Working Scientifically: Statutory Requirements

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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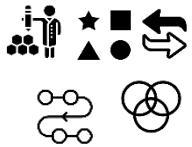
Year 5 Autumn 1 (6 weeks)	Key concepts	Sequence of lessons	Sticky knowledge for this topic	Working scientifically	Snap Science Assessments
Big Question: How has diversity improved life? Snap Science Module: Circle of Life NC Strand - Animals including Humans (Biology)	Working Scientifically Change Similarity and difference Process Variation 	1. SS lesson 1 – What is a life cycle? And SS lesson 2 – What do we know about the life cycle of mammals? 2. SS lesson 3 – What do we know about the life cycle of amphibians? 3. SS lesson 4 – What do we know about the life cycle of insects? 4. SS lesson 5 – What do we know about the life cycle of birds? 5. SS lesson 6 – What makes a successful life cycle? And SS lesson 7 – How are humans heling endangered animals to complete their life cycles?	1. I can explain the life cycle of a mammal. (Give birth to live young that look like a smaller version of an adult; Have four legs or two arms and two legs; Females produce milk to feed babies; Most spend their entire lives on land 2. I can explain the life cycle of an amphibian. (Part life in water and part on land. Hatch in water. Breathe with gills when young. Metamorphosis takes place meaning the young look entirely different to the adult Lay jelly-like eggs.) 3. I can explain the life cycle if an insect. (Transform either complete metamorphosis including a pupa or the incomplete metamorphosis. Most hatch from eggs. The habits and habitat of the young is often very different from the adult) 4. I can explain the life cycle of a bird. (Lay eggs that have hard shells. Hatch after periods of incubation of varying lengths. Reliant on adults for survival in early stages of growth until ready to leave the nest.) 5. I can clearly describe the similarities between the life-cycles of at least two pairs of animals, insects and birds 6. I can clearly describe the differences between the life-cycles of at least two pairs of animals, insects and birds	Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.	1. What is the same and what is different?

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Year 5 Autumn 2 (7.5 weeks)	Key concepts	Sequence of lessons	Sticky knowledge for this topic	Working scientifically	Snap Science Assessments
Big Question: What can we learn about the world around us? Snap Science Module: Earth and Beyond NC Strand - Earth and Space (Physics)	Working Scientifically Change Similarity and difference 	1. SS lesson 1 – What's in space? 2. SS lesson 2 – What is a year? And SS lesson 3 – What is a day? 3. SS lesson 4 – How does the sun help us to measure time? 4. SS lesson 5 – What time is it around the world? 5. SS lesson 6 – Why do we have seasons? 6. SS lesson 7 – What are our conclusions about sunrise and sunset times? 7. SS lesson 8 – Why does the moon change shape?	1. I know that the sun is a star and is in the centre of the solar system - planets travel around it 2. I can name the planets in order from the sun 3. I know that the planets travel around the Sun in fixed orbits - Earth takes 365¼ days to complete its orbit around the Sun 4. I can use the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky – 24 hours is the time taken for Earth to complete 1 rotation 5. I can explain why other planets have longer or shorter years 6. I know that the moon takes about 27 days to orbit the Earth and its shape appears to change during this time (due to the amount we can see of the illuminated part gradually changing)	Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks	1. Solar system 2. Shadow sequence 3. The moon: true or false

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Year 5 Spring 1 (5.5 weeks)	Key concepts	Sequence of lessons	Sticky knowledge for this topic	Working scientifically	Snap Science Assessments
Big Question: How do things change over time? Snap Science Module: Reproduction in Plants and Animals NC Strand - Living things and their Habitats (Biology)	Working Scientifically Change Variation Process 	1. SS lesson 1 – How do flowering plants reproduce? 2. SS lesson 2 – Are all flowers on all plants the same? And SS lesson 3 – Do all plants reproduce by producing seeds? 3. SS lesson 4 – How do amphibians and insects reproduce? 4. SS lesson 5 – How do mammals and birds reproduce? 5. SS lesson 6 – How does the human life cycle compare with that o other mammals? 6. SS lesson 7 – How do girls become women? And SS lesson 8 – How to boys become men?	1. I know that as part of their life cycle, plants and animals reproduce 2. I know that most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg 3. I know that animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. 4. I know that plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects 5. I can describe the process of reproduction in some plants and animal types 6. I can describe the changes to humans through each stage of baby, toddler, child, teenager, adult, elderly, and know that at puberty, a child's body changes and develops primary and secondary sexual characteristics which enables the adult to reproduce	Pupils could work scientifically 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.	1. Starting all over again – plants 2. Birth to old age

