the source enters our eyes. Light travelling in straight lines can be used to explain why a shadow is the same shape as the object that casts it and how the shape of shadows can be changed. Light is reflected from shiny surfaces in a predictable way because it travels in straight lines. We can see objects because they reflect some of the light that falls onto them into our eyes.

		and position of a shadow can be changed by moving the light source.			
		Light - Skills			
		- can clearly identify that eyes and a light source are needed to see anything - can explain that without a light source there is darkness and eyes can see nothing - can describe light from a light source (for example, a torch) as being reflected off a shiny object - can identify shiny and dull objects by how reflective they are and explain that this can be compared by measuring how well the surface reflects light. - can give a reason why eyes should be protected from bright sunlight - can give a reason why skin should be protected from sunlight - can give examples of how to protect eyes and skin from bright sunlight, with reference to the amount of light that passes through a material. - draws or demonstrates the positions of a light source, object and shadow - draws a shadow that is black, featureless and similar			- can describe and draw light travelling in straight lines. - can recognise that light from a light source is seen when light rays, travelling in straight lines from the source, enter our eyes - can model and explain, orally and/or in writing, how light travels from a light source to an object and then to our eyes enabling us to see the object. - can describe and draw light travelling in straight lines to create a shadow the same shape as the object. - can represent how light rays are reflected by objects using physical models and/or labelled diagrams.

		in shape to the object casting it - can explain that opaque objects block all of the light and so cast darker shadows than those made by translucent objects states that moving the light source changes the size of a shadow - can identify a pattern in how the size of the shadow changes when they move the torch further from or closer to an object casting a shadow on a screen - can identify a pattern in how the size of a shadow changes when the torch is moved higher and lower in relation to an object casting a shadow onto a surface on which it is standing			
Key Vocabulary	Key Vocabulary	Key Vocabulary absence artificial block similar surface comparative test data data logger evidence explain/explanation	Key Vocabulary	Key Vocabulary	Key Vocabulary block travel reflection

		identifying and classifying measure/measurement observe/observation pattern: predict/prediction bright dark/darkness data logger dim light light source lux opaque reflect reflective sensor shadow Sun Sunlight translucent transparent ultraviolet			
Sound - Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
-	-	-	Sounds are made by something vibrating; this is the source. Different sources make different sounds. Vibrations travel from the source through a material to the ear so that we can hear them. Sounds can be quiet or loud; volume depends on the size of the vibrations. Sounds get fainter as the distance from the sound source increases. Sounds can be high	-	-

			or low in pitch. Pitch depends on the size of the object vibrating. The pitch of a note played on a stringed instrument depends on the length, thickness and tautness of the vibrating string.		
Sound- Skills					
			- can identify the source of a sound, draw or state what is vibrating to cause it and recognise that vibration is a rapid back and forth movement - can identify what is vibrating to produce a sound and recognise that it has moved through a solid or a gas to reach their ears. - can recognise that a larger instrument will make a lowerpitched sound than a smaller one - can recognise that changing the length of the vibrating air column in a wind instrument will change the pitch of the note - can recognise that the length, thickness and tautness of a string will affect the pitch of a plucked note - can identify the pattern that more vigorous playing of different instruments creates stronger vibrations and these cause louder sounds. - can recognise that sounds are louder closer to the source and reduce in volume as the distance from the source increases.		

Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary communicate compare pluck taut travel fair test refute support variable air decibel gas liquid pitch solid: sound sound source vibrate/vibration volume	Key Vocabulary	Key Vocabulary
Forces- Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		A force is a push or pull that can make something move. The surface a spinning top is moving on affects how long it spins for. The surface on which an object rests affects how it slides. Magnets have a North and a South pole. Unlike poles attract and like poles repel each other. Some metals are attracted to a magnet and are known as magnetic. Other materials are not. The strength of magnets varies and can be tested using the idea that		Friction is a force that makes it harder to move an object across a surface or slows down an object moving over a surface. The unit of measurement of a force is Newtons (abbreviated to N). Gravity is a force that pulls all objects to the centre of the Earth. Air resistance is a force that slows down an object moving through air. The amount of air resistance depends on the surface area of the object. It is air resistance, not the object's weight, that affects how	

		magnetic forces act at a distance		quickly an object falls. Water resistance is a force that slows down an object moving through water. The amount of water resistance depends on the shape of the object. A pulley a mechanism used for lifting heavy objects (the load) by applying a pulling force at one end of rope attached to the load which passes over a wheel. A lever is a long rigid arm that rests on a pivot. A force is applied to one part of the lever to lift the load at another point on the lever. A gear is a mechanism which consists of wheels with teeth that slot together. Gears change the direction of movement and the force required to make something move	
Forces- Skills					
		- can identify smooth surfaces on which an object will move more easily and rough surfaces which will lead to slow, difficult movement. - can identify the pushes and pulls that are making the objects move and uses the word 'force' to describe them identifies the direction in which the object is moving as a result of the force - can recognise that wind can also provide a contact force to move objects			

