

Compounds, Elements, and Molecules

S1-2-09 Compare elements to compounds. Include: atoms, molecules

We must be able to differentiate between the following terms:

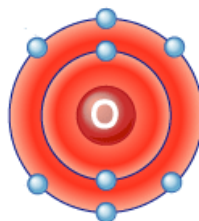
Atom:

- Smallest UNIT of an ELEMENT.
- Made of PROTONS, ELECTRONS and NEUTRONS

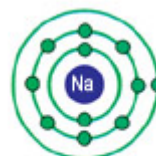
Examples:



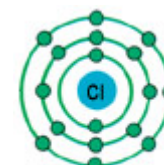
Hydrogen Atom



Oxygen Atom



Sodium atom



Chlorine atom

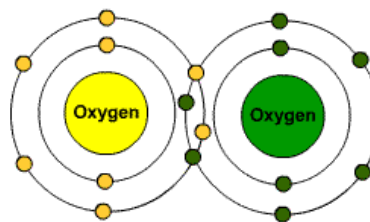
Element

- A PURE SUBSTANCE made of IDENTICAL ATOMS.
- Cannot be BROKEN DOWN into DIFFERENT KINDS of atoms.
- Elements are made of atoms

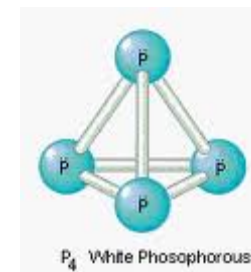
Examples:



Hydrogen Atom



Oxygen Gas

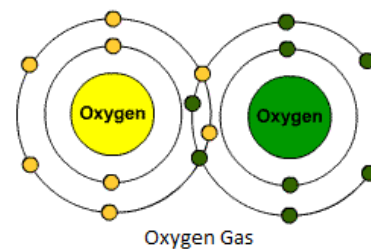
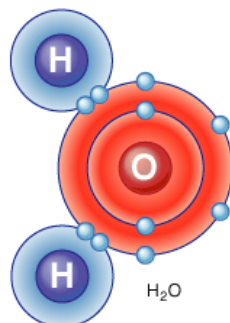


P₄ White Phosphorous

Molecule

- Is a PURE SUBSTANCE made of a CLUSTER of atoms of SIMILAR or DIFFERENT ELEMENTS.
- Can be BROKEN DOWN into those ATOMS during a CHEMICAL CHANGE.

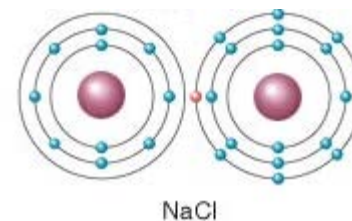
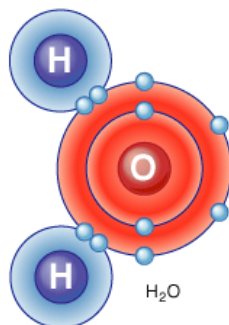
Examples:



Compound

- A PURE SUBSTACNCE whose MOLECULES are made of DIFFERENT KINDS of ATOMS.
- COMPOUNDS can be broken down into DIFFERENT ELEMENTS.

Examples:



Recall the Particle Theory of Matter:

- A particle is a small "THING".
- ALL MATTER is composed of tiny PARTICLES called ATOMS.
- ATOMS can join to form MOLECULES or COMPOUNDS which are also PARTICLES.

A PURE SUBSTANCE is something that contains only ONE KIND of MATTER.

A MIXTURE is something that contains TWO or MORE PURE SUBSTANCES.

There are about 10 million known PURE SUBSTANCES

- Only about 112 of these are actually ELEMENTS
- The rest are COMPOUNDS or MOLECULES

Examples

Baking soda is actually SODIUM BICARBONATE (NaHCO_3)

- A mixture of SODIUM, CARBON and OXYGEN atoms.
- It is a COMPOUND or a MOLECULE

Pure OXYGEN is just O_2 ,

→ It is a MOLECULE AND an ELEMENT.

Salt is also known as SODIUM CHLORIDE ($NaCl$)

→ A COMPOUND or MOLECULE

Toothpaste is also known as SODIUM FLUORIDE (NaF)

→ A COMPOUND/MOLECULE

What is the composition of other household items?

Vinegar – ACETIC ACID ($HC_2H_3O_2$)

Drain Cleaner – SODIUM HYDROXIDE ($NaOH$)

Chalk – CALCIUM CARBONATE $CaCO_3$

Lime – CALCIUM OXIDE CaO

Ammonia – NH_3

Pure Substances...

Can you think of any pure substances that you see every day?

Examples:

Put the above substances in the correct column:

Element

Compound