St. George's Junior School Science Progression of Knowledge

SCIENCE	Year 3	Year 4	Year 5	Year 6
PLANTS	**National Curriculum** - identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers -explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant -investigate the way in which water is transported within plants - explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.		**National Curriculum** -describe the life process of reproduction in some plants and animals.	
	Sticky knowledge Know the function of different parts of flowering plants (roots, stem, trunk, leaves and flowers) Seeds come in a variety of sizes Know what conditions plants need to grow (air, light, water, nutrients from soil, space) Know how water is transported in plants. Understand how flowering plants are pollinated Know the main stages in the life cycle of flowering plants Know different ways seeds can be dispersed.		**Sticky knowledge** Identify the function of parts of a flower Describe how some plants reproduce Know some advantages and disadvantages to sexual and asexual reproduction	
ANIMALS INCLUDING HUMANS	**National Curriculum** -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.	**National Curriculum** -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.	**National Curriculum** -describe the changes as humans develop to old age.	**National Curriculum** -identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood - recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies' function -describe the ways in which nutrients and water are transported within animals, including humans.
	Sticky knowledge Know the importance of different types of nutrition. Know that humans need vitamins and minerals to survive Know the main food groups. Know what different animals eat and begin to explain why. Know animals with backbones are called vertebrates. Know animals without backbones are called invertebrates. Know the three functions of the human skeleton. Know we have muscles for movement. Know different muscles move different parts of our body Know that bones and muscles work together to create movement.	**Sticky knowledge** Know the four main types of teeth. Know the functions of each tooth type. Know that you need to look after your teeth. Know some food and drinks which can damage the teeth. Name parts of the human digestive system Know the functions of the organs in the human digestive system Know how humas digest food. Know how to use and construct food chains to identify producers, predators and prey	**Sticky knowledge** Know the 6 stages of growth in humans Explain the changes that take place during the stages of human development Understand how babies grow in height and weight See RSE for knowledge Know the changes that take place in old age Know the gestation period differs between animals.	**Sticky knowledge** Know that there are three parts to the circulatory system: Blood, Blood Vessels and Heart Know what each part of the heart does. Know the functions of different parts of blood Know the function of the heart, blood vessels and blood Know why water is important for humans Know how water is transported round the body Know where the parts of the circulatory system are in my body and describe the function of them. PE – Know the benefits of sports and exercise PSHE – Know how drugs effect the body over time
LIGHT and SOUND	**National Curriculum** -recognise that they need light in order to see things and that dark is the absence of light - notice that light is reflected from surfaces -recognise that light from the sun can be dangerous and that there are ways to protect their eyes -recognise that shadows are formed when the light from a light source is blocked by an opaque object - find patterns in the way that the size of shadows change.	**National Curriculum** - identify how sounds are made, associating some of them with something vibrating - recognise that vibrations from sounds travel through a medium to the ear -find patterns between the pitch of a sound and features of the object that produced it - find patterns between the volume of a sound and the strength of the vibrations that produced it - recognise that sounds get fainter as the distance from the sound source increases.	**National Curriculum** -recognise that light appears to travel in straight lines -use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye -explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes -use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	
	Sticky knowledge	**Sticky Knowledge** Know that sounds are made through vibrations.	**Sticky Knowledge**	

