

6.1- Atoms, Elements, and Compounds

(Day 1)

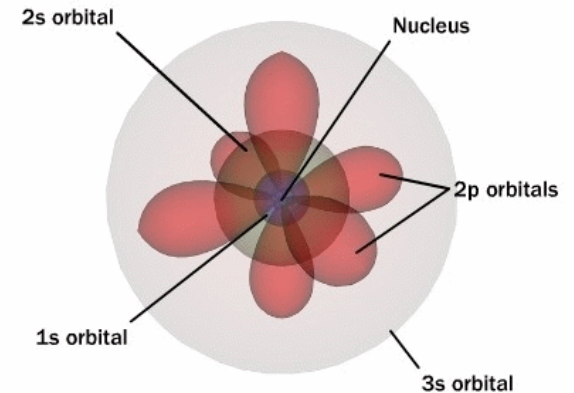
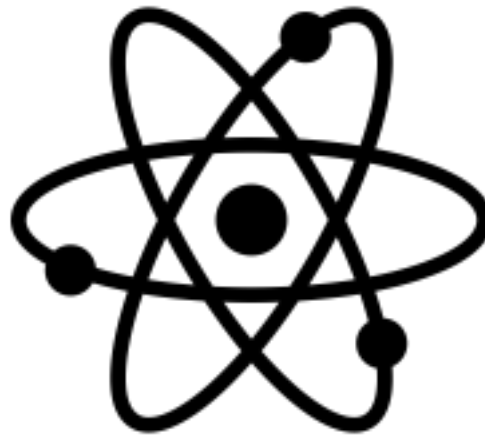
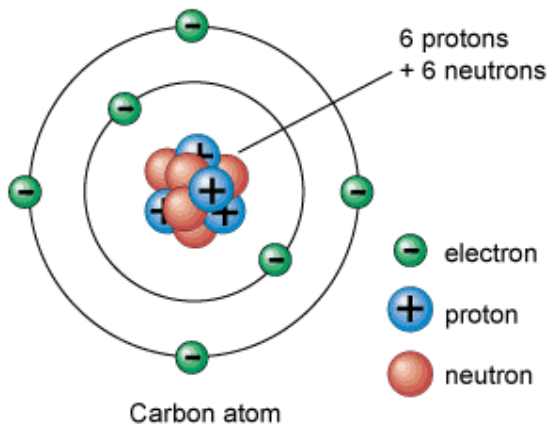
Matter is anything that has mass and takes up space.

Everything in the universe is either **matter** or **energy**.

Atoms are the basic unit of matter.

They are the building blocks of all matter (everything).

Remember- *cells are the basic unit of LIFE*



Atoms are made up of smaller pieces called **subatomic particles**

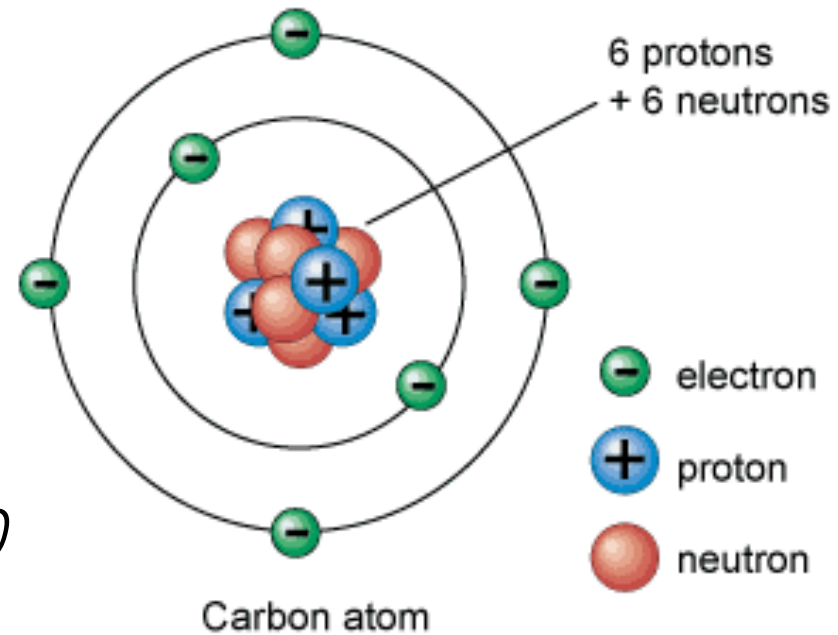
in the nucleus:

Protons (positive) p^+

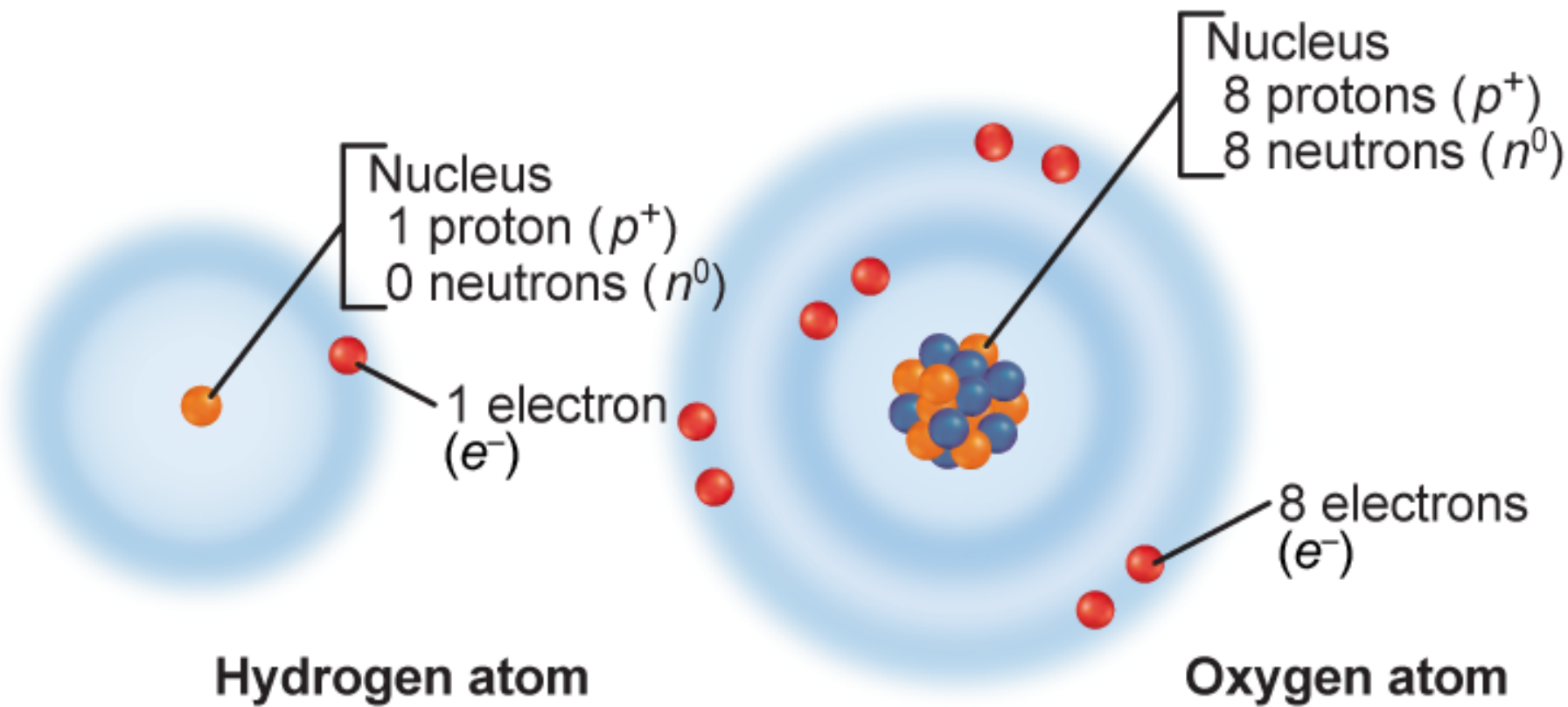
Neutrons (neutral) n^0

Orbit around the nucleus

Electrons (negative) e^-

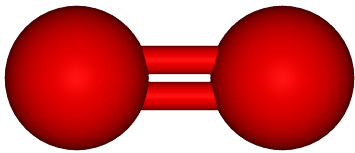
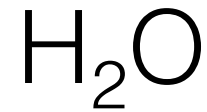
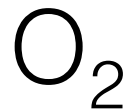


It takes about 1,800 electrons to equal the mass of one neutron

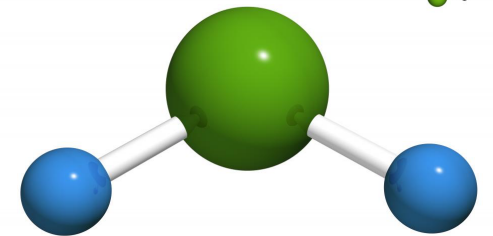


A **molecule** is a group of atoms bonded together.

