Name Date

Section 2.1 Summary

Elements

Textbook pages 42–51

Before You Read

An element is a pure substance that cannot be broken down or separated into anything simpler than it already is. Gold and carbon are examples of elements. What other elements can you name?

Make Flash Cards

For each paragraph, think of a question that might be on a test. Write the question on one side of a flash card. Write the answer on the other side. Quiz yourself until you can answer all the questions.

What kinds of elements are there?

Most of the elements are either metals or non-metals.

Metals	Non-metals
Elements that are **metals**, such as gold, typically have the following physical properties: ◆ are hard solids at room temperature (except for mercury, which is a liquid) ◆ shiny ◆ malleable ◆ ductile ◆ good conductors of heat and electricity	Elements that are **non-metals**, such as carbon, typically have the following physical properties: ◆ are gases or brittle solids at room temperature (except for bromine, which is a liquid) ◆ not shiny ◆ not malleable ◆ not ductile ◆ not good conductors of heat and electricity ✔

Reading Check

1. List two ways that a metal is different from a non-metal.

What are chemical symbols?

Each of the elements has a chemical symbol for its name. Some elements have a chemical symbol with just one letter, for example H (hydrogen) and C (carbon).

Other elements have chemical symbols with two letters. The second letter of the chemical symbol sometimes is the next letter in the name of the element, for example Be (beryllium) and Si (silicon). Other times the second letter is from another part of the word, for example Mg (magnesium) and Cl (chlorine).

Sometimes the two letters for an element symbol come from the element's name in another language. For example:

◆ potassium is K (from the Latin *kalium*)

◆ sodium is Na (from Latin *natrium*) ✔

Reading Check

2. How are the letters for a chemical symbol always written?

Some Common Elements		
Name of Element	**Symbol**	**Origin of Element's Symbol**
Gases at room temperature		
hydrogen	H	***H****ydros genes* = water forming
helium	He	***He****lios* = sun
neon	Ne	***Ne****on* = new
nitrogen	N	***N****itron* = saltpetre (an explosive)
oxygen	O	***O****xys genes* = acid forming
fluorine	F	***F****luere* = Latin for flowing
chlorine	Cl	***Ch******l****oros* from *khloros* = pale green
Liquids at room temperature		
bromine	Br	***Br****omos* = smelly
mercury	Hg	***H****ydrar****g****yrum* = Latin for liquid silver
Solids at room temperature		
lithium	Li	***Li****thos* = stone
sodium	Na	***Na****trium* = Latin for sodium
potassium	K	***K****alium* = Latin for potash
rubidium	Rb	***Ru******b****idus* = Latin for red
cesium	Cs	***C****ae****s****ius* = Latin for bluish-grey
beryllium	Be	***Be****ryllos* = emerald
magnesium	Mg	***M****a****g****nesia alba* = a place in Greece
calcium	Ca	***Ca****lx* = Latin for limestone
strontium	Sr	***St******r****ontian* = a village in Scotland
barium	Ba	***Ba****rys* = heavy
titanium	Ti	***Ti****tans* = gods from Greek mythology
chromium	Cr	***Ch******r****oma* = colour
manganese	Mn	***M****ag****n****esia negra* = Latin for black magnesium
iron	Fe	***Fe****rrum* = Latin for iron
cobalt	Co	***Co****bald from kobold* = German for goblin
nickel	Ni	*kupfer* ***Ni****ckel* = German for devil's copper
copper	Cu	***Cu****prum* = Latin for Cyprian
zinc	Zn	***Zi******n****k* = German for zinc
silver	Ag	***A****r****g****entum* = Latin for silver
gold	Au	***Au****rum* = Latin for gold
tin	Sn	***S****ta****n****num* = Latin for tin
lead	Pb	***P****lum****b****um* = Latin for lead
carbon	C	***C****arbo* = Latin for coal
phosphorus	P	***P****hosphoros* = bringer of light
sulphur	S	***S****ulphurium* = Latin for sulphur
iodine	I	***I****odes* = violet

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Extension Activity
Section 2.1

Use with textbook pages 43–44.

Element names

1. Identify the element based on the clues given. The first one is done to help guide you.

	General clue	Element
(a)	policeman	copper
(b)	to press clothes	
(c)	planet closest to the Sun	
(d)	5 cents	
(e)	to be shown the way	

2. What is the English name for each of these Latin names of elements?

(a) *plumbum* _____ **(e)** *natrium* _____

(b) *ferrum* _____ **(f)** *kalium* _____

(c) *argentum* _____ **(g)** *fluere* _____

(d) *carbo* _____ **(h)** *hydrargyrum* _____

3. Which elements' names have the following meanings?

(a) bringer of light _____ **(e)** emerald _____

(b) stone _____ **(f)** heavy _____

(c) violet _____ **(g)** sun _____

(d) colour _____ **(g)** smelly _____

Use with textbook pages 43–44.

