



Knowledge Stems



Shurdington Knowledge Stems are 6 pieces of key knowledge that subject leaders have chosen as the building blocks for each unit. Following a quick introductory lesson at the start of lesson 1, where all 6 stems are shared, they will then be learnt by all children through the use of low stake tests at the start of each of the following lessons. These 'Knowledge Stems' are core pieces of knowledge we want all children to learn and will be built on within the main part of the unit lessons. All children should be able to confidently remember these stems and previous stems they have learnt.

Name of subject: Science

Reception			
Unit	ELG: Managing self	ELG: People, Culture and Communities	ELG: The Natural World
Knowledge Stems	1. Understand how to wash hands thoroughly. 2. Understand when washing hands is appropriate. 3. Use the toilet appropriately. 4. Some foods are healthy. 5. Some foods (if we have too much) are unhealthy. 6. Understand what a 'healthy diet' is.	1. Recognise the difference between plants and trees. 2. Discover different plants in and around school. 3. Discover different trees in and around school. 4. The school and classroom is made of different materials. 5. Different materials have different uses (e.g. glass – window) 6. Discover natural wildlife at school (forest school area).	1. There are 4 seasons, spring, summer, autumn and winter. 2. A force can be a push and pull. 3. Liquids can freeze. 4. Liquids can melt. 5. We live on planet Earth. 6. The Sun gives the Earth light.

Year 1							
Unit	Everday materials	Animals, including humans Plants		Plants	Seasonal change		
Knowledge Stems	1. An object is made of one or more materials. 2. Some objects can be made from different types of materials. 3. Materials can be described by their properties. 4. Some properties can be in different forms with very different properties. 5. Classify means to group similar things. 6. Objects can be classified in different	Animals 1. Humans are animals. 2. Animals vary in many ways and have different structures (e.g. wings, tails, ears) 3. Animals have different skin coverings (e.g. scales, feathers, fur) 4. Animals eat certain things (e.g. other animals, plants, animals and plants) 5. Classify means to group similar things. 6. Animals can be classified in different ways.	Humans 1. Humans have key parts in common, but these vary from person to person. 2. Humans use their eyes to see (sight). 3. Humans use their bodies to feel (touch). 4. Humans use their mouths to taste. 5. Humans use their ears to hear. 6. Humans use their nose to smell.	1. Some trees keep their leaves all year (evergreen). 2. Some trees drop their leaves during autumn and grow them again during spring (deciduous). 3. The different parts of a plant are leaf, root, stem, petal, and anther. 4. The different parts of a tree are trunk, branch, bark, roots, fruit, crown and leaf. 5. Identify common wild plants. 6. Identify garden	1. Autumn months are September, October and November. 2. Days become shorter in the autumn. 3. The weather becomes cooler, wetter and windier. 4. Winter months are December, January and February. 5. In the winter, the weather is colder than the autumn.	1. Spring months are March, April and May. 2. When the clocks change in March, the sun sets later in the evening and rises later in the morning. 3. Daylight hours increase in the spring. 4. Weather in the spring can still be wintry in the beginning and then begin to warm. 5. In the spring	1. Summer months are June, July and August. 2. In the summer there are more daylight hours. 3. Summer weather is warmer and drier. 4. There is more plant and animal life to be seen.

	ways based on their properties.			plants.	6. Winter weather may include fog and frost.	there are signs of plant growth and animal life (e.g. daffodils, frogspawn, lambs).	
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Year 2						
Unit	Plants	Animals including humans		Living things and their habitats	Uses of everyday materials	
Knowledge Stems	1. Plants may grow from either seeds or bulbs. 2. Seeds and bulbs have a store of food inside them. 3. Seeds and bulbs don't need light to start growing. 4. Plants use energy from sunlight to make food in their leaves from carbon dioxide and water. 5. Plant roots anchor (hold down) the plant in soil and take in water. 6. Plants often make flowers to attract insects for pollen.	Animals and offspring 1. Animals including humans have offspring which grow into adults. 2. In humans and some animals offspring will be young (e.g. babies and kittens) that grow into adults. 3. In other animals, (e.g. chickens and insects) there may be eggs laid that hatch into young, which then grow into adults. 4. The young of some animals do not look like their	Basic needs 1. All animals and humans have basic needs of: feeding, drinking and breathing. 2. Exercise and a healthy balanced diet is important for your health. 3. Exercise changes your heart rate and breathing. 4. Different types of food are fruit vegetables, carbohydrates, protein, dairy and fats and oils. 5. Good hygiene is important in preventing illness and infections.	1. All objects are either living, dead or have never been alive. 2. Living things are plants and animals. 3. The place an animal lives is called a habitat. 4. Some living things stay in very small habitats, called microhabitats. 5. A habitat provides basic needs of the animals and plants (shelter, food and water). 6. The way that animals obtain their food from plants and other animals can be shown	1. All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task (e.g. water bottle is waterproof). 2. Some materials are waterproof. 3. Some materials are absorbent. 4. Some materials are transparent, translucent and opaque. 5. Some materials are reflective and non-reflective.	1. Objects made of some materials can be changed in shape. 2. Some materials can be twisted. 3. Some materials can be squashed. 4. Some materials can be bent. 5. Some materials can be stretched. 6. Some materials can be pushed and pulled.

