



Junior Knowledge Map for Science

		Year 3	Year 4	Year 5	Year 6
UNIT 1 – ANIMALS INCLUDING HUMANS	KEY KNOWLEDGE	<u>Animals including humans:</u>	<u>Animals including humans:</u>	<u>Animals including humans:</u>	<u>Animals including humans:</u>
		<ul style="list-style-type: none"> • Some foods needed for a healthy and varied diet • The components of a healthy and varied diet • 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 • <i>The role of different food groups</i> • <i>Diets of animals including pets</i> • <i>That there are many ways of achieving an adequate and varied diet for humans</i> • Humans and other animals have internal bones which make up skeletons • There are animals that do not have an internal skeleton (invertebrates) • <i>The advantages of having an internal skeleton over no skeleton or an exoskeleton</i> • Movement depends on both skeleton and muscles • When one muscle contracts another relaxes • Humans and some other animals have skeletons and muscles for support, protection and movement • Skeletons grow as they grow • <i>There are problems associated with broken bones or bones diseases</i> 	<ul style="list-style-type: none"> • Name body parts, including some internal organs (large intestine, small intestine, brain, lungs, heart, stomach, oesophagus) • The different organs in the digestive system and where they are • The role of each organ in the digestive system • The simple functions of the basic parts of the digestive system in humans • <i>That food needs to be broken down</i> • The different types of teeth in humans and their simple functions • Teeth require care • <i>Excess sugar is detrimental to teeth</i> • Animals with different diets need different kinds of teeth • <i>Fossilised teeth tell us about that animals' diet</i> • <i>Humans do not have a full set of adult teeth at birth</i> 	<ul style="list-style-type: none"> • Humans change as they develop to old age • Appearance of humans changes as they get older • Some characteristics that will not change with age • Humans develop in stages; including puberty 	<ul style="list-style-type: none"> • Parts of the circulatory system • The heart is made of muscle • The main parts of the human circulatory system, and the functions of the heart, blood vessels and blood • Pulse rate is a measure of how fast the heart is beating • During exercise the heart beats faster to take blood more rapidly to the muscles • Different functions of the blood (e.g. transporting and protecting) • Blood comes from the heart in arteries and returns to the heart in veins • Blood carries oxygen and other essential materials around the body • Harmful effects of smoking • Diet, exercise, drugs and lifestyle have an impact on the way bodies function • The ways in which nutrients and water are transported within animals, including humans • Some harmful effects of drugs • Food groups and sources of each • <i>The effect of diet on particular organs of the body/aspects of health</i> • <i>The effect of exercise on particular organs of the body / health</i> • <i>Ideas about smoking have changed over time</i> • <i>Advice on diet changes (e.g. butter vs margarine, five a day, tax on sugary drinks)</i>

	KEY VOCAB	Balanced diet, carbohydrates, protein, fats, fibre, fruit and vegetables, bones, muscles, femur, ribs, spine, tibia, shoulder blade, hollow, relax and contract, protect, support, internal skeleton, exoskeleton	Teeth and eating: incisor, molar, canine, diet, decay, healthy, teeth, acids, sugars, mouth, rip, tear, chew, grind Digestive system: saliva tongue, toilet waste, nutrients energy, stomach, large/small intestine, brain, lungs, movement, acids, urine, faeces, oesophagus	New born, infant, child, teenager, puberty, adult, wrinkles, grey hair, height, weight	Circulatory System: Heart, veins, arteries, capillaries, blood, pulse, beats, oxygen, carbon dioxide nutrients, organs, drugs, medicines, minerals, vitamins, lungs Healthy Lifestyle: caffeine, medical, legal, illegal
	IMPACT QUESTIONS	<ol style="list-style-type: none"> 1) What nutrients are found in food? 2) What type of diet do humans need to be healthy? 3) What are the purposes of a skeleton? 4) How do muscles and joints help humans to move? 5) Can you give examples of animals that have an internal skeleton and animals that have an exoskeleton? 	<ol style="list-style-type: none"> 1) What are the main parts of the digestive system? 2) Where is the digestive system found in the human body? 3) What happens in each part of the digestive system? 4) What are the different types of teeth we have? 5) What does each type of tooth look like and what they are used for? 	<ol style="list-style-type: none"> 1) What changes take place in boys and girls during puberty? 2) How does a baby change as it reaches childhood? 3) How does a child change as it reaches teenage years? 4) How does a teenager change as it reaches adulthood? 5) How does an adult change as it reaches old age? 	<ol style="list-style-type: none"> 1) What parts of the body make up the circulatory system? 2) What are the different parts of the heart? 3) Why do we need blood? 4) Explain how blood moves around the body. 5) How can we look after our circulatory system and our general health?
	PREVIOUSLY TAUGHT	Food groups are looked at in year 1 D&T.	Links with year 3 science looking at food and nutrition. Links PSHE healthy me topic - looking after yourself i.e. brushing teeth etc.	Strong links with SRE topic in year 5 looking at the changes of child through puberty. NB: Some of this topic may be taught in combination with the SRE topic and therefore not evident in science books.	Muscles and Food groups taught in year 3. Healthy lifestyle also taught in PSHE

