

A FREE RESOURCE PACK FROM EDUCATIONCITY

Electricity



Science



Lesson Plans



Suitability

Electricity Lesson Plans

What Does This Pack Include?

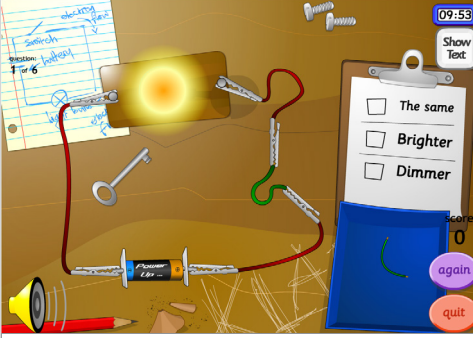
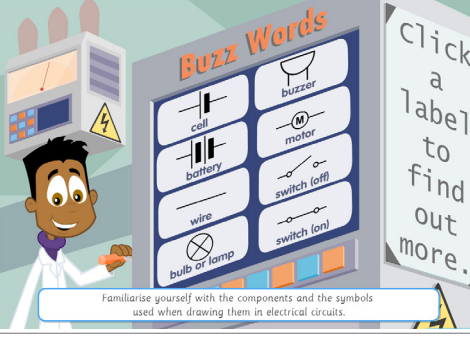
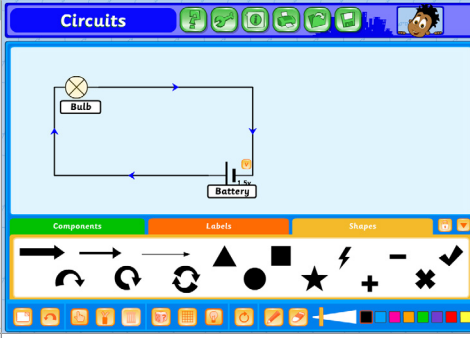
This pack has been created by teachers, for teachers. In it, you'll find high quality Lesson Plans, along with worksheets and answer sheets, to support your students as they develop their understanding of electrical circuits.

To go directly to the content, simply click on the title in the index below:

ROBOT REPAIR:	
Learning Objective: Working Scientifically Make a working circuit using bulbs, switches and batteries.	<ul style="list-style-type: none"> • Activity Sheet • Activity Sheet with Answers
DISCO FEVER:	
Learning Objective: Electricity Select from the conductor or the insulator to repair a broken circuit.	<ul style="list-style-type: none"> • Activity Sheet • Activity Sheet with Answers
SHORT FUSE:	
Learning Objective: Electricity Understanding circuits and fuses in the home environment.	<ul style="list-style-type: none"> • 60 minute Lesson Plan • Activity Sheet • Activity Sheet with Answers
ROBOT REPAIR:	
Learning Objective: Working Scientifically Fit the correct components into the circuit, using the circuit diagram as reference.	<ul style="list-style-type: none"> • 60 minute Lesson Plan • Activity Sheet • Activity Sheet with Answers
Science Investigation Template	

Other Resources Linking to the Theme

Before deciding what to include in your lesson, check out our online content relating to electricity too. It's simple to find, just enter the Content ID numbers into EducationCity's Search tool!

Activities: Educational Content	Learn Screens: Introduce or Reinforce a New Concept	Topic Tools: Explore Concepts as a Class
Short Fuse Content ID: 1115	Buzz Words Content ID: 22328	Circuit Builder Content ID: 2254
 <p>Understand circuits and fuses in the home environment.</p>	 <p>Find out about circuit symbols and the components that they represent.</p>	 <p>Explore a range of circuits and the components required to build them.</p>

Enjoyed these resources?

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or call us on +44 (0)1572 725080!

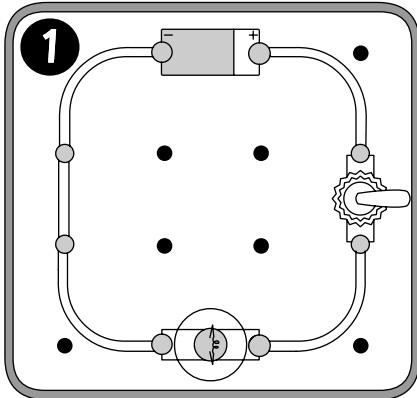


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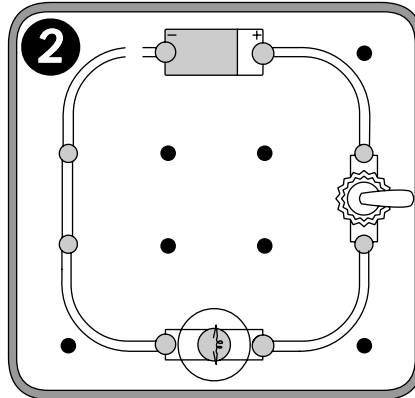
When the circuits are complete they can be used to turn the bulb on and off.