Ex: Oxygen Water



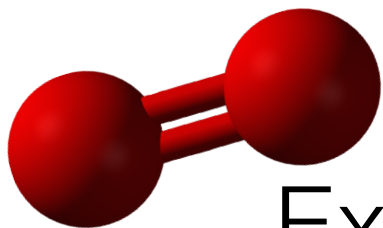
Water



H_2O

wiseGEEK

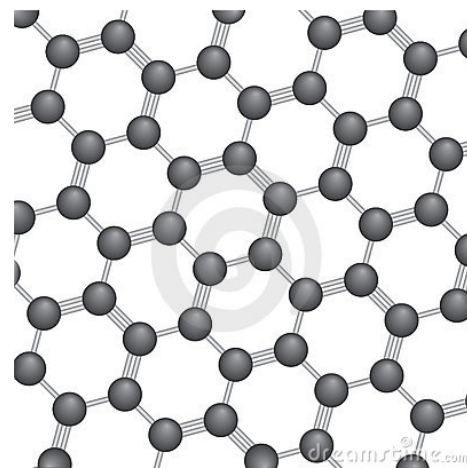
An **element** is a pure substance that cannot be broken down into other substances.



Ex: Oxygen, Carbon

O

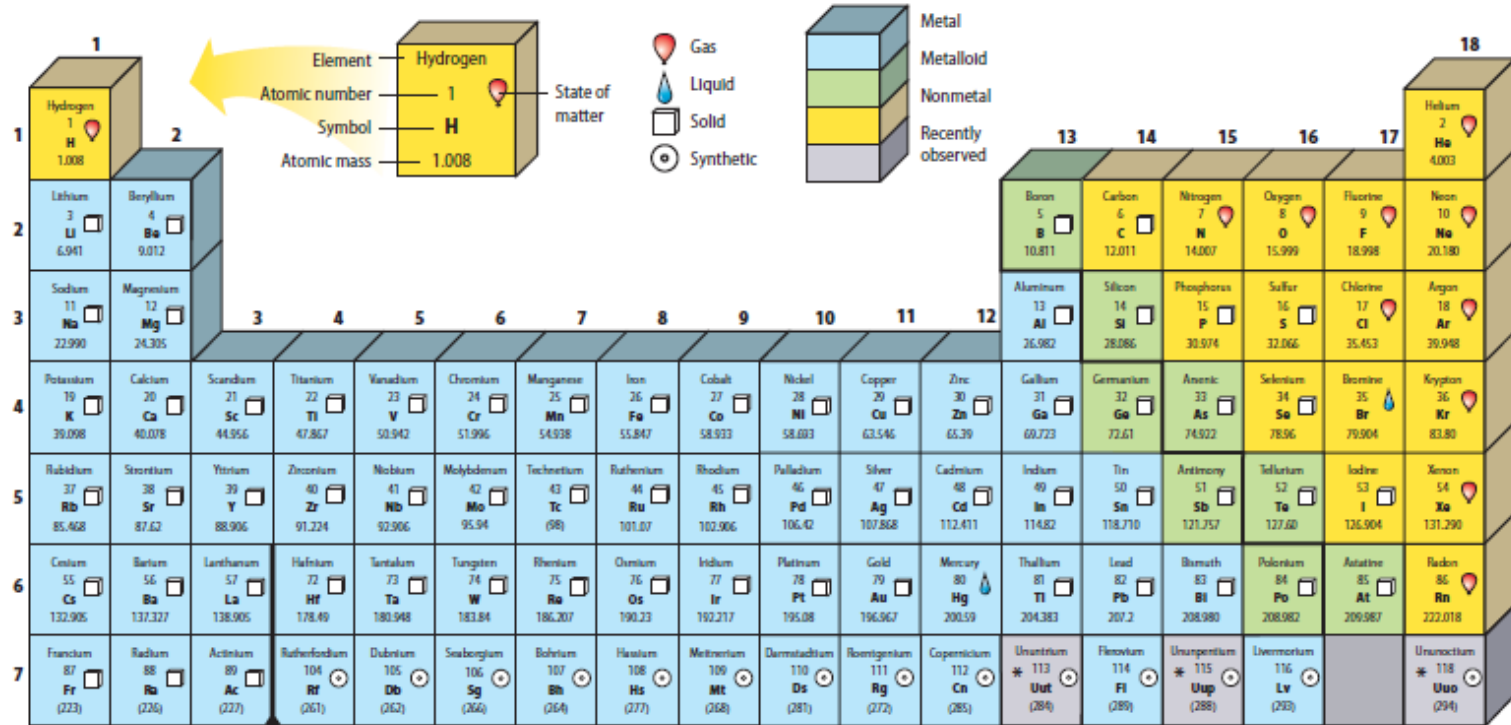
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Each element has a unique name and symbol.

