



## Simplicity of Electricity

The simplicity of electricity is that it never tires of going down wires.

The invention of plugs was to stop mugs who touch wires becoming electric fires.

The simplicity of electricity is that it seems to know it cannot flow through plastic.  
Fantastic!









## TEACHERS' GUIDE: Lighting Circuits

<b>Topic</b> Sound and Hearing	<b>National Curriculum Reference</b> SC4 1a(until 2014)/ Year 4 'Electricity' (2014 onwards)
<b>Learning Outcomes</b>	
<ul style="list-style-type: none"> <li>• To explain why a bulb is off when there is a gap in the circuit</li> <li>• To construct two bulb circuits from pictorial diagrams</li> <li>• To construct a circuit or circuits to control two bulbs in a specified way</li> </ul>	
<b>Poem Link</b>	
The Simplicity of Electricity... <i>'is that it never tires of going down wires'</i> . Throughout these activities the children will need to remember that electricity never tires of flowing around the complete loop of a circuit.	

## Activities

Activity Type	Running Notes	Resources
 <b>Quick Fire</b>	<p>Show the children the simple circuit photos (slide 1) . Ask the children to talk to a partner to explain why each of the bulbs are off.</p> <p>Use this as an opportunity to reinforce the need for a complete loop in a circuit. An open switch or gap in ANY part of the circuit stops the electricity from flowing through the wires.</p>	Slide 1
 <b>Hands On</b>	<p>Challenge the children to build a two bulb circuit that would allow the Centrally Heated Knickers stage crew to switch the main stage light off but keep a second spotlight on Michael Rosen.</p> <p>Support the children in setting up two possible circuits using the pictorial diagrams (activity sheet 1). If using this activity with older children circuit symbols could be used.</p> <p>Allow the children some time to experiment with placing the switch at different points in each circuit. Encourage the children to explain what they observe in terms of complete loops in the circuit.</p> <p>The children will then need two switches to build their final circuit.</p>	<p>Basic circuits equipment including batteries, bulbs, switches and wires</p> <p>Activity Sheet 1: Circuit Building</p>
 <b>Extended</b>	<p>Ask the children to use a shoe box to design a model set to stage one a performance of one Michael Rosen's poems (e.g. Shadow from the Centrally Heated Knickers show). Their set should include a main stage light on the top and a separate 'spotlight' on Michael Rosen.</p> <p> NB Adult assistance may be required in making suitable holes to place the bulbs through. Care should be taken not to force bulbs through as the glass could break. Wires and batteries can be affixed to the outside of the box using sticky tape.</p>	<p>Shoe box, coloured pens, coloured paper/card, scissors, glue, sticky tape etc to create a model stage set</p> <p>Basic circuits equipment including batteries, bulbs, switches and wires</p>



## Science Background

### Quick Fire Activity

This activity is designed to find out if any of the children hold a common misconception about electricity. If the explanation for the first photo is given that the electricity cannot 'reach' the bulb this explanation will not work for the second photo where the switch is after the bulb. The child must then think more carefully and be supported in understanding that an open switch or gap anywhere in the circuit stops the electricity from flowing. Similarly in picture 3, the electricity does not reach the first bulb but not the second. When the switch is open both bulbs are off.

### Hands On Activity

Circuit 1 is a series circuit and circuit 2 is a parallel circuit. At this stage children are not required to recall parallel circuits so the focus in this activity is on identifying whether each bulb is part of a completed circuit. In the series circuit the bulbs will go off together wherever the switch is placed because the whole circuit is 'broken'. In the parallel circuit, if a switch is placed next to one of the bulbs, the other bulb is still part of a complete loop in the circuit. This bulb therefore remains on when the switch is opened. This type of circuit will allow the crew to control a spotlight on Michael Rosen separately to the main stage light.

### Extended Activity

The hands on activity above may be used to support the children in understanding how to use a parallel circuit to control two bulbs in one circuit. However if felt that the use of a parallel circuit is too complicated the children could also use this as an opportunity to reinforce the building of simple circuits by using two separate circuits to control the two bulbs. Older children could draw a diagram of their circuit using symbols.

A variation on this task would be to use coloured transparent plastic sheet to create two different colours of light.



