**Lesson plan – What is Electricity**

**Curricular Links**

SCN 1-09a/ 2-09a

**Learning Intentions**

We are learning to:

* Describe an electrical circuit
* Discuss the transfer of energy around a circuit

**Success Criteria**

We can:

* Ask and answer constructive questions about electrical circuits
* Use illustrations and role play to model an electrical circuit
* Explain how energy is transferred around a circuit using scientific terms

**Learning Activities**

Pupils come in to classroom with virtually no electricity (lights, computers and IWB off). Ask what electricity is off and how it makes life difficult. Turn on lights and discuss.

Have whiteboard split into two (uses electricity and doesn’t use electricity as column heading). Variety of magazines on desks. Groups have to bring pictures out from magazines for each column. Older/ more able to further divide the ‘uses electricity’ section into uses batteries and uses mains electricity (can use Venn diagram here)

Groups then have 10 minutes to write down everything they know about electricity. Encourage discussion and sharing ideas.

Class discussion about findings. Use of Bloom’s Taxonomy questions to expand on class thinking – critique each other’s thoughts and justify own thinking. How could we find out more?. Encourage pupils to justify their thoughts and evaluate others.

Be aware of misconceptions (particularly the common ones detailed below).

Demo rubbing a balloon and holding it near hair – stands up – discuss charges (use of ‘magic wand’ here also from electricity box) This experiment enables us to ‘see’ electricity. Scientists like proof – this ‘proves’ there are charges. Use of Bloom’s taxonomy to discuss ‘evidence’.

Flow of electrons – abstract concept (we can’t see electricity) so we will model.

Class model – all stand up. Someone is battery, someone else bulb, everyone else are electrons (inside a wire – conductor) Have each person wear an electron hat - when the battery is switched on, the electrons are given energy cards (chemical energy similar to us having food) so move through the wire – everyone can begin moving and collect an energy card on the way past the battery. This is a closed circuit. Demonstrate bulb lighting (pupil who is the bulb can collect the energy cards from passing electrons and put hands into air to show it is lit) when the battery provides the electrons with charge (pushes – link to forces). If circuit breaks (move pupils apart) electrons can no longer flow and so bulb doesn’t light. Discuss transfer of energy – from battery to bulb – chemical to light (and heat). When the chemical energy runs out the electrons can no longer collect energy so the bulb will no longer light.

This is current – flow of electrons.

Dependent on age/ pupils this can be expanded once pupils have made predictions and tested predictions as to what would happen if there was another battery (more energy will be handed to electrons to more passed to bulb = brighter) or another bulb (chemical energy will run out sooner)

Discuss what we have learnt. Make a word web on the whiteboard with key words and facts we have learnt. Use our new knowledge to draw a closed circuit on the board together.

This will move on to circuit diagrams and matching up symbols to pictures.

The pupils can also carry out a lot of practical work here to test predictions and identify faults in circuits.

Conductors and insulators practical work.

Using circuits to make a board game (operation)

**Misconceptions to be corrected**

When a circuit is completed, the current (electrons) pours out the battery and round the circuit.

When the current stops flowing all the electrons go back to the battery.

The physics they learn is not relevant to their everyday lives

**Possible cross-curricular**

Art – make posters of circuits using variety of materials to represent different components (metallic etc. for conductors).

Technology – design an electrical board game. Make a lighthouse with a working light.

Literacy – write a letter to Franklin or Edison explaining what information we know now about electricity compared to what they knew. Write an electricity poem.

Numeracy – recording results in tables.

Drama – role play of circuits.

**Differentiation**

Group mixed ages/ abilities.

Extra teacher scaffolding for special needs and younger pupils (e.g. prompts about how to organise what they know,).

Use of model and role play of electrons to enable pupils to visualise.

Older and more able pupils to separate items using electricity into battery and mains.

**Assessment**

Think-pair-share to assess student responses to what uses electricity.

Questioning during role play to assess students’ ability to link model to abstract ideas. Reassign roles of bulb and switch etc. to check understanding and apply knowledge to new situations by asking ‘what would happen if’.

Circulate and listen to student conversations to evaluate pupil understanding.

Assess misconceptions via groups feeding back to class about which version they believe and why.

Assess understanding via ability to come up with using our role play to translate into a circuit diagram.