calculate the resistance of the resistor. To improve accuracy, repeat the above method for the remaining batteries and average your values of resistance.

Other Assessment Opportunities

- BLM 3-27, Chapter 8 Quiz
- Assessment Checklist 1, Making Observations and Inferences
- Assessment Checklist 4, Laboratory Report
- Assessment Checklist 7, Scientific Drawing
- Assessment Checklist 17, Science Math Connect
- Assessment Checklist 18, Data Table
- Assessment Checklist 19, Graph from Data
- Process Skills Rubric 3, Controlling Variables
- Process Skills Rubric 5, Fair Testing
- Process Skills Rubric 8, Interpreting Data
- Process Skills Rubric 10, Measuring and Reporting
- Assessment Rubric 4, Scientific Drawing Rubric
- Assessment Rubric 5, Conduct an Investigation Rubric
- Assessment Rubric 12, Using Tools, Equipment, and Materials Rubric

CHAPTER 8 ASSESSMENT, p. 302-303

PREPARE YOUR OWN SUMMARY

Student summaries should incorporate the following main ideas:

1. Electrical Energy
   - When electrons are separated from the positive nucleus, they gain electric potential energy.
   - Electrochemical cells or batteries are common sources of electrical energy.
   - The amount of electrical energy depends on the amount of charge separated and the voltage.
   - Electrical energy can be created by many other forms of energy.
   - Any device that converts electrical energy to other forms is called a load.
2. Current
   - Electric current is defined as the amount of charge that passes a given point per second.
   - Electric current is measured in the ampere (a).
   - An ammeter is a device used to measure electric current.
   - Conventional current is defined as a flow of positive charge. Conventional current would leave the positive terminal and return to the negative terminal. Electric current refers to electron flow, which would leave the negative terminal and return to the positive terminal.
3. Voltage
   - Voltage is a common name for electric potential difference.
   - Voltage is measured in volts (V).
   - A voltmeter is used to measure voltage.
   - A chemical cell uses two dissimilar metals and an electrolyte to separate charge and produce voltage.
4. Resistance and Ohm's Law
   - Resistance slows down the flow of electrons and transforms electrical energy to other forms.
   - Resistance is measured in ohms (Ω).
   - Resistors are electrical components used in circuits to decrease current and transform electrical energy into other forms.
   - To measure the resistance of a resistor, a current must travel through the resistor and the voltage across the resistor is measured. The resistance of this resistor can be calculated using Ohm's law.
   - Ohm's law states that the relationship of voltage, current, and resistance is given by $V = IR$.
   - Manufacturers display the value of the resistance of a resistor by using a colour code.
5. Circuits
   - A complete pathway that allows electrons to flow is called a circuit.
   - Circuit diagrams are drawn to represent electric circuits.
   - In a complete circuit, the total electrical energy supplied by the source must be changed to other forms of energy by the loads in that circuit.

CHAPTER REVIEW ANSWERS

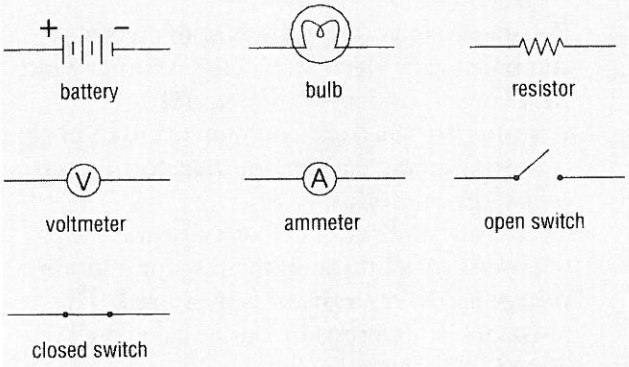
Checking Concepts

1. The battery is the source of electric potential energy in a circuit.
2. In a battery, chemical energy is transformed into electric potential energy.
3. The amount of electric potential energy is dependent on both the amount of charge separated and the voltage.
4. Two dissimilar metals and an electrolyte are needed to produce an electrochemical cell.
5. Five methods of producing electrical energy are: friction, piezoelectric crystals, photoelectrochemical cells, thermocouples, and generators. Other answers may be acceptable.
6. Voltage is measured in volts.
7. A voltmeter is used to measure voltage.
8. An ammeter is used to measure current.

9.

	Symbol	Unit	Unit Symbol
Voltage	V	volts	V
Current	I	amperes	A
Resistance	R	ohms	Ω

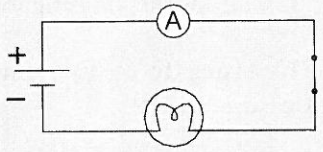
10.



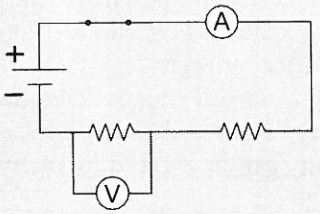
11. 1000 mA = 1 A
12. Conventional current is the flow of positive charge and therefore flows from positive to negative. Electron flow is the flow of negative charge and therefore flows from negative to positive.
13. The four basic components of an electric circuit are: source, conductor, load, and switch.
14. Resistance is the property of any material that slows down electrons and converts electrical energy into other forms. A resistor is an electrical component that has resistance.
15. Voltage equals the product of current and resistance.
16. When an electron passes through a resistor, its electrical energy is transformed into other forms of energy.
17. An ohmmeter is a device used to measure resistance.
18. The four coloured bands on a resistor represent: first digit, second digit, multiplier, and accuracy.

Understanding Key Ideas

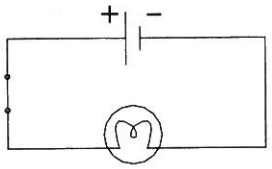
19. Skiers at the top of a hill have gained potential energy. This potential energy can now change into other forms as they ski down the mountain. Electrons on the negative terminal of the battery also have potential energy and can transform this energy into other forms of energy as they pass through the circuit.
20. The reading on the voltmeter would now be zero. This is because both leads are at the same potential; therefore there is no potential difference (voltage).
21. Electric potential energy is due to both the voltage and the amount of charge separated. Even though the two batteries have the same voltage, one of the batteries could be able to separate more charge and therefore provide a greater energy.
22. Static electricity is charge that does not move. Current electricity describes charge that is able to move.
23. A complete path means the circuit is not "broken." Any electron leaving the negative terminal of the battery has a pathway to return to the positive side of the battery.
24. All the electrons "push" each other at the same time. This is due to the action-at-a-distance force between electrons.
25.



26. (a) 0.4 A
    (b) 18 000 Ω
    (d) 12 000 000 V
27. 240 V
28. 160 Ω
29. 4.0 Ω
30. 10 000 Ω
31.



Pause and Reflect Answer



It does not matter where the switch is located. When you open the switch, electrons throughout the circuit will stop moving.