Name Date

Section 8.1 Summary

Electric Potential Energy and Voltage

Textbook pages 270–279

Before You Read

Static electricity involves charges that build up and stay in the same place on an object. How could you store the charges to use later? Write down your ideas on the lines below.

_____

_____

Mark the Text

Identify Definitions

As you read this section, highlight the definition of each word that appears in bold type.

Reading Check

1. What is electric potential energy?

_____

_____

_____

What is a battery?

Energy is the ability to do work—to make things move or change. A **battery** is a device that stores the energy in electric charges so that it can be used at some later time to do work. In other words, a battery is a source of **electric potential energy**—stored energy that has the potential to make something move or change.

Batteries convert chemical energy to electrical energy. For example, batteries that power a flashlight or a cordless mouse convert chemical energy to electrical energy. Batteries that convert chemical energy to electrical energy are called **electrochemical cells**, and may be wet cells or dry cells (see illustration).

How does a battery provide energy?

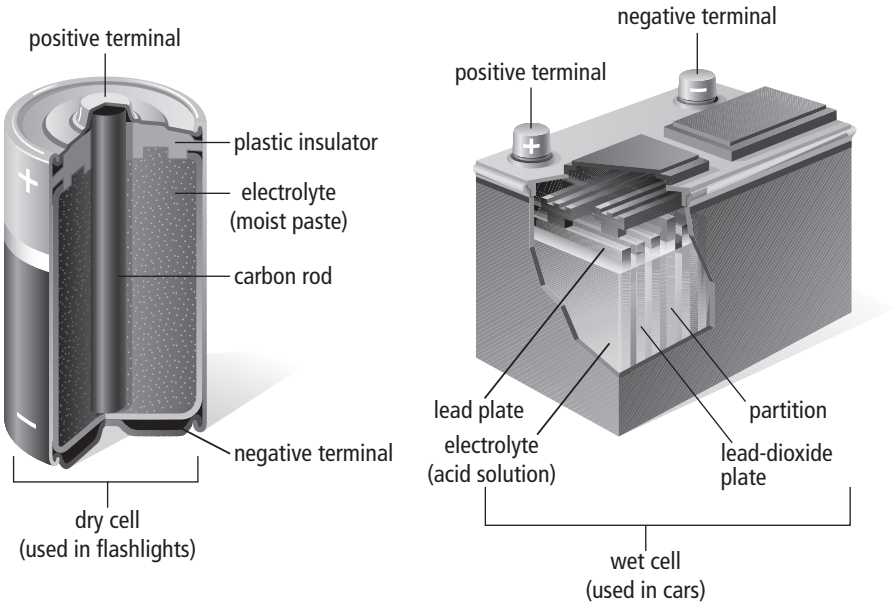
A battery provides energy to push negative charges through conductors that are connected together. Energy to push electrons is available if positive and negative charges are separated. In a flashlight battery, for example, energy from chemical reactions does the work of separating the charges.

A flashlight battery has two terminals called **electrodes** in a moist paste called an **electrolyte** that conducts electricity. Electrons build up at one terminal, making it negatively charged. At the same time, electrons withdraw from the other terminal, leaving it positively charged. Once the charges are separated, the charges have the ability to do work on something else, such as making a bulb light up.

What is voltage?

Scientists use the term **potential difference** to talk about the difference in potential energy per coulomb of charge between two points of an electric circuit. Potential difference is another name for **voltage**. The standard unit for voltage is the **volt** (V). The label 1.5 V on a battery means that it has a potential difference of 1.5 V. Voltage can be measured by a **voltmeter**.

Voltage is what causes charges to move. Think of a waterfall. The water in a waterfall naturally flows from a higher point to a lower point. In a similar way, charges naturally move from a higher level of energy to a lower level of energy. The difference in potential energy between one point in a circuit and another—the voltage—makes charges move in a circuit.