		parents (e.g. tadpoles) 5. Making new living things is called reproduction. 6. The process of birth, growing and reproduction is called a lifecycle.		in a food chain.	6. Some materials are flexible or rigid.	
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Year 3										
Unit	Plants		Animals, including humans	Forces and Magnets		Rocks	Light			
Knowledge Stems	1.	Roots absorb water and nutrients from the soil and anchor the plant in place.	1.	Animals need to eat in order to get the nutrients they need.	Forces		1.	Rock is a naturally occurring material.	1.	We see objects because our eyes can sense light, dark is absence of light.
2.	The stem transports water and nutrients/minerals around the plant and holds the leaves and the flowers up.	2.	Food contains a range of different nutrients that are needed by the body to stay healthy.	2.	A force is a push or a pull.		2.	There are different types of rock which have different properties.	2.	Some sources of light are the Sun, light bulbs and candles.
3.	The leaves use sunlight and water to produce the plants' food.	3.	A piece of food will often provide lots of different nutrients.	3.	Forces can slow down or stop moving objects.		3.	Sedimentary rocks are made up by sediments compressed over millions of years.	3.	Some surfaces reflect light.
4.	Some plants produce flowers which enable the plant to reproduce.	4.	Humans and some other animals have skeletons to provide protection.	4.	Forces can change the direction of a moving object.		4.	Fossils are formed when animals remains are turned to stone along with sedimentary grains.	4.	Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light.
5.	The pollination and photosynthesis processes.	5.	Human and animal skeletons look different.	5.	The texture of an object and the surface affects how it moves.		5.	Metamorphic rocks are made by heating and squeezing sedimentary rocks beneath	5.	The size of a shadow depends on the position of the source,
6.	Different plants require different conditions for germination and growth.	6.	Human and animals have muscles which help them	6.	The surface can help or hinder the way in which an object moves.		6.	Magnetic force can act at a distance.		
					Magnets					
					1.	Magnets have a north and south pole at opposite ends.				
					2.	North and south poles attract each other, similar poles repel.				
					3.	Not all materials are magnetic.				
					4.	All magnetic materials contain metal.				
					5.	The magnet does not need to touch the object it attracts.				
					6.	Magnetic force can act at a distance.				

		move and provide support.			the Earths crust. 6. Igeneous rocks are cooled magma.	object and surface. 6. Very strong light, including sunlight can damage our eyes.
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Year 4						
Unit	Electricity	Animals, including humans		Sound	Living things and their habitats	States of matter
Knowledge Stems	- Some household devices and appliances plug into mains and others run on batteries. - An electrical circuit consists of a cell or battery connected to a component using wires. - If there is a break in the circuit, a loose connection or a short circuit the component will not work. - A switch can be added to the circuit to turn the component on and off. - Metals are good conductors. - Non-metallic solids are insulators, except for graphite (pencil lead).	Digestive System - Food enters the body through the mouth. - Digestion starts when the teeth start to break the food down. - Saliva is added and the tongue rolls the food into a ball. - The food is swallowed and passes down the oesophagus to the stomach. - The food is broken down further (in the stomach) by being churned around and other chemicals are added. - The food passes into	Teeth - Humans have four different types of teeth. - Incisors are for cutting. - Canines are for tearing. - Molars and premolars are for grinding and chewing. Life cycles - Living things can be classified as producers, predators and prey. - Food chains demonstrate producers, predators and prey.	- A sound source produces vibrations, which travel through a medium from the source to our ears. - The vibrations cause parts of our body inside our ears to vibrate allowing us to hear the sound. - Different mediums such as solids, liquids and gases can carry sound. - The loudness (volume) of a sound depends on the strength of vibrations. - A source insulator is a material	- Living things can be grouped (classified) in different ways according to their features. - Classification keys can be used to identify and name living things. - Vertebrates are animals that have a backbone inside their body and invertebrates do not have a backbone. - Habitats may change naturally (e.g. flooding, fire, earthquakes) and affect the animals which live there. - Humans can cause environmental changes, both	- A solid keeps its shape and has a fixed volume. - A liquid has a fixed volume but changes in shape to fit the container. - A gas fills all available space; it has no fixed shape or volume. - Melting is a state change from solid to liquid. - Freezing is a state change from liquid to solid. - Boiling is a change of state from liquid to gas. - Evaporation is the same state change as boiling but it

