Ditton Junior School Science Progression of Key Scientific Skills

	Lower KS2 Skills (Working Scientifically) End Points: ● Asks relevant questions and use different types of scientific enquiries to answer them. ● Sets up simple practical enquiries, comparative and fair tests. ● Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. ● Gathers, records, classifies and presents data in a variety of ways to help in answering questions. ● Records findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. ● Reports on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. ● Uses results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. ● Identifies differences, similarities or changes related to simple scientific ideas and processes. ● Use straightforward scientific evidence to answer questions or to support their findings.		Upper KS2 Skills End Points (Working Scientifically): ● Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. ● Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. ● Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. ● Reports and presents 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. ● Uses test results to make predictions to set up further comparative and fair tests. ● Identifies scientific evidence that has been used to support or refute ideas or arguments.	
	Year 3	Year 4	Year 5	Year 6
Term 1	**Rocks**	**Living Things and their habitats**	**Living things and their habitats**	**Evolution and inheritance**
	Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. ● Can devise tests to explore the properties of rocks and use data to rank the rocks* ● Can link rocks	Observe plants and animals in different habitats throughout the year and use recordings to compare and contrast the living things observed. ● Explore and use classification keys to help group, identify and	Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes organise mammals into different groups - sea and land and marsupials and use scientific evidence to refute/support	Follow lines of enquiry to support Explanation of the process of evolution. ● Demonstrate an understanding, with specific examples, of how an animal or plant has evolved over time e.g. penguin, peppered moth.

	changing over time with their properties e.g. soft rocks get worn away more easily ● Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. ● Can identify plant/animal matter and rocks in samples of soil ● Can devise a test to explore the water retention of soil	name a variety of living things in their local and wider environment. ● Classify living things found in different habitats based on their features. ● Create a simple identification key based on observable features. ● Use research to explore human impact on the local environment e.g. litter, tree planting.* ● Use secondary sources to find out about how environments may naturally change.* ● Use secondary sources to find out about human impact, both positive and negative, on environments and write a report on this.*	correct/incorrect statements (such as 'dolphins are fish'). Draw and label appropriate scientific diagrams following use of secondary sources and first hand observations relating to the life cycle of a range of animals. compare and contrast the life cycles of different living things and present findings identify which insects complete which type of metamorphosis and present findings identify the key differences between some amphibians – for example, toads and frogs, and present findings in different forms. Use data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Look for patterns between the size of an animal and its	● Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. ● Compare the ideas of Charles Darwin and Alfred Wallace on evolution. ● Research the work of Mary Anning and understand how this provided evidence of evolution. ● Referring to and using examples of fossil evidence that support the theory of evolution.

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			expected life span)	
Term 2	**Investigations linked to creative curriculum**	**Electricity**	**Earth and Space**	**Light**
		Construct and investigate a range of circuits. ● Investigate which materials can be used instead of wires to make a circuit . ● Classify materials that conduct electricity and those that don't following investigation and record findings..* ● Investigate the effect of a switch and combinations of switches in simple circuits. ● Investigate switches and consider variations for specific uses, such as a pressure switch for a burglar alarm. ● Apply their knowledge of conductors and insulators to design and make different types of switch.	Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. ● Use secondary sources to create a model to show why day and night occur ● Make first-hand observations of how shadows caused by the Sun change through the day ● Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. ● Research time zones ● Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel.	Plan and conduct a test to investigate how light travels and explain/present the findings. ● Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light. ● Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. ● Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram

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Term 3	Light	Investigations linked to creative curriculum	Forces	Living things and their habitats
	Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source. ● Observe and identify the difference in shadows of opaque, translucent and transparent objects/materials. ● Observe how shadows are formed and affected by different circumstances. ● To notice that light can be reflected off surfaces and Replace with 'investigate the visibility of different materials (eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according to which reflect most light.' ● Investigate the size of shadows according to times of day and year, by tracing shadows outside and comparing differences. ● Classify materials according to opaque, transparent and translucent. ● Use oral		Investigate the pull on different objects using a newton meter and record forces in Newtons (N). ● Report on conclusions relating to an object's mass and its weight in Newtons. ● Investigate the effect of friction in a range of contexts . ● Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water. ● Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. ● Explore how levers, pulleys and gears work. ● Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	Classify plants and animals and record conclusions from the use of classification keys. ● Use information about the characteristics of an unknown animal or plant to assign it to a group. ● Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. ● Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system