The periodic table of elements

PERIODIC TABLE OF THE ELEMENTS



The number in parentheses is the mass number of the longest lived isotope for that element.

* The names and symbols for elements 113, 115, and 118 are temporary. Final names will be selected when the elements' discoveries are verified.

| | | | | | | | | | | | | | |
|--------------------------|---------------------|---------------------|-------------------|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------|---------------------|---------------------|--------------------|---------------------|
| Lanthanide series | | | | | | | | | | | | | |
| 58 Ce 140.115 | 59 Pr 140.908 | 60 Nd 144.242 | 61 Pm (145) | 62 Sm 150.36 | 63 Eu 151.965 | 64 Gd 157.25 | 65 Tb 158.925 | 66 Dy 162.50 | 67 Ho 164.930 | 68 Er 167.259 | 69 Tm 168.934 | 70 Yb 173.04 | 71 Lu 174.967 |
| Actinide series | | | | | | | | | | | | | |
| 90 Th 232.038 | 91 Pa 231.036 | 92 U 238.029 | 93 Np (237) | 94 Pu (244) | 95 Am (243) | 96 Cm (247) | 97 Bk (247) | 98 Cf (251) | 99 Es (252) | 100 Fm (257) | 101 Md (258) | 102 No (259) | 103 Lr (262) |

CHNOPS

Most common elements:

carbon

hydrogen

nitrogen

oxygen

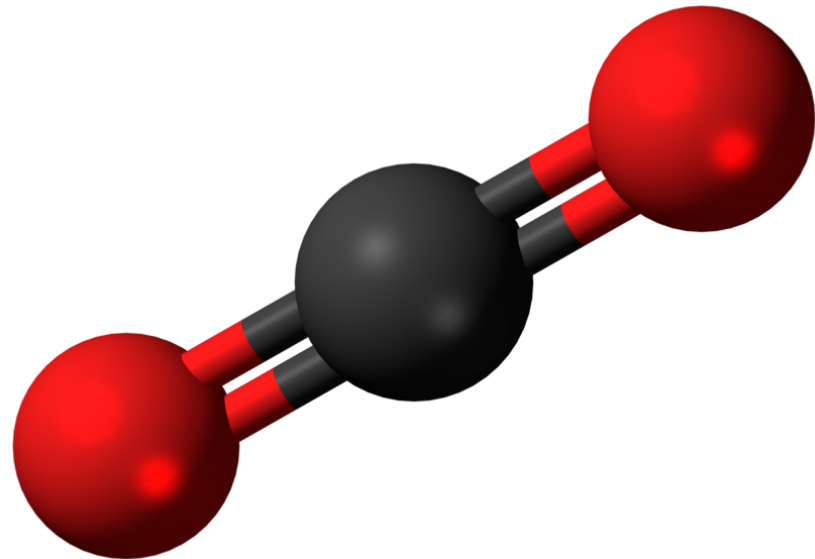
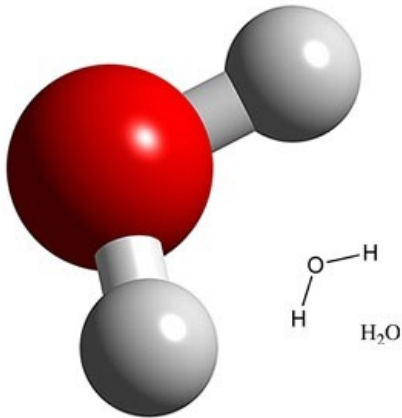
phosphorus

sulfur

A **compound** is two or more elements chemically combined

Ex: Water H₂O

Carbon Dioxide CO₂



Compounds are formed from elements in a **fixed ratio**.

