

## Section 1: Classifying Matter

### Preview

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- What is Matter?
- Elements
- Elements in the Human Body
- Compounds
- Pure Substances and Mixtures
- Types of Mixtures

### Key Ideas

- › How can matter be classified?
- › Why are carbon and copper classified as elements?
- › How are elements related to compounds?
- › What is the difference between a pure substance and a mixture?

## Bellringer

Chemists and other scientists write the element names so often that they have developed a system of short symbols. Most of the symbols are one or two letters taken from the element's name. Some of the elements have symbols that derive from their Latin names. What is important about knowing the symbols is that scientists from all over the world are able to communicate, no matter what language they speak.

## Bellringer, *continued*

1. Complete the right column of the table below, using the following names: boron, bromine, calcium, magnesium, neon, nitrogen, silicon, sulfur, zinc.

Symbol	Element	Symbol	Element
O	oxygen	Mg	a.
H	hydrogen	Br	b.
Na	sodium	N	c.
K	potassium	S	d.
I	iodine	Ca	e.
C	carbon	B	f.
Cl	chlorine	Zn	g.
Fe	iron	Si	h.
Ag	silver	Ne	i.

## Bellringer, *continued*

2. Today, there are rules for how a newly discovered element is to be named. However, in earlier times, elements were named for people, places, and foreign words, among other things. **Match each element to how it was named. You may also use an element's symbol as a clue. Write the correct letter in the space provided.**

\_\_\_ Berkelium (Bk)

\_\_\_ Curium (Cm)

\_\_\_ Einsteinium (Es)

\_\_\_ Gold (Au)

\_\_\_ Krypton (Kr)

\_\_\_ Iron (Fe)

\_\_\_ Iodine (I)

\_\_\_ Titanium

a. Noble Prize winner who studied relativity

b. Latin name (ferrum)

c. powerful mythological beings

d. home of the university in California where the element was first made

e. Greek word for *violet* (iodes)

f. Nobel Prize winner who studied radioactive elements

g. Greek word for *hidden* (kryptos)

h. Latin name (aurum)

## What is Matter?

- › How can matter be classified?
- › Every sample of matter is either an element, a compound, or a mixture.
- **matter:** anything that has mass and takes up space