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UNIT 2 - LIVING THINGS AND THEIR HABITATS	KEY KNOWLEDGE		<p><u>Living Things and their Habitats:</u></p> <ul style="list-style-type: none"> Names of a variety of living things in their local and wider environment Living things can be grouped in a variety of ways Animals can be vertebrates or invertebrates Characteristics of the vertebrate (fish, mammals, amphibians, reptiles and birds) groups (e.g. warm-blooded, have fur, lay eggs) Animals that are vertebrates (fish, mammals, amphibians, reptiles and birds) and invertebrates (snails, slugs, spiders, worms and insects) Exceptions that are hard to classify (e.g. platypus, echidna, bat, flightless birds) Some animals feed on other animals and some on plants a food chain must always start with a green plant (a producer) Green plants are the ultimate source of food for all animals Food chains include identifying producers, predators and prey (Teacher Note: statement moved from NC 'Animals including humans' to improve progression within topics) Know the function of some of the more complex features which aid survival in specific habitats (e.g. gills, blubber, camouflage) Why different animals and plants live in different habitats Environments can change and that this can sometimes pose dangers to living things How humans can changes to environments It is necessary to use a reasonably large sample when investigating the preferences of small invertebrates Different organisms are found in different habitats because of different environmental factors How humans have negatively impacted environments (e.g. pollution, deforestation, introduction of invasive species) 	<p><u>Living Things and their habitats:</u></p> <ul style="list-style-type: none"> Plants, animals and humans all have life cycles Differences in the life cycles of a mammal, an amphibian, an insect and a bird The parts of a flower The functions of some parts of a flower The main functions of parts of a plant involved in reproduction The processes of sexual and asexual reproduction in plants The parts of the human reproductive system The simple functions of parts of the human reproductive system The life process of reproduction in some plants and animals The different methods of seed dispersal That most animals reproduce by sexual reproduction The internal and external fertilisation of animals are different processes Living things need to reproduce if the species is to survive The gestation periods (pregnancy) of some different animals The life cycle of a kangaroo or koala are unusual 	<p><u>Classification:</u></p> <ul style="list-style-type: none"> Recognise that there is a wide variety of living things Classification is important Identify vertebrates and invertebrates Name and describe the five vertebrate groups How living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Reasons for classifying plants and animals based on specific characteristics Early ideas about classification (e.g. Aristotle) There are living things that are too small to be seen and these can affect our lives There are many micro-organisms, some which can cause illness or decay There are useful micro-organisms which can be used in food production How micro-organisms feed, grow and reproduce like other organisms Yeast is living Micro-organisms can move from one food source to another or from one animal to another The rate of reproduction in microorganisms is different to other animals The development of the microscope has contributed to our understanding of microorganisms Ideas about hygiene have changed over time (e.g. Semmelweis)

