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| **What have they taught us? Autumn Term 1 A Science Year 6**  Change For The Better?    –UKS2 Title of area of learning: Electricity | |
| **Prior Knowledge** | **Future Learning** |
| • Identify common appliances that run on electricity. (Y4 - Electricity)  • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4 - Electricity)  • 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. (Y4 - Electricity)  • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4 - Electricity)  • Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity) | Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3)  • Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3)  • Differences in resistance between conducting and insulating components (quantitative). (KS3)  • Static electricity. (KS3) |
| **Planned outcome:**  • 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.  **Key Learning**  Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. You can use recognised circuit symbols to draw simple circuit diagrams.  **Misconception**  Some children may think:  • larger-sized batteries make bulbs brighter  • a complete circuit uses up electricity  • components in a circuit that are closer to the battery get more electricity.  **Possible Evidence**  • Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs, can be changed by increasing or decreasing the number of cells or using cells of different voltages  • Can draw circuit diagrams of a range of simple series circuits using recognised symbols | |
| **Learning Journey**  **Step 1**- use recognised symbols when representing a simple circuit in a diagram.  Ask the children to make particular circuits (e.g. a circuit with a bulb and a cell), which they must then draw as a diagram with symbols.  **Step 2** able to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.  able to take repeat measurements of data with precision using a data-logger.  able to explain the degree of trust can be had in results  Game – Why bother repeating? Provide small groups of children with some suggested statements about why we might take repeated measurements in an investigation.  They must first decide which ones are incorrect, and place these to one side. They could then decide if any of the remaining statements are more important than others. Statements could include:  Correct ones:  • Because the first reading might not be right  • Because readings can be different  • Because things might be a little different, so we will need an average  • Because we need to check our results  • Because we need more evidence  Incorrect ones:  • Because we need to make the test fair  • Because we need to measure accurately  • Because we need to all have a go  Illustrative fair-test – How will the number of batteries (amounts of Volts) affect the brightness of the bulb?  **Step 3** able to 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.  Investigative Fair-test – What affects the brightness of a bulb in a circuit?  To be able to plan a fair-test by recognising the control variables. To be able to use predictions to set up fair tests  To be able to use recognised symbols when representing a simple circuit in a diagram. | Tiered Vocabulary  **3**  **2**  **1**  **Cell:** A single cell is called a battery  **Batteries:** Batteries are formed when a number of cells are grouped together  **Electrical wire:** metal covered in an insulator that electricity flows along in a circuit  **Buzzer:** an electrical device that makes a buzzing sound  **Switch:** used to control circuits, they can break or complete a circuit  **Circuit:** a complete ‘path’ around which electricity can flow. It must include a source of electricity ie. A cell  **Voltage:** an electrical force that causes electrons to flow around a circuit. Voltage comes from a cell or battery  **Current:** a measure of the flow of electrons in a circuit. It is measured in Amps or Amperes  **Watts:** the power or energy used by a circuit  **Electrons:** a very small piece of matter or energy. Electrical energy is caused by electrons moving about to cause a current  **Resistor:** an electrical component that limits the flow of electricity through a circuit, these can be used to protect people by limiting the amount of electricity in a circuit  **Variable resistor:** a resistor in which the level of resistance is adjustable eg. the volume dial on a radio  **Conductor:** an object or material that allows the flow of current in a circuit  **Insulator:** an object or materials that prevents the flow of current in a circuit |
| Scaffolds/Enquiry Activities | Oracy Activities |
| • Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower.  • Make circuits to solve particular problems, such as a quiet and a loud burglar alarm.  • Carry out fair tests exploring changes in circuits.  • Make circuits that can be controlled as part of a DT project. | • Incorporate a switch into a circuit to turn it on and off  • Change cells and components in a circuit to achieve a specific effect  • Communicate structures of circuits using circuit diagrams with recognised symbols  • Devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test  • Predict results and answer questions by drawing on evidence gathered |