Tick the complete circuits and write "circuit complete".

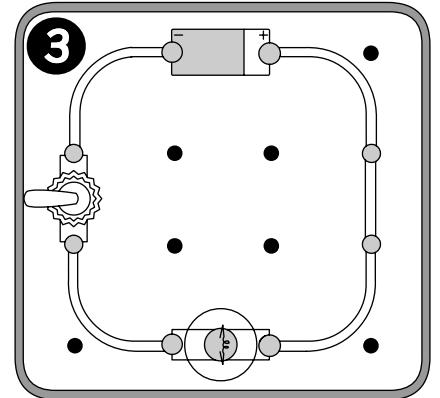
Cross the incomplete ones and write why they will not work. One has been done for you.



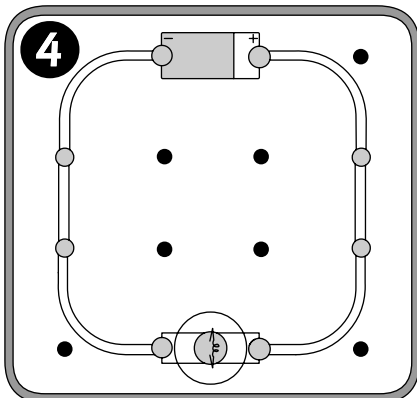
☒ **Circuit complete.**



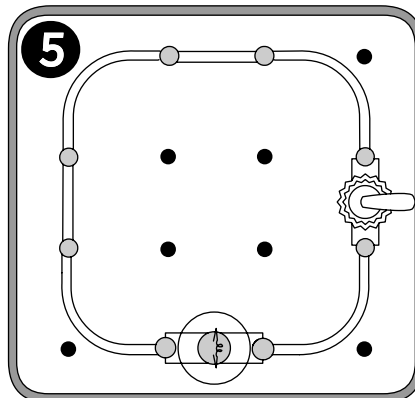
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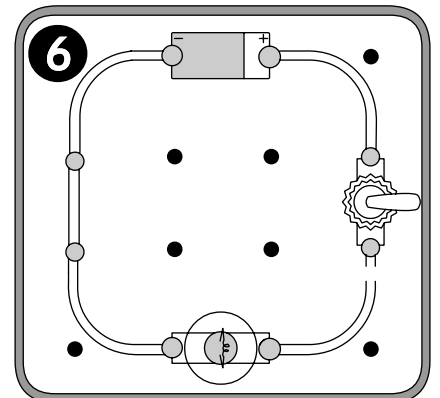
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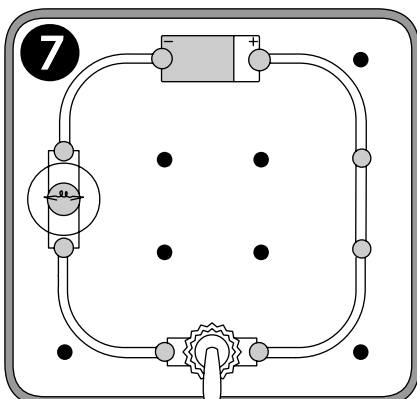
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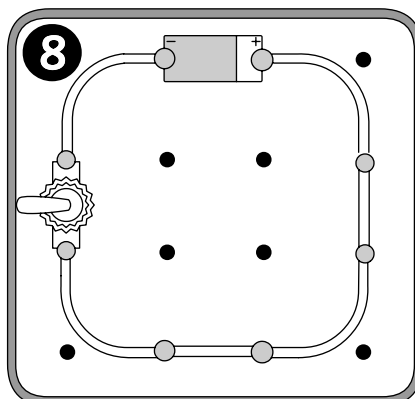
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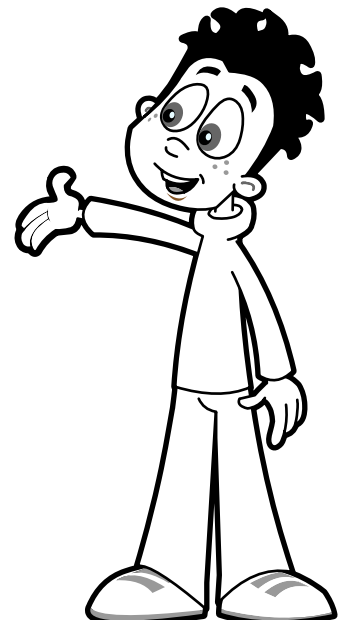
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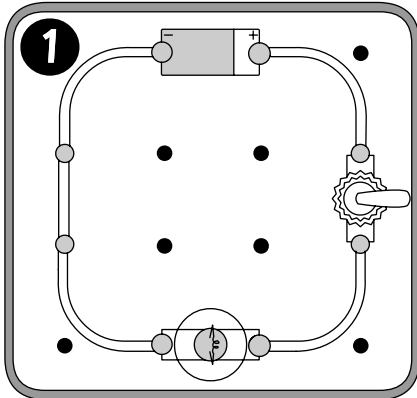


