

# LESSON | What are compounds and 17 | molecules?

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.

What if you combined the chemical elements? There are only ~~109~~<sup>112</sup> elements, but we know that there are more than ~~109~~ substances. In fact, there are millions and millions of substances. <sup>112</sup>

Most of the substances we know are made up of two or more elements: water, salt, carbon dioxide, 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.

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.

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

# WATER

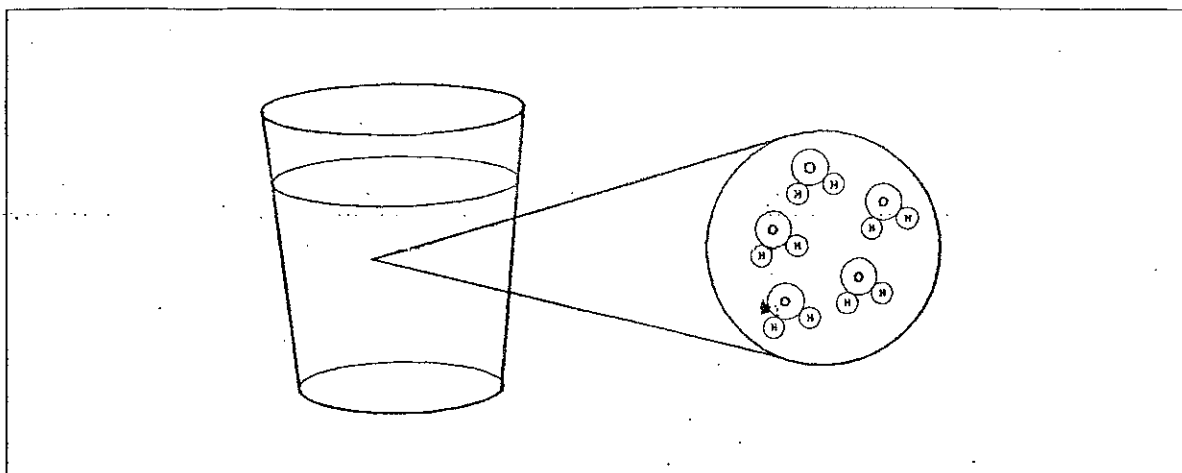


Figure A

Water is a liquid compound. A glass of water has billions and billions of water molecules in it. Each molecule is exactly alike. Each molecule has all of the properties of water. The smallest part of a compound is just one molecule of that compound.

Water is made up of the elements hydrogen and oxygen. Two hydrogen atoms and one oxygen atom combine to make one water molecule.