KEY VOCAB		Predator, prey, producer, vegetation, shelter, vertebrate, invertebrate, classify, characteristic, flowering plant, non- flowering plant (fern, moss)	Live young, hatch, tadpole, caterpillar, butterfly, ladybird, pupae, larvae, chrysalis, reproduction, asexual, sexual, life cycle, pollination, seed dispersal, pollen, stamen, stigma	Micro-organism, microbe, fungus, bacteria, virus, classified, classification key, yeast, characteristic, microscope
	IMPACT QUESTIONS	<ol style="list-style-type: none"> 1) What makes an animal a vertebrate or invertebrate? 2) What order do predator, prey and producer come in a food chain? 3) How are animals grouped and classified? 4) What is camouflage and how does it help animals? 5) How have humans impacted the natural environment and a specific food chains? 	<ol style="list-style-type: none"> 1) What are the similarities and differences between the life cycles of animals and plants? 2) What are the similarities and differences between the life cycles of mammal, insect, bird and amphibian? 3) How do animals and plants reproduce? 4) What is the difference between sexual and asexual reproduction? 5) What is seed dispersal and what are the different types? 	<ol style="list-style-type: none"> 1) What are the broad groups that we use to classify living things? 2) How are animals classified? 3) What are the key characteristics that animals are grouped using? 4) What are micro-organisms? 5) How can you prove that yeast is living?
	PRIOR LEARNING LINKS	Year 3 – Animals including humans – looking at animals with and without spines and introducing the term vertebrate /invertebrate	Year 5 – PSHE links with SRE	Year 5 – D&T – cooking bread with yeast

		Year 3	Year 4	Year 5	Year 6
UNIT 3 - MATERIALS	KEY KNOWLEDGE		<p>Materials:</p> <ul style="list-style-type: none"> • The categories: solids, liquids and gases • Air is a gas and one of a range of gases which have important uses • That gases flow from place to place and can be easily compressed • Differences between solids and liquids • Simple solids and liquids can be compared (e.g. squashing or pouring) • Materials can be sorted, according to whether they are solids, liquids or gases • <i>Granular solids have some of the properties associated with liquids</i> • <i>Some substances are hard to classify as solids, liquids and gases (e.g. whipped cream, mousse, mayonnaise, muddy water, fizzy drinks, cornflour and water)</i> • For a substance to be detected by smell, some of it must be in the gas state • Some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) (e.g. chocolate, ice cream, butter, water) • <i>Different liquids have different boiling temperatures</i> • Ice, water and steam are the same material • Melting, freezing, evaporation and condensation are process that can occur and are reversible • Sequence the water cycle • The relationship between liquids and gases in terms of evaporation and condensation • The part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature • That temperature can affect the rate of evaporation or condensation • <i>The effect of salt on ice</i> 	<p>Materials:</p> <ul style="list-style-type: none"> • The range of properties that materials have (e.g. hardness, transparency, magnetism, electrical and thermal conductivity) • Materials that are good thermal insulators and some everyday uses • Metals conduct heat and electricity well • Materials can group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • Some solids can be dissolved (salt and sugar dissolve in water but sand will not) • Dissolved solids cannot be seen, but remain in the solution and pass through filters • There are factors that affect the rate at which a solid dissolves • An undissolved solid can be separated from a liquid by filtering and a dissolved solid can be recovered by evaporation • The properties of mixtures which can be separated by filtration • That some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • Dissolving, mixing and changes of state are reversible changes • A variety of chemical changes (e.g. burning) are irreversible and often make new and useful materials • That some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda • In some cases the new materials made are gases and identify some evidence for the production of gases (e.g. vigorous bubbling) 	

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">KEY VOCAB</p>		<p>Water, air, ice, milk, lemonade, juice, metal, solid, liquid, gas, pour, flow, change shape, squash, heat, cool, grain/granular, temperature, thermometer, freeze, melt, boil, evaporate, condense, steam, smoke, sea water, properties, melting point, degrees Celsius,</p>	<p>Hardness, solubility, transparency, conductivity, thermal, insulation, dissolve, solution, separation, polymers, reversible, irreversible, evaporating, melting, evaporation, filtering, sieving, , dissolving, burning, rusting, vinegar, bicarbonate of soda, magnetism, insulators, conductors, soluble, insoluble</p>		
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">IMPACT QUESTIONS</p>		<p>What are the differences between solids, liquids and gases? How can temperature effect an object such as water? Where does the water in the puddles on the playground go? What is the water cycle? Why is salt put on the roads during the winter?</p>	<ol style="list-style-type: none"> 1) Which materials good for conducting electricity? 2) What are some everyday uses for wood, plastic and metal and why are they used? 3) How can a solid be extracted from a solution? 4) What are reversible and irreversible changes? 5) What might vigorous bubbling in a liquid tell us? 	
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">PRIOR LEARNING</p>			<p>Year 4 – electricity – looking at materials that conduct electricity</p>	

		Year 3	Year 4	Year 5	Year 6
UNIT 4 – ELECTRICITY	KEY KNOWLEDGE		<p><u>Electricity:</u></p> <ul style="list-style-type: none"> • Lots of common appliances run on electricity • Devices are mains or battery operated • Dangers are associated with mains electricity • Components of a simple electrical circuit • Batteries are sources of electricity • A circuit must be complete to work • The names of components in a simple series electrical circuit they have made, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Make pictorial drawings of simple working circuits (symbols covered in year 6) • Make circuits from drawings provided • A lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • <i>Faults can occur in simple circuits</i> • The effect of making and breaking one of the contacts on a circuit • A switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Materials are conductors or insulators • Some common conductors and insulators, and associate metals with being good conductors • <i>Metals and non-metals are used in electrical appliances and why including wires</i> • <i>Playdough and graphite are non-metal conductors and this is unusual</i> 		<p><u>Electricity:</u></p> <ul style="list-style-type: none"> • The ‘amount’ of electricity (voltage) depends on the number of batteries • Conventional circuit symbols are generic • Recognised symbols are used to when representing a simple circuit in a diagram • The brightness of bulbs and the volume of a buzzer can be changed and how • The amount of electricity is measured in voltage • The brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit • There may be variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • <i>The thickness of a wire impacts a circuit</i> • <i>There are differences between wires usually used for circuits and fuse wires</i> • <i>The effect of all the lights in a home were connected in the same circuit and one broke</i> • <i>The current in circuits can be represented by simple models and analogies (e.g. piped water, bicycle chain, children and sweets)</i> • <i>Have an idea how electricity gets into our homes (added by CHS)</i>
	KEY		Battery, cell, wires, switch, crocodile clips, buzzer, bulb, circuit, symbols, insulator, conductor, plastic, metal, appliance, component		Voltage, current, series, component, circuit, conductor, positive/negative terminal, complete circuit, battery, cell

	IMPACT QUESTIONS		<ol style="list-style-type: none"> 1) What appliances in the classroom are mains / battery operated? 2) What components might you find in a simple circuit? 3) Why might a circuit not work (what are the possible faults)? 4) What are conductors and insulators? 5) What is the purpose of a switch? 		<p>voltage and how does it affect an electrical circuit? symbols used to represent electrical components? What are the symbols for electrical components? range to effect the brightness of a bulb in a circuit? where does the electricity in our homes come from?</p>
	PRIOR LEARNING LINKS				<p>Linked with D&T – moving vehicles</p>

		Year 3	Year 4	Year 5	Year 6
UNIT 5 – ROCKS AND SOILS LEADING TO EVOLUTION AND INHERITANCE	KEY KNOWLEDGE	<p>Rocks and Soil:</p> <ul style="list-style-type: none"> • The characteristics of a variety of rocks • Fossils can be found in rocks • Different types of rock react differently to physical forces (e.g. water, rubbing) • Rocks can be grouped together on the basis of their appearance and simple physical properties • There are rocks under the Earth's surface • <i>The simple physical properties of some rocks are linked to their formation</i> • <i>Rocks have uses based on their properties e.g: Marble- kitchen worktops or statues, Slate roof tiles, Granite walls</i> • <i>Sedimentary, metamorphic and igneous rocks can be represented through a model.</i> • <i>Lots of the same types of rock are often found in one place</i> • Fossils are formed when things that have lived are trapped within rock • <i>Mary Anning discovered fossils</i> • <i>We do not see the soft parts of animals in fossils</i> • Soil is a mixture of different materials and living things including dead plants and animals • There is rock under all surfaces and that soils come from rocks • Soils are made from rocks and organic matter 			<p>Evolution and Inheritance:</p> <ul style="list-style-type: none"> • There is variation in different species (e.g. dogs, horses) • Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Animals have to compete for food • Animals avoid predators (e.g. speed, camouflage) • Animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • Being well adapted to an environment means an organism is more likely to survive • <i>Animals which are better adapted to an environment are more likely to survive, reproduce and pass on characteristics to their offspring meaning the animal species will gradually change and evolve (giraffe with the tallest neck could reach more leaves to feed on)</i> • Living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • We do not have a complete fossil record • <i>The story of the peppered moth and how this provides evidence for natural selection</i> • <i>We can see evidence for natural selection in fast reproducing organisms like bacteria (e.g. antibiotic resistant bacteria and pesticide resistant insects)</i> • <i>The introduction of a new species to an isolated environment can effect native species (e.g. Dodo, Kakapo or Stephen's island wren)</i> • <i>The ideas of Darwin and Lamarck on evolution had similarities and differences</i>

