Long term planning – science

Aims: The national curriculum for science aims to ensure that all pupils:

- ✓ develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- ✓ develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- ✓ are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Progression in working scientifically

Early Years	**Years 1 & 2 (KS1)**	**Years 3 & 4 (LKS2)**
○ Carry out simple investigations in a small group ○ Explain why something happened and use this to predict what might happen next/change ○ Identify, compare, classify and group a variety of places, objects, materials and living things	○ asking simple questions and recognising that they can be answered in different ways ○ observing closely, using simple equipment ○ performing simple tests ○ identifying and classifying ○ using their observations and ideas to suggest answers to questions ○ gathering and recording data to help in answering questions	○ asking relevant questions and using different types of scientific enquiries to answer them ○ setting up simple practical enquiries, comparative and fair tests ○ making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers ○ gathering, recording, classifying and presenting data in a variety of ways to help in answering questions ○ recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables ○ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ○ using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions ○ identifying differences, similarities or changes related to simple scientific ideas and processes ○ using straightforward scientific evidence to answer questions or to support their findings.

Science long term plan – rolling 2-year programme

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
23/24	**London: Including the Great Fire of London**		**Ice explorers: Including the poles and mountains**		**The beginning of the kingdom of England: (AD927 united as the Kingdom of England by King Æthelstan)**	
KS1	**Plants** ○ identify and name a variety of common wild and garden plants, including deciduous and evergreen trees (LINKS TO MEDICINAL PLANTS –PLAGUE) ○ identify and describe the basic structure of a variety of common flowering plants, including trees. ○ observe and describe how seeds and bulbs grow into mature plants ○ find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. *(Link to seasonal changes)*	**Seasonal changes** ○ observe changes across the four seasons ○ observe and describe weather associated with the seasons and how day length varies. *Although planned for Autumn for overview this is referred back to through the year as seasons change and direct observation is possible.*	**Living things and their habitats** ○ explore and compare the differences between things that are living, dead, and things that have never been alive ○ identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other ○ identify and name a variety of plants and animals in their habitats, including microhabitats ○ describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.		**Everyday materials** ○ distinguish between an object and the material from which it is made (INCLUDE WATERPROOF & ABSORBENCY) ○ identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock ○ describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties.	
KS2	**Plants** ○ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (LINKS TO MEDICINAL PLANTS – PLAGUE) ○ 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 ○ explore the part that flowers play in the life cycle of flowering plants.	**Electricity** ○ 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	**Living things and their habitats** ○ 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.		**Rocks** ○ 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	**States of matter** ○ 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

		○ recognise some common conductors and insulators, and associate metals with being good conductors.		from rocks and organic matter	of evaporation with temperature.
24/25	**That's Entertainment: Including Hollywood, (N. America) and performing arts from around the world.**		**Coasts and Islands: Local and contrasting study** **Famous mathematicians**	**Invaders Viking invasions & Danegeld (Local and Scandinavian study)**	
KS1	**Plants** ○ identify and name a variety of common wild and garden plants, ○ find out and describe how **crops** need water, light and a suitable temperature to grow and stay healthy. ○ identify and describe the basic structure of a variety of common flowering plants, including a greater focus on trees.	**Seasonal changes** ○ observe changes across the four seasons ○ observe and describe weather associated with the seasons and how day length varies. *Although planned for Autumn for overview this is referred back to through the year as seasons change and direct observation is possible.*	**Animals, including humans** ○ identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ○ identify and name a variety of common animals that are carnivores, herbivores and omnivores ○ describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) ○ identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. ○ notice that animals, including humans, have offspring which grow into adults ○ find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ○ describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	**Uses of everyday materials** Review / introduce learning from everyday materials the previous year ○ distinguish between an object and the material from which it is made ○ identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock ○ describe the simple physical properties of a variety of everyday materials ○ compare and group together a variety of everyday materials on the basis of their simple physical properties. Then extend: ○ identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses ○ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	
KS2	**Plants** ○ 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	**Forces and magnets** ○ 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	**Animals, including humans** ○ 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. ○ 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	**Light** ○ 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	**Sound** ○ 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

	○ (R) identify and describe the basic structure of a variety of common flowering plants, including a greater focus on trees.	○ predict whether two magnets will attract or repel each other, depending on which poles are facing.	○ construct and interpret a variety of food chains, identifying producers, predators and prey.	when the light from a light source is blocked by an opaque object ○ find patterns in the way that the size of shadows change.	strength of the vibrations that produced it ○recognise that sounds get fainter as the distance from the sound source increases.

Science planning continued

Early Years links

Understanding the World	**Key skills, knowledge and understanding**	**Early Learning Goals**
Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.	• Make simple predictions about what they think might happen • Carry out simple investigations in a small group • Explain why something happened and use this to predict what might happen next/change • Identify, compare, classify and group a variety of places, objects, materials and living things • Talk about changes, including the seasons • Talk about their immediate environment and compare it to other environments	**The Natural World** • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. **Listening, Attention and Understanding** • Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions. • Make comments about what they have heard and ask questions to clarify their understanding.

Next stage – Middle School coverage for UKS2

Y5	**What's going on inside us?** Circulation, organs, impact of exercise, diet, drugs & lifestyle on the body.	**Can you feel the force?** Gravity, balanced and unbalanced forces, friction, resistance, application to machinery (pulleys / levers / gears).	**How does age change us?** Gestation, child development, puberty, aging.	**What makes life 'circular'?** Life cycles of plants and animals.	**What on Earth is the time?** Earth, Sun & moon – shape/size, day/night. Over a year Phases of the moon.	**What good can materials do?** Investigating different materials – focus on absorbency, hardness, conductivity and magnetism.

Y6	**How do materials change?** Reversible and irreversible changes.	**Is electricity the best type of energy?** Types of energy, renewable energy, circuits.	**Why do we need classification systems?** Plants and animals.	**Are all microbes bad for us?** Micro-organisms. Disease and vaccination.	**How did we evolve?** Fossils, variations, adaption, selection, evolution.	**Why can we not see as well in the dark?** How light travels, reflection, luminosity, diffusion.