Two types of batteries

Reading Check

2. What is another name for voltage?

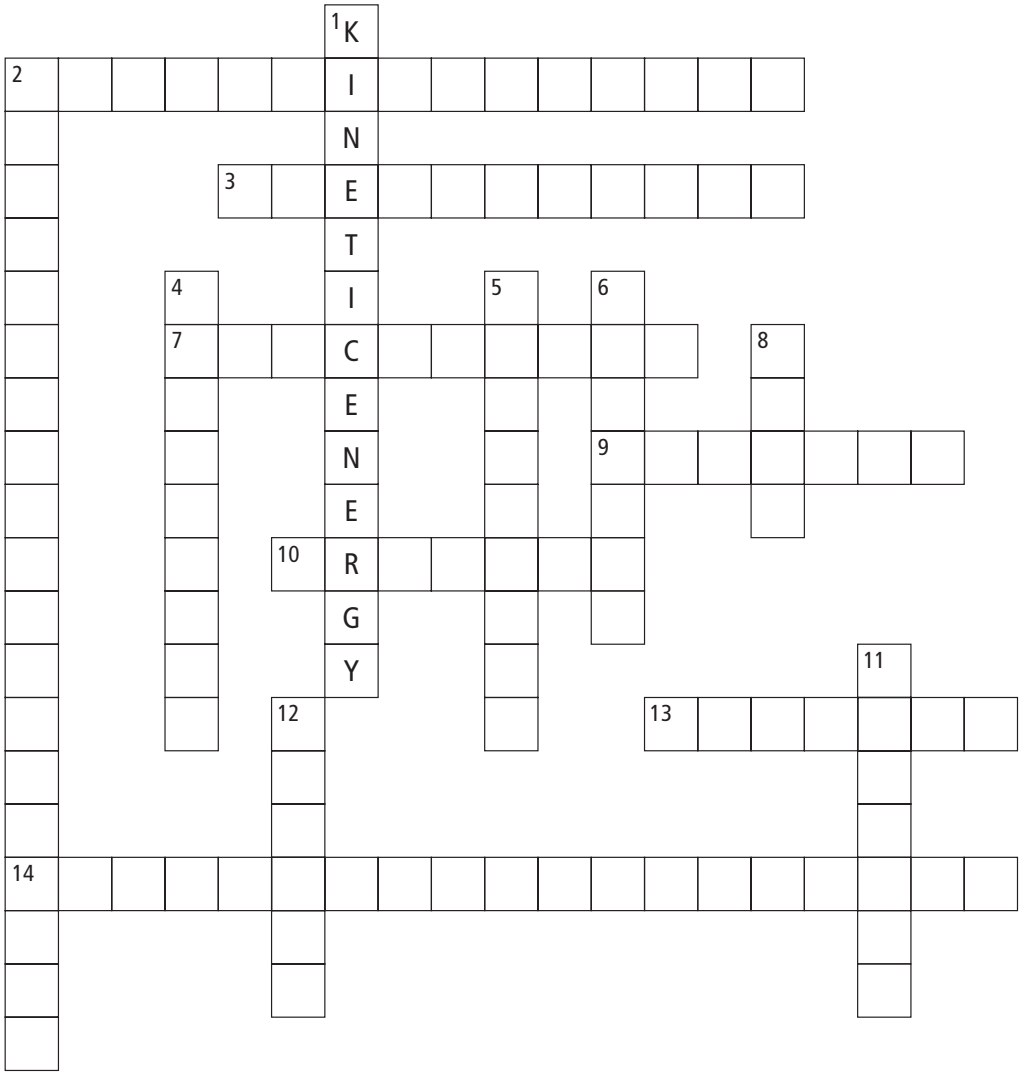
Name Date

Vocabulary Puzzle

Section 8.1

Use with textbook pages 270–275.

Electricity crossword puzzle



Across	Down
2. stored energy 3. electrodes are placed in a substance that conducts electricity 7. two terminals in a battery 9. unit for charge 10. battery in flashlights 13. amount of electric potential energy per one coulomb of charge 14. converts chemical energy into electrical energy	1. energy a moving object has 2. another name for voltage 4. positive and negative end points of a battery 5. device used to measure voltage 6. battery in cars 8. unit for potential difference 11. converts a form of energy into electrical energy 12. ability to do work

Use with textbook pages 270–275.

Electric potential energy

Vocabulary	
battery	positively
chemical	potential difference
electrical	potential energy
electrochemical cell	removed
electrodes	separated
electrolyte	terminals
energy	volt
negatively	voltage

Use the terms in the vocabulary box to fill in the blanks. You may use terms more than once. You will not need to use every term.

1. The ability to do work is called _____.

2. A device that stores the energy in electric charges so that it can be used at some later time to do work is called a(n) _____ or _____.