### Visual Concept: Matter

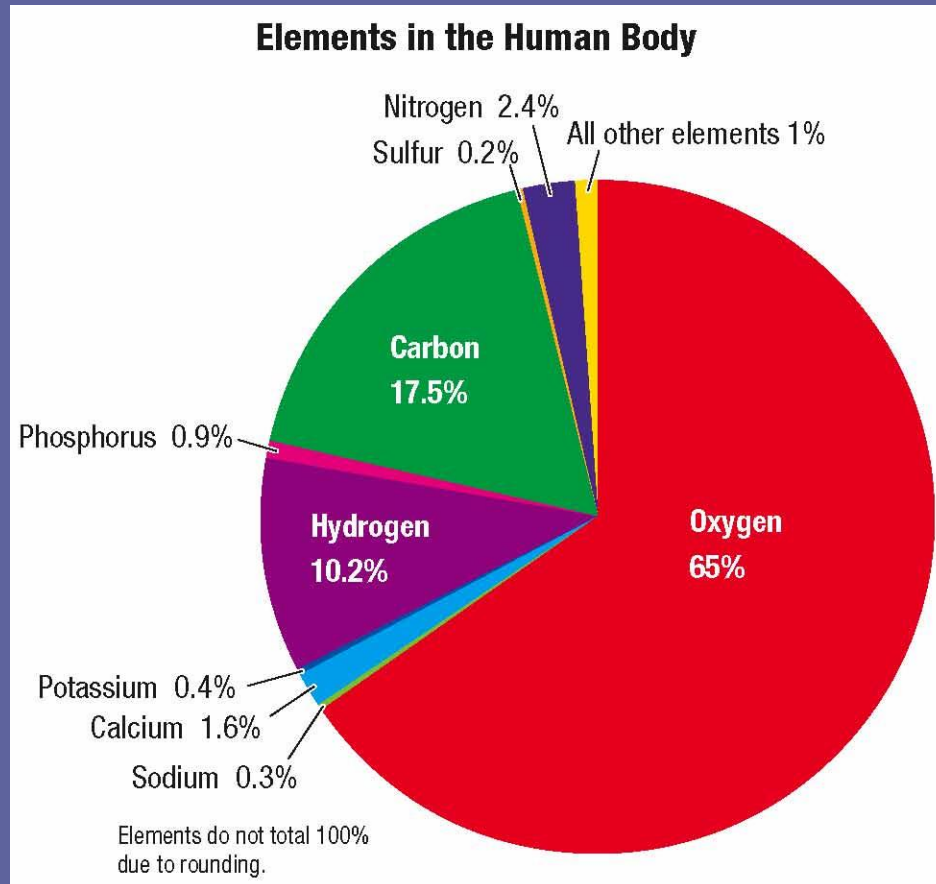


## Elements

- › Why are carbon and copper classified as elements?
- › Each element is made of one kind of atom.
- **element:** a substance that cannot be separated or broken down into simpler substances by chemical means
- **atom:** the smallest unit of an element that maintains the properties of that element



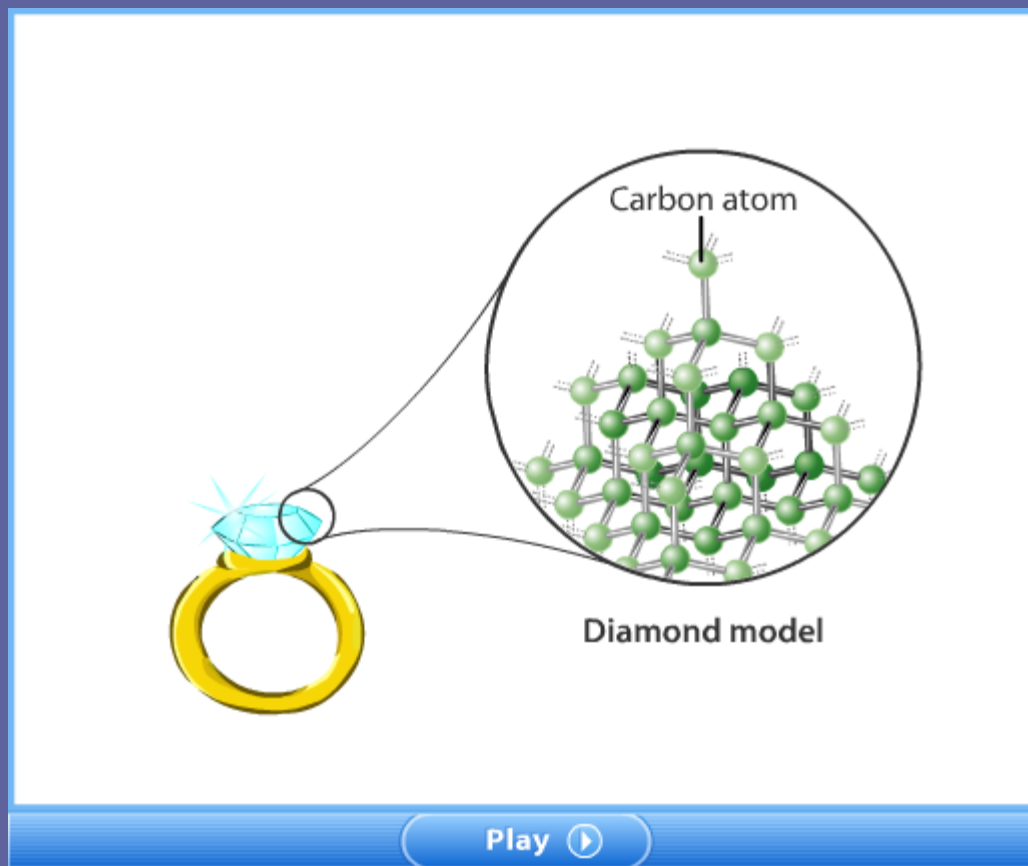
# Elements in the Human Body



## Elements, *continued*

- Elements are represented by symbols.
- Atoms that make up a molecule act as a unit.
- **molecule:** a group of atoms that are held together by chemical forces; a molecule is the smallest unit of matter that can exist by itself and retain all of a substance's chemical properties.

