

## Grade 8 Natural Science Worksheet

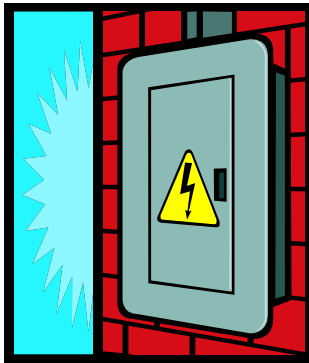
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### Physical Sciences - electricity, energy

#### Cells and batteries

What you will need for this assessment:

- ⊗ each learner, or group of about three learners, will need a torch and the cells that power the torch.
- ⊗ some electrical wire (“flex”)
- ⊗ electrical tape



When you switch on an electric light in your home, or use an electric stove, or any electrical appliance, you draw on current electricity that is supplied to your home from a power source.

#### **Part One: How much do you know about power sources?**

Talk about the electrical power source to your home with a partner and record your ideas. Use the questions below to help you structure your discussion.

1. Where is the electricity that you use in your homes generated?
2. How does the electricity get to your homes?
3. Is all the electrical power that you use generated in this way? Explain.

From your discussion and the feedback to your discussion, you should realise that electrical power can be generated by very useful and portable “generators” that you can buy everyday in the shop! You call them batteries!

#### **Part Two: Practically examine the torch**

For this task, you need to practically examine the torch as well as use what you have learned about cells and batteries, in order to answer the questions.

Examine your torch carefully. Take it apart and observe the different parts. The “batteries” that make your torch work properly, are more correctly called cells.

Put the torch back together again, so that it works properly.

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1. Is there only one way, or are there many ways, that the cells can be put together for the torch to work?  
[1]
2. How many cells does your torch have? Do all torches have the same number and kinds of cells?  
[3]
3. Why do you think we call these cells “batteries”? What is a battery?  
[2]
4. Are all cells and batteries the same size? Explain.  
[3]
5. How does a cell or battery work to produce electricity? Does it work in the same way as a power station to generate electricity?  
[3]

### Part 3: Make a drawing of your experiment

- Take apart the torch again in order to use the light bulb and the cell in this practical assessment activity.
- You will also need the piece of flex and the electrical tape.

From your examination of the torch, use the bulb, the cell, the electrical wire or flex and the electrical tape to produce a working electrical circuit that causes the bulb to glow.

Once you have produced the circuit, make a drawing of what you produced. Next to the drawing of your torch bulb circuit, draw a scientific representation of the electrical circuit using the correct symbols.

Your teacher will assess your electrical circuit and drawing according to the rubric.

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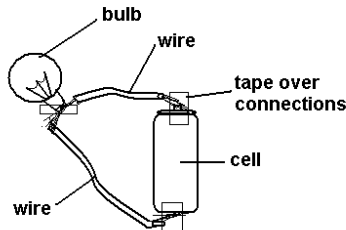
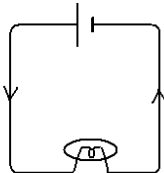
### Rubric to assess electrical circuit and drawing

Elementary	Adequate	Substantial	Outstanding
The learner has not constructed a working circuit, although there is elementary evidence that he/she tried.	The circuit works most of the time; the task has been tackled with a sense of understanding and the learner is able to communicate this understanding, the task took a long time to be completed.	A substantial level of understanding of the concept of a circuit; the circuit works and the task has been completed in a fair amount of time with little assistance.	The learner has achieved an outstanding grasp of the task. Excellent skills and application. The circuit works and the task was completed quickly with no assistance.
1 - 3	4 - 5	6 - 7	8 - 10
The drawing does not reflect the actual circuit; it is incorrect in most aspects; it is poorly labelled.	The drawing largely reflects the circuit; attempts to label correctly.	The drawing correctly reflects the circuit; good attempt to label correctly.	The drawing correctly reflects the circuit; correct labelling and neat scientific drawing.
1 - 3	4 - 5	6 - 7	8 - 10

[20 marks]

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### Suggested Solutions

Question number	Possible marks	Solution
<b>Part 1</b>	No mark allocation – baseline assessment	Electricity is generated in power stations. Power stations are the source of electricity. Coal powered power stations are the ones the learners are probably the most familiar with.
<b>1</b>		Electricity is generated at power stations and then it flows along conductors – or power lines – to where it is needed in homes, industries, shops and businesses.
<b>2</b>		No. Electricity can also be generated by cells and batteries or small home/business generators.
<b>3</b>	1	There is only one way that the cells can be placed in order for current electricity to flow and the torch to “work”.
<b>Part 2</b>	1	1 mark for number of cells in their torch. 1 mark for recognising that different torches use different numbers of cells. 1 mark for recognising that some torches use different types of cells.
<b>1</b>	3	1 mark - “Battery” is an everyday word for the scientific word “cell”. A cell is a source of electricity. 1 mark - If two or more cells are connected to each other, this is called a “battery”. A car battery has many cells joined together.
<b>2</b>	2	1 mark – not all cells/batteries are the same size. 1 mark – cells/batteries have their power generation ability written on the battery in units of volts. 1 mark – different appliances need more power than others in order to work, so different sized cells/batteries are needed.
<b>3</b>	3	1 mark - Power stations generate electricity by burning coal and producing steam to turn turbines. 2 marks - Cells rely on chemicals inside them which react together to produce current electricity.
<b>4</b>	3	1 mark - Power stations generate electricity by burning coal and producing steam to turn turbines. 2 marks - Cells rely on chemicals inside them which react together to produce current electricity.
<b>Part 3</b>	See Rubric below.	Use the rubric to assess these two items – the actual construction of the electrical circuit and the drawing thereof.    <p><u>Circuit diagram of the torch bulb and single cell electrical circuit</u></p>

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