3. Energy that is stored in a battery is called electric _____.

4. A battery that powers a flashlight converts _____ energy to _____ energy.

5. Energy to push electrons is available if positive and negative charges are _____.

6. In a flashlight battery, energy from _____ reactions does the work of separating the charges.

7. A flashlight battery has two terminals called _____ in a moist paste called a(n) _____.

8. Electrons build up at one terminal, making it _____ charged. At the same time, electrons withdraw from the other terminal, leaving it _____ charged.

9. _____ , or voltage, is the difference in energy per coulomb of charge between one point in a circuit and another point in a circuit.

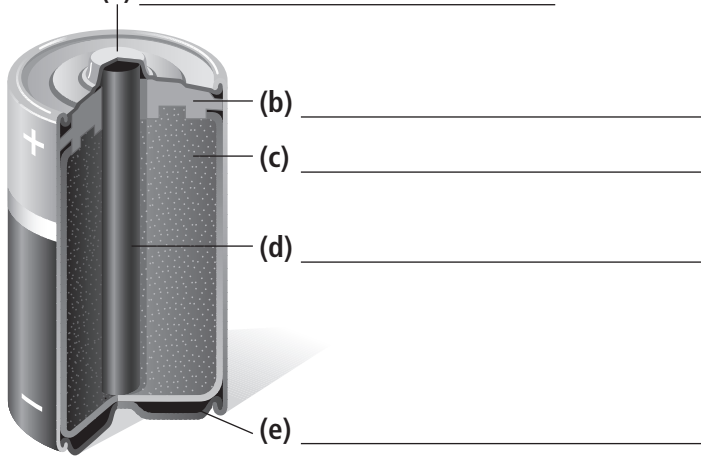
Use with textbook pages 270–275.

Electrochemical cells

Use the following terms to label the two diagrams. You can use terms more than once. Some parts have been labelled for you.

Terms	
carbon rod	negative terminal
electrolyte	plastic insulator
lead plate	positive terminal

1.



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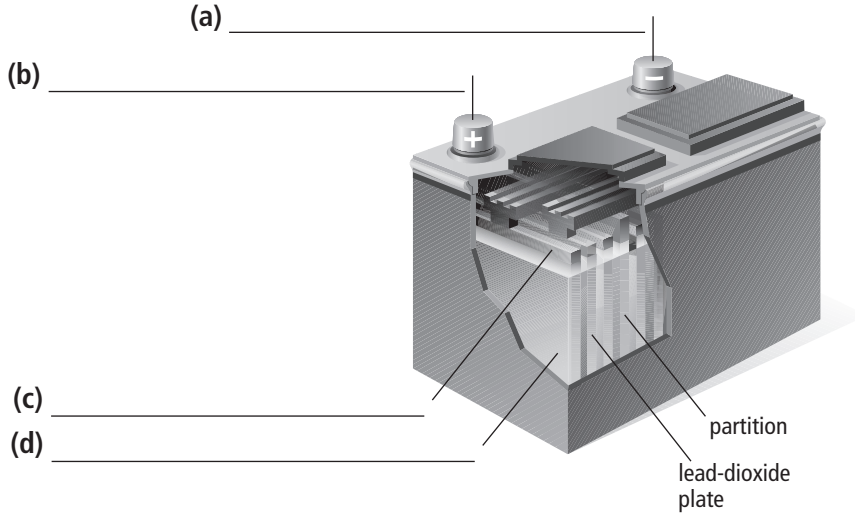

Use with textbook pages 270–275.

Electric potential energy and voltage

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. _____ electrochemical cell	**A.** battery terminal
2. _____ potential energy	**B.** conducts electricity
3. _____ potential difference	**C.** converts chemical energy into electrical energy
4. _____ electrode	**D.** another name for voltage
5. _____ electrolyte	**E.** energy from motion
	F. stored energy

Circle the letter of the best answer.

6. Which of the following could be used to measure the amount of potential difference in a circuit?

A. electrode

B. voltmeter

C. electrolyte

D. electroscope

7. What is the unit for measuring potential difference?

A. volt (V)

B. second (s)

C. metre (m)

D. coulomb (C)

Use the following diagram to answer questions 8 and 9.

8. What is shown in the diagram above?

A. dry cell

B. wet cell

C. voltmeter

D. electroscope

9. Which of the following describes the electrolyte used in the object shown above?

A. a fluid

B. a moist paste

C. an acid solution

D. a copper electrode

10. Which of the following are different names for the same thing?

I.	battery
II.	electrochemical cell
III.	electric potential difference

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III