Electricity

Explorify planning support

Curriculum statements	Explorify activities	Suggested use / taking it further
SOURCES OF ELECTRICTY		
Identify common appliances that run on electricity *(England)* **Sources of energy in the world - For example, learning about the use of electricity as an energy source and the importance of using it safely** *(Northern Ireland)*	Have you ever had a power cut? **HYE** Electrical appliances - kettle, iron and toaster **OOO** How much electricity do we use? **TBQ** Pearly tips – electric toothbrush **ZIZO** **See Celebrating Scientists at bottom of the table - Chi Onwurah**	You can use the Have You Ever to start a discussion about where our energy comes from. From this you can establish that some electrical appliances use mains electricity and others use batteries. The Odd One Out has three household appliances that rely on mains electricity, whilst the Zoom in Zoom Out is an example of something that uses batteries, regularly charged using mains electricity. Children could identify all the electrical devices in the classroom or go on a walk around school and classify them by their source: mains or battery. They could do the same at home. It is important when teaching electricity to teach electrical safety. Children could use the Big Question to explore electricity use at school and at home – something that everyone will be very conscious of at the moment.

BUILDING CIRCUITS

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.** *(England)* **I can describe an electrical circuit as a continuous loop of conducting materials. I can combine simple components in a series circuit to make a game or model.** *(Scotland)* **The causes and effect of energy, forces and movement - The effects of adding components to simple circuits** *(Northern Ireland)* **I can explore and communicate the basic properties of light, sound, electricity and magnetism.**	Have you ever tried to turn something on when it wasn't turned on at the plug? **HYE** Curly coil – filament inside an old electric lights and bulbs for school circuits **ZIZO** Inside a plug **ZIZO** Battery bonanza! - three different batteries **OOO**	Children first need to familiarise themselves with all the components in an electric circuit and remember their names, including the word cell (battery). Curly coil and Battery Bonanza! contain components. Use the Have You Ever to spark a discussion about things not working when you expect them to. *The background science in this activity gives you all the basics for teaching circuits.* Children need lots of experience of building simple series circuits, ideally in no more than pairs. This should include building circuits from drawings to test whether they work or not, and to decide how to correct any error in the circuit. There are lots of resources to support this. Once they are more confident you could show them the inside of a plug and even get them to wire one if you have any spares in school. Look at this PSTT document for guidance about children's misconceptions.

CONDUCTORS AND INSULATORS		
recognise some common conductors and insulators, and associate metals with being good conductors. *(England)*	Interesting insulators **MB** To the wire **PS** What if everything conducted electricity? **WI** Electrifying metals **MB**	Children will know that some metals are magnetic but are less likely to know about electrical conductors and insulators. Use the Mystery Bag activity to give children a range of materials to investigate in an electrical circuit. Can they classify the materials as insulators or conductors? They could discuss the What If. The Problem Solver is a great challenge to see if the children can apply what they have learnt about conductors.
INVESTIGATING CIRCUITS		
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 **associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit** **use recognised symbols when representing a simple circuit in a diagram.** *(England)* **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** *(England)*	Is bigger always better? **ZIZO** Battery bonanza! - batteries **OOO** Soak up some rays **WGO**	Once children are familiar with simple circuits, they can move onto investigating what might affect the brightness of a bulb, motor or buzzer. Children are often very surprised to find that bigger batteries do not necessarily mean more voltage – this Odd One Out and this Zoom In Zoom Out are good activities to spark this discussion. When trying to measure the brightness of a bulb, you can put a cardboard tube (toilet roll) over the bulb and then use a datalogger to measure the brightness. Alternatively, the children can see how many pieces of tissue paper are needed to cover the bulb until the light cannot be seen. Measuring volume in a noisy classroom is trickier – you will need to find lots of quiet spaces for children to work. CLEAPSS have guidance on circuit investigations including: voltage and motors and voltage and buzzers. Children also need to experience building circuits for a purpose including using switches. The What's Going On shows a complete circuit but the solar powered

I have used a range of electrical components to help to make a variety of circuits for differing purposes. I can represent my circuit using symbols and describe the transfer of energy around the circuit. *(Scotland)* **I can describe the factors that affect electrical circuits and this will enable me to change variables and predict what will happen.** *(Wales)*		buggy does not move because the switch stops the electric current flowing. Children should also be familiar with circuit symbols and be able to construct circuits for circuits diagrams and create diagrams of their own circuits. **See Celebrating Scientists at bottom of the table- Haydn Francis**
RENEWABLE ENERGY		
I can investigate the use and development of renewable and sustainable energy to gain an awareness of their growing importance in Scotland or beyond *(Scotland)*	Take your turn - a water mill, a windmill and a wind turbine **OOO** Power up - solar panels of a Mars rover **ZIZO** How can the wind help us **TBQ** What if all transport was electric? **WI** Roving robots **WGO** Soak up some rays **WGO**	Use the Odd One Out to introduce renewable energy. The background science gives information about wind and water and has suggestions linked to wind turbines as does the The Big Question. The ZIZO looks at solar power. Children could explore building circuits using solar power education kits, This What's Going On shows a solar toy being assembled. They can also explore wind turbines.

BUILDING CELLS		
To begin to understand how batteries work, I can help to build simple chemical cells using readily-available materials which can be used to make an appliance work *(Scotland)*	Super spinning wire **WGO** Have you ever not been able to find a battery when you need one? **HYE**	This What's Going On shows a simple motor powered by a magnetic field. Children could then try building their own. This link gives instructions for an alternative version. Children could also explore using lemons to generate electricity. Another version here. **See Celebrating Scientists at bottom of the table - Haydn Francis**
CELEBRATING SCIENTISTS		
Through research and discussion, I have an appreciation of the contribution that individuals are making to scientific discovery and invention and the impact this has made on society *(Scotland)*	Who is Chi Onwurah? **WHO** Nuclear energy scientist **WHO** Who is Haydn Francis? **WHO**	Use our Celebrating Scientists category to discuss the contribution scientists are making to developing mobile phone networks, keeping nuclear energy safe and designing car batteries that last longer.

ABBREVIATIONS AND DESCRIPTIONS OF THE DIFFERENT EXPLORIFY ACTIVITY TYPES		
ZIZO	Zoom In, Zoom Out	Visually engaging close-up photos
OOO	Odd One Out	Find similarities and differences
WGO	What's Going On?	Short, distraction-free videos
HYE	Have You Ever?	Activities linked to everyday experiences
WI	What If?	Explore ideas in new contexts
TBQ	The Big Question	Plan an investigation
PS	Problem Solvers	Think critically and creatively
MS	Mission Survive	Fun, imaginative hands-on challenges
MB	Mystery Bag	Use senses to work out contents in a bag
LWCYH	Listen What Can You Hear?	Recordings of familiar sounds
SWA	Start With Art	Using artworks to prompt science discussion
WJH	What Just Happened?	Observing changes over time
WHO	Who Is?	Learn about a diverse range of scientists

Other recommended resources to support planning:

PLAN primary science assessment resources (planassessment.com)

Assessment (TAPS) - Curriculum Materials | Primary Science Teaching Trust (pstt.org.uk)

The Great Science Share - see videos on Scientific Enquiry under the tab "Great Science Skills".

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