Ditton Junior School Science Progression of Key Scientific Knowledge

Lower KS2 National Curriculum Strands

Lower KS2 Working Scientifically	Year 3				
	Biology		Chemistry	Physics	
• asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings.	Animals, including Humans	Plants	Rocks	Forces	Light
	Year 4				
	Biology		Chemistry	Physics	
	Animals, including Humans	All Living things and their habitats	States of Matter	Electricity	Sound

Upper KS2 National Curriculum Strands

Upper KS2 Working Scientifically	Year 5				
	Biology		Chemistry	Physics	
• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments.	Animals, including Humans	All Living things and their habitats	Properties and Changes in Materials	Forces	Earth in Space
	Year 6				
	Biology			Physics	
	Animals, including Humans: Circulatory System	All Living things and their habitats	Evolution and Inheritance	Electricity (Circuits)	Light

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Terms	Year 3	Year 4	Year 5	Year 6
Term 1	**Rocks**	**Living Things and their habitats**	**Living things and their habitats**	**Evolution and Inheritance**
	Rock is a naturally occurring material. ● There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. ● Rocks can be hard or soft. They have different sizes of grain or crystal. ● Rocks can be different shapes and sizes (stones, pebbles, boulders) and some absorb water. ● Knows, in simple terms, how fossils are formed when things that have lived are trapped within rock. ● Knows that soils are made from rocks and organic matter.	Knows that living things can be grouped in a variety of ways. ● Knows and can name living things in a range of habitats. ● Knows and can relate the key adaptational features of an organism to the known features of its habitat. ● Knows and can give examples of how an environment may change both naturally and due to human impact.	Knows and can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird ● Knows and can describe the life processes of reproduction in some plants (including the pollination process) and animals ● Knows that bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent	All living things have offspring of the same kind. The offspring are not identical to their parents and vary. ● Plants and animals have characteristics that make them suited (adapted) to their environment. ● If the environment changes rapidly some variations may not suit the new environment and will die. If it changes slowly, animals and plants with ● variations that are best suited survive and reproduce. ● Over a very long period of time these characteristics may be so different that a new species is created. This is evolution. ● Fossils give us evidence of what lived on the Earth millions of years ago scientists such as Darwin and Wallace observed how living things adapt to different environments ● that the brightness of a bulb, or the volume of a buzzer, correlates with the voltage of cells used in the circuit. ● Knows and can give reasons for variations in how components function, including the brightness of

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				bulbs, the loudness of buzzers and the on/off position of switches ● Knows the effect of adding more components to a circuit with one cell and the effect of adding multiple cells ● Knows and can use the recognised symbols to represent a simple circuit in a diagram
Term 2	**Investigations linked to creative curriculum**	**Electricity**	**Earth and Space**	**Light**
		Can identify and name appliances that require electricity to function ● Knows the basic parts of a circuit, including cells, wires, bulbs, switches and buzzers ● Knows that for an appliance to work within a circuit, it has to be part of a complete loop with a battery. ● Knows that a switch in a circuit is a temporary break in an otherwise 'complete circuit'. ● All metals conduct electricity but some, such as aluminium and titanium, are relatively poor conductors. ● Knows the recognised symbols	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. ● Earth takes 365¼ days to complete its orbit around the Sun. ● The Earth rotates (spins) on its axis every 24 hours. ● As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. ● The Moon orbits the Earth. It takes about 28 days to complete its	Light appears to travel in straight lines ● Knows and can explain that objects are seen because they give out or reflect light into the eye ● Knows and can 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. ● Knows and can explain, with reference to how light travels, why shadows have the same shape as the objects that cast them

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		used to represent components of a circuit and uses these to represent a circuit pictorially.	orbit. ● The Sun, Earth and Moon are approximately spherical	
Term 3	**Light**	**Investigations linked to creative curriculum**	**Forces**	**Living things and their habitats**
	Knows that light is needed to see things and that dark is the absence of light ● Knows that light is reflected from surfaces ● knows that light from the sun can be dangerous and that there are ways to protect the eyes ● knows that shadow are formed when the light from a light source is blocked by an opaque object. ● Knows and can explain some of the reasons why the size of shadows changes. ● Knows how the shadows of transparent, opaque and translucent materials vary.		Knows that unsupported objects fall to Earth because of the force of gravity acting between the earth and the falling object ● Knows and can identify the effects of air resistance, water resistance and friction, that act between moving surfaces ● Knows that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	Plants can be divided broadly into two main groups – flowering plants and nonflowering plants. ● Living things can be formally grouped according to characteristics. ● Animals can be divided into two main groups – vertebrates and invertebrates. ● Each group has common characteristics.
Term 4	**Forces and Magnets**	**States of Matter**	**Animals (including humans)**	**Electricity**
	Knows that friction affects the way that things move on different surfaces ● Knows that some forces need contact between two objects, but magnetic forces can act at a distance ● Knows that magnets attract or repel each other and attract some materials and not	Knows the basic parts of the digestive system in humans. ● Knows and can identify the different types of teeth in humans and their simple functions. ● Knows which organisms are producers, predators and prey and apply to the construction and	describe the changes as humans develop to old age. Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty. Pupils could work scientifically	Plants can be divided broadly into two main groups – flowering plants and nonflowering plants. ● Living things can be formally grouped according to characteristics. ● Animals can be divided into two main groups – vertebrates and invertebrates. ● Each group has

	others ● Knows and can describe magnets as having two poles ● Knows whether two magnets will attract or repel each other, depending on which poles are facing	interpretation of food chains.	by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows	common characteristics.
Term 5	**Animals including humans**	**Animals including humans**	**Investigations linked to creative curriculum**	**Animals (including humans)**
	Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. ● Food contains a range of different nutrients that are needed by the body to stay healthy – carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars, water. ● A piece of food will often provide a range of nutrients. ● Humans and some other animals have skeletons and muscles which help them move and provide protection and suppo	Knows the basic parts of the digestive system in humans. ● Knows and can identify the different types of teeth in humans and their simple functions. ● Knows which organisms are producers, predators and prey and apply to the construction and interpretation of food chains.		Can 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 the body functions ● Knows and can describe the way in which nutrients and water are transported within animals, including humans

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Term 6	Plants	Sound	Properties and Changes of Materials	Investigations linked to creative curriculum
	Knows and can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ● Knows 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. ● Knows through investigation, the ways in which water is transported within plants ● Knows the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Knows how sounds are made, associating some of them with vibrating. ● Knows how sound travels from a source to our ears. ● Knows the correlation between pitch and the object. ● Knows the correlation between the volume of a sound and the strength of the vibrations that produced it. ● Know that sounds get fainter as the distance from the sound source increases	Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. ● Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. ● Mixtures can be separated by filtering, sieving and evaporation. ● Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.	