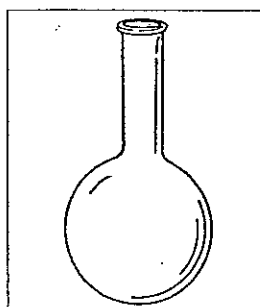


Figure B

**HYDROGEN**  
invisible gas  
element

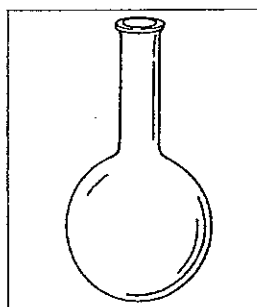


Figure C

**OXYGEN**  
invisible gas  
element

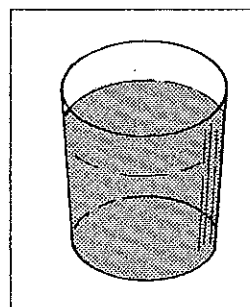


Figure D

**WATER**  
clear liquid  
compound

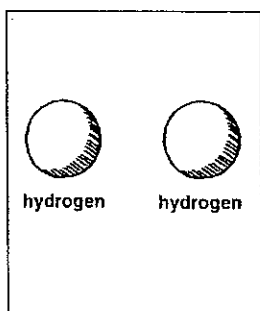


Figure E

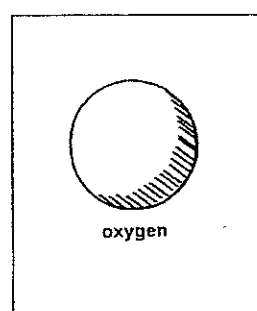


Figure F

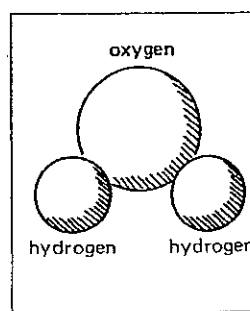


Figure G

# SALT

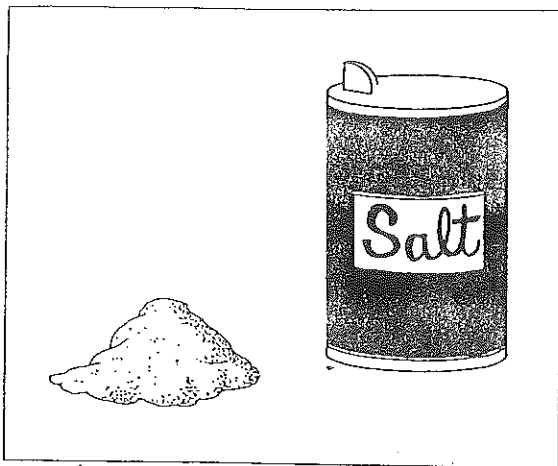


Table salt is a compound. It is made up of the elements sodium and chlorine.

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

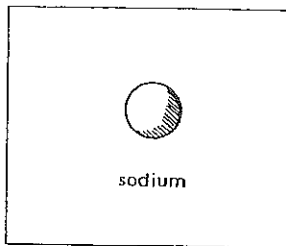


Figure I

SODIUM  
dangerous solid  
element

+

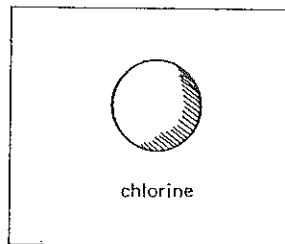


Figure J

CHLORINE  
deadly gas  
element

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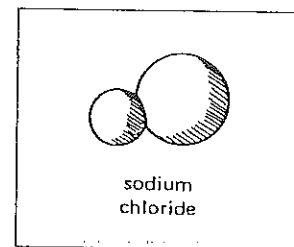


Figure K

SODIUM CHLORIDE  
safe white solid  
compound

# CARBON DIOXIDE

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

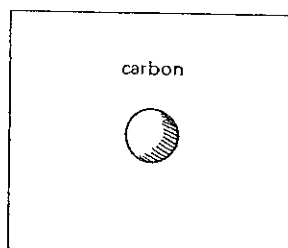


Figure L

CARBON  
dark solid  
element

+

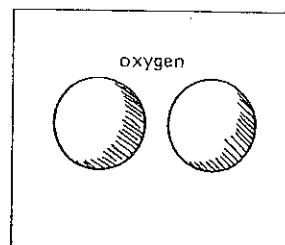


Figure M

OXYGEN  
invisible gas  
element

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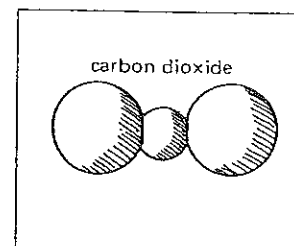


Figure N

CARBON DIOXIDE  
invisible gas  
compound

## FILL IN THE BLANK

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  
compounds  
nonmetal

millions  
~~100~~ 112  
lose

metal  
elements  
two

molecule  
linked-up

1. There are \_\_\_\_\_ known ~~metals~~ **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 a least \_\_\_\_\_ elements.
6. A compound must have at least one \_\_\_\_\_ atom and one \_\_\_\_\_ atom.
7. The smallest part of a compound is called a \_\_\_\_\_.
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

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

### Column A

- \_\_\_\_\_ 1. atom
- \_\_\_\_\_ 2. molecule
- \_\_\_\_\_ 3. symbol
- \_\_\_\_\_ 4. element
- \_\_\_\_\_ 5. compound
- \_\_\_\_\_ 6. water
- \_\_\_\_\_ 7. carbon dioxide
- \_\_\_\_\_ 8. sodium and chlorine
- \_\_\_\_\_ 9. metal
- \_\_\_\_\_ 10. sodium chloride

### Column B

- a) has one kind of atom
- b) short way of writing an element
- c) smallest part of an element
- d) two or more elements are linked together
- e) smallest part of a compound
- f) salt
- g) elements that make up salt
- h) links with a nonmetal
- i) compound made up of hydrogen and oxygen
- 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 must have at least one metal atom and one nonmetal atom.
- \_\_\_\_\_ 10. There are more elements than compounds.

## REACHING OUT

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Why should you always follow instructions carefully when mixing chemicals.

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