

Grade 9 Natural Sciences Worksheet

How charges flow through a circuit

Investigative question

When charges flow through a circuit, do all the charges flow through every part of the circuit?

Aim

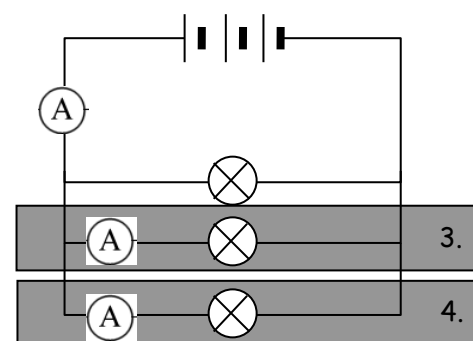
To measure the strength of electric current in a parallel circuit using an ammeter.

Apparatus

Circuit board and components, 3 torch cells, three ammeters.

Method

1. Set up a circuit containing three cells, one light bulb and an ammeter in series.
2. Take down the reading on the ammeter.
3. Add a second light bulb in parallel with a second ammeter and take down the reading on both ammeters.
4. Add a third light bulb in a parallel with a third ammeter and take down readings of all three ammeters.
5. Complete the table below.



Results

Number of light bulbs in parallel	Main Circuit Ammeter reading (A)	Parallel Branch 1 Ammeter reading (A)	Parallel Branch 2 Ammeter reading (A)
One			
Two			
Three			

[3]

Discussion

Select the most appropriate word or term to make each statement correct:

1. When more than one light bulb is connected in parallel in a circuit the bulbs (are equally bright/differ in brightness).
2. Adding light bulbs in parallel (increases/decreases) the resistance in the circuit.

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3. As more light bulbs are added in parallel, the ammeter reading in the main circuit (increases/stays the same/decreases).
4. As more light bulbs are added in parallel, the ammeter reading in the main circuit (increases/stays the same/decreases).
5. The ammeter reading in the branch is (greater than/the same as/less than) the ammeter reading in the main circuit.

[10]

Conclusion

1. Adding more resistors in parallel (increases/decreases) current strength.
2. The ammeter readings indicate that the current in the main circuit (divides into the branches/is the same as the current in the branches).

[4]

Rubric to assess practical work

Category	Levels of Achievement			
	4	3	2	1
Handling apparatus	Learner can manipulate apparatus and helps others in the group/sets up apparatus entirely unassisted. [8 marks]	Learner is confident and can set up the circuit with minimal assistance. [6 marks]	Learner is unsure of what to do but attempts to set up the circuit with prompting. [4 marks]	Clumsy, not confident, little basic understanding of circuits. [2 marks]

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Suggested Solutions

Question number	Possible marks	Solution				
Results	3		Number of light bulbs in parallel	Main Circuit Ammeter reading (A)	Parallel Branch 1 Ammeter reading (A)	Parallel Branch 2 Ammeter reading (A)
			One	Increases as more light bulbs are added in parallels.	Reading is less than in main circuit.	Reading is less than in main circuit.
			Two			
			Three			
Discussion	10	<ol style="list-style-type: none"> When more than one light bulb is connected in parallel in a circuit the bulbs are equally bright. Adding light bulbs in parallel decreases the resistance in the circuit. As more light bulbs are added in parallel, the ammeter reading in the main circuit increases. As more light bulbs are added in parallel, the ammeter reading in each branch increases. The ammeter reading in the branch is less than the ammeter reading in the main circuit. 				
Conclusion	4	Adding more resistors in parallel increases current strength. The ammeter readings indicate that the current in the main circuit divides into the branches.				
Practical work	8	See rubric below.				

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