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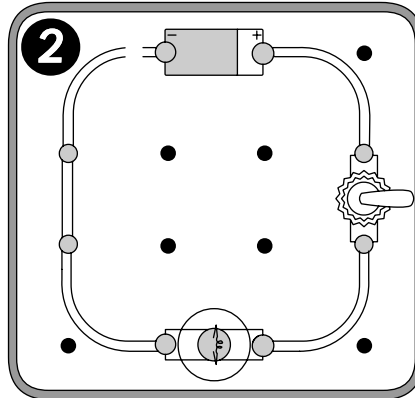
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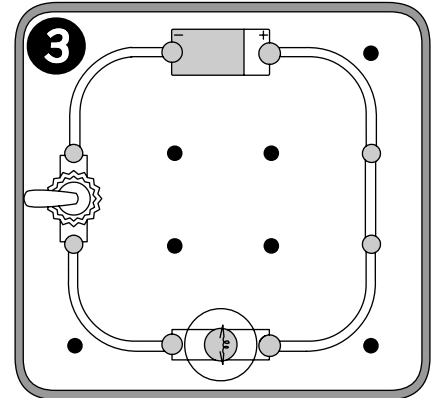
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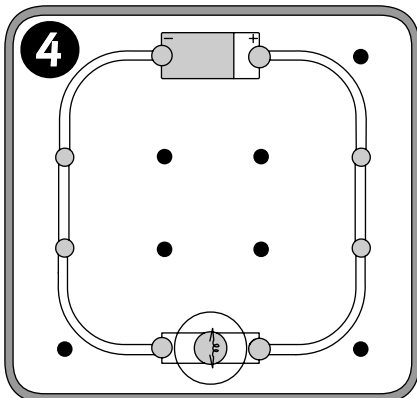
☒ Circuit complete.



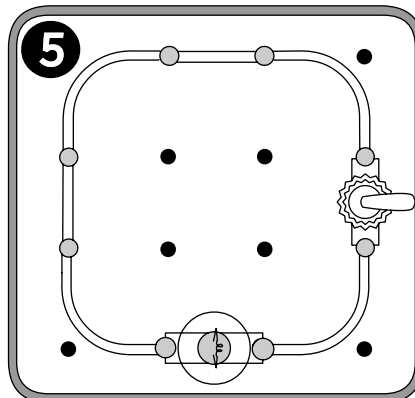
☒ Gap in the circuit.



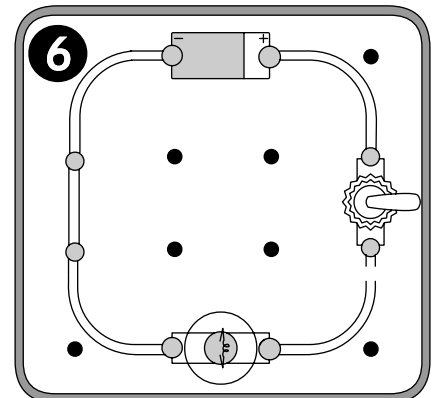
☒ Circuit complete.



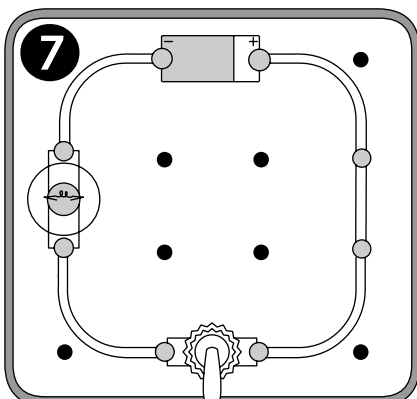
☒ No switch.



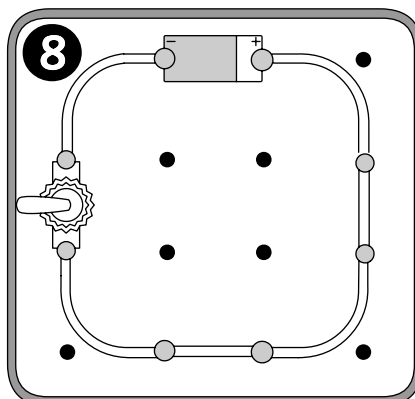
☒ No battery.



☒ Gap in the circuit.



☒ Circuit complete.



