

Grade 9 Natural Sciences Worksheet

Adding cells in parallel in a circuit

Investigative question

If we add cells in parallel in a circuit, how will the current strength and potential difference be affected?

Aim

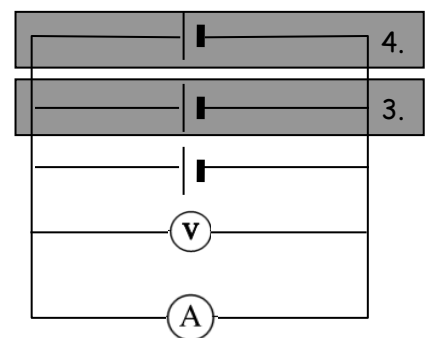
To investigate current strength and potential difference when cells are added in parallel.

Apparatus

Circuit board and components, 3 torch cells.

Method

1. Set up a circuit containing one cell and an ammeter in series. Connect a voltmeter in parallel to the cell.
2. Record the readings on the ammeter and voltmeter.
3. Add a second cell in parallel and record the readings.
4. Add a third cell in parallel and record the readings.
5. Complete the table below.



Results

| Number of cells in parallel | Ammeter reading (A) | Voltmeter reading (V) |
|-----------------------------|---------------------|-----------------------|
| One | | |
| Two | | |
| Three | | |

[4]

Discussion

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

1. As more cells are added in parallel, the ammeter reading (increases/stays the same/ decreases).

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2. As more cells are added in parallel, the voltmeter reading (increases/stays the same/ decreases).

[4]

Conclusion

1. Adding cells in parallel (increases/does not affect/decreases) the current strength in the circuit.
2. Adding cells in parallel (increases/does not affect/decreases) the potential difference in the circuit.

[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 | 4 | Number of cells in parallel | Ammeter reading (A) | Voltmeter reading (V) | |
| | | One | Stays the same | Stays the same | |
| | | Two | | | |
| | | Three | | | |
| Discussion | 4 | 1. As more cells are added in parallel, the ammeter reading stays the same. 2. As more cells are added in parallel, the voltmeter reading stays the same. | | | |
| Conclusion | 4 | 1. Adding cells in parallel does not affect the current strength in the circuit. 2. Adding cells in parallel does not affect the potential difference in the circuit. | | | |
| Practical work | 8 | See rubric in Appendix of Assessment Tools. | | | |

Rubric to assess practical work

| Category | Levels of Achievement | | | |
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