## Activity Sheet 1: Circuit Building

### Circuit 1

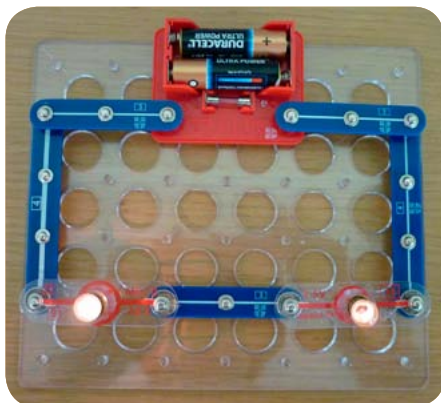
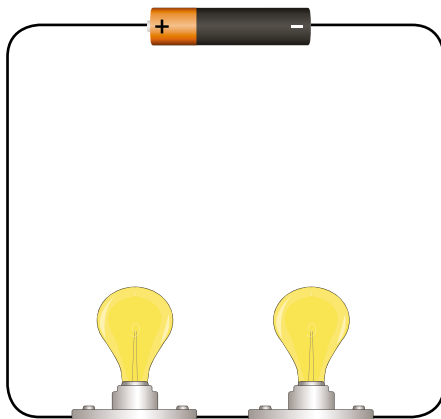
Build the circuit shown below.

Try placing a switch a different places in the circuit.

Do the bulbs go on and off together?

Can you make only one bulb go on and off?

### Circuit 1

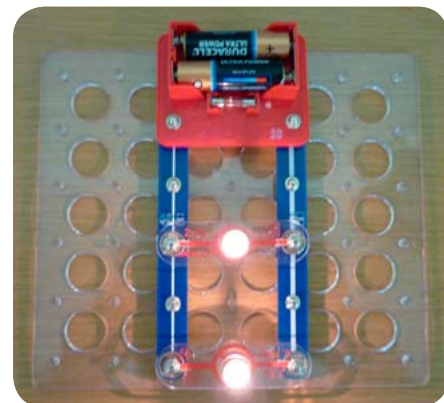
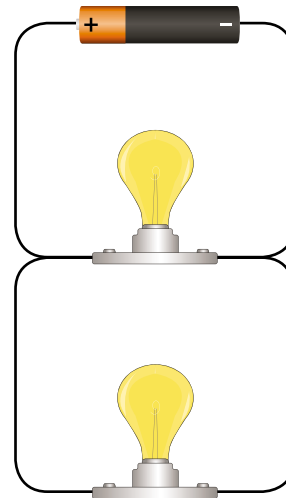


### Circuit 2

Now try the same thing with this circuit.