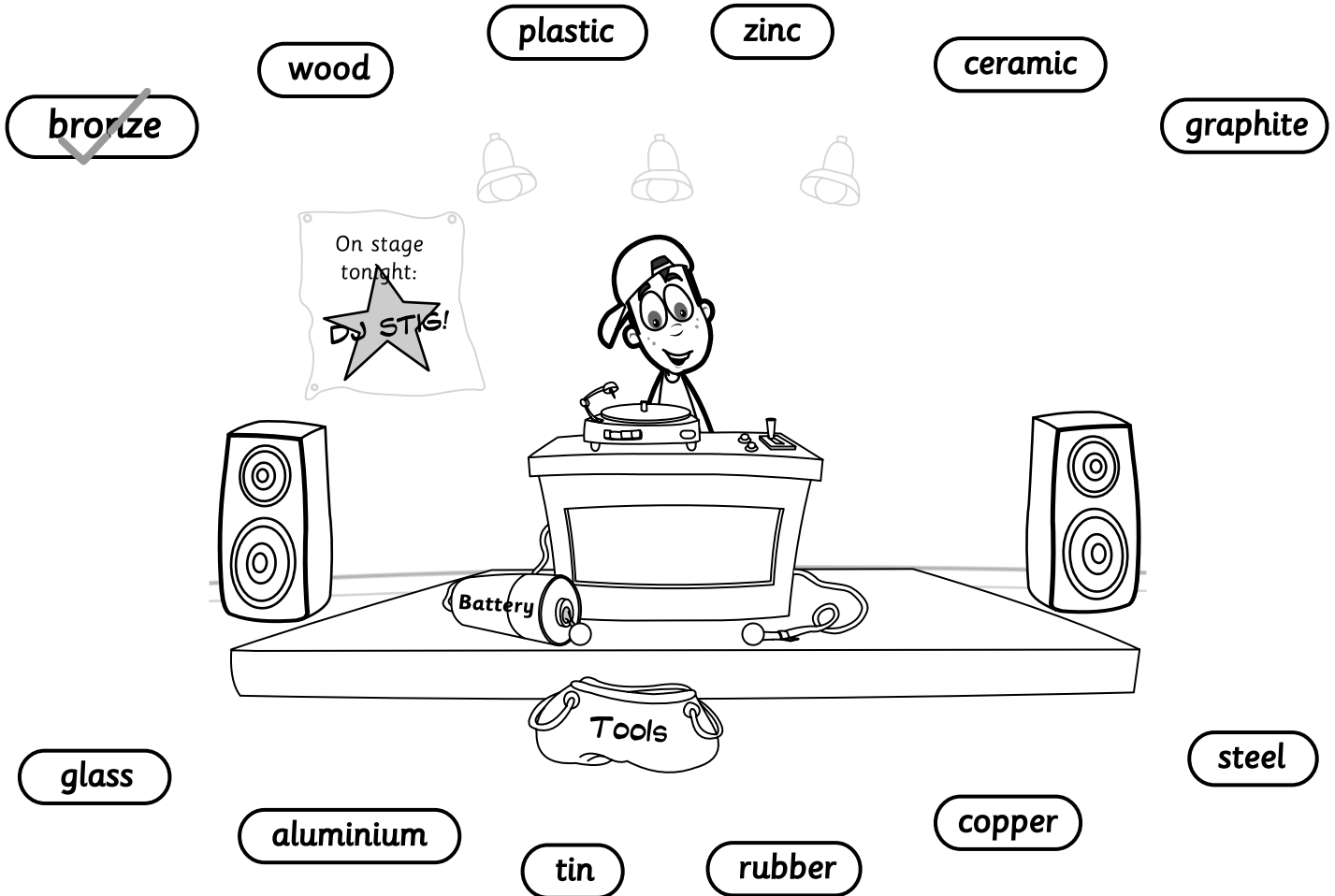
☒ No bulb.





Name: _____ Class: _____

Tick the materials that conduct electricity and cross out the ones that do not.
One has been done for you.



Now fill in the gaps using the words.

conductor lead cheap copper wire
bronze conducts expensive conductor

- 1 _____ is an electrical _____ made from copper and tin.
- 2 _____ is a metal used in solder, that helps us join things in electric circuits.
- 3 Gold is an _____ metal that _____ electricity.
- 4 _____ is a metal that most electrical wires are made from because :-
 - (a) It is a good _____ of electricity.
 - (b) It can easily be stretched into _____ without breaking.
 - (c) It is quite _____.



Name: _____ Class: _____

Tick the materials that conduct electricity and cross out the ones that do not.
One has been done for you.



Now fill in the gaps using the words.

conductor lead cheap copper wire
bronze conducts expensive conductor

- ① wire is an electrical conductor made from copper and tin.
- ② lead is a metal used in solder, that helps us join things in electric circuits.
- ③ Gold is an expensive metal that conducts electricity.
- ④ copper is a metal that most electrical wires are made from because :-
 - (a) It is a good conductor of electricity.
 - (b) It can easily be stretched into wire without breaking.
 - (c) It is quite cheap.



Overview

In this session, students get the opportunity to carry out a first-hand investigation into what happens to a circuit when the length and thickness of the wire is changed.