O_2 Oxygen

H_2O Water

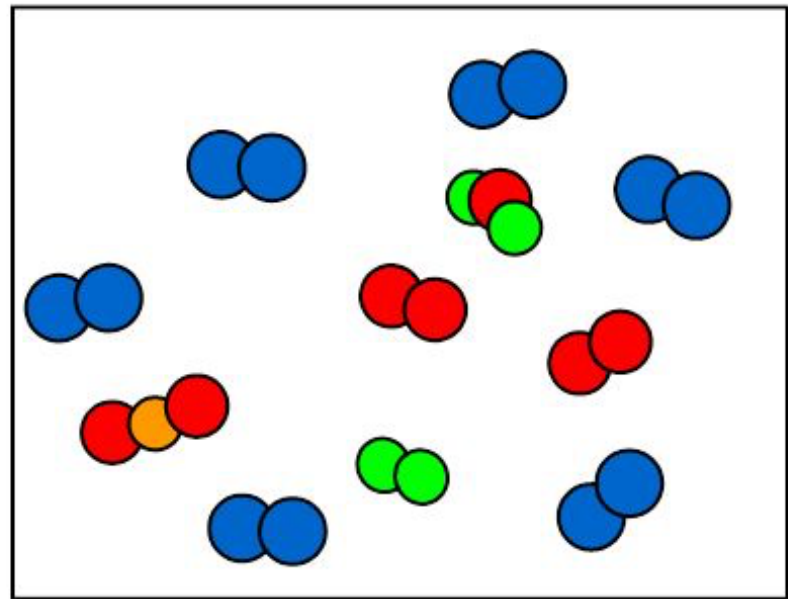
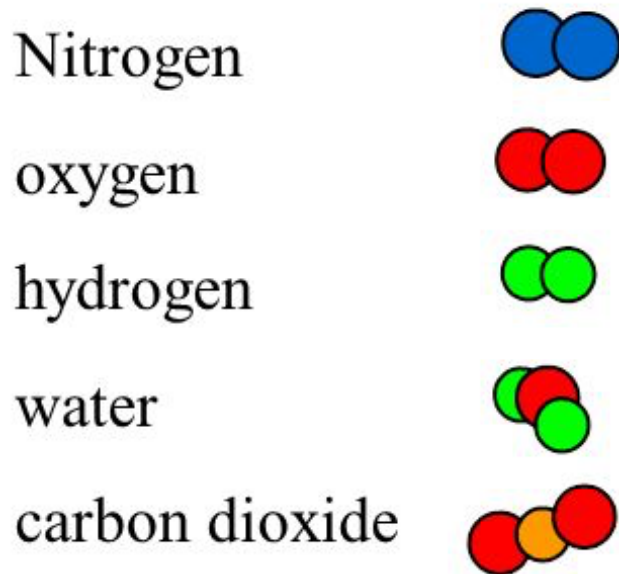
O_3 Ozone

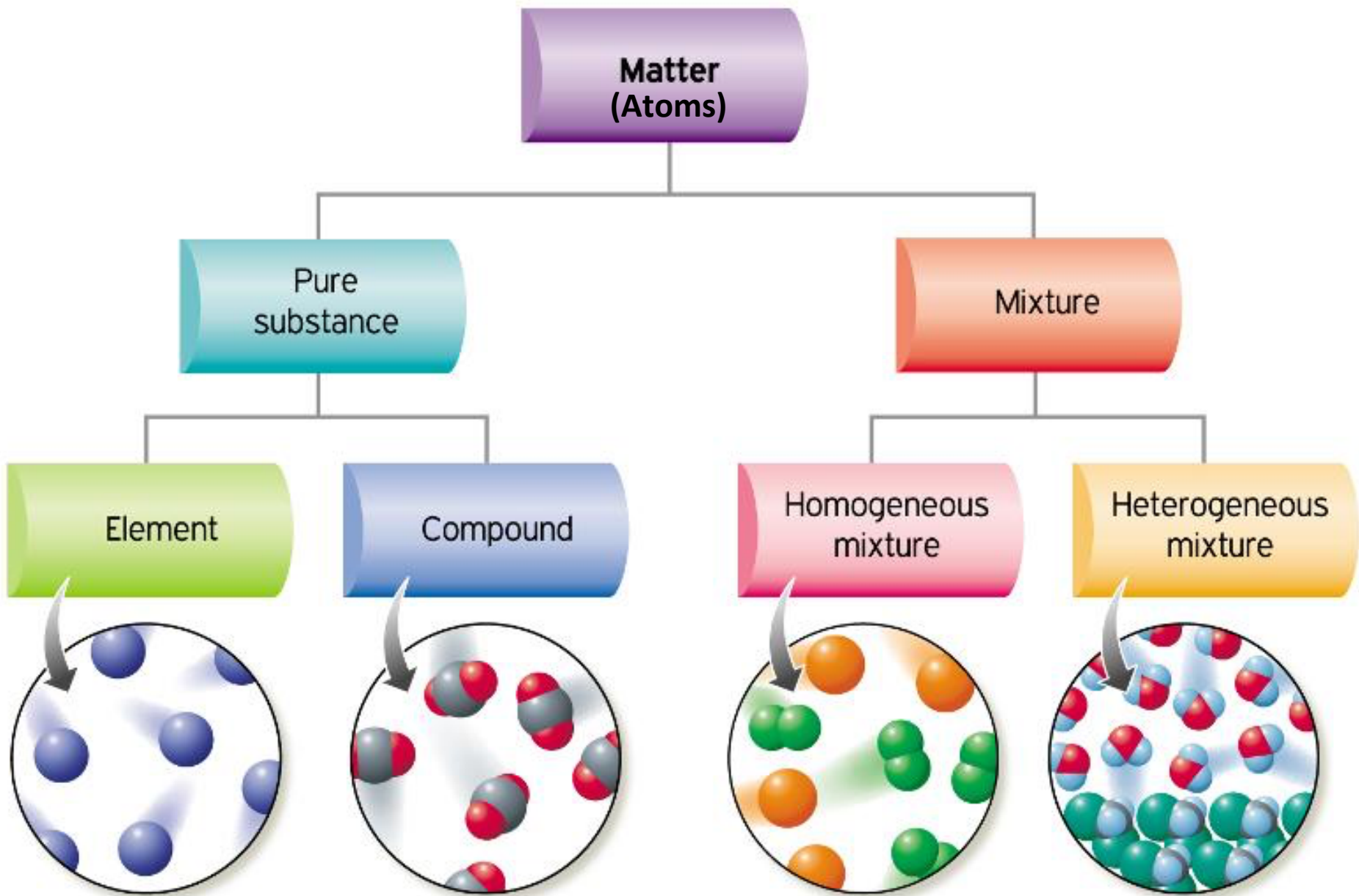
H_2O_2 Hydrogen Peroxide

Compounds **can** be broken down into their elements.

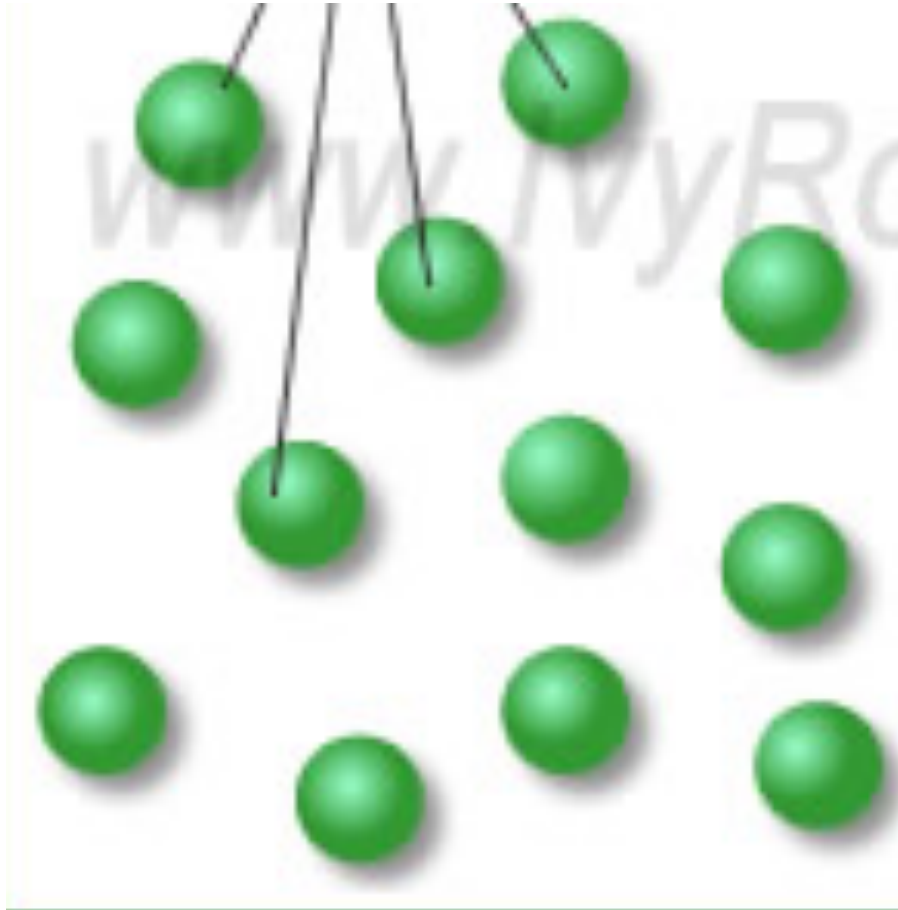
A **mixture** is two or more molecules that are NOT chemically combined.

Ex: air

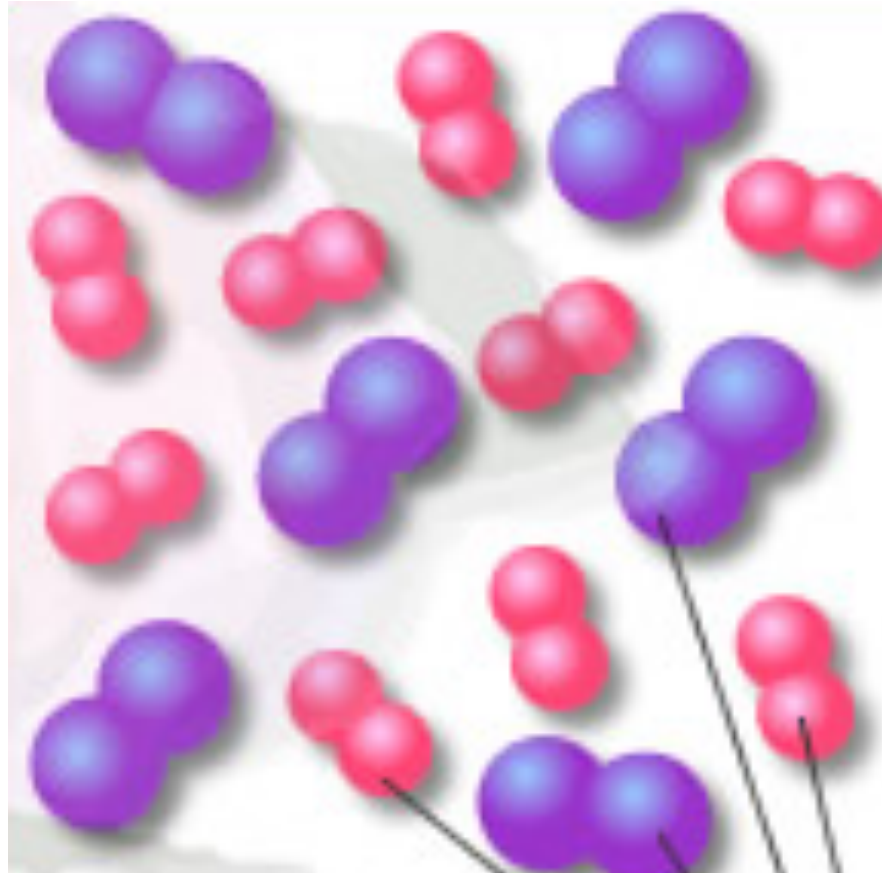




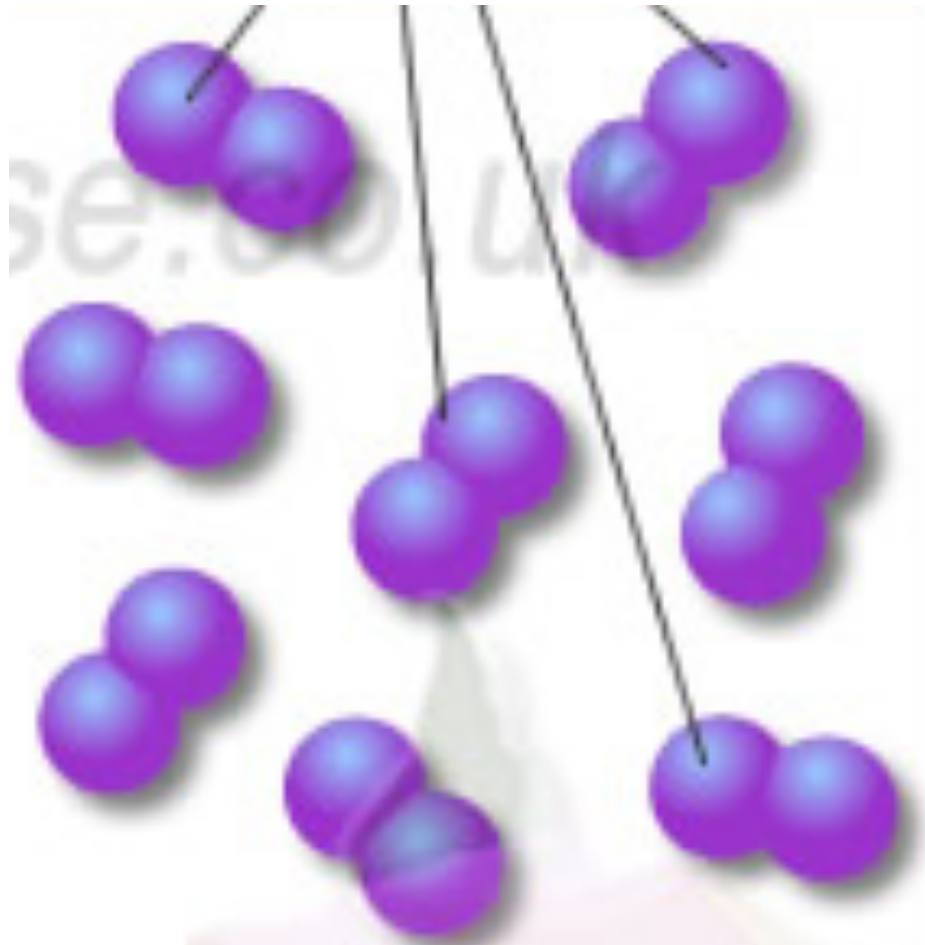
Atoms or Molecules? Element, Compound, Mixture?



