

# How does electricity work?

## Building electrical circuits

### Lesson 2



### Overview

Pupils learn how to construct simple electrical circuits (using bulb, buzzer, motor) and how to draw simple circuits using electrical symbols.

### Learning outcomes

We will be able to:

- identify and name the basic parts of a simple circuit, including cells, wires, bulbs and buzzers
- make a simple circuit to make something heat or light up, move or make a noise
- explain what a circuit needs to be complete and for electricity to flow through it
- draw a simple circuit using electrical symbols

**With circuit equipment:** For this lesson, teachers will need to prepare resources with which pupils can build and experiment with building electrical circuits. There should be enough provided for each small group, and batteries should be pre-tested to ensure they are working.

Resources to include: wires, cells (batteries), crocodile clips, bulbs, buzzers, motors.

**Note:** *If pupils are working at home, or if circuit equipment is not available, use Worksheet 1: Building an electrical circuit.*

### Starter activity

#### Slide No.

Recap on learning from the previous lesson with some quick-fire questions such as:

- Name three everyday things/things in this room which use electricity
- How do we know if something uses electricity? (it can be turned on; it doesn't work without being plugged in/without batteries)
- What is the difference between mains electricity and batteries? (mains electricity comes from a plug socket; batteries are cells which store electricity)
- What are three ways of staying safe around electricity indoors?
- What are two ways of staying safe around electricity outdoors?
- What four things can electricity be turned into? (heat; light; sound; movement)

**Note:** *This activity can be used as a way to spot any gaps in knowledge or understanding, and learning should be revisited if necessary. Questions can be altered to suit your pupils/needs.*



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### Core activities

#### Slide No.

Remind pupils that to make things work, electricity can be turned into four things:

- Heat
- Light
- Movement
- Sound

Ask for examples for each one (e.g. heat: oven; light: lamp; movement: remote control toy; sound: doorbell)

Tell them that their task today is to use electricity to make something work in one or more of those ways.

#### Slide No.

Explain that for electricity to work it needs to flow around a circuit – their challenge is to work out how to do that.

**With circuit equipment:** Divide the class into smaller groups depending on your resources, and provide each group with the resources required to build a circuit. Encourage them to handle each resource and establish what each one is. Note: if they are confused between ‘cell’ and ‘battery’, explain that a cell is a single unit that converts chemical energy into electrical energy, and a battery is a collection of cells.

(If pupils are working at home, or for additional emphasis in class, show the slide images to reinforce the names of each resource).

Ask them to work with their group/partner to make the light work, using what they have in front of them. Give them time to experiment and work out how to do this (use the question examples below to guide them).

If anyone manages to do it, challenge them to explain why and how they did it, or to construct the circuit differently to see what happens. What is needed for the electricity to work?

As they work, challenge pupils with questions such as:

- *what happens if you add an extra cell?*
- *what happens if you turn the bulb sideways?*
- *does it make a difference if you connect the wires to the bulb in different places?*
- *what happens if you take away a component?*
- *how can you ‘fix’ this?*

**Without circuit equipment:** For pupils working at home, or if there are limited or no resources available, use Worksheet 1 to cut out the components of an electrical circuit and ask pupils to put them together in different formations to discuss whether or not these are likely to work.

#### Resources

For each small group: wires, cells (batteries), crocodile clips, bulbs, buzzers, motors.

If pupils are working at home, or if resources are not available, use Worksheet 1: Building an electrical circuit.

Watch our video to find out more about circuits and how they work with Fran, our Bright Sparks facilitator: [PLACEHOLDER LINK](#)



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#### Slide No.

When everyone has had a chance to experiment, and whether they have made their circuit work or not, discuss what is needed for electricity to create light, and help pupils arrive at the conclusion that the circuit needs to be unbroken and have a complete flow of energy to work. Demonstrate what happens when you make a break in the circuit, explain that the electrical current flows around the circuit, and the circuit must be complete for the bulb to light.

Challenge pupils to use what they now know to make the buzzer and then the motor work.

#### Resources

Worksheet 2: Will it or won't it?

#### Slide No.

Ask pupils to look at the circuits on the slide, and predict whether each circuit will work. They should first record their prediction individually on Worksheet 1, then test it together by building the circuit with the resources they have. They should then record if their prediction was correct or not, and why.

When everyone has finished, discuss their findings. Were their predictions correct? Did any of the circuits surprise them? Take time to discuss why some predictions weren't correct, or some circuits worked and others didn't (e.g. circuits 4 or 6 didn't light as they needed to be connected at two points).

Show the correct answers on slide 8.

#### Slide No.

Tell pupils that there are special symbols used to draw circuits, and go through those on the slide. Why do they think special symbols are needed? (e.g. to enable a 'universal language' for electricity use)

Ask them to draw the circuits on Worksheet 3 using electrical symbols.

#### Resources

Worksheet 3: Using electrical symbols

You can find a full list of symbols here: <https://www.enwl.co.uk/globalassets/stakeholder-engagement/csr/electricity-resource-files/electrical-and-electronic-symbols.pdf>

### Plenary

#### Slide No.

Recap on what has been taught during the lesson using the questions on the slide.

**Note:** Pupils' original mindmaps from Lesson 1 can also be returned to here for pupils to add any additional knowledge using a different coloured pen/pencil.