Resources and Organisation

- Batteries
- Bulbs
- Crocodile clips
- Wires of varying thicknesses
- Prompt cards
- Organise the students into pairs

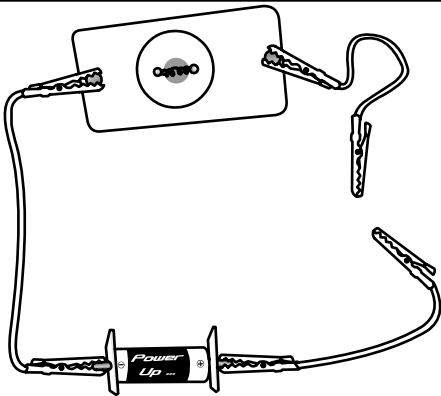
Lesson Structure

- | | |
|----------------------|---|
| 0-10 minutes | Explain to the students that you would like them to carry out an investigation into the effect that changing the length and thickness of wires will have on the brightness of a bulb. Talk to them about what they could investigate and then ask students to write some of these in the form of statements on to prompt cards that can then be placed on each table. Examples of prompt cards could read 'Changing the wire to a thinner wire will make the bulb brighter', and 'Changing both wires that lead to and from the battery to thicker ones will make the bulb dimmer'. Ask the students to put the prompt cards on their table so they can carry out a range of investigations throughout the session. |
| 10-15 minutes | Explain the students will be working in pairs and set these up. Then ask the pairs to decide which resources they will need and to gather them. |
| 15-35 minutes | Ask students to make a circuit and to consider the strength of the bulb. Then ask them to take one of the prompt cards and to carry out the investigation with their partner. Once the investigation has been carried out, ask students to record their findings and then choose another prompt card. Circulate while students are working to support their understanding and the investigation process. |
| 35-45 minutes | Draw the class back together and discuss their investigations. Ask them to report back on what they discovered. Engage the class in the conversation to see if the other pairs agree or whether something else happened when they carried out the same investigation. Ask students to think about their results and present some reasons to substantiate their findings. |
| 45-60 minutes | In light of the investigations, ask students if there is anything new that they would now like to go and investigate, for example whether adding more wires would make any difference. Time permitting, allow students to investigate. |

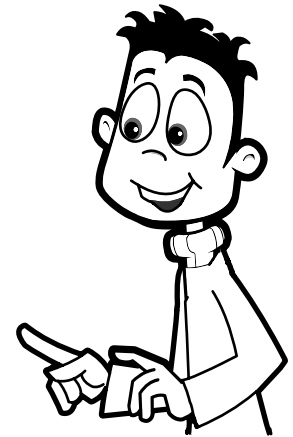


Name: _____ Class: _____

Look at the circuit and the tray of components.



	thin wire
	thick wire
	long wire
	short wire



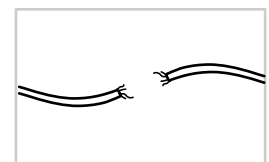
- 1** Which wire would you use from the tray to make the bulb brighter? Explain your answer.

- 2** Which wire would you use from the tray to make the bulb dimmer? Explain your answer.

- 3** Which wires would not make any difference? Explain your answer.

- 4** Is there another component, not on the tray, that would make the bulb brighter?

- a** What has happened here?



- b** Can you draw the correct fuses in Granny's fuse box?

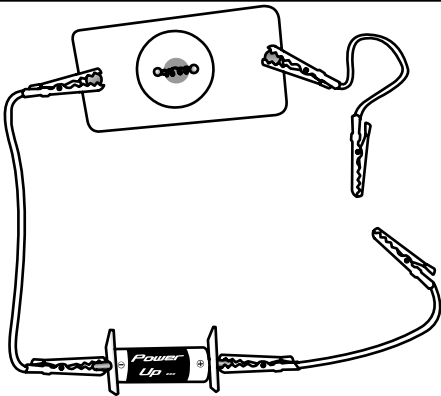
lights	
fridge	
microwave	
heater	

3A
3A
3A

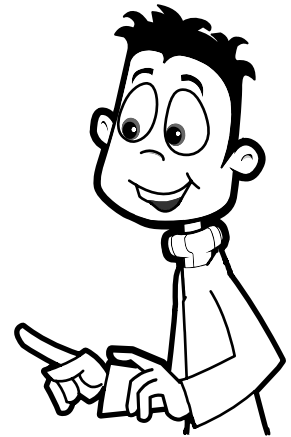


Name: _____ Class: _____

Look at the circuit and the tray of components.



	thin wire
	thick wire
	long wire
	short wire



- 1** Which wire would you use from the tray to make the bulb brighter? Explain your answer.

The thick wire would make the bulb brighter because more electricity would travel around the circuit.

- 2** Which wire would you use from the tray to make the bulb dimmer? Explain your answer.

The thin wire would make the bulb dimmer because less electricity would travel around the circuit.

- 3** Which wires would not make any difference? Explain your answer.

