CURRICULUM PROGRESSION GRID: SCIENCE				
Upper Key Stage 2 - Chemistry and Physics				
Properties and changes of materials	**Earth and Space**	**Forces**	**Light**	**Electricity**
NC Link: Pupils should be taught to: - 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,	**NC Link:** Pupils should be taught to: - 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.	**NC Link:** Pupils should be taught to: - 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.	**NC Link:** Pupils should be taught to: - 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.	**NC Link:** Pupils should be taught to: - 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.

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.				
Theme links: 'Survivors' Cycle B Spr 1 & 2	**Theme links**: 'Mayans' Cycle B Aut 2	**Theme links**: 'Egypt' Cycle B Aut 1	**Theme links**: 'Mayans' Cycle B Aut 2	**Theme links**: 'Saltaire' Cycle A Aut 1
Builds On: LKS2: -Pupils can group solids, liquids and gases. -They can describe how changes of state can happen through heating and cooling. -Pupils can measure or research the temperature at which different materials change state.	**Builds On: LKS2:** Not taught in KS1	**Builds On: LKS2:** -Pupils can compare how things move on different surfaces. -Pupils can understand that some forces need contact but magnetic forces can act at a distance.	**Builds On: LKS2:** -Pupils can understand that light is needed to see objects and that some objects reflect light. -They understand the dangers of the sun on our eyes and how we must protect our eyes from UV light.	**Builds On: LKS2:** -Pupils will be able to name common appliances that require electricity. -They can set up simple circuits and name the basic parts in a series circuit such as cells, wires, bulbs, switches and buzzers.

-Pupils can use measurements to explain changes to the state of water. -Pupils can explain evaporation and condensation and its importance in the water cycle. -Pupils can relate this to puddles in the playground.		-They can describe magnets as having two poles. -Pupils can predict whether two magnets will attract or repel each other depending on which poles are facing. -They can group everyday objects based on whether they are magnetic or not. -Pupils can identify some magnetic materials.	-Pupils can explain how shadows are formed. -Pupils can explain how the size of the shadows can change.	-Pupils can understand what happens when a circuit is incomplete. -They can include switches into a circuit and can describe how it works. - They can name a variety of conductors and insulators and describe how they work.
Intent (overarching success criteria) - Pupils can compare and group different materials according to their properties including hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets. - Pupils know that some objects dissolve such as sugar and salt to form a solution. -Pupils can describe how to recover a substance from a solution. -They can explain using their knowledge of solids,	**Intent (overarching success criteria)** - Pupils will be able to describe Earth and the other planets movements around the sun -Pupils can explain how seasons and the associated weather is created. - They can describe how the moon moves around the Earth -Pupils describe the sun, earth and moon as approximately spherical bodies.	**Intent (overarching success criteria)** - Pupils can understand that gravity is acting on a falling object pulling it down to the ground. - They can explain the effects of water resistance on an object. - They can explain air resistance - Pupils can describe how friction acts on an object on a moving surface. - Pupils can explain that levers, pulleys and gears create a greater force.	**Intent (overarching success criteria)** - Pupils understand that light travels in straight lines and we see it because the object reflects light or gives off its own light and it travels to our eyes. - Pupils understand the different ways we can see an object. - Pupils understand that shadows are cast and are the same shape because light travels in straight lines.	**Intent (overarching success criteria)** - Pupils can associate the brightness of a bulb with the amount of volts in the circuit. - Pupils can associate the volume of a buzzer with the amount of volts in the circuit. - Pupils can describe variations in the circuits and use symbols when recording these circuits.

liquids and gases how objects can be separated using a variety of processes-sieving, evaporation, filtering. - Pupils can use evidence from comparative and fair tests to compare very day objects and what uses they have including metal, wood and plastic. - Pupils understand that dissolving, mixing and changes of state are reversible changes - Pupils can explain that irreversible changes produce a new material e.g. candle wax and burning.	- Pupils can explain how we get day and night using scientific vocabulary.			
Extended writing: **To write a letter to a company (who have set the Pupils tasks) to describe what they have found out during the topic.**	**Extended writing:** **To write a newspaper article on Tom Wagg-the 15 year old school boy who found a new planet.** **To write a persuasive piece of writing about**	**Extended writing:** **To create an advertisement which advertises new goalie gloves made from the results of their investigations.**	**Extended writing:** **To write a narrative story about 'The day in the life of a light Photon.'**	**Extended writing:** **To write a set of instructions of how to make the product of their open ended product. e.g. light up greeting card, electrical game etc.**

	the Earth being round and not flat.			
Vocabulary: Hardness Solubility Transparency Conductivity Magnetic Filter Evaporation Dissolving Mixture Solution Reversible Irreversible Rusting Substance	**Vocabulary:** Earth Sun Moon Axis Rotation Day Night Phases of the Moon Star constellation	**Vocabulary:** Air resistance Water resistance Friction Gravity Newton Gears Pulleys Mass Weight Push Pull	**Vocabulary:** Refraction Reflection Light Spectrum Rainbow Colour	**Vocabulary:** Cells Wires Bulbs Switches Buzzers Battery Circuit Series Conductors Insulators Amps Volts Cell
Scientists Spencer Silver, Arthur Fry and Alan Amron (Post-it notes) Ruth Benerito (Wrinkle-Free cotton) Jo Shien Ng (Avalanche photodiodes)	**Scientists** Katherine Johnson (First woman (also Black woman) to have her work published at NASA) Helen Sharman (First British Astronaut) Mae Jemison (First African-American woman to travel to space) Tim Peake	**Scientists** Isaac Newton (Gravitation) Archimedes of Syracuse (levers)	**Scientists** Thomas Young (Wave Theory of Light) Ibn al-Haytham (Alhazen) (Light and our Eyes)	**Scientists** Alessandro Volta (Electrical battery) Nicola Tesla (Alternating Currents)

	(First British ESA astronaut)			
Reading books - Kensuke's Kingdom (Materials) - Possom's magic (dissolving) - The BFG –Roald Dahl	**Reading books** - The Biggest Hole in the World. - A Black hole is not a hole - George's secret key to the Universe- Lucy and Stephen Hawking (Space) -The Skies Above My Eyes-Charlotte Guillain - Dr Maggie's Grand Tour of the Solar System - A Galaxy of Her Own: Amazing Stories of Women in Space - Man on the Moon	**Reading books** - The Tin Snail (Forces) - Mr Archimedes' Bath (water resistance)	**Reading books** - Blackout- John Rocco - Letters from the lighthouse-Emma Carroll	**Reading books** - Electrical Wizard: How Nikola Tesla lit Up the World-Elizabeth Rusch.