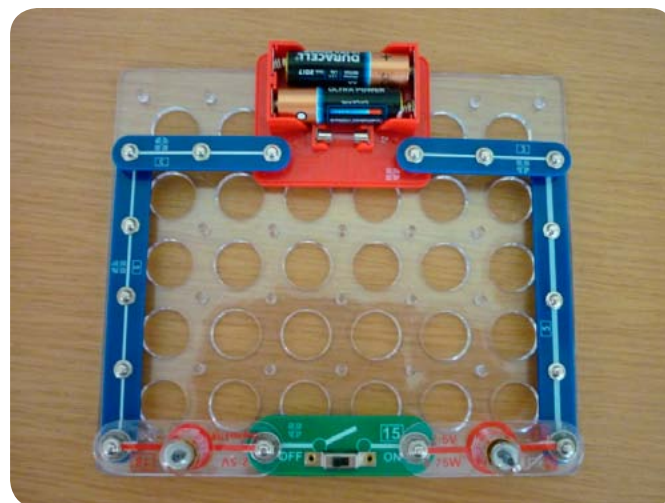
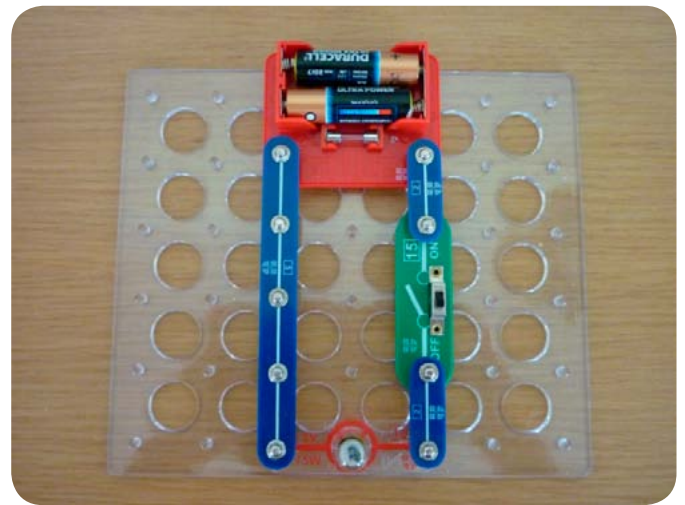
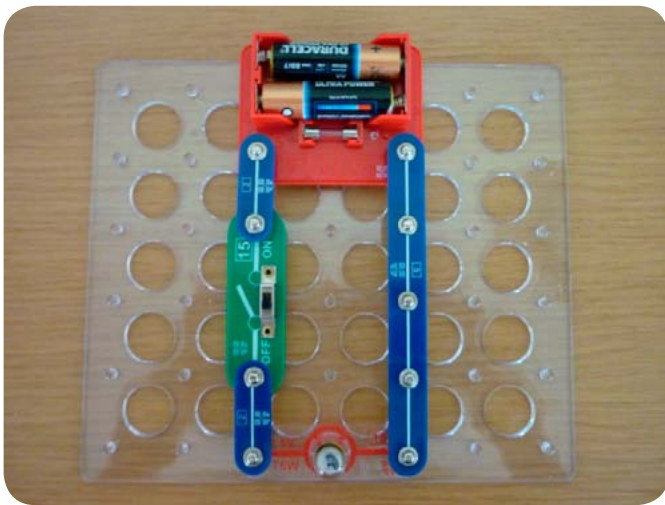
What do you notice?

### Circuit 2



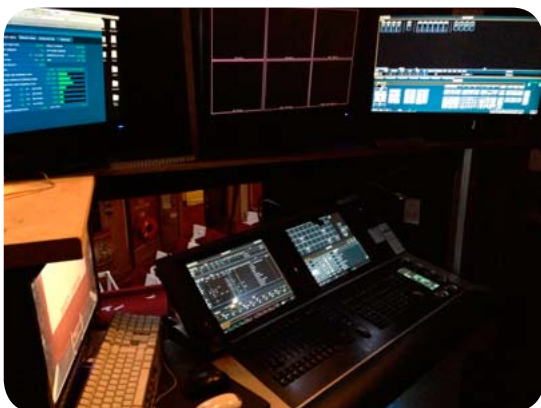
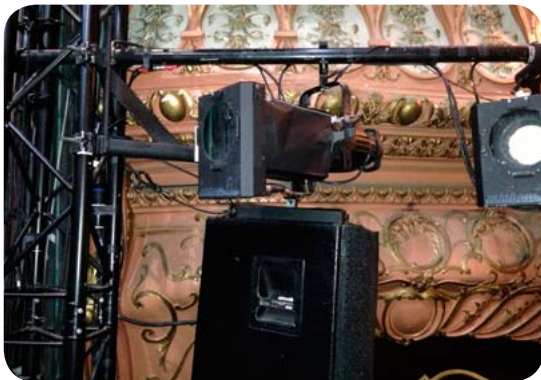
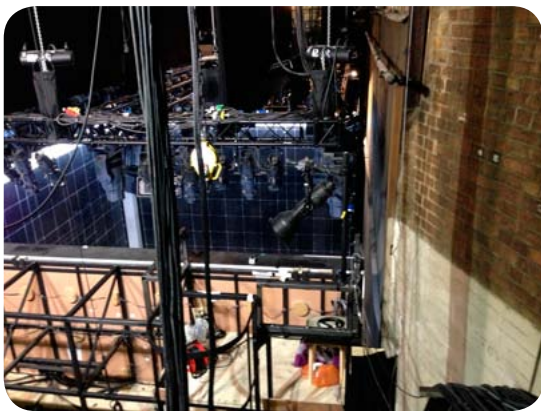


**Explain why each of these bulbs is off when the switch is open.**





**Build a circuit that allows the stage crew to separately control the main stage light and the spot light on Michael Rosen.**





## Create a model stage set for a performance of a Michael Rosen poem with working lighting.