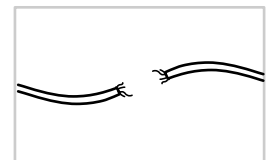
The long and short wires would not make any difference because the same amount of electricity would travel around the circuit.

- 4** Is there another component, not on the tray, that would make the bulb brighter?

Adding an extra battery or a battery with more power (volts) would make the bulb brighter.

- a** What has happened here?

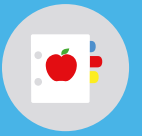
Too much electricity has been forced through the wire and it has overheated and snapped.



- b** Can you draw the correct fuses in Granny's fuse box?

lights	5A	
fridge	13A	
microwave	13A	
heater	13A	

3A
3A
3A



Overview

In this 60 minute lesson, students build a simple lemon battery powered circuit. Students gain an understanding of the three requirements for an electrical current to flow: a conductor, a power source and a closed circuit.

Materials

- 2 lemons
- 3 copper wires
- 2 large metal paper clips
- 2 pennies
- 1 small digital clock
- knife

Introduction (15 minutes)

We depend on electricity every day to operate our radios, televisions, lights and more. Most of the electricity we use comes from power plants, but other electricity comes from self-contained units called 'dry cells' or batteries. Regardless of the power source, the flow of electrons in a circuit works the same. In order for electrical currents to flow you must have a conductor, a power source and a closed circuit.

- A conductor is any material that allows electricity to flow through it easily.
- A power source can come in any forms as long as it has voltage to push the electrons through the circuit.
- A closed circuit allows a direct and uninterrupted flow of electrons out from the power source and back again with no end and no beginning.

Simple Lemon Circuit Activity (30 minutes)

1. Attach 1 paper clip to a copper wire by twisting the wire several times around the paper clip.
2. Attach 1 penny to a separate copper wire by again twisting the wire around the penny several times.
3. Attach the last penny and paper clip to either end of the last copper wire.
4. Using the palm of your hand, roll both lemons on a hard surface to loosen the pulp.
5. Make 2 small slits in the centre of each lemon.
6. Take the copper wire that is attached to both the penny and the paper clip. Insert the penny in one of the slits of the 1st lemon. Then insert the paper clip in one of the slits of the 2nd lemon.
7. Insert the 2nd paper clip in the slit of the lemon that contains the penny.
8. Insert the 2nd penny in the slit of the lemon that contains the paper clip. (Each lemon should have 1 penny and 1 paper clip inserted in it).
9. Connect the free ends of the copper wires to the terminals of the digital clock.

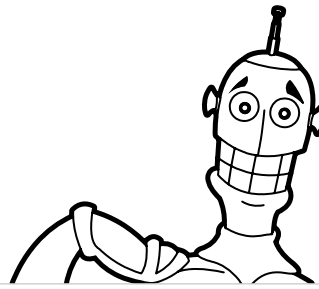
Wrap-Up (15 minutes)

Lead the students in a discussion about the activity. How does the lemon battery work? Is the electrical current in this circuit the same or different to the electrical current in a wall clock?

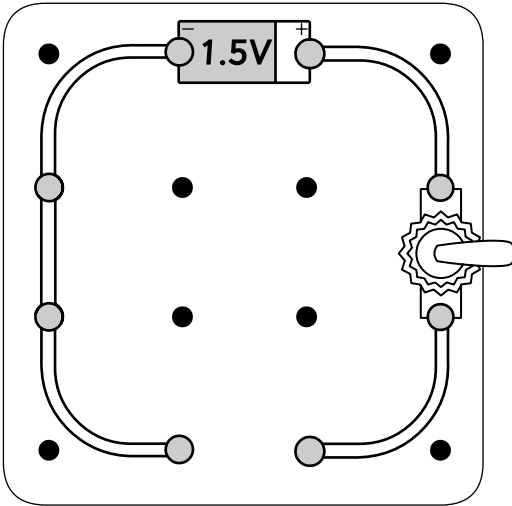
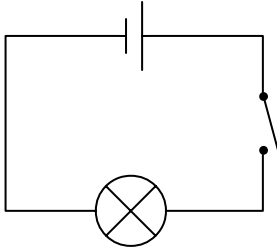


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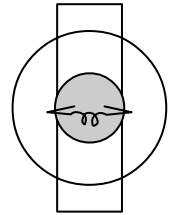
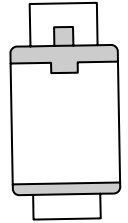
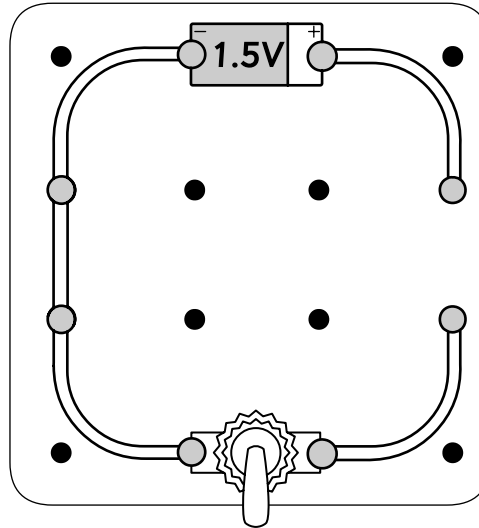
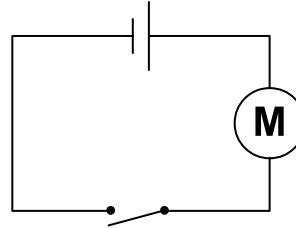
Look at the symbols and complete the circuits by drawing the missing parts.



