

Pioneer Federation
Medium term plan
UKS2- Cycle 2, Term 4
Science



Subject: Science

Key Concept/ Theme: Electricity

Prior Learning links:

Electricity last taught in year 4:

- 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.

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.

Vocabulary:

Electricity, *Volts*, Series circuit

Components: battery, bulb (lamp), bulb (lamp) holder, buzzer, crocodile clip, leads, wires, switch

Describing words: brighter, duller, slow, fast, quiet, loud

Conductor, insulator

Resistance

Effects of electricity: Light, sound, movement, heat

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.

1. **Deeper learning question for the term:** How has the invention of electricity had an impact in the world we live in today?

Prior learning reconnection (year group, cycle & term): Year 4 cycle 2 term 1

Enquiry skill: Safety and equipment

LO: Let's learn how to use recognised symbols when representing a simple circuit in a diagram.

Activity: Explain that this term they will be pitching an idea in the style of 'Dragon's Den'. They will need to create an electronic scarecrow to help with the farmers in the local area to help them grow crops in spring. Use assessment concept cartoons and some reconnection questions to find out their current understanding. The children will not have been taught the symbols in year 4 so in this session they will be learning them and using them in their own diagrams. Inform the children that as part of their pitch to Dragons'

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	<p>Den they must provide drawings of the electrical circuits in their products. Show the children the electrical symbols and the component that they stand for. Provide each pair of children with symbol cards; symbols on one side and the picture of the component and word on the other side. The children can test each other. Children to make specific circuits (e.g. a circuit with a bulb and a cell), which they must then draw as a diagram with symbols.</p> <p>Future learning links: Links to ks3 learning about Electricity.</p>
2.	<p>Deeper learning question: How does the brightness of a lamp associate with the number of voltage?</p> <p>Reconnection: Can the children draw the symbol as the teacher reads it?</p> <p>LO: Let's learn about the brightness of a lamp or the volume of a buzzer and how it compares with the number and voltage of cells used in the circuit.</p> <p>Enquiry skill: Predicting, fair testing, identifying important information</p> <p>Activity: How will the number of batteries (amounts of Volts) affect the brightness of the bulb? This investigation should still fit within the overall problem that is being solved; i.e. the farmer needs to know what will be the effect of adding more batteries to his scarecrow. Provide the children with the precise question – 'How will the number of batteries affect the brightness of the bulb?' Today they will be putting the scientific skills they have practise together in a longer experiment. See Kent planning for experiment notes- page 7.</p>
3	<p>Deeper learning question: What affects the brightness of a bulb in a circuit?</p> <p>Reconnection: How did the number of batteries (amounts of Volts) affect the brightness of the bulb?</p> <p>LO: Let's compare and give reasons for variations in how components function.</p> <p>Enquiry skill: fair test, prediction, measuring, results</p> <p>Activity: Investigative Fair-test – What affects the brightness of a bulb in a circuit? To establish what effect components have on a circuit, allow the children to have an opportunity to perform a whole investigation where they have a great degree of choice. Ask the children (in small groups of 3) to list the variables that they think might affect the brightness of the bulb. List the ways by which they could measure or observe the brightness of the bulb/s. The children can then choose one of the independent variables (e.g. the number of bulbs) and one of the dependent variables (e.g. brightness of bulb in lux). Placing these two variables together, the children can make their own investigation – e.g. Does the number of bulbs affect the brightness of the bulbs (in lux)? Ask the children to make a prediction; possibly based on previous observations/measurements. The children can choose their own method for recording their results and their explanations</p>
4	<p>Deeper learning question: How have the discoveries in electricity affected our modern day lives?</p> <p>Reconnection: What affects the brightness of a bulb in a circuit?</p> <p>LO: Let's compare and give reasons for variations in how components function.</p> <p>Activity:</p>

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	<p>Drama/modelling – Being electricity- Children could try being electricity. They can stand in a large circle. One child wears a bib with a picture of a bulb on it; another child wears a bib with a picture of 1.5V cell on it. The cell child holds a dish of pieces of carrot (check for dislike and allergies!). As soon as the ‘circuit’ is complete each of the children (electrons/particles) flows around in the same direction. As they pass the battery child they take a piece of carrot (energy) which they eat when they come to the bulb child. At the same time the bulb child shows that energy have been converted by shouting out ‘light, heat’ every time a child passes them eating their carrot. The children can work out what they think will happen when they increase the number of batteries, or the number of components. Record using photograph and children to record one circuit and explain what happened. Use the other part of this (as it will be shorter) lesson to find out about key scientists who have had an influence in science and electricity- talk about how their findings have had an impact on society today. Thomas Edison (1847-1931). Inventor of the fuse. Alessandro Volta (1745-1827). Invented the first battery. The volt, the unit of electromotive force, is named after him. Include other discoveries eg Tesla and electric cars- impact on society and environmental issues.</p>
5	<p>Deeper learning question: Reflect on: How has the invention of electricity had an impact in the world we live in today? Reconnection: Can you name any inventors linked to electricity and explain what they invented/impact today? LO: Let’s problem solve by applying all the skills we have learnt this term. Enquiry skill: method and equipment, suggesting improvements, so what? Activity: The children must now apply what they know about electricity and circuits to make a scarecrow that has at least: one rotating motor, one bulb that lights, and one buzzer that makes a sound. They could also have a circuit that needs to be turned on when a bird lands on a switch in a field/on a fence. Children to draw the circuit and then suggest improvements for future. See Kent planning for more details- page 12.</p>
	<p>5 x sessions this term as there will be a week for science week activities.</p>

End points:

To know the components and draw their symbols.

To construct simple series circuits.

To construct simple series circuits in order to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors.

They represent a simple circuit in a diagram using recognised symbols.

To associate the brightness of a lamp or the volume of a buzzer and how it compares with the number and voltage of cells used in the circuit.

To apply the skills learnt within investigations- focusing on the following enquiry skills: Measuring, results, fair testing, predicting, method and equipment, using equipment safely, suggesting improvements.