Class 2 Y5-6 two year rolling Science Overview

Science Intent

Science provides the foundation for understanding the world around us. Engaging children's natural curiosity, imagination and excitement; science enables children to explore, learn and make sense of the world they live in. Our creative science curriculum will enable children to gain positive attitudes towards scientific knowledge and investigative processes; to understand both the uses and implications of science today, and in the future.

Age	Year	Autumn		Spring		Summer	
KS2	**A (2021-2022, 2023-2024 etc) Y5/6**	(Material Properties) **'PROPERTIES & CHANGES OF MATERIALS'** (Testing material properties) ▪ Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. ▪ Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. *Focus on thermal insulation and designing own test. Test based around either changing what the wrap. Build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4.*	**'LIVING THINGS & THEIR HABITATS'** (observing life cycles/reproduction in animals and plants) ▪ Describe the changes as humans develop to old age. ▪ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. ▪ Describe the life process of reproduction in some plants and animals. *Research the lifecycle of x2 from bird, mammal, insect* *-Compare the life cycles and identify common features of a life cycle* *David Attenborough* *Research life cycles of 2 plants of their choice, explore asexual reproduction by growing own examples from cuttings from mint plant, factors affecting germination of seeds or bulbs.* *Pupils should study and raise questions about their local environment throughout the year. Observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.* *Find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world. Grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. Observe changes in an animal over a period of time.*	HEALTH **'ANIMALS, INCL HUMANS'** (Keeping Healthy, Diet & Lifestyle) ▪ Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. ▪ Describe the ways in which nutrients and water are transported within animals, including humans. Design menus/diets for…. 'Astronaut' or Explorer Revisit/recap digestive system and review learning. - know the different food groups – proteins, carbohydrates, fats, vitamins and minerals – reaction timers Design an experiment to test reactions speeds for different groups/ages/parameters. *Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.*	LIGHT & ASTRONOMY **'EARTH & SPACE'** ▪ Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. ▪ Describe the movement of the Moon relative to the Earth. ▪ Describe the Sun, Earth and Moon as approximately spherical bodies. ▪ Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. *Be introduced to a model of the Sun and Earth that enables them to explain day and night.* *Learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).* *Understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).*	**'FORCES'** (Friction and air resistance and mechanisms) ▪ Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. ▪ Identify the effects of air resistance, water resistance and friction that act between moving surfaces. ▪ Friction, air resistance and water resistance are forces which slow down moving objects. ▪ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. *Explore falling objects and raise questions about the effects of air resistance. Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. Experience forces that make things begin to move, get faster or slow down. Explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Explore the effects of levers, pulleys and simple machines on movement. 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. 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 effects.*	LIGHT & ASTRONOMY **'Y6 LIGHT'** ▪ Recognise that light appears to travel in straight lines. ▪ Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. ▪ 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. ▪ Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. *Children to plot shadow clock data on line graphs.* *Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. Deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. Investigate the relationship between light sources, objects and shadows by using shadow puppets. Extend their experience of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters.*

KS2	B (2022-2023, 2024 – 2025 etc) Y5/6	**'LIVING THINGS & THEIR HABITATS'** (classification) ▪ Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. ▪ Give reasons for classifying plants and animals based on specific characteristics. *Introduce classification system and work of Linnaeus to all children – UKS2 children can design keys for more complex animals.* *Build on their learning about grouping living things by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.* *Find out about the significance of the work of scientists such as Carl Linnaeus.* *Use classification systems and keys to identify some animals and plants in the immediate environment. Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.*	**'EVOLUTION & INHERITANCE'** (incl. adaptations) ▪ Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. ▪ Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. ▪ Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. *Building on what they learned about fossils, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, Labradors are crossed with Poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.*	**'ELECTRICITY'** ▪ Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. ▪ Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. ▪ Use recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) when representing a simple circuit in a diagram. *Pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. Pupils should be taught to take the necessary precautions for working safely with electricity.* *Systematically identify the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.*	(Material. Changes) **'PROPERTIES & CHANGES OF MATERIALS'** (Reversible changes) ▪ Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. ▪ Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. ▪ Demonstrate that dissolving, mixing and changes of state are reversible changes. *Yr5/6 dissolving, evaporation, condensation* - *factors affecting dissolving – number of stirs, temp, amount of solid/liquid* - *retrieving undissolved materials with filtering* - *retrieving dissolved materials with evaporation* *using dissolving, filtering and evaporation to separate a material (e.g. extracting salt from rock salt)* *They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.*	(Material changes) **'PROPERTIES & CHANGES OF MATERIALS'** (Irreversible changes) ▪ Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. *Irreversible changes/chemical reactions (e.g. acid and alkaline), burning and rusting, formation of new materials.* *Explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. Find out about how chemists create new materials.*	**'ANIMALS, INCL HUMANS'** (Circulatory system and Exercise) ▪ Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. *Pupils should build on their learning about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function.* *Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.* *Explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.*