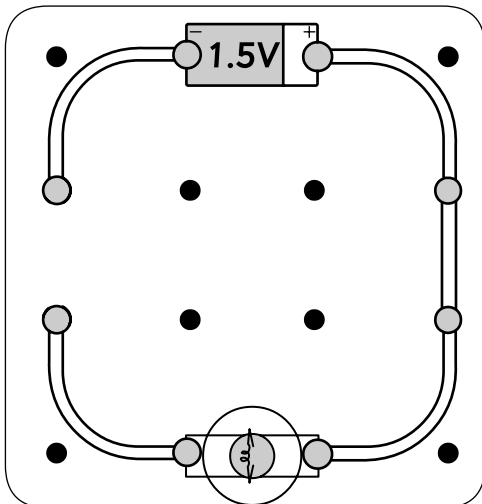
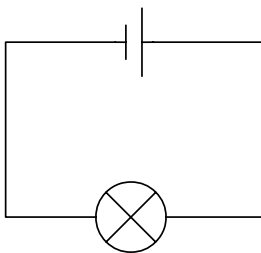
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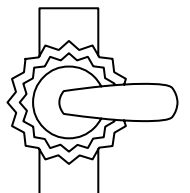
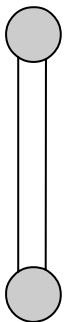
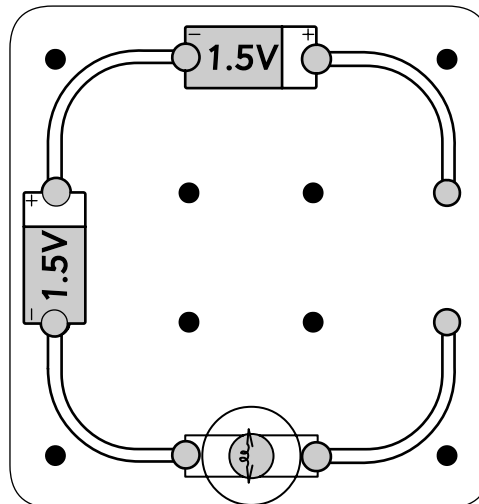
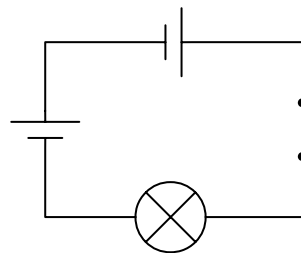
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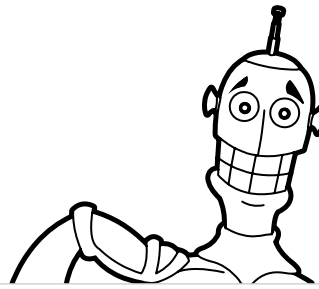
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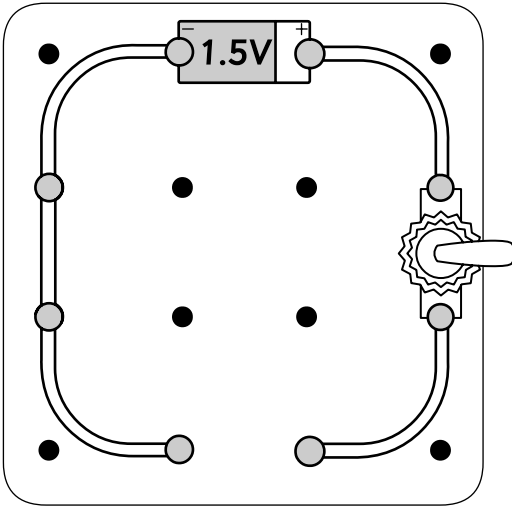
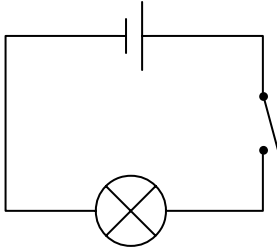