Learning chemical symbols

Write the element name in the blank beside its symbol.

1. Symbols that come from the first letter of the element's name

(a) P _____ **(d)** I _____

(b) S _____ **(e)** F _____

(c) O _____ **(f)** N _____

2. Symbols that come from the first two letters of the element's name

(a) He _____ **(c)** Be _____

(b) Li _____ **(d)** Ne _____

3. Symbols that come from the first letter and another letter in the name

(a) Cl _____ **(c)** Zn _____

(b) Mg _____ **(d)** Mn _____

4. Symbols that come from the name of the element in Latin

(a) Pb _____ **(e)** Cu _____

(b) Au _____ **(f)** Fe _____

(c) Ag _____ **(g)** Na _____

(d) Sn _____ **(h)** Rb _____

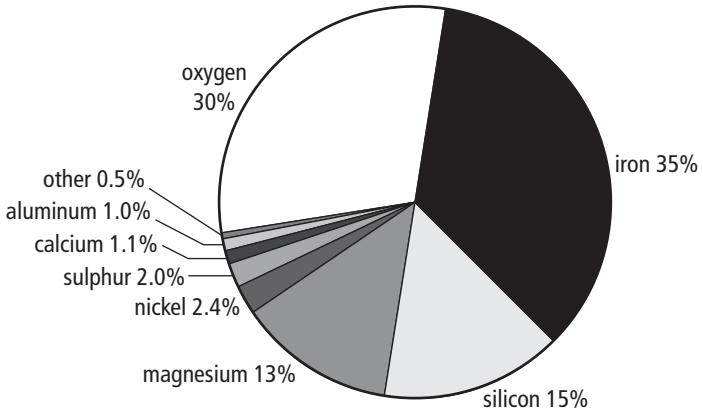
5. Use the chemical symbols to write three English words. An example is provided for you.

English word	Symbols	Names of elements used
none	N-O-Ne	nitrogen-oxygen-neon

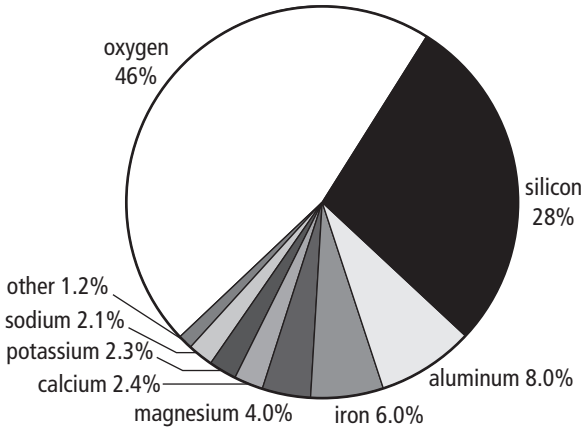
Use with textbook pages 43–44.

Elements in Earth's crust

The following pie charts show the most abundant elements (by mass) in the whole Earth and in Earth's crust (the surface layer of Earth).



Whole Earth



Earth's crust

1. Use the information in the pie charts to help you complete the following table.

	Most common element	Second most common element	Third most common element
in the whole Earth			
in Earth's crust			

2. Aluminum, calcium, nickel, magnesium, iron, sodium, and potassium are all metals.

(a) Approximately what percentage of the whole Earth is made of metals?

_____

(b) Approximately what percentage of Earth's crust is made of metals?

_____

Use with textbook pages 42–47.

Elements

Match the Element on the left with the corresponding Symbol on the right. Each Symbol may be used only once.	
Element	**Symbol**
1. _____ calcium **2.** _____ carbon **3.** _____ chlorine **4.** _____ potassium **5.** _____ phosphorus **6.** _____ sulphur **7.** _____ sodium	**A.** C **B.** Ca **C.** Ch **D.** Cl **E.** K **F.** Na **G.** P **H.** Ph **I.** Po **J.** S **K.** So **L.** Su

Circle the letter of the best answer.

8. Which of the following are rules for writing a chemical symbol?

I.	first letter must be capitalized
II.	symbol is made of either one or two letters
III.	second letter, if present, must be lower case

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

9. What is the chemical symbol for helium?

A. H

B. He

C. Hl

D. Hi

10. Which of the following correctly matches the name of the element with the chemical symbol?

A. magnesium=Mg

B. aluminum=A

C. oxygen=Ox

D. nitrogen=Ni

11. Which of the following is a gas at room temperature?

A. calcium

B. carbon

C. chlorine

D. copper

12. Which of the following metals is a liquid at room temperature?

A. silver

B. sodium

C. mercury

D. manganese

13. Which of the following are physical properties of metals?

I.	ductile
II.	malleable
III.	good conductors of heat and electricity

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III