Science Knowledge and skills progression Map Cycle A

Class 4 Years 5/6						
Upper KS2 Working Scientifically.	● 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.					
Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Reproduction	Evolution and Inheritance	Scientists and inventors	Animals including humans.	Properties and changes of materials.	
Key knowledge	I Know and can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird ● I Know and can describe the life processes of reproduction in some plants (including the pollination process) and animals ● I Know that bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent I know of how bodies change throughout our lives and changes that	I know that all living things have offspring of the same kind. The offspring are not identical to their parents and vary. ● I know that plants and animals have characteristics that make them suited (adapted) to their environment. ● I know that if an 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. ● I know that fossils give us evidence of what lived on the Earth millions of years ago, and how organisms have changed over time. ●I know that Scientists such as Darwin and Wallace observed how living things adapt to different environments. ●I Understand how inheritance and dominant genes allows us to predict the likelihood of certain characteristics in offspring (e.g. dog fur colour).	• I know about Stephen Hawkings theory of black holes and can report my findings. • I can research about Libbie Hyman's work on classification. • I can explain how our diet can effect our bodies. • I can research into Mary Leakey's work on fossils. • I can explain the discoveries that Dr Daniel Hale Williams made about the heart.	I Can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. ●I can recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions ● I Know and can describe the way in which nutrients and water are transported within animals, including humans	● I know that 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. ● I know that some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. ● I know that mixtures can be separated by filtering, sieving and evaporation. ● I know that 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.	

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	happen as humans develop to old age.				
Key Skills	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 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.	• 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. • Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. • Identify how Charles Darwin and Alfred Wallace used observation to support their theory of natural selection and evolution. • Referring to and using examples of fossil evidence that support the theory of evolution, including learning about the work of Mary Morland and William Buckland.	Share facts about Stephen Hawking's life and work • set up an enquiry into the effects of black holes • draw a diagram of observations from an enquiry into black holes • give facts about Libbie Hyman's life and work • describe the characteristics of invertebrates • make the link between saturated fat in our diets and high cholesterol levels. • describe Alexander Fleming's discovery of penicillin • construct a scatter graph from a table of results • sort facts about Mary Leakey's life and work • describe the fossils found by Mary Leakey • label the main parts of the heart	● 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 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.	● 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 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)

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	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 expected life span)			● Use information acquired to write a scientific report on how the human circulatory system works.	
Enrichment opportunities			Give talk to another class about their researched scientist.	Use field/playground to carry out exercise experiment.	Science museum visit.
Previous learning	EYFS Autumn 1 All about me I know about how I have changed from a baby to a child Class 2 Cycle A Autumn 1- Animals I Can describe how animals including humans have offspring which grow into adults, using the appropriate names for the stages	EYFS Autumn 1 All about me I know about how I have changed from a baby to a child Summer 1 Dinosaurs I can identify different animals and their habitats. Summer 1 Rumble in the jungle I can name animals. I can compare animals in our country with animals in a different country. Class 2 Cycle A	New Learning	EYFS Throughout the Year ● Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. EYFS Spring 2 Spring 2 Growing plants	Class 2 Cycle A Summer-Materials I can distinguish between an object and the material from which it is made I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock I can describe the simple physical properties of a variety of everyday materials I know why and how the properties of materials make them particularly useful for specific purposes (for example, stone is a hard,

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	Class 2 Cycle A Autumn 2- Humans • I know that humans have offspring. Class 2 Cycle A Spring- Plants ● I Know and can identify and describe the basic structure of a variety of common flowering plants, including trees. ● I Know that plants may grow from either seeds or bulbs. ● I knows that seeds and bulbs can germinate and then grow into seedlings and then continue to grow into mature plants. Class 2 Cycle B Autumn- Animals inc humans ● I Can describe how animals	Autumn 2- Humans • I know that humans have offspring. Class 2 Cycle B Autumn-Animals inc Humans ● I Know that to survive animals need sunlight, water, air, food and a suitable habitat (including shelter for protection from predators and the environment. Class 2 Cycle B Summer 1-Living things and their habitats. ● I Know that most living things live in habitats to which they are suited ● I Know and can describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other ● I Know and can name a variety of plants and animals in their habitats, including micro-habitats Class 3 Cycle A Spring 1- Rocks and Fossils • I Knows in simple terms, how fossils are formed when things that have lived are trapped within rock. Class 3 Cycle A Summer 2- Habitats • I Knows that living things can be grouped in a variety of ways.		I can plant seeds and observe what happens. I can observe growth. I can identify what plants need to survive. Class 2 Cycle A Autumn 2- Human growth • I understand the basic needs for human growth and survival. ● I Know that exercise is important to humans and can explain why. ● I Know the different food groups and the benefits of each as part of a healthy, balanced diet ● I Know which food groups	heavy and durable material so is useful for construction of buildings). I know how the properties of a material can make it useful for a range of different purposes (for example, plastic is waterproof so it can be used to coat fabric for clothing but can also be used for outdoor play equipment) I know that different materials can share the same properties (for example glass and plastic can both be transparent). I Know and can explain why some materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard are particularly suited to specific purposes I Know how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching ● I Know the difference between materials that are transparent, translucent and opaque.

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	including humans have offspring which grow into adults, using the appropriate names for the stages <u>Class 3 Cycle A Summer 1- Life Cycles</u> I Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <u>Class 3 Cycle B Summer 2- Plants</u> • Knows and can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • I Know the requirements	• I Know and can name living things in a range of habitats. • I Know and can relate the key adaptational features of an organism to the known features of its habitat. • I Know and can give examples of how an environment may change both naturally and due to human impact.		common foods belong to. ● I Know about general hygiene and its importance and can state examples of hygienic practice. <u>Class 2 Cycle A Spring-Plants</u> ● I Knows that plants need water, light and a suitable temperature to grow and stay healthy I Know and can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ● I Know the requirements of plants for life	<u>Class 3 Cycle B Summer 1-States of Matter</u> I Know how to distinguish between a solid, liquid and gas. I Know that some materials change state when they are heated or cooled. I Know the temperatures at which ice, water and water vapour change state. I Know the part played by evaporation and condensation in the water cycle.

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	of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.			and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. ● I Know through investigation, the ways in which water is transported within plants ● I Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <u>Class 2 Cycle B Autumn- Animals including humans</u> ● I Know that to survive animals	

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				need sunlight, water, air, food and a suitable habitat (including shelter for protection from predators and the environment. ● I can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense <u>Class 2 Cycle B Summer 1- Living things and their habitats</u> ● I Know and can describe how animals obtain their food from plants and other animals, using the idea of a	

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				simple food chain, and identify and make the different sources of food. <u>Class 3 Cycle B Autumn 2- Animals including nutrition.</u> ● I know that animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. ● I know that food contains a range of different nutrients that are needed by the body to stay healthy – carbohydrates including sugars, protein, vitamins,	

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				minerals, fibre, fat, sugars, water. ●I know that a piece of food will often provide a range of nutrients. ●I know that humans and some other animals have skeletons and muscles which help them move and provide protection and support <u>Class 3 Cycle B Spring 1- Teeth and Digestion.</u> I Know the basic parts of the digestive system in humans. I Know and can identify the different types of teeth in humans and their simple functions.	

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				I Know which organisms are producers, predators and prey and apply to the construction and interpretation of food chains. <u>Class 3 Cycle B Summer 2- Plants</u> I Know 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. I Know through investigation, the ways in which water is transported within plants	