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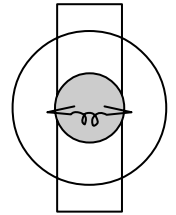
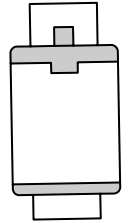
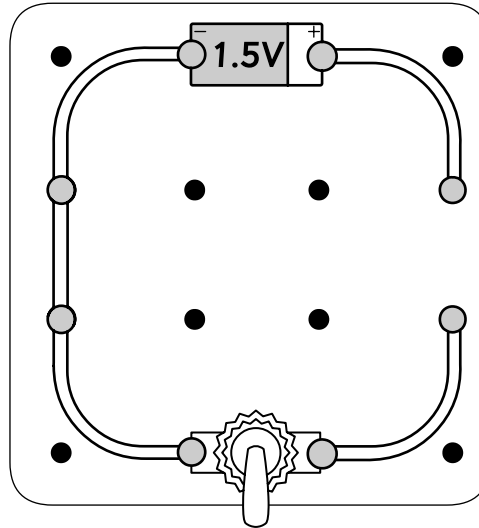
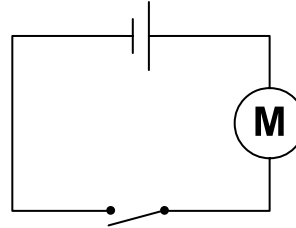
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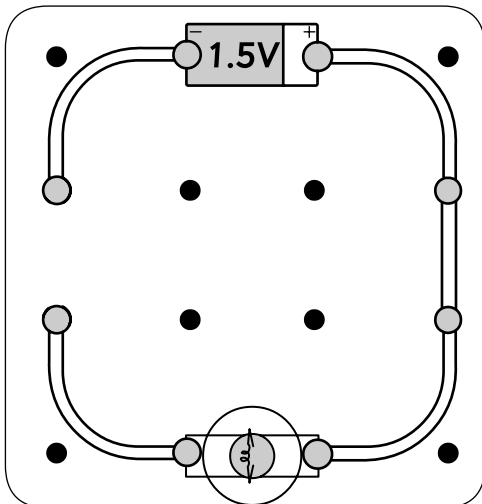
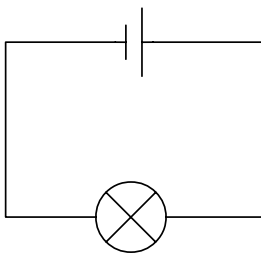
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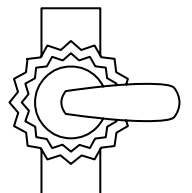
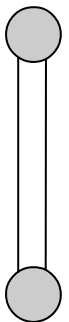
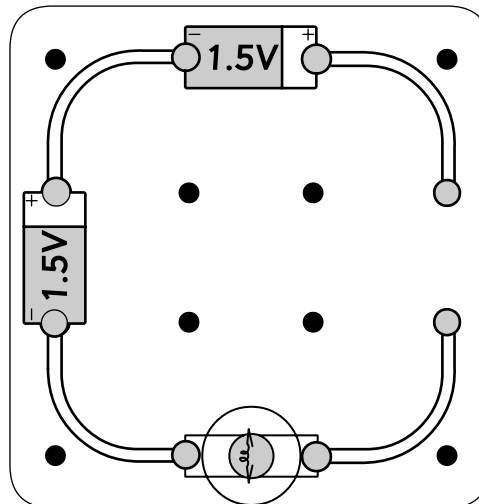
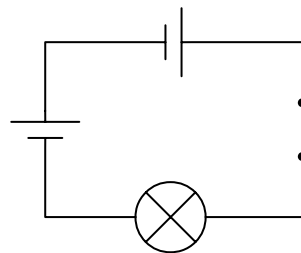
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4





Aim

Prediction

Apparatus

Method



Results and Observations

Conclusions

About EducationCity

EducationCity produces fun, educational materials to engage students in learning and empower teachers to tailor their teaching. [Take a look at how EducationCity can support you in the classroom:](#)



Target Lesson Objectives Easily

Find relevant content that links to your curriculum by using our Curriculum Map or Search tool.

Comprehensive and clearly organised by strand, content is so easy to access!



Plan in Advance

When planning your lessons, choose your Activities in advance and put them into a MyCity so they're easy for students to access. Choose a meaningful name for each MyCity and you'll be able to update and retrieve them year after year!



Differentiated Teaching

Monitor progress with SuccessTracker and you'll be able to identify the strengths and areas of development for each of your students and so choose relevant activities to help them progress.



Flexible Learning

EducationCity is accessible via desktops, laptops, tablets and whiteboards, so can support you whatever equipment is available in your classroom.



Lesson Plans

Access our ready-made Lesson Plans, topical content and Teacher Resource Pack to support teaching and learning in the classroom.

There's more to EducationCity than Activities alone!



Blog

Keep abreast of events in the teaching arena, changes to the resource, and see how EducationCity is supporting the education community.



“Teachers have been delighted with the content of this package and most impressed with how easy it is to find appropriate learning and teaching resources and then to use them in a variety of ways.”

Mark Sanderson,

Senior ICT Consultant, Herefordshire Learning and Achievement Service

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