		- can give examples of contact forces and states that a magnetic force is an example of a non-contact force. - can demonstrate and use the key vocabulary to explain that magnets can attract or repel each other depending on their position - can demonstrate and use the key vocabulary to explain that some metals are attracted to magnets and that others are not. - can state that magnetic materials are attracted to a magnet; that only some metals are magnetic; and that a magnet can be used to check for attraction between the magnet and the material - can list iron as a magnetic metal (children may also list iron as a constituent of steel, and list other magnetic metals such as cobalt and nickel. - can explain that magnets attract and repel other magnets, but they only attract, and do not repel, magnetic materials. - can correctly state that the ends of a magnet are called the north and south poles can identify the ends of a bar magnet and a horseshoe magnet as the poles. - can indicate correctly whether pairs of bar magnets will attract or repel each other depending on their position can use the idea			

		and vocabulary of poles to explain the magnets' behaviour.			
Key Vocabulary	Key Vocabulary	Key Vocabulary Contact pull/pulling push/pushing rough slide smooth surface texture value attract contact force force like poles magnet magnetic non- contact force north/south pole repel	Key Vocabulary	Key Vocabulary Anticlockwise Clockwise system	Key Vocabulary
Electricity - Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. A switch can be added to a circuit to turn the component on and off. If there is a break in a circuit, a loose connection or a short circuit, the component will not work. Metals are good electrical conductors. Non-		Circuits diagrams using standard symbols are used to record circuits. Adding cells to a circuit makes a lamp brighter. A lamp gets brighter if the voltage in the circuit is increased. A lamp gets dimmer if thinner wires are used. If the voltage is increased in a circuit a buzzer makes a louder sound and a motor turns more quickly.

			metals are generally electrical insulators except for graphite (pencil lead), human tissue and water.		
Electricity- Skills					
			- can name a range of electrical devices that they use. - can confidently make circuits to make bulbs and buzzers work and use a switch to control them. - can confidently describe how to fix a circuit that is not working. - can describe how a switch opens and closes a circuit, controlling the flow of electricity and allowing the bulb to be turned on and off. - can classify materials as electrical conductors and insulators and explain what these terms mean.		- can describe how the lamp became brighter as more cells were added can state that the higher the voltage in the circuit, the brighter the lamp - can state that the higher the voltage in the circuit, the louder the buzzer. - can describe how changing other variables in a circuit affects how lamps, buzzers and motors function. - can use the recognised symbols in diagrams to record the circuits they make.
Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary appliance complete device flow function manual plug socket wire carroll diagram refute support Venn diagram Battery Bulb Buzzer Cell	Key Vocabulary	Key Vocabulary fan flow propeller symbol voltage volts

			Circuit closed circuit connection points electrical appliance electrical component electrical conductor electrical insulator electricity mains motor open circuit switch		
Earth in Space - Knowledge					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				The main bodies that are found in space are the Sun, Moon, Earth and planets. They are all spherical. The Earth and the other planets all orbit the Sun. The time it takes to complete one orbit is called a year. The other planets of our solar system also orbit the Sun at different distances and taking different times to complete one orbit. The Sun appears to move east to west in an arc across the sky from sunrise to sunset. Changes in shadows during the day can be explained by the changes in the position of the Sun. The Earth rotates on its axis and this causes day and night, the apparent movement of the Sun across the sky and changes in shadows. The Moon orbits the	

				Earth every 28 days and rotates on its axis.	
Earth in Space - Skills					
				- can correctly use the term 'orbit' - can describe the orbits of the planets as roughly circular paths that do not overlap can state that the Earth takes one year to orbit the Sun - can create a model of the solar system with all the planets orbiting in the correct order from the Sun - can describe in writing and/or diagrams the Moon orbiting the Earth and rotating on its axis can include the Moon in a moving model of the solar system.	
Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary	Key Vocabulary Dawn Diameter Dusk Horizon Midday Spherical Sunrise Sunset Moon Orbit Planet Rotate solar system star year	Key Vocabulary