Matter—Properties and Changes

3 Elements and Compounds

REVIEW VOCABULARY

proportion

NEW VOCABULARY

element

periodic table

compound

law of definite proportions

percent by mass

law of multiple proportions

Recall the definition of the Review Vocabulary term.

proportion

Define each New Vocabulary term.

element

periodic table

compound

law of definite proportions

percent by mass

law of multiple proportions

3 Elements and Compounds (continued)

Discuss elements and compounds by completing the following paragraph.

There are more than _____ naturally occurring elements. Seventy-five percent of the universe is _____. The Earth's crust and the human body are made of different elements. But _____ is an element that is abundant in both. Most objects are made of _____ with approximately ten million known and over _____ being developed and discovered every _____.

Describe how the periodic table organizes elements.

Get It? **Define** *element* and *compound*.

Explain how **Figure 16** illustrates the fact that the properties of a compound are different from the properties of its component elements.

Get It? **Explain** the process of electrolysis.

3 Elements and Compounds (continued)

Get It? **Summarize** how the properties of a compound and the properties of its component elements compare.

Describe how to do percent by mass by completing the following paragraph.

The _____ of a compound is _____ to the _____ of the masses of the _____ that make up the compound. This demonstrates the law of _____.

Get It? **State** the law of definite proportions.

Analyze the law of definite proportions by indicating whether the following examples are for identical or different compounds.

Description	Analysis
Compound 1 consists of 24g of Na, and 36g of Cl. Compound 2 has 36g of Na and 54g of Cl.	
Compound 3 has 10.00g of lead and 1.55g of sulfur. Compound 4 has 10.00 g of lead, 1.55g of sulfur, and 1.55g of carbon.	

3 Elements and Compounds (continued)

Describe the law of multiple proportions by completing the following statement.

When different _____ are formed by combining the same _____, different masses of one element combine with the same _____ of the other element in a ratio of _____.

Get It? **State** the law of multiple proportions in your own words.

Get It? **Explain** why the ratio of the relative masses of copper in both compounds in **Table 4** and **Figure 17** is 2:1.

SYNTHESIZE

Carbon combines with oxygen to form two compounds, carbon monoxide and carbon dioxide. Based on the law of multiple proportions, describe how the proportions of oxygen in the two compounds relate to each other.

CHECK YOUR PROGRESS

20. **Compare** and contrast elements and compounds.

21. **Describe** the basic organizational feature of the periodic table of the elements.

3 Elements and Compounds (continued)

22. **Explain** how the law of definite proportions applies to compounds.

23. **State** the type of compounds that are compared in the law of multiple proportions.

24. **Complete** the table. Then analyze the data to determine if Compounds I and II are the same compound. If the compounds are different, use the law of multiple proportions to show the relationship between them.

Analysis Data of Two Iron Compounds					
Compound	Total Mass (g)	Mass Fe (g)	Mass O (g)	Mass Percent Fe	Mass Percent O
I	75.00	52.46	22.54		
II	56.00	43.53	12.47		

25. **Calculate** the mass percent of each element in water.

26. **Graph** Create a graph that illustrates the law of multiple proportions.