	Know about the danger of direct sunlight and describe how to keep protected. Know that there are safety measures they can take to protect their eyes. Know that we cannot see without light. Know that light is reflected off surfaces. Know what opaque means and that a shadow forms when the light source is blocked by an opaque object. Know that the size of a shadow changes as an object moves closer or further away from the light source.	Know that sounds travel as waves to the ear. Know that sounds waves cause the ear drum to vibrate Know faster vibrations create a higher pitched sound. Know low pitched sounds have slower vibrations Know the height of a sound wave is measured in amplitude. Know that loud sounds produce taller sound waves Know that quieter sounds weaves have smaller peaks Know sound is an energy. Know sound waves spread out over distance and their waves get smaller and smaller.	Know that we see things because light travels from a light source to objects and then to our eyes. Know that objects give out or reflect light into the eye for us to be able to see. Know that refraction changes the direction of light. Know that prisms change how we see rays of light. Know that cone cells help us to see colour. Know Isaac Newton discovered that clear white light is made of 7 visible colours. Know why shadows are the same shape as the object.	
FORCES AND MAGNETS	**National Curriculum** -compare how things move on different surfaces -notice that some forces need contact between two objects, but magnetic forces can act at a distance - observe how magnets attract or repel each other and attract some materials and not others - compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials - describe magnets as having two poles - predict whether two magnets will attract or repel each other, depending on which poles are facing.		**National Curriculum** compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets	**National Curriculum** -explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object -identify the effects of air resistance, water resistance and friction, that act between moving surfaces -recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
	Sticky knowledge Know that friction is a contact force when two surfaces rub together Know about and describe how objects move on different surfaces Know that magnets have a north and south pole Know when magnets will be attracted to or repel each other. Know the properties of magnetic materials. Know some magnetic materials. Know that gravity and magnetism are noncontact forces. Know how some forces require contact and some do not, giving examples Name some places magnets are used in everyday life.		**Revisit of Sticky Knowledge (Materials)** What which materials are magnetic Know that magnetism is a non-contact force	**Sticky Knowledge** Know forces make objects move or stop, change speed, direction or shape. Know gravity acts on all objects, pulling them towards the Earth. Know the rate of fall is not due to the weight of an object. Know the larger the surface area of the parachute, the slower the rate of fall. Know the smaller the surface area of the parachute, the faster the rate of fall. Recognise streamline and not streamline objects. Know that force of gravity and upthrust need to be balanced for an object to float. Know objects weigh (N) less in water. Know rough surfaces have more friction so require more force to move on object. Know smooth surfaces have less friction so require less force to move an object. Know that levers, gears and pulleys are used to make work easier. Know that levers, gears and pulleys allow a small force to have a greater effect.
	National Curriculum - observe how magnets attract or repel each other and attract some materials and not others - compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials	**National Curriculum** -compare and group materials together, according to whether they are solids, liquids or gases -observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) - identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	**National Curriculum** -compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets -know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	

STATES OF MATTER AND MATERIALS			-use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating -give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic - demonstrate that dissolving, mixing and changes of state are reversible changes -explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
	Sticky Knowledge **(Forces and magnets)** Know the properties of magnetic materials Know some magnetic materials.	**Sticky Knowledge** Know there are 3 states of matter, solid, liquid, gas Know higher temperature increases speed at which change of state occurs Know different materials change state at different temperatures. Know evaporation is the process of liquid changing to a gas Know condensation is the process of a gas changing to a liquid. Know higher temperatures increase rate of evaporation. Know the water cycle is continuous. Know data can be observed over a period of time. Know rainfall and temperature vary across the year Know different climates receive different amounts of rainfall. Know temperature does affect rainfall (but there are lots of other factors involved) **(Electricity)** Know which materials conduct electricity. Know which materials are insulators.	**Sticky Knowledge** Know that materials are chosen for use based on specific properties (magnetic, transparent, electrical, hardness). Know properties of solid, liquid and gas. Know that foils best protect from UV light because it is reflective. Know sugar dissolves fastest in hot water. Know sugar dissolved in water is a solution and can be reversed through evaporation. Know materials can change between states through heating and freezing. Know water can be shown in all 3 states and these are reversible changes. Know some mixtures can be separated through sieving and filtering. Know some changes result in the formulation of new materials. Know burning and chemical reactions are irreversible changes.	**Revisit of Sticky Knowledge** **(In Geography)** Know evaporation is the process of liquid changing to a gas. Know condensation is the process of a gas changing to a liquid. Know the water cycle is continuous.
Living Things and Their Habitats	**National Curriculum** Animals Including humans link (see above)	**National Curriculum** - recognise that living things can be grouped in a variety of ways - explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment - recognise that environments can change and that this can sometimes pose dangers to living things.	**National Curriculum** - 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.	**National Curriculum** - describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals - give reasons for classifying plants and animals based on specific characteristics.
	Sticky Knowledge Know animals with backbones are called vertebrates. Know animals without backbones are called invertebrates.	**Sticky Knowledge** Know animals can be grouped based on their characteristics. Know vertebrates can be sorted grouped into Birds, Mammals, Reptiles, Amphibians, or Fish Know classification keys allow us to sort animals by looking at both similarities and differences. Know a wide variety of wildlife can be found in our local area. Know and understand the terms producer, predator and prey. Know human activities can have negative consequences on the wider environment. Know human activities are causing some creatures to become endangered.	**Sticky Knowledge** Know the life cycle of different living things e.g. mammal, amphibian, insect and bird Know the differences between different life cycles Know which animals give birth to live young and which lay eggs Identify the function of parts of a flower Describe how some plants reproduce Know some advantages and disadvantages to sexual and asexual reproduction	**Sticky Knowledge** Know that we can use keys to classify animals. Describe who Carl Linnaeus was. Explain how living things are classified using the Linnaean system. Know some of the reasons for classifying animals Know that there are 5 classifications of living things (plants, animals, fungi, bacteria and protista) Know what microorganisms are Know microorganisms can be helpful and harmful Know which conditions best support the growth of microorganisms.