		the small intestine, here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. 7. The rest of food passes into the large intestine; here water is removed for uses elsewhere in the body. 8. What is left is then stored in the rectum until it leaves the body through the anus.		which blocks sound out effectively. 6. Pitch is the highness or lowness of a sound.	positively and negatively. 6. Environments can change with the seasons, different living things can be found in different habitats at different times of year.	happens slowly. 8. Condensation is the change back from gas to liquid. 9. The different elements of the water cycle.
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Year 5						
Unit	Living things and their habitats	Animals, including humans	Forces	Earth and space	Properties and changes of materials	
Knowledge Stems	1. As part of their life cycle animals and plants reproduce. 2. Most animals reproduce sexually. 3. In humans and some animals offspring will be born live and then grow into adults. 4. In other animals, there may be eggs laid that hatch. 5. Some undergo a further change before becoming adults, metamorphosis.	1. Gestation is the period of development during carrying of an embryo, and later fetus, inside animals. 2. Gestation periods vary between animals. 3. When babies are young they grow rapidly. 4. At puberty a child's body changes and develops. 5. The characteristics of adults. 6. The characteristics of the elderly.	1. A force causes an object to start moving, stop moving, speed up, slow down or change direction. 2. Gravity is a force that acts at a distance. 3. Everything is pulled to the Earth by gravity. 4. Air resistance, water resistance and friction are contact forces that act between moving surfaces. 5. A mechanism is a device that allows a small force to be increased to a larger force.	1. The Sun is a star that is the centre of our solar system. 2. There are 8 planets in our solar system. 3. Earth takes 365 1/4 days to complete its orbit around the Sun. 4. The Earth rotates (spins) on its axis every 24 hours. 5. As Earth rotates half faces the Sun and half is facing away from the Sun. 6. The Moon orbits the Earth, it takes about 28 days to complete this orbit.	1. Materials have different uses depending on their properties and state (solid, liquid, gas). 2. Properties of materials are hardness and transparency. 3. Properties of materials include electrical and thermal conductivity. 4. Properties of materials include attraction to magnets. 5. Some materials will dissolve in a liquid and form a solution. 6. Some materials are insoluble	1. Mixtures can be separated by filtering. 2. Mixtures can be separated by sieving. 3. Mixtures can be separated by evaporation. 4. Some changes to materials are reversible (dissolving, mixing and changes of state). 5. Some changes to materials are non-reversible (burning wood, rusting, and mixing vinegar with bicarbonate of soda).

	6. Sexual reproduction of plants occurs through pollination, usually involving wind and insects.		6. Pulleys, levers and gears are all mechanisms, also known as simple machines.		and form sediment.	
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Year 6					
Unit	Evolution and inheritance	Electricity	Animals including humans	Light	Living things and their habitats
Knowledge Stems	1. All living things have offspring of the same kind, as features in the offspring are inherited from the parents. 2. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. 3. Plants and animals have characteristics that make them suited (adapted) to their environment. 4. Evolution is the process by which different kinds of living organism are believed to have developed from earlier forms during the	1. Adding more cells to complete a circuit will make a bulb brighter, a motor spin faster or make a buzzer make a louder sound. 2. Adding more bulbs to a circuit will make each bulb less bright. 3. Using more motors or buzzers each, each buzzer will spin more slowly and each buzzer will be quieter. 4. Turning a switch off breaks a circuit is not complete and electricity cannot flow. 5. Any bulbs, motors or buzzers will turn	1. Explain the different elements of the circulatory system. 2. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. 3. Diet, exercise, drugs and lifestyle can affect how well our heart and lungs work. 4. Diet, exercise, drugs and lifestyle can affect how likely we are to suffer from conditions such as diabetes. 5. Diet, exercise, drugs and lifestyle can affect how clearly we think and generally how fit and well we are. 6. Some conditions are caused by deficiencies in our diet (e.g. lack of vitamins)	1. Light appears to travel in straight lines. 2. We see objects when light from them goes into our eyes. 3. The light may come directly from light sources but for other objects some light must be reflected from the object into our eyes for the object to be seen. 4. Objects that are not fully transparent block light. 5. Objects that block light will cause shadows. 6. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.	1. Living things can be formally grouped according to characteristics. 2. Plants and animals are two main groups but there are other living things that do not fit into these groups (e.g. micro-organisms) 3. Plants can make their own food whereas animals cannot. 4. Animals can be divided into two main groups, vertebrates and invertebrates. 5. Vertebrates can be divided into 5 small groups (fish, amphibians, reptiles, birds and mammals). 6. Invertebrates can be divided into a number of groups (e.g. insects, spiders, snails and worms).

	history of the Earth. 5. Fossils give us evidence of what lived on Earth millions of years ago and support the theory of evolution. 6. Scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.	off is a switch is off. 6. Use simple circuit symbols to draw simple circuit diagrams.			
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