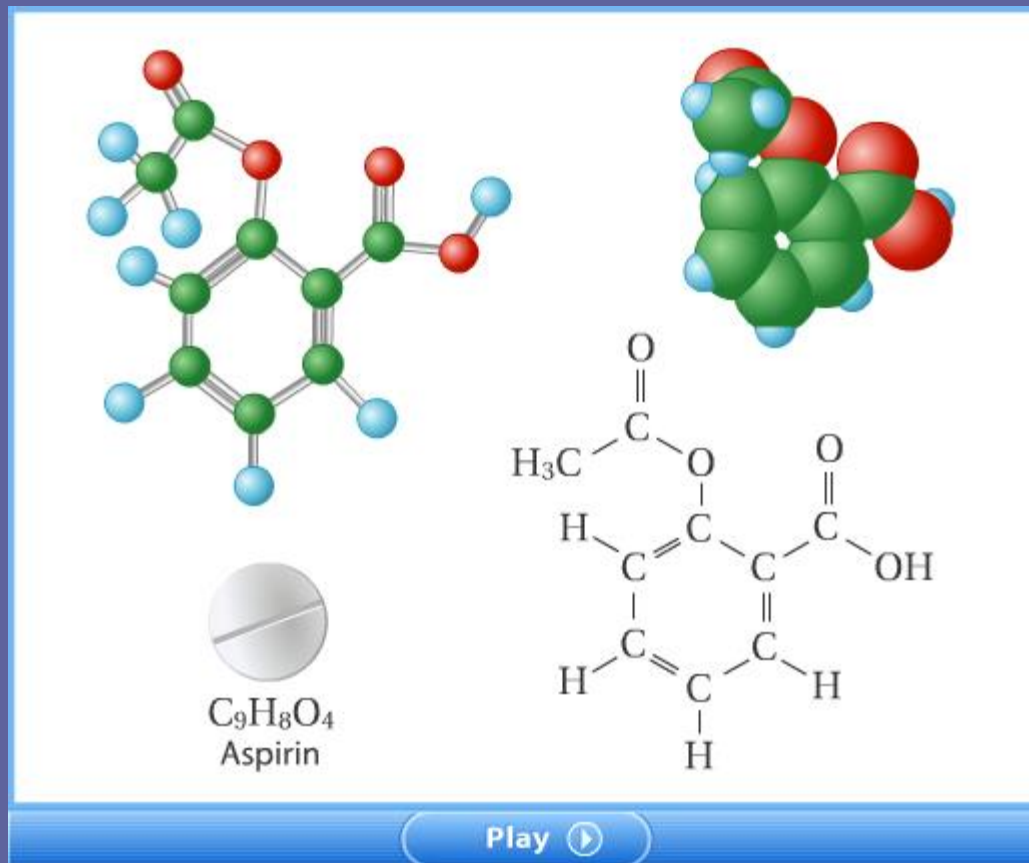
# Visual Concept: Elements



## Compounds

- › How are elements related to compounds?
- › Each molecule of a compound contains two or more elements that are chemically combined. Elements combine chemically to form a compound.
- **compound:** a substance made up of atoms of two or more different elements joined by chemical bonds

# Visual Concept: Compounds



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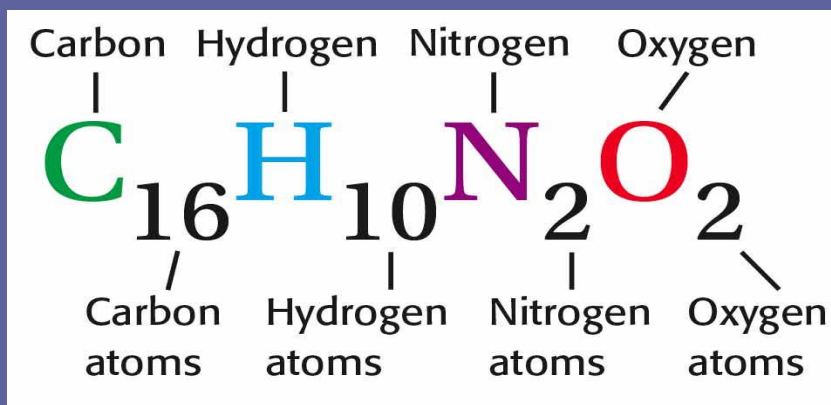
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## Compounds, *continued*