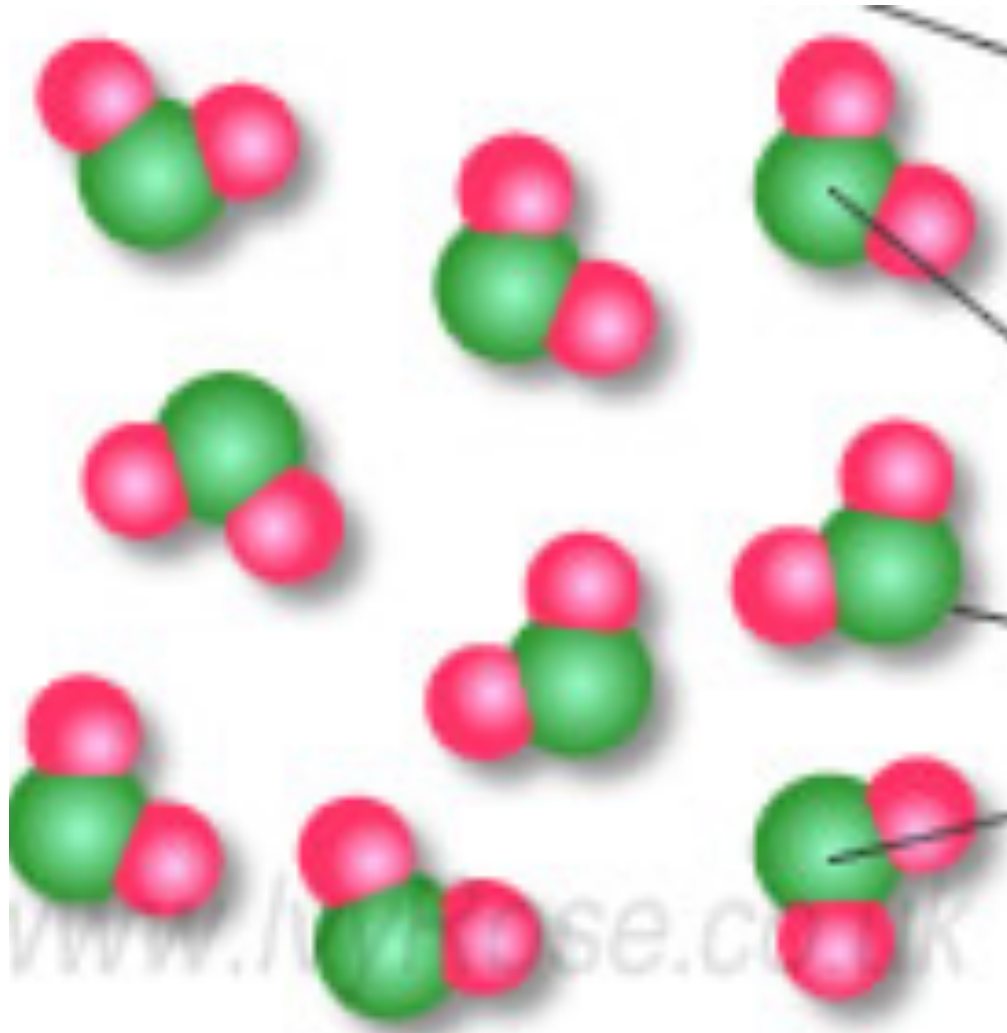
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Atoms or Molecules? Element, Compound, Mixture?



Atoms or Molecules? Element, Compound, Mixture?

