Portfields Primary School Medium Term Plan

Year Group – **6** Subject - **Science** Strand – **Electricity** Topic - **Circuits and Investigations** Term – **Spring 2**

National Curriculum	**Key Questions**	**Substantive Knowledge**	**Key Vocabulary**	**Real-Life Links**
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	• What is a circuit? • What are circuits used for? • What are components? • What equipment do I need to make a circuit? • What are circuit diagrams used for? • How do I measure sound/light?	• Recognise the differences between AC voltage and DC voltage and their application • Review and consolidate understanding of electrical symbols Make links to real-life examples. • Identify from circuit diagrams those circuits that will function correctly or not.~ • Explore properties of various electrical circuits to answer *"What if…"* questions • Explain the effect of different voltages in a circuit • Recognise that electricity flows in a loop and that flow is controlled using resistors	Cell Battery Bulb Wire Motor Buzzer Brightness	Variable resistors used in: household dimmer switches, motors, heaters, ovens, volume control.
Notes and guidance (non-statutory)	**Technical Questions**		**Technical Vocabulary**	**Inventors and Makers**
Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. Note: Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.	**What is current?** Current is the rate at which charge flows through a circuit The greater the current flowing through a device, the harder the device works. When current flows through wires heat is released. The greater the current, the more heat is released. **What is Voltage?** Voltage measures how strong the charge flowing through a circuit is, at a given point. **What does Potential Difference mean?** The measure of the difference in energy between two parts of the same circuit. **What is a variable resistor?** Variable resistors are widely used in electric circuits to adjust the value of current or voltage. A dimmer-switch on a lighting circuit is a practical example of a variable resistor. **What is the measure of audio volume?** The unit of sound measure that is used is Decibel which is abbreviated as dB. **What is the measure of light?** The unit of measure that is used for light is Lux.	**Disciplinary Knowledge** • Draw an accurate circuit diagram to reflect constructed circuits • Complete investigations using simple circuits. • Predict and then investigate the result of adding bulbs/buzzers to a series circuit, without altering the voltage. What do you discover? • Record the brightness of bulbs using pre-programmed micro:bits and present data in a scatter graph. • Use graphite strips in order to construct a variable resistor in a series circuit.	Circuit Component Voltage Alternating current Direct current Open switch Closed switch	Alessandro Volta Invented the electric battery Lewis H. Latimer

Lesson Breakdown

Lesson 1	**Lesson 2**	**Lesson 3**	**Lesson 4**	**Lesson 5**	**Lesson 6**
Learning Objective LO: To recognise the purpose of circuit diagrams and component symbols, as well as identifying faults in a circuit Success Criteria *I know the scientific symbols for the main parts of a circuit.* *I can create circuit diagrams using scientific symbols.* *I can identify faults in a parallel circuit diagram.* **Star Knowledge** **What is current?** Current is the rate at which charge flows through a circuit **What is Voltage?** Voltage measures how strong the charge flowing through a circuit is, at a given point. **Potential Difference** The measure of the difference in energy between two parts of the same circuit.	Learning Objective LO: Associate the volume of a buzzer with the number and voltage of cells used in a circuit. Success Criteria *I can plan/complete a fair test.* *I can observe and explain the effects of differing volts in a circuit.* *I can use a sound meter to record the changes in volume from a buzzer.* *I can explain the importance of the work of Alessandro Volta.* **Star Knowledge** **What are cells/batteries?** A cell is the basic unit that produces electricity, and a battery has two or more cells. **What is the measure of audio volume?** The unit of sound measure that is used is Decibel which is abbreviated as dB.	Learning Objective LO: Associate the brightness of a bulb with the number and voltage of cells used in a circuit. Success Criteria *I can plan an investigation.* *I can record results using a micro-bit light meter.* *I can understand variations in how components function.* **Star Knowledge** **What is the measure of light?** The unit of measure that is used for light is Lux.	Learning Objective LO: To display results of investigations completed in a scatter graph. Success Criteria *I can present findings using a scatter-graph* **Star Knowledge** **What are scatter-graphs?** A scatter diagram or scatter graph is used to explore patterns between two sets of data.	Learning Objective LO: To investigate the effects of using a variable resistor in a circuit. Success Criteria *I can create a simple circuit containing a variable resister.* *I can explain the purpose of using variable resistors in a circuit.* *I can predict the effect of using a variable resistor in a circuit.* *I can develop a 'dimmer switch'.* **Star Knowledge** **What is a variable resistor?** Variable resistors are widely used in electric circuits to adjust the value of current or voltage.	Learning Objective LO: To use knowledge of circuits to design and create a pressure-pad alarm. Success Criteria *I can apply my understanding of circuits in a real-life situations*

Assessment Statements
Working At
• explain how our understanding of electricity has changed over time; • draw circuit diagrams using the correct symbols and label the voltage correctly; • decide which variables to control while planning an investigation; • decide how to report their findings; • make new predictions based on the previous results; • select an appropriate scientific enquiry.