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Year 5 Spring 2 (6 weeks)	Key concepts	Sequence of lessons	Sticky knowledge for this topic	Working scientifically	Snap Science Assessments
Big Question: What makes a good place to live? Snap Science Module: Feel the Force NC Strand - Forces (Physics)	Working Scientifically Cause and effect Energy 	1. SS lesson 1 – How can we measure forces? And SS lesson 2 – Why does an object fall? 2. SS lesson 3 – What makes things move? And SS lesson 4 – How can we slow down falling objects? 3. SS lesson 5 – Does the shape of an object affect its movement in a liquid? And SS lesson 6 – Do all heavy things sink? 4. SS lesson 7 – How far can you stretch? And SS lesson 8 – How can we use levers to help us? 5. SS lesson 9 – How can we lift a heavy load? 6. SS lesson 10 – Can a wheel with teeth make work easier?	1. I know that a force causes an object to start moving, stop moving, speed up, slow down or change direction 2. I know that gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. 3. I know that air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object 4. I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 5. I can give an example of each mechanism in everyday life 6. I can describe what would happen if a force did not exist e.g. with no gravity we could not be anchored to the ground and would float	Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effeχτσ.	1. Drag forces: compare and contrast 2. What is gravity? 3. Annotating mechanisms

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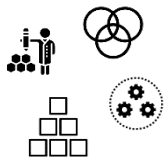
Year 5 Summer 1 (6 weeks)	Key concepts	Sequence of lessons	Sticky knowledge for this topic	Working scientifically	Snap Science Assessments
Big Question: Where does the power come from? Snap Science Module: Get Sorted and Everyday Materials NC Strand - Materials (Chemistry)	Working Scientifically Structure Function Similarity and difference 	1. SS 'Get Sorted' lesson 1 – How can we compare and group materials? And SS 'Get Sorted' lesson 2 – Is a solid always hard? 2. SS 'Get Sorted' lesson 3 – Is a liquid always runny? And SS 'Get Sorted' lesson 4 – Are all metals the same? 3. SS 'Get Sorted' lesson 5 – Are all plastics the same? And SS 'Get Sorted' lesson 6 – To bounce or not to bounce: why are sports balls so different? 4. SS 'Everyday Materials' lesson 1 – Which materials are used in our school building, what for and why? And SS 'Everyday Materials' lesson 2 – Weighty problem: which is the best carrier bag? 5. SS 'Everyday Materials' lesson 3 – Which is the best type of plate to use? And SS 'Everyday Materials' lesson 4 – Cool box conundrum: can the same container keep things cold and things hot? 6. SS 'Everyday Materials' lesson 5 – Mystery material: what will happen if we add water to the material? And SS 'Everyday Materials' lesson 6 – Nappy ending: what's the best brand of nappy?	1. I know that materials have different uses depending on their properties and state (liquid, solid, gas) 2. I know that these properties include hardness, transparency, solubility, electrical and thermal conductivity and attraction to magnets 3. I know that some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment 4. I can describe the link between specific functions of objects and the properties of materials they are made from 5. I can choose a suitable material for a purpose by considering its properties 6. I recognise that while some materials in the same category may share similarities, they have differences that make them suited to different uses	Pupils might work scientifically by: carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit.	1. Defining properties (Get Sorted) 2. Why am I made from this? (Everyday Materials)

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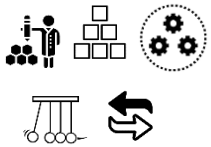
Year 5 Summer 2 (7.5 weeks)	Key concepts	Sequence of lessons	Sticky knowledge for this topic	Working scientifically	Snap Science Assessments
Big Question: Is everything what it first appears to be? Snap Science Module: Marvellous Mixtures and All Change NC Strand - Materials (Chemistry)	Working Scientifically Structure Change Cause and effect Function 	1. SS 'Marvellous Mixtures' lesson 1 – How can we separate mixtures? 2. SS 'Marvellous Mixtures' lesson 2 – What happens when we mix liquids and solids? And SS 'Marvellous Mixtures' lesson 3 – What makes a difference to how fast sugar or salt dissolves? 3. SS 'Marvellous Mixtures' lesson 4 – How can we get drinkable water from seawater? And SS 'Marvellous Mixtures' lesson 5 – How can we purify materials? 4. SS 'All Change' lesson 1 – Are the changes that happen around us reversible or non-reversible? And SS 'All Change' lesson 2 – How much gas can be produced by non-reversible change? 5. SS 'All Change' lesson 3 – How long does it take for iron nails to rust? (setting up experiment) 6. SS 'All Change' lesson 4 – What happens when a candle burns? 7. SS 'All Change' lesson 5 – How long does it take for things to rust? (results from experiment)	1. I can recognise and name separation methods (filtering, sieving and evaporating) and can choose a suitable method 2. I know that if a solid is still present, it can be recovered by evaporating the liquid 3. I know that a dissolved liquid cannot be separated by filtration as the solid particles will pass through the filter 4. I can describe how to evaporate the liquid and condense the vapour to separate a solid and a liquid from a solution 5. I know that some changes to materials such as dissolving, mixing and changes of state are reversible 6. I know that when changes result in the formation of new materials, it is not usually reversible, e.g. burning wood, rusting and mixing vinegar with bicarbonate of soda	Pupils may work scientifically by: observing and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.	1. Sort it out – separating materials (Marvellous Mixtures) 2. Solutions (Marvellous Mixtures) 3. Can we change it back? (All Change)

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