



Markland Hill Science Curriculum – Upper Key Stage 2 Sequence of Learning - YEAR A

 physics
 biology
 chemistry

Light (Y6)	Electricity (Y6)	Evolution and inheritance (Y6)	Forces(Y5)	Properties and Changes of Materials (Y5)
Scientist: Isaac Newton Substantive Knowledge 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. Disciplinary Knowledge: Decide where to place rear-view mirrors on cars;	Scientist: Thomas Edison Substantive Knowledge: 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. Disciplinary Knowledge Systematically identifying the effect of changing one component at a time in a circuit; End points	Scientist: Charles Darwin Substantive Knowledge: 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. Disciplinary Knowledge observing and raising questions about local animals	Scientist: Isaac Newton Substantive Knowledge: 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. Disciplinary Knowledge 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.	Substantive Knowledge: 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

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. 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). End points I can recognise that light appears to travel in straight lines. I can 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. I can 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. I can use the idea that light travels in straight lines to explain why shadows have	I can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. I can 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. I can use recognised symbols when representing a simple circuit in a diagram. I can systematically identify the effect of changing one component at a time in a circuit. Key Vocabulary: Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage	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. End points I can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. I can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. I can observe and raising questions about local animals and how they are adapted to their environment. I can compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. Key Vocabulary:	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. End points I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. I can identify the effects of air resistance, water resistance and friction that act between moving surfaces. I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. I can design and make a variety of parachutes and carry out fair tests to determine which designs are the most effective. I can explore resistance. Key Vocabulary: Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple	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. Disciplinary Knowledge 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. End points
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the same shape as the objects that cast them. I can design and make a periscope and use the idea that light appears to travel in straight lines to explain how it works. I can investigate the relationship between light sources, objects and shadows by using shadow puppets. Key Vocabulary: As for Year 3 - Light, plus straight lines, light rays		Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils	machines, levers, pulleys, gears	I can compare and group together everyday materials on the basis of their properties. I know that some materials will dissolve in liquid to form a solution, and can describe how to recover a substance from a solution. I can use knowledge of solids, liquids and gases to decide how mixtures might be separated. I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials. I can demonstrate that dissolving, mixing and changes of state are reversible changes. I can explain that some changes result in the formation of new materials and that this kind of change is not usually reversible. I can carry out tests to answer questions. I can research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials.
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				Key Vocabulary Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material
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