

Science Knowledge and skills progression Map Cycle B

Class 4 Years 5/6						
Upper KS2 Working Scientifically.	<ul style="list-style-type: none"> ● 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	Forces	Solar System	Light	Classification of plants and animals.	Electricity	
Key knowledge	<ul style="list-style-type: none"> ● I know that unsupported objects fall to Earth because of the force of gravity acting between the earth and the falling object ● I know and can identify the effects of air resistance, water resistance and friction, that act between moving surfaces ● I know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 	<ul style="list-style-type: none"> ● I know that the Sun is a star. It is at the centre of our solar system. There are 8 planets. These travel around the Sun in fixed orbits. ● I know that Earth takes 365¼ days to complete its orbit around the Sun. ● I know that the Earth rotates (spins) on its axis every 24 hours. ● I know that 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. ● I know that the Moon orbits the Earth. It takes about 28 days to complete its orbit. ● I know that the Sun, Earth and Moon are approximately spherical 	<ul style="list-style-type: none"> ● I know that light appears to travel in straight lines ● I know and can explain that objects are seen because they give out or reflect light into the eye ● I know 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. ● I know and can explain, with reference to how light travels, why shadows have the same shape as the objects that cast them 	<ul style="list-style-type: none"> ● I know that plants can be divided broadly into two main groups – flowering plants and nonflowering plants. ● I know that living things can be formally grouped according to characteristics. ● I know that animals can be divided into two main groups – vertebrates and invertebrates ● I know that each group has common characteristics. 	<ul style="list-style-type: none"> ● I know that the brightness of a bulb, or the volume of a buzzer, correlates with the voltage of cells used in the circuit. ● I know and can give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches ● I know the effect of adding more components to a circuit with one cell and the effect of adding multiple cells ● I know and can use the recognised symbols to represent a simple circuit on a diagram. 	

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Key Skills	<p>Investigate the pull on different objects using a newton meter and record forces in Newtons (N).</p> <ul style="list-style-type: none"> ● 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 gravity. 	<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● 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 by making a periscope ● Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram. 	<ul style="list-style-type: none"> ● 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. 	<ul style="list-style-type: none"> ● 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 and graphs ● Evaluate and explain their investigation, results and conclusions.
Enrichment opportunities		Use playground/field to create working model of the solar system.		Plant flowering plants on the field and observe/record their growth.	Science museum trip
Previous Learning	<u>Class 3 Cycle A Autumn 1- Forces</u>	<u>EYFS Throughout the Year</u>	<u>EYFS Throughout the Year</u>	<u>EYFS Spring 2 Growing plants</u>	<u>Class 3 Cycle B Autumn 1-Electricity</u>

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	<ul style="list-style-type: none"> • I Know that friction affects the way that things move on different surfaces. • I Know that some forces need contact between two objects. <p><u>Class 3- Cycle B</u> <u>Spring 2- Forces</u> I Know that magnets attract or repel each other and attract some materials and not others I Know and can describe magnets as having two poles I Know whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<ul style="list-style-type: none"> • Understands some important processes and changes in the natural world around them, including the seasons and changing states of matter. <p><u>Class 2 Cycle A</u> <u>Spring- Plants</u></p> <ul style="list-style-type: none"> • I know that seeds and bulbs need to be planted at particular times of the year and will germinate and grow at different rates. <p><u>Class 2 Cycle B</u> <u>Spring and Summer Seasons</u></p> <ul style="list-style-type: none"> • I Know when each of the four seasons occurs • I Know what the features of Spring are and what happens to trees in this season • Knows that days are longer in summer (sunshine hours) than in winter • Observe changes across the four seasons 	<ul style="list-style-type: none"> • Understands some important processes and changes in the natural world around them, including the seasons and changing states of matter. <p><u>Class 2 Cycle B</u> <u>Spring and Summer Seasons</u></p> <ul style="list-style-type: none"> • I Know when each of the four seasons occurs • I Know what the features of Spring are and what happens to trees in this season • Knows that days are longer in summer (sunshine hours) than in winter • Observe changes across the four seasons • I Know about and can describe 	<p>I can plant seeds and observe what happens. I can observe growth. I can identify what plants need to survive.</p> <p><u>Summer 1</u> <u>Dinosaurs</u> I can identify different animals and their habitats.</p> <p><u>Spring 2</u> <u>Minibeasts</u> I can observe and sort minibeasts</p> <p><u>Summer 1</u> <u>Rumble in the jungle</u> I can name animals. I can compare animals in our country with animals in a different country.</p> <p><u>Class 2 Cycle A</u> <u>Autumn 1- Animals</u></p> <ul style="list-style-type: none"> • I can identify and name common animals. • I Can describe how animals including humans have offspring 	<ul style="list-style-type: none"> • I can identify and name appliances that require electricity to function. • I Know the basic parts of a circuit, including cells, wires, bulbs, switches and buzzers. • I Know that for an appliance to work within a circuit, it has to be part of a complete loop with a battery. • I Know that a switch in a circuit is a temporary break in an otherwise ‘complete circuit’. • I know that all metals conduct electricity but some, such as aluminium and titanium, are relatively poor conductors. • I Know the recognised symbols used to represent components of a circuit and uses these to represent a circuit pictorially.
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			<p>size of shadows changes.</p> <ul style="list-style-type: none">● I Know how the shadows of transparent, opaque and translucent materials vary.	<p>seeds, berries and fruits etc.</p> <ul style="list-style-type: none">● I know that seeds and bulbs need to be planted at particular times of the year and will germinate and grow at different rates.● I know that some plants are better suited to growing in full sun and some grow better in partial and full shade.● 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 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	
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				<p>which water is transported within plants</p> <ul style="list-style-type: none">● I Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <p><u>Class 2 Cycle B</u> <u>Autumn- Animals inc Humans</u></p> <ul style="list-style-type: none">● I Can describe how animals including humans have offspring which grow into adults, using the appropriate names for the stages● I Know that to survive animals 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	
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				<p><u>Class 2 Cycle B</u> <u>Spring 2- Animals</u></p> <ul style="list-style-type: none">● I Know and can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals e.g. cat, robin, adder, frog, salmon.● I Know and can identify and name a variety of common animals that are carnivores, herbivores and omnivores. <p><u>Class 3 Cycle A</u> <u>Summer 2- Habitats</u></p> <p>I Knows that living things can be grouped in a variety of ways.</p> <p>I Know and can name living things in a range of habitats.</p> <p>I Know and can relate the key adaptational features of an organism to the known features of its habitat.</p> <p>I Know and can give examples of how an environment may change</p>	
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				<p>both naturally and due to human impact.</p> <p><u>Class 3 Cycle B</u> <u>Autumn 2- Animals</u></p> <ul style="list-style-type: none">● I know that 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.● 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 <p><u>Class 3 Cycle B</u> <u>Summer 2- Plants</u></p> <ul style="list-style-type: none">● I Know and can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.	
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				<ul style="list-style-type: none">• 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	
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