Science Scheme of Work Overview (Knowledge & Skills)

Year 3		
Autumn 1	Animals, including Humans (Biology)	identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement. ***Pupils might work scientifically by:*** *identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.*
Autumn 2	Forces & Magnets (Physics)	compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing. ***Pupils might work scientifically by:*** *comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.*
Spring 1	Rocks & Soils (Chemistry)	compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter. ***Pupils might work scientifically by:*** *observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.*

Spring 2	Light & Dark (Physics)	▯ recognise that they need light in order to see things and that dark is the absence of light ▯ notice that light is reflected from surfaces ▯ recognise that light from the sun can be dangerous and that there are ways to protect their eyes ▯ recognise that shadows are formed when the light from a light source is blocked by an opaque object ▯ find patterns in the way that the size of shadows change. ***Pupils might work scientifically by:*** *looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.*
Summer 1	Plants (Biology)	▯ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers ▯ explore 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 ▯ investigate the way in which water is transported within plants ▯ explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. ***Pupils might work scientifically by:*** *comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.*
Summer 2		

Year 4		
Autumn 1	Electricity (Physics)	identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors. ***Pupils might work scientifically by:*** *observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.*
Autumn 2	Sound (Physics)	identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases. ***Pupils might work scientifically by:*** *finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.*
Spring 1		
Spring 2	States of Matter (Chemistry)	compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. ***Pupils might work scientifically by:*** *grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.*
Summer 1	Animals, including Humans (Biology)	describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey. ***Pupils might work scientifically by:*** *comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.*
Summer 2	Living things & their Habitats (Biology)	recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider

		environment recognise that environments can change and that this can sometimes pose dangers to living things. ***Pupils might work scientifically by:*** *using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.*

Year 5		
Autumn 1	Properties & changes of Materials (Chemistry)	▯ 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 ▯ 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 ▯ give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic ▯ demonstrate that dissolving, mixing and changes of state are reversible 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. ***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. They could observe 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.*
Autumn 2		
Spring 1	Earth & Space (Physics)	▯ 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. ***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.*

Spring 2	Forces (Physics)	▯ 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 ▯ recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. ***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 effects.*
Summer 1	Living things & their Habitats (Biology)	▯ 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. ***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.*
Summer 2	Animals, including Humans (Biology)	▯ describe the changes as humans develop to old age. ***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.*

Year 6		
Autumn 1	Light (Physics)	▯ 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. ***Pupils might work scientifically by:*** *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. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).*
Autumn 2	Electricity (Physics)	▯ 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 when representing a simple circuit in a diagram. ***Pupils might work scientifically by:*** *systematically identifying 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.*
Spring 1	Living things & their Habitats (Biology)	▯ describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals ▯ give reasons for classifying plants and animals based on specific characteristics. ***Pupils might work scientifically by:*** *using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.*
Spring 2	Animals, including Humans (Biology)	▯ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ▯ 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. ***Pupils might work scientifically by:*** *exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.*

Summer 1	Evolution & Inheritance (Biology)	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. ***Pupils might work scientifically by:*** *observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.*
Summer 2		