KEY VOCAB	Rock, soil, marble, granite, sand, stone, slate, chalk, clay, texture, absorbed, permeable, pebble, characteristic, surface, organic, impermeable, crystal, grains, crumbly, igneous, sedimentary, metamorphic, fossil			Variety, variation, offspring, species, competition, adapt, adaptation, reproduce, survive, evolve, fossil record, gills, blubber, moulting, long neck, hooves, eyelashes, tails, generation
IMPACT QUESTIONS	<ol style="list-style-type: none"> 1) What physical properties could you use to group different types of rock? 2) What is the difference between igneous, sedimentary and metamorphic rock? 3) How are fossils formed? 4) What is Mary Anning famous for? 5) What is soil made of? 			<ol style="list-style-type: none"> 1) Why does a child not look exactly the same as its mother? 2) What is adaptation? 3) How do the adaptations of a _____ help it to survive? 4) How might an animal be suited to its environment? 5) How do fossils help us to learn about the past?
PRIOR LEARNING LINKS	New topic – children will have some experience of sorting and will possibly have looked at rocks floating / sinking in KS1			<p>Closely linked with year 1 and 4 Living things and their habitats looking at adaptations and physical attributes of groups of animals.</p> <p>In year 3 children looked at the bone structure of different animals and this included some discussion about adaptations.</p>



Forces:

- Pushes and pulls are forces
- A force acts in a particular direction
- The movements, shape or direction of objects may change when forces act on them
- Force makes an object start moving by pushing or pulling, they can also make it speed up, slow down, change direction or shape
- Annotated drawings can show the direction of force needed to make an object move
- Friction is a force
- Friction affects the movement of objects
- Friction between solid surfaces can be increased or decreased
- **Things move differently on different surfaces**
- **Magnets attract or repel each other and attract some materials and not others**
- Materials are either magnetic or non-magnetic
- **Everyday materials can be grouped on the basis of whether they are attracted to a magnet, and identify some magnetic materials**
- The difference between a magnet and a magnetic material
- **Some forces need contact between two objects, but magnetic forces can act at a distance**
- What happens when some materials are put near a magnet
- **Magnets have two poles (North and South)**
- **Two magnets will either attract or repel each other, depending on which poles are facing**
- *Some everyday uses of magnets*
- *A compass works by lining up with the Earth's magnetic field*
- *Lodestone was found to be a naturally occurring magnet and was used as the first compass for navigation*

Forces:

- Weight is a force
- Force is measured in Newtons
- Simple forces include: gravity, friction and air resistance
- More than one force can act on an object
- Force can be represented in diagrams with arrows to show the direction of forces acting on an object
- Different forces effect objects differently
- Air resistance slows things down
- Friction can be useful or not useful
- **The effects of air resistance, water resistance and friction, that act between moving surfaces**
- More than one force can be acting on an object at a time and give some examples of this
- Forces on an object can be either balanced or unbalanced
- Balanced forces on an object cause it to remain stationary or travel at the same speed
- Unbalanced forces on an object cause it to speed up, change shape or slow down
- **Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object**
- Air resistance is the frictional force of air on objects moving through it
- Factors that can increase friction between solid surfaces and increase air and water resistance
- Frictional forces can be helpful or unhelpful with examples
- *Bicycle tyres treads are designed according to how much friction they need*
- *Streamlined objects are designed in this way to have less resistance (e.g. cycling helmets, formula 1 cars, dolphins)*
- **Some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect**
- *Levers, pulleys and gears are used in everyday life (e.g. describe how having gears can make it*