- Compounds have unique properties.
- Chemical formulas represent compounds.
  - The following chemical formula represents the compound for indigo:



# Visual Concept: Chemical Formula



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## Pure Substances and Mixtures

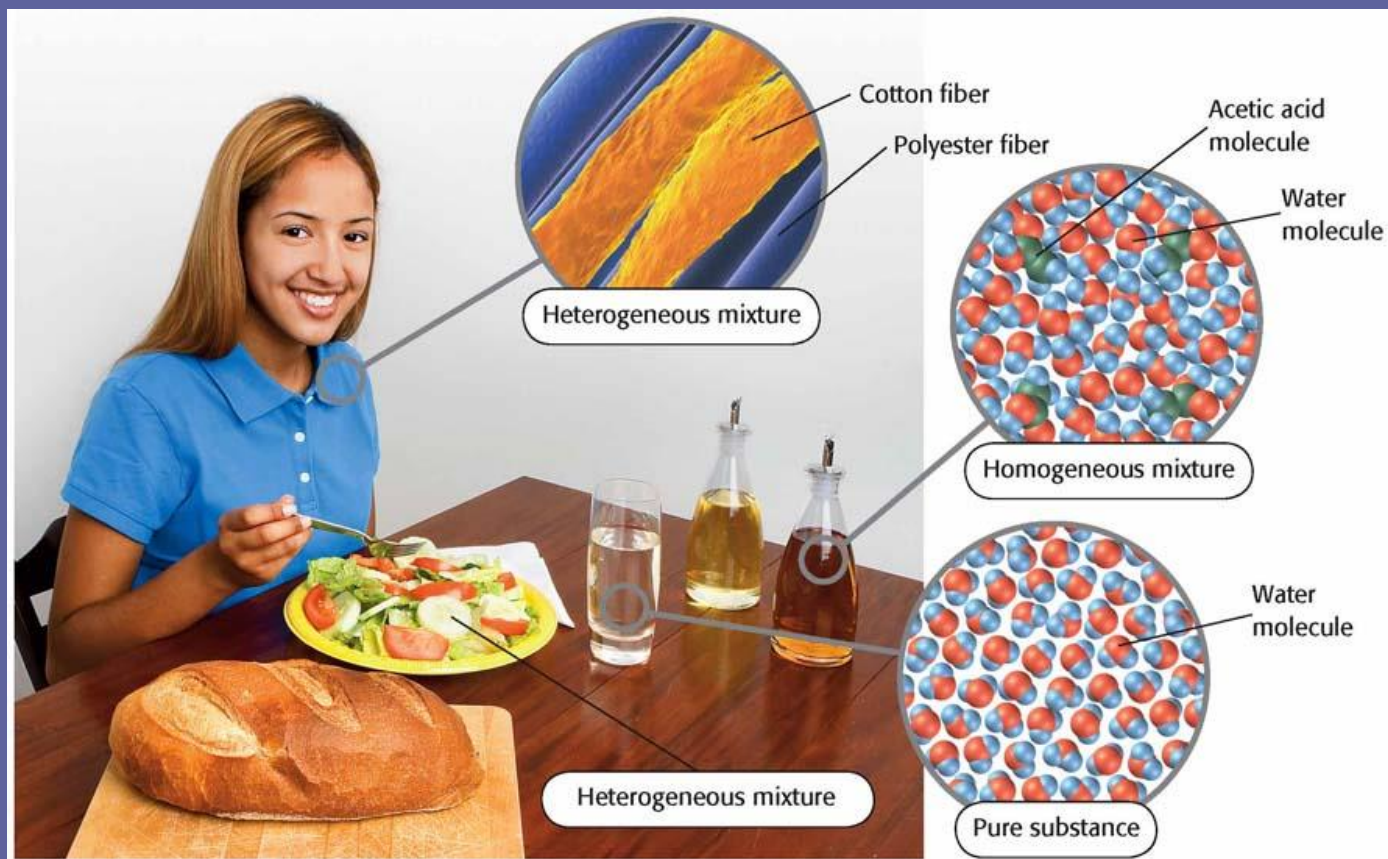
- › What is the difference between a pure substance and a mixture?
- › Elements and compounds are pure substances, but mixtures are not.
- **pure substance:** a sample of matter, either a single element or a single compound, that has definite chemical and physical properties
- **mixture:** a combination of two or more substances that are not chemically combined