	and written explanations to report on why shadows are formed and how the length and size of a shadow can be changed. ● Investigates questions related to an object and the shadow it will cause..*			
Term 4	**Forces and Magnets**	**States of Matter**	**Animals (including humans)**	**Electricity**
	Record and report on findings from investigations, involving how things move on different surfaces* ● Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic.* ● Make and investigate predictions on whether two magnets will attract or repel, depending on which poles are facing.	Observe closely and classify a range of solids and liquids. ● Explore making gases visible ● Classify materials according to whether they are solids, liquids and gases. ● Observe a range of materials melting. ● Investigate how to melt ice more quickly. ● Observe the changes that are non-reversible relating (common ingredients). ● Investigate melting point of different materials. ● Explore freezing different liquids. ● Observe and measure temperature of	draw a timeline to indicate stages in the growth and development of humans. Research about the changes experienced in puberty. 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	Draw circuit diagrams of a range of simple series circuits, using recognised symbols. ● Communicate structures of circuits using circuit diagrams with recognised symbols ● make electric circuits and demonstrate, following investigation, how variation in the working of particular components can be changed. ● Plan and select resources for a fair scientific enquiry, deciding which variables to control. ● Record results from an experiment using tables

		icy water, tap water, hot water. ● Observe water evaporating and condensing. ● Set up investigations to explore changing the rate of evaporation.* ● Use secondary sources to find out about the water cycle.* ● Using their data, can explain what affects how quickly a solid melts. ● From their data, can explain how to speed up or slow down evaporation. ● Present learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water drople		and graphs ● Evaluate and explain their investigation, results and conclusions.
Term 5	**Animals including humans**	**Animals including humans**	**Investigations linked to creative curriculum**	**Animals (including humans)**
	Classify food in a range of ways ● Use food labels to explore the nutritional content of a range of food items ● Use secondary sources to find out the types of food that contain different nutrients * * * ● Use food labels to answer enquiry questions e.g.	Construct and interpret a variety of food chains, identifying producers, predators and prey. ● Can create food chains based on research.* ● Identifies differences, and similarities of different types of teeth according to herbivore,		Plan and conduct a scientific enquiry to identify different food groups. ● Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body. ● Use information

	How much fat do different types of pizza contain? How much sugar is in soft drinks? ● Plan a daily diet contain a good balance of nutrients and record and present findings * * * * * ● Explore the nutrients contained in fast food ● Use secondary sources to research the parts and functions of the skeleton* ● Investigate pattern seeking questions such as ; Can people with longer legs run faster?; Can people with bigger hands catch a ball better? ● Compare, contrast and classify skeletons of different animals	omnivore and carnivore. ● Can record the teeth in their mouth (make a dental record). ● recreate the human stomach and observe representation of how food breaks down. ● Label the different parts of the digestive system.		to identify the main components of the heart. ● Predict what will happen to the heart during exercise. ● Construct and analyse the variables that make a fair test. ● Conduct a fair investigation on the effects of exercise on the heart. ● Use scientific equipment to track results and record data using tables and graphs. ** ● Analyse whole class data after investigation to compare and reflect on findings and draw conclusions. ● Use information acquired to write a scientific report on how the human circulatory system works.
Term 6	**Plants**	**Sound**	**Properties and Changes of Materials**	**Investigations linked to creative curriculum**
	Observe what happens to plants over time when the leaves or roots are removed. ● Observe the effect of putting cut white carnations or celery in coloured water. ● Investigate what happens	Experiment with at least three different instruments to observe and explore volume and pitch. ● Make predictions and draw conclusions about the pitch and volume of sounds.* ●	Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to	

	to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. ● Spot flowers, seeds, berries and fruits outside throughout the year. ● Observe flowers carefully to identify the pollen ● Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. ● Observe seeds being blown from the trees e.g. sycamore seeds. ● Research different types of seed dispersal. ● Classify seeds in a range of ways including by how they are dispersed. ● Create a new species of flowering plant ● Can explain observations made during investigations. ● Can look at the features of seeds to decide on their method of dispersal. ● Can draw and label a diagram of their created flowering plant to	Note how vibrations make sounds of different volumes and travel to our ears. ● Identify and show how sound travels through particles and into the ear. ● Make own instruments that produce a range of pitches.	identify a suitable fabric for a coat ● Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate ● Investigate rates of dissolving by carrying out comparative and fair test and records findings * * ● Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture ● Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning ● Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? ● Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton)	

	show its parts, their role and the method of pollination and seed dispersal.			