		Know environment change is an issue within our local environment. Know human activities can impact other creatures		
ELECTRICITY		**National Curriculum** - identify common appliances that run on electricity - construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers - identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery - recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit - recognise some common conductors and insulators, and associate metals with being good conductors.	**National Curriculum (Materials link)** -compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets	**National Curriculum** - associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit - compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches - use recognised symbols when representing a simple circuit in a diagram.
		Sticky Knowledge Know electricity can be dangerous. Describe electrical dangers in the home. Name electrical appliances and state whether they use mains /battery or both. Know that simple circuits are made up of components and wires. Know that a circuit needs to be complete in order to worker (form a loop) Know that a switch opens and closes a circuit. Know which materials conduct electricity. Know which materials are insulators.	**Revisit of Sticky Knowledge** Know which materials conduct electricity. Know which materials are insulators.	**Revisit of Year 4 Sticky Knowledge** Know common appliances that run on electricity Construct a simple series electrical circuit Know whether a lamp will light in a simple series circuit Know that a switch opens and closes a circuit **Year 6 Sticky Knowledge** Know the higher the voltage the brighter the bulb. Know too much voltage will cause a circuit too short. Know symbols for: buzzer, bulb, wire, motor, cell, battery, switch Know how to use symbols to draw simple circuit diagrams. Know about the dangers of electricity. Know an electrician has to fault find. Know there are different types of switches depending on where they are used. Know why different switches work differently for different purposes.
EARTH AND SPACE			**National Curriculum** - describe the movement of the Earth, and other planets, relative to the Sun in the solar system - describe the movement of the Moon relative to the Earth - describe the Sun, Earth and Moon as approximately spherical bodies - use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	
			Sticky Knowledge Know the sun is the centre of the solar system. Know the planets orbit the sun. Know the earth sun and moon are all roughly spherical. Know the Earth takes 24 hours to complete 1 rotation on its axis. Know the moon orbits the Earth. Know when the Earth faces the sun, it is daytime. Know when the Earth faces away from the moon, it is night time. Know the moon appears to change shape as it reflects the light if the sun. Know this changes over a lunar month.	

			Know the sun appears to move across the sky as the Earth rotates on its axis. Know the impact of key players in the space race.	
ROCKS AND EVOLUTION And Inheritance	**National Curriculum** - compare and group together different kinds of rocks on the basis of their appearance and simple physical properties - describe in simple terms how fossils are formed when things that have lived are trapped within rock -recognise that soils are made from rocks and organic matter			**National Curriculum** -recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago -recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents - identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
	Sticky Knowledge Know rocks come from a quarry. Know rocks are used to build things. Know soils are made from dead plants and animals (organic matter). Know fossils are trapped in sedimentary rocks. Know soils are made from rocks and organic matter Know rocks are made from organic matter Know that once living things get trapped in rocks called sediment Layers of sediment compact to form rocks.	**Sticky Knowledge** **(Living things and their habitats)** Know human activities can have negative consequences on the wider environment. Know human activities are causing some creatures to become endangered. Know environment change is an issue within our local environment. Know human activities can impact other creatures	**Sticky Knowledge** **(Living Things and their habitats)** Know the life cycle of different living things e.g. mammal, amphibian, insect and bird Know the differences between different life cycles Know which animals give birth to live young and which lay eggs Identify the function of parts of a flower Describe how some plants reproduce Know some advantages and disadvantages to sexual and asexual reproduction	**Sticky Knowledge** Identify how animals are adapted to suit their environment in different ways and that Name ways in which animals have adapted to specific biomes (desert/tundra). Know that adaptation may lead to evolution Know that living things have changed over time Know that fossils provide information about living things that inhabited the Earth millions of years ago Know who Darwin is and why he is so important. Know that birds' beaks were adapted to the food available in their environment. Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents