



# What is Matter?

## Matter:

Anything that has mass and occupies space (volume)

## Chemistry:

the study of matter and how it changes

## Changes of matter:

**Physical change:** a change in physical properties  
(size, shape, color or state)

**Chemical change:** a change in the chemical make-up  
(a new substance is formed)

## Element:

a substance that cannot be broken down into a simpler substance (only 1 kind of atom, pure)

Periodic Table of Elements on pages 291

(examples: carbon, gold, hydrogen, silicon, 118 total)

## Rules for writing Element Symbols: (not abbreviations)

1. first letter is **ALWAYS** capitalized
2. second letter is **ALWAYS** lower case

## Atom:

the smallest particle of an element  
(has the properties of the element)

## Compound:

a substance made of more than one element  
chemically combined

(Water is 2 Hydrogens + 1 Oxygen =  $H_2O$ )



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## Chemical Formula:

the chemical symbols and numbers indicating the atoms contained in a substance



**C** = Carbon (subscript "6" means 6 atoms)

**H** = Hydrogen (subscript "12" means 12 atoms)

**O** = Oxygen (subscript "6" means 6 atoms)

This is the formula for sugar (glucose)

## Pure substance:

Any matter that has a fixed composition and definite properties (elements and compounds) water or sugar

## Mixture:

A combination of more than one pure substance  
(not chemically combined)

## Heterogeneous Mixture:

Substances are not even throughout (not dissolved)  
(flour and water, oil and water)

Immiscible: liquids that don't dissolve into each other

## Homogeneous Mixture:

Substances mixed evenly throughout (dissolved)  
(salt and water, gasoline, air we breathe)

Miscible: liquids that dissolve into each other

## **Hints & Examples**

**Hydrogen = explosive gas**  
**Oxygen is flammable gas**  
**H<sub>2</sub>O is a liquid that extinguishes fires?**

**Carbon = C**  
**Oxygen = O**  
**Carbon Monoxide = CO**  
**Cobalt = Co**  
**CO & Co are NOT the same!**

### **Symbols not abbreviations**

**Sodium = Na (Latin is Natrium)**  
**Gold = Au (Latin is Aurium)**  
**Tungsten = W (Latin is Wolfram)**  
**Lead = Pb (Latin is Plumbum)**  
**"Lead worker is a plumber!"**

### **Deadly Story**

**A man gets a package of chemicals**  
**The label says "Hf" which is Halfnium a harmless element.**  
**He opens the box and dies instantly.**  
**The label should have been HF.**  
**Hydrogen Fluoride a toxic gas!**