## Pure Substances and Mixtures, *continued*

- Mixtures are classified by how thoroughly the substances mix.
  - *heterogeneous mixture*: substances aren't mixed uniformly and are not evenly distributed
  - *homogeneous mixture*: substances are evenly distributed, and the mixture is the same throughout
  - *miscible*: substances that can be mixed
  - *immiscible*: substances that cannot be mixed
- Gases can mix with liquids.

# Types of Mixtures



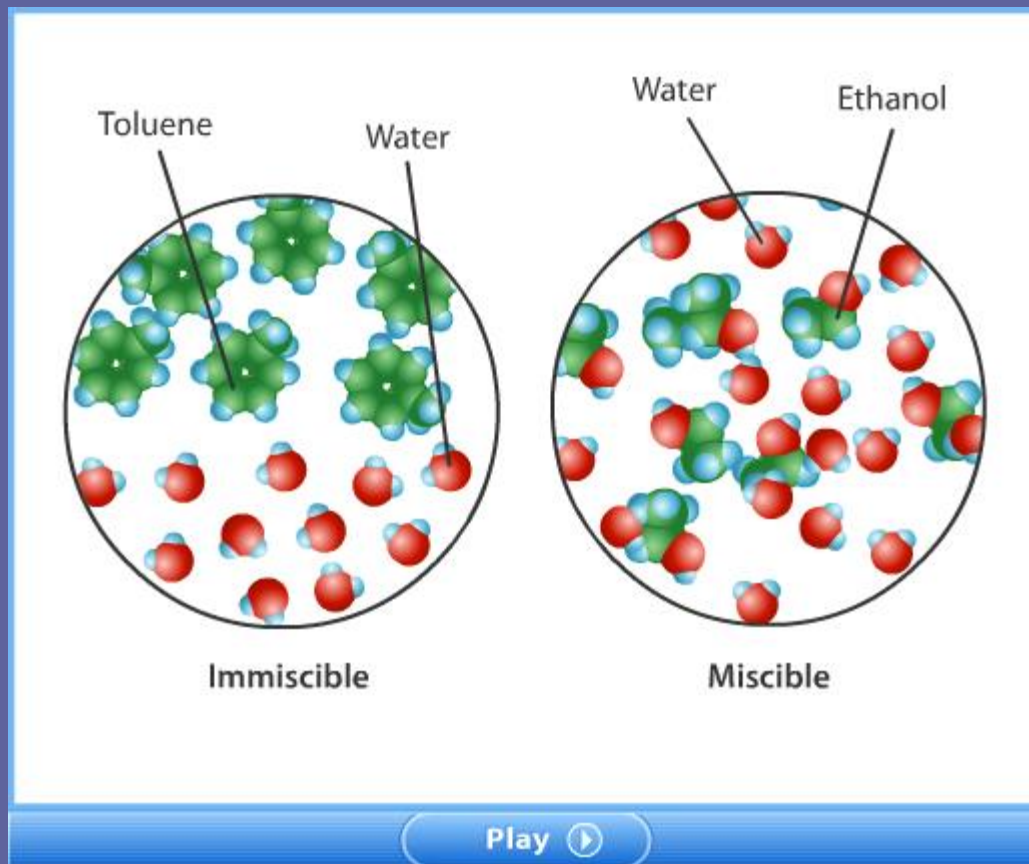
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## Visual Concept: Comparing Miscible and Immiscible Liquids



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