			<p><i>easier to pedal a bike, how a bottle opener makes it easier to open a bottle lid)</i></p> <ul style="list-style-type: none"> • <i>Introducing gears onto bikes has changed cycling</i> 	
KEY VOCAB	Force, push, pull, speed up, slow down, change shape, change direction, movement, direction, friction, magnets, magnetic, surface, magnetism, north pole, south pole, repel, attract,		force, air resistance, water resistance, magnetic attraction, gravitational attraction, direction, force, motion, weight, upthrust, Newton, forcemeter, stationary, surface area, force applied, pulley, lever, gear	
IMPACT QUESTIONS	<ol style="list-style-type: none"> 1) What is a force? 2) How can force effect an object? 3) How does friction effect a moving object? 4) What could happen when 2 magnets are placed near each other? 5) Which classroom objects are magnetic / non-magnetic? 		<ol style="list-style-type: none"> 1) How do air resistance, water resistance and friction impact a moving object? 2) What force makes objects fall to Earth? 3) What forces may act upon an object at the same time? 4) How do multiple, balanced forces effect an object? 5) What is the effect of levers, pulleys and gears? 	
PRIOR LEARNING LINKS				

		Year 3	Year 4	Year 5	Year 6
UNIT 7 - LIGHT	KEY KNOWLEDGE	<p>Light:</p> <ul style="list-style-type: none"> • A number of light sources, including the sun • Light sources are seen when light from them enters the eyes • Light from the sun can be dangerous - there are ways to protect eyes • We cannot see in the dark • Light travels from a source • Light is needed in order to see things and that dark is the absence of light • Light is reflected from surfaces • Reflections can be seen in shiny surfaces • Shiny surfaces may have similar general characteristics (e.g. smooth) • Light travels from a torch and bounces off a mirror • There is reflective clothing for travelling in the dark • We cannot see shiny objects in the dark due to lack of light sources • When light is blocked, a shadow is formed • Shadows are formed when the light from a light source is blocked by a solid object • Shadows have a similar shape to the objects forming them • Even transparent objects block some light and form shadows • Opaque, translucent and transparent materials cast different shadows • The shapes and sizes of shadows can be altered • There are patterns in the way that the size of shadows change • <i>Nocturnal animals are adapted to use what little light there is or their other senses in the dark (e.g. cats, aye-aye, lemurs)</i> • <i>Percy Shaw invented cat's eyes and explain their importance to road safety</i> 			<p>Light:</p> <ul style="list-style-type: none"> • Light appears to travel in straight lines • Reflection is light 'bouncing off' objects • All non-luminous objects must reflect light to be seen • We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • The size of the shadow produced by an object can change • There is a relationship between the size of a shadow and the distance between the light source and an object • Light travels in straight lines therefore shadows have the same shape as the objects that cast them. • <i>When sunlight passes through some objects, coloured light is produced (for example in rainbows, soap bubbles and prisms)</i> • <i>Curved mirrors distort a reflection</i> • <i>How Ibn – Haytham initiated our understanding of the eye and how it sees.</i>

KEY VOCAB IMPACT QUESTIONS PRIOR	Shadow, light, flames, opaque, block, direction, light, travels, shortest, longest, highest, torch, shape, similar, transparent, translucent, light source, sun, object daytime, night-time, reflect, shine, shiny, absorb, reflective surface, surface, mirror, sundial, block, lamp			Reflection, transparent, translucent, opaque, periscope, luminous, non-luminous, absorb, di- rection
	1) How can you protect your eyes from sun damage? 2) What do we need to see objects? 3) What are shadows and how are they formed? 4) What is the difference between the shadows created by transparent, translucent or opaque objects? 5) How can the shape / size of a shadow be changed?			1) How does light travel? 2) How do we see? 3) How can the path of light rays be directed by reflection? 4) How can the shape of shadows can be varied? 5) What is refraction?

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UNIT 8 – EARTH AND SPACE	KEY KNOWLEDGE			<p><u>Earth and Space</u></p> <ul style="list-style-type: none"> • The components of the solar system (i.e. Sun, Moon, Earth and other planets) • Earth and other planets orbit the Sun • Earth takes one year to orbit the Sun • Earth rotates on its' axis - taking one day • The movement of the Earth, and other planets, relative to the Sun in the solar system • <i>The effects that are caused by the movement of the Earth – using simple models</i> • The Moon orbits the Earth • <i>Gravity is a force of attraction and it is what holds the planets in orbit around the Sun and the Moon in orbit around the Earth</i> • The Moon orbits the Earth • <i>The changes in the appearance of the Moon over a period of 28 days arise from the Moon orbiting the Earth once every 28 days</i> • The Sun, Earth and Moon are approximately spherical bodies • It is daylight in the part of the Earth facing the Sun • A shadow from the Sun changes over the course of a day and how • The Earth's rotation causes day and night and the apparent movement of the sun across the sky • It is night time in Australia when it is day time in England • <i>Ideas about the solar system have changed over time</i> 	

