Curriculum Intent – Knowledge Builder

Science - Physics			
Subject Intent Statement: Science has changed our lives and is vital to the world's future prosperity. Our aim is to encourage pupils to recognise the power of scientific explanation and develop a sense of excitement and curiosity about natural phenomena. We seek to inspire in pupils' a curiosity and fascination about the world around them 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 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. We aim to develop knowledge and skills that are transferable to other curriculum areas and which can and are used to promote their spiritual, moral, social and cultural development.			
Year 3	**Year 4**	**Year 5**	**Year 6**
Key Knowledge:	**Key Knowledge:**	**Key Knowledge:**	**Key Knowledge:**
Forces and magnets Pupils learn how to compare how objects move on different surfaces Pupils learn about magnets and how they work They know magnets have two poles; knowing two magnets will attract or repel each other, depending on which poles are facing; know that some forces need contact between two objects but magnetic forces can act at a distance; know uses of magnetism in everyday life. **Light** Pupils learn about different light sources. They understand that we need light to see. They know that dark is the absence of light. They know that the sun can damage their eyes and how to protect their eyes from the sun. They will know that a shadow is formed when a solid object blocks light Pupils will identify patterns in the way the size of a shadow changes. Pupils will know that light can be reflected from surfaces. Pupils know how to use big questions as the basis for investigation.	**Sound** Pupils will identify how sounds are made, associating some of them with something vibrating. They will recognise that vibrations from sounds travel through a medium to the ear. Pupils will find patterns between the pitch of a sound and features of the object that produced it. Pupils will find patterns between the volume of a sound and the strength of the vibrations that produced it. They will recognise that sounds get fainter as the distance from the sound source increases. **Electricity** Pupils will learn about safety with electricity They will know common appliances that run on electricity. They will know how to construct a simple electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. They will know 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. They will know that a switch opens and closes a circuit and associate this	**Forces (Term 2)** -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. **Earth in Space (Term 2)** -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 **Light (Term 3)** -recognise that light appears to travel in straight lines	**Electricity- revision and development (Term 1)** Know some simple circuit symbols and how to draw circuit diagrams. Know how to build a simple circuit and how changing circuit components affects their use. **Sound – revision (Term 3)** Know how sounds are made and travel. Know the features of different sounds and how they change.

Such as: What effect do magnets have on planet Earth? Which magnet is strongest? Which surface is best to stop you slipping?What can you see when there is absolutely no light? How does our body protect our eyes from too much light? How do animals see in the dark? Why do we have day and night?	with whether or not a lamp lights in a simple series circuit. Pupils will know some common conductors and insulators, and associate metals with being good conductors. Pupils know how to use big questions as the basis for investigation. Such as: How does the volume of a drum change as you move further away from it? Do all animals have the same hearing range? Are two ears better than one? Which room has the most electrical sockets in the house? How does a light bulb work? Which metal is the best conductor of electricity?	- 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.	
Key Skills:	**Key Skills:**	**Key Skills:**	**Key Skills:**
Working scientifically ● asking relevant questions start to use different types of scientific enquiries to answer them ● with help set up simple practical enquiries, comparative and fair tests ● making systematic and careful observations and, begin to take accurate measurements using standard units, using a range of equipment, ● gathering data to help in answering questions ● recording findings using developing scientific language, drawings, labelled diagrams, keys, bar charts, and tables ● reporting on findings from enquiries, including oral and written explanations begin to form simple conclusions	**Working scientifically** ▪ asking relevant questions ▪ independently and within small groups set up simple practical enquiries, comparative and fair tests ▪ making 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 confident command of scientific language, drawings, labelled diagrams, keys, bar charts, and tables	**Working Scientifically** Planning different types of scientific enquiries to answer questions. Taking measurements, using a range of scientific equipment. Recording data and results. Using test results to make predictions. Reporting and presenting findings from enquiries, including conclusions, in oral form and in simple reports Identifying scientific evidence that has been used to support ideas. **Forces (Term 2)** Pupils might work scientifically by: exploring falling paper shapes, and designing and making a variety of	**Working Scientifically** -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

● using results to draw simple conclusions begin to make predictions ● identifying differences, similarities or changes related to simple scientific ideas and processes ● using straightforward scientific evidence to answer questions **Forces and magnets term xx (school to add when this is taught)** 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. **Light term xx (school to add when this is taught)** 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.	▪ 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 ▪ using straightforward scientific evidence to answer questions or support their findings **Sound term xx (school to add when this is taught)** 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. **Electricity term xx (school to add when this is taught)** 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.	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. **Earth in Space (Term 2)** 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; being able to identify evidence that has been used to refute the geocentric model of the solar system and support the heliocentric model. **Light (Term 3)** Pupils might work scientifically by: building on LKS2 work exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. Investigating the relationship between light sources, objects and shadows by using shadow puppets.	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. **Electricity (Term 1)** Pupils work scientifically to identify the variables and carry out fair testing to: investigate 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. **Sound revision (Term 3)** Work scientifically to identify how sounds are made; use a variety of equipment to discover how sounds travel as vibrations through solids, liquids and gases to the ear. describe the relationship between the pitch of a sound and features of its source.
Key Vocabulary:	**Key Vocabulary:**	**Key Vocabulary:**	**Key Vocabulary:**
Magnets/magnetic force/ magnetism Pole	**Sound** vibration, pitch, volume, ear drum	**Forces (Term 2)**	**Electricity (Term 1)**

Attract Repel **Light** Shadow Light source Light/dark Mirror/reverse image	**Electricity** Circuits components, conductors, insulators, battery, buzzer, cell, switch,	Air resistance, Force, Force Diagram, Friction, Gravity, Mass, Newtons, Newton meter, Force meter, Scale, Upthrust, Water resistance, Weight **Earth in Space (Term 2)** Axis, Crescent, Daytime, Equinox, Lunar eclipse, Lunar month, Geocentric, Gibbous, Heliocentric, Moon, Night, Orbit, Phases, Planet, Rotation, Season, Solar eclipse, Solstice, Star. **Light (Term 3)** Image, Light rays, source, Mirror, Opaque, Reflection, Shadow, Translucent, Transparent.	Appliance, Battery, Buzzer, Cell, Circuit, Component, Conductor, Current, Graphite, Insulator, Motor, Parallel, Series, Switch, Terminal, Voltage. **Sound revision (Term 3)** Amplitude, Ear drum, Frequency, Pitch, Sound source, Sound waves, Vibration, Wave.