

# LESSON

# 8

# What are compounds?

There are only 26 letters in the alphabet, but you know thousands of words. A good dictionary has hundreds of thousands of words in it. How is this possible?

Words are made up of letters and letters can be put together in many ways. Words can be different lengths. Most words use two or more letters. Some use the same letter more than once. The longest word in the Oxford English Dictionary is FLOCCIPAUCINIHIILIPILIFICATION. How many different letters does this word have? How many of these letters are used more than once?

What if you combined the chemical elements? There are more than 110 known elements. But there are probably many more. In fact, there are millions and millions of substances. And new ones are being discovered every day.

Most of the substances we know are made up of two or more elements. Some common examples are water, salt, carbon dioxide, and baking soda. These substances are possible because atoms of different elements can link up.

A **compound** is a substance made of linked-up atoms. The elements in the compound lose their own properties. The compound takes on new properties. Compounds do not even have to be in the same state as the elements of which they are made. For example, hydrogen and oxygen are both gases. They can link up to make water—a liquid. A compound must have at least one metal element and one nonmetal element.

Atoms link up to form compounds in different ways. Sometimes the atoms share electrons and form a molecule. A **molecule** [MAHL-uh-kyool] is the smallest part of a compound that still has the properties of that compound. A molecule has two or more atoms linked together. Some molecules have thousands of atoms.

Other times atoms lend or borrow electrons. When this happens we say the atoms form something called a **formula unit**. Formula units are like molecules. But they differ in how they were put together.

Most compounds are found in nature. Some compounds are made by scientists.

## SALT

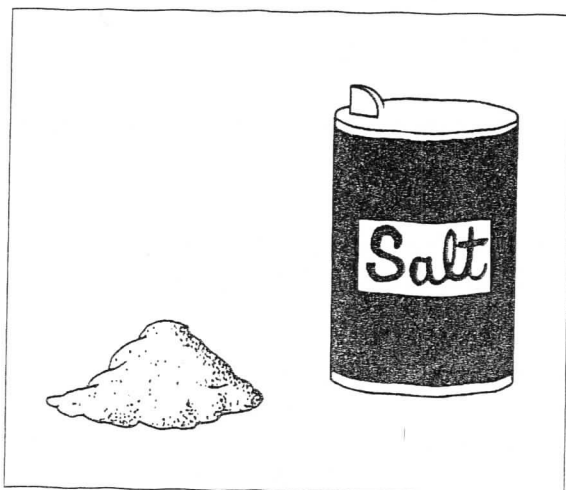


Table salt is a compound. It is made up of the elements sodium and chlorine.

Sodium is a dangerous metal. Chlorine is a poisonous gas.

They can link up to form a compound that our bodies need.

The compound is sodium chloride. We call it salt.

Figure H

## SODIUM CHLORIDE

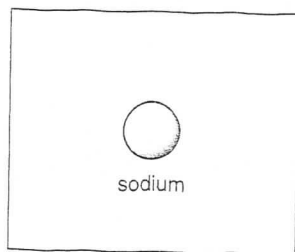


Figure I

SODIUM  
dangerous solid  
element

+

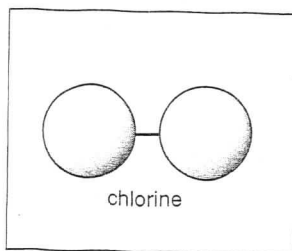


Figure J

CHLORINE  
deadly gas  
element

→

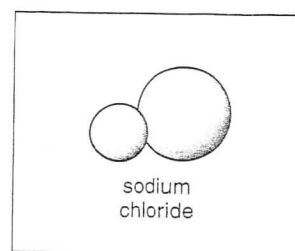


Figure K

SODIUM CHLORIDE  
safe white solid  
compound

## CARBON DIOXIDE

Carbon dioxide is a gas compound. It is made of the elements carbon and oxygen.

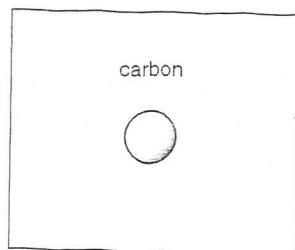


Figure L

CARBON  
dark solid  
element

+

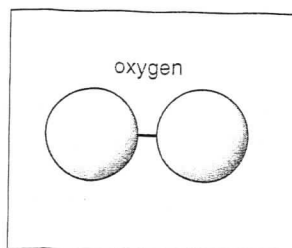


Figure M

OXYGEN  
invisible gas  
element

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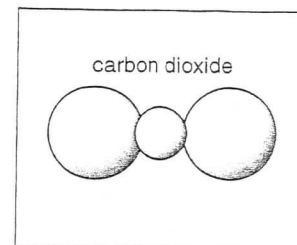


Figure N

CARBON DIOXIDE  
invisible gas  
compound

## FILL IN THE BLANK

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Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

one million	millions	metal	molecule
compounds	110	elements	linked-up
nonmetal	lose	two	formula unit

1. There are more than \_\_\_\_\_ known elements.
2. The number of different known substances is more than \_\_\_\_\_.
3. Elements combine to form \_\_\_\_\_.
4. Elements of a compound \_\_\_\_\_ their properties.
5. A compound has at least \_\_\_\_\_ elements.
6. A compound usually has at least one \_\_\_\_\_ atom and one \_\_\_\_\_ atom.
7. The smallest part of a compound is called a \_\_\_\_\_ or \_\_\_\_\_.
8. In a small amount of a compound there may be \_\_\_\_\_ of molecules.
9. A compound is made of \_\_\_\_\_ atoms.
10. All matter is made up of \_\_\_\_\_ or \_\_\_\_\_.

## MATCHING

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Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

Column A	Column B
_____ 1. atom	a) has one kind of atom
_____ 2. molecule	b) short way of writing an element
_____ 3. symbol	c) smallest part of an element
_____ 4. element	d) two or more elements are linked together
_____ 5. compound	e) smallest part of a compound
_____ 6. water	f) salt
_____ 7. carbon dioxide	g) elements that make up salt
_____ 8. sodium and chlorine	h) links with a nonmetal
_____ 9. metal	i) compound made up of hydrogen and oxygen
_____ 10. sodium chloride	j) compound made up of carbon and oxygen

## TRUE OR FALSE

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*In the space provided, write "true" if the sentence is true. Write "false" if the sentence is false.*

- \_\_\_\_\_ 1. All matter is made of atoms.
- \_\_\_\_\_ 2. An element is matter.
- \_\_\_\_\_ 3. A compound is matter.
- \_\_\_\_\_ 4. All matter is made of elements or compounds.
- \_\_\_\_\_ 5. Elements and compounds are made of atoms.
- \_\_\_\_\_ 6. Compounds link up to make elements.
- \_\_\_\_\_ 7. A compound can have only one element.
- \_\_\_\_\_ 8. The smallest part of a compound is one atom of that compound.
- \_\_\_\_\_ 9. A compound usually has at least one metal atom and one nonmetal atom.
- \_\_\_\_\_ 10. There are more elements than compounds.