				<p>Earth, Sun, planet, Mercury, Venus, Mars, Jupiter, Moon, Saturn, Uranus, Neptune, solar system, spherical, moon, day and night, celestial body, rotation, hemisphere, orbit, gravity, shadow, daylight</p>	
				<ol style="list-style-type: none"> 1) What are the components of the solar system? 2) How does the Earth move? 3) How do day and night occur? 4) Why does it look like the sun is rising and setting each day? 5) How does the moon 'change' every 28 days? 	
	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">PRIOR LEARNING LINKS</p>			<p>Links with year 3 and 5 forces (gravity) Links with year 3 and year 6 light and shadows Links with geography topics looking at time zones and understanding length of days in different places i.e. year 6 rainforest topic and why the equator is hotter than the poles.</p>	

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UNIT 9 - SOUND			<p><u>Sound:</u></p> <ul style="list-style-type: none"> • When sounds are generated by objects, something moves or vibrates • That sounds are produced when objects vibrate • Sounds are generated by specific objects • Vibrations from sounds travel through a medium to the ear • <i>Sounds travel through solids, water and air</i> • That the pitch of a sound links to the features of the object that produced it • That altering vibrations alters the pitch (how high or low) or volume (loudness). • <i>The pitch of a sound made by a particular instrument or vibrating object can be raised or lowered</i> • The pitch and volume of sounds can be varied and how • The volume of a sound is linked to the strength of the vibrations that produced it • Sounds get fainter as the distance from the sound source increases • <i>Instruments are grouped by the way sounds are produced</i> • <i>Some materials are suitable for sound insulation</i> • <i>That sound can be reflected from a surface which can cause an echo</i> • <i>Some animals use echo-location</i> 		
	KEY		Sound, pitch, volume, vibrations, medium, insulation, travel, instrument		

	IMPACT		<ol style="list-style-type: none"> 1) How are sounds produced? 2) How do sound reach our ears? 3) What is the link between an object or an instrument and the pitch of the sound it makes? 4) How can we alter the volume or of a sound? 5) How will a sound change under water, in air or in space? 	
	PRIOR LEARNING LINKS		Links with the whole of the music curriculum – particularly with percussion and woodwind topics in year 3 and ukulele in year 4	



Plants:

- **Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers**
- Healthy roots and a healthy stem are needed for plants to grow
- Leaves of a plant are associated with healthy growth (nutrition)
- Water travels from roots up the stem
- **Plants require air, light, warmth, water, nutrients from soil, and room to grow, for life and growth and how they vary from plant to plant**
- Plants make their own food
- Fertilisers contain minerals
- Plants absorb minerals from the soil
(Teacher Note: plants create food from sunlight, water and carbon dioxide, they do not absorb food from the soil)
- Changes to light and fertiliser affect plant growth
- *Differences in plant growth are due to the amount of light and/or water*
- **Water is transported within plants**
- The stem has a role in support and nutrition (transport of water)
- **The part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal**
- The life cycle of a plant in simple pictorial sequences (Teacher note: closely linked with Y5 see Living things and their habitats for progression)
- Role of bees and insects in pollination
- *The processes of pollination, seed formation and seed dispersal*
- *Roots of different plants vary (e.g. desert plants or rainforest trees (Teacher Note: rainforest trees have very shallow roots as the quality of the soil is poor and most of the nutrients are near the surface))*

KEY VOCAB	Ground, transport, attract bees, catch sunshine, green, air, nutrients, growth, pollen, pollination, seed formation, seed dispersal, nutrition, support, anchor, reproduction			
IMPACT QUESTIONS	<ol style="list-style-type: none"> 1) What are the different parts of a plant? 2) What do plants need to live and grow? 3) How do plants reproduce? 4) What do the different parts of the plant do? 5) Why are insects important to plants? 			
PRIOR LEARNING LINKS	Year 2 & Year 5 – Plants link very closely and living things and their habitats where children will look at the life cycle in more depth – simple understanding only is needed.			