

## Grade 9 Natural Sciences Worksheet

### Current electricity investigation 2

#### Investigative question

Does the light bulbs in a series circuit shine with the same intensity?

#### Aim

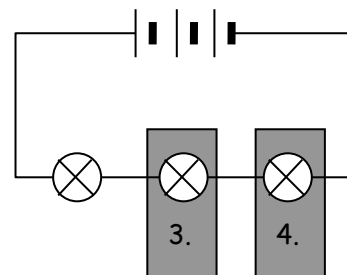
To investigate the strength of electric current in a series circuit.

#### Apparatus

Circuit board, components and 3 torch cells.

#### Method

1. Set up a circuit containing three cells and one light bulb connected in series.
2. Observe the brightness of the light bulb.
3. Add a second light bulb and observe the brightness of both light bulbs.
4. Add a third light bulb and observe the brightness of all three light bulbs.
5. Complete the table below.



#### Results

Number of light bulbs in series	Brightness of light bulbs (brightest, bright, least bright)	Resistance (low, medium, high)
One		
Two	bright	medium
Three		

[4]

#### Discussion

Select the most appropriate word or term to make each statement correct. [8]

1. When more than one light bulb is connected in series in a circuit the bulbs (are equally bright/differ in brightness).
2. Light bulbs are (conductors/resistors).
3. Adding light bulbs in series (increases/decreases) the resistance in the circuit.
4. As more light bulbs are added in series, the brightness of the light bulbs (increases/ stays the same/decreases).

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### Conclusion

1. Adding more resistors in series (increases/decreases) current strength.

[2]

### Rubric for practical investigation

Category	Levels of Achievement			
	4	3	2	1
<b>Handling apparatus</b>	Learner can manipulate apparatus and helps others in the group/sets up apparatus entirely unassisted. [6 – 5 marks]	Learner is confident and can set up the circuit with minimal assistance. [4 – 3 marks]	Learner is unsure of what to do but attempts to set up the circuit with prompting. [2 marks]	Clumsy, not confident, little basic understanding of circuits. [1 mark]

[Total: 20 marks]

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### Suggested Solutions

Question number	Possible marks	Solution		
<b>Results</b>	4	<b>Number of light bulbs in series</b>	<b>Brightness of light bulbs (brightest, bright, least bright)</b>	<b>Resistance (low, medium, high)</b>
		One	brightest	low
		Two	bright	medium
		Three	least bright	high
<b>1 – 4</b>	8 – 2 marks each	1. When more than one light bulb is connected in series in a circuit the bulbs are equally bright. 2. Light bulbs are resistors. 3. Adding light bulbs in series increases the resistance in the circuit. 4. As more light bulbs are added in series, the brightness of the light bulbs decreases.		
<b>Conclusion</b>	2	Adding more resistors in series decreases current strength.		
<b>Practical work</b>	6	See rubric in Appendix of Assessment Tools.		

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