Harrow Gate Primary Academy **Physics Progress Grid**

		NC POS	Declarative Knowledge	Procedural Knowledge
EYFS	**FS1**	**Understanding the World:** Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.	**Understanding the world** • Explore how things work. • Talk about the differences in materials and changes they notice. • Explore how things work. • Explore and talk about different forces they can feel.	Children explore the natural world and objects in the environment. They learn to understand questions such as 'why' questions and they begin to ask their own questions about the world around them. Children can: • Explore how things work. • Explore different materials freely, in order to develop their ideas about how to use them and what to make. • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" • ask questions to find out more and to check they understand what has been said to them • Describe what they see, hear and feel whilst outside. • Talk about the differences between materials and changes they notice. • Understand the effect of changing seasons on the natural world around them. • Explore the natural world around them, making observations and drawing pictures of animals and plants • Compare sizes, weights etc. using gesture and language -'bigger/little/smaller', 'high/low', 'tall', 'heavy'. • Make comparisons between objects relating to size, length, weight and capacity • Compare quantities using language: 'more than', 'fewer than'. • Compare length, weight and capacity • Notice patterns and arrange things in patterns. • Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs', etc. Extend and create ABAB patterns –stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. • Continue, copy and create repeating patterns
	FS2	**Understanding the World:** **The World:** Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.	**Understanding the world** • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.	

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Y1	**Working Scientifically** • 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 **Seasonal Changes** • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	• 3 methods of scientific enquiry: 1. Carrying out comparative tests 2. Observing changes over time 3. Grouping and classifying • Know what a question is **Seasonal Changes** • Name seasons • Features of a season • Time of year / dates • Length of day • Weather	• Carry out comparative tests with 2 variables • Orally answer a question with scientific vocabulary • Sort using 2 given criteria / groups • Notice things that are the same. • Scientific equipment: Measuring jug, thermometer
Y2			
Y3	**Working Scientifically** • 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.	Method of scientific enquiry: Fair Test • Scientific Keys **Light** • Definition of light • Definition of dark • Light source • Reflection • Safety of light with the sun a source • Definition of shadow **Forces and magnets** • Definition of force • Definition of friction • Magnetic force • Attract • Repel • Magnetic materials	• Ask informed questions using expressive scientific vocabulary • Carry out a simple, guided, fair test • To use a simple key • To use a secondary source as guided by the teacher • Use **systematic observation** to track the movement of water through a plant • Write a guided conclusion using PEEL (point evidence explanation link) • To use a scientific diagram in support of conclusion • Scientific equipment: Magnets, light box, Newton meters

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	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 when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change **Forces and magnets** • compare how things move on different surfaces • notice that some forces need contact between 2 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing		
Y4	**Working Scientifically** • 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	**Sound** • Sound definition • How sound is made • Sound travel through Medium • Robert Boyle 1627 – 1691 (medium) • Pythagoras – vibration and sound waves • Speed of sound – Marin Mersenne **Electricity** • Electrons and protons • A complete circuit • Electrical components • Conductors and insulators • Electricity safety	• Ask a range of questions based on scientific knowledge and suggest where answers could be found. • Design a simple fair test • Interpret a food chain • Design a simple key • Identify and use a secondary source • Write a clear and cohesive guided conclusion using PEEL which incorporates any data / findings. • To create a guided scientific diagram in support of conclusion. • Scientific equipment: Tuning forks, data loggers, decibel readers batteries, switches, buzzers, clips, wires, bulbs, amps

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	• identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **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 strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases **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 • recognise some common conductors and insulators, and associate metals with being good conductors		
Y5	**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	**Earth and Space** • Gravity • **Sir Isaac Newton 1643 - 1727** • Movement of the Earth • Name planets in our Solar system • Sun = star • Movement of the moon • Spherical bodies – flat earth theory • Night and day • Heliocentric • Geocentric **Brian Cox – 1968 – to present**	• Identify an opportunity to work scientifically drawing on their prior knowledge and learning. • Create a line of enquiry for the science opportunity presented, incorporating a wide range of question types and scientific vocabulary. • Design and make a key for a given purpose • Identify opinion and fact when using a secondary source • Look for causal relationships in data • Write a conclusion which draws on all scientific vocabulary and understanding using relevant diagrams.

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	• Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and 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. **Earth and 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 **Forces** • 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	**Forces** • Air Resistance • Water resistance • Load, pivot point, fulcrum • **Archimedes 212BC**	• Scientific equipment: Levers, pulleys, gears
Y6	**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 degree of trust in results, in oral and written forms such as displays and other presentations	**Light** • Journey of light • Light sources **Thomas Edison 1877 – 1930** **Electricity** • Adding more volts (power) • Renewable power • **Nikola Tesla –** alternating current electricity supply system • **Eton Musk –** electric car	• Independently work scientifically creating own lines of enquiry • Explain why variables must be controlled • Design and make a key • Identify evidence that refutes or supports their ideas • Justify science thought using all previous methods for recording, explaining the degree of trust in results • Use their results to make predictions and identify further observations, comparative and fair tests might be needed.

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	NC POS	Declarative Knowledge	Procedural Knowledge
	• Identifying scientific evidence that has been used to support or refute ideas or arguments. **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 **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 when representing a simple circuit in a diagram		