

Understanding Pure Substances

Pure Substances

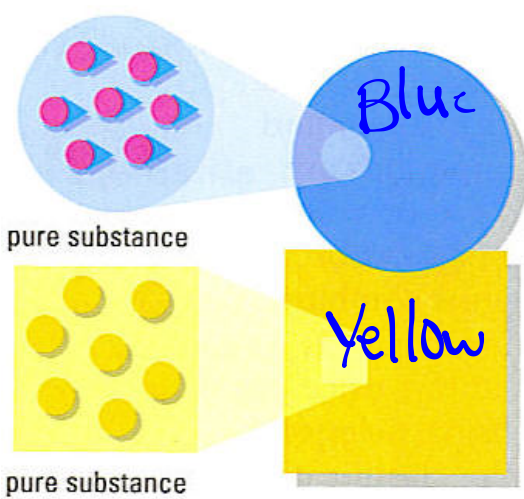
Contains only one kind of particle. Can be a element or a compound

-Sugar is a pure substance. It contains only sugar particles. A scoop of sugar made from Canadian sugar beets contain the exact same kind of particle sas a scoop of sugar made from Australian sugar cane.

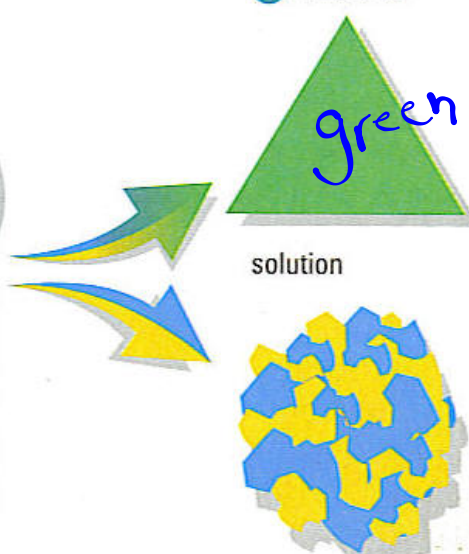


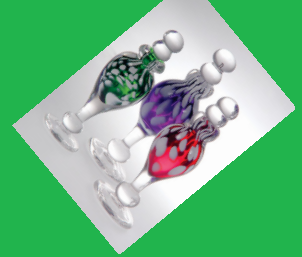
Figure 1

a pure substances



b mixtures





Solution - a mixture made up of liquids, solids and gas in which you can not see the individual parts.

Example: sugar in water,
perfumes (alcohol and fragrances), alloys (solid metals)

Classifying Mixtures

Mixtures can be divided up into two categories

- 1) **Heterogeneous** mixtures
- 2) **Homogenous** mixtures

Homogeneous Mixtures

- Every piece of the solution would contain the exact same substances



- A solution can be made up from solids, liquids or gases
 - Ex. Air is a solution of gases
 - Ex. Salt water

 - Alloys are mixtures of metals

Heterogeneous Mixtures

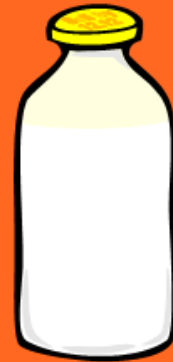
- Every piece of the mixture would NOT contain all of the exact same substances

- Ex. Pizza, cereal and milk, yogurt and berries



Classifying Mixtures

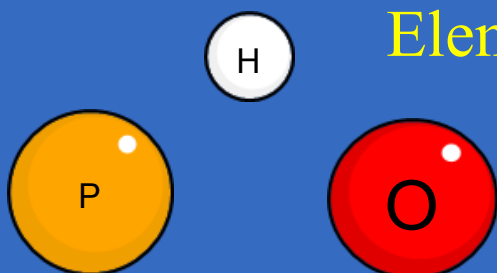
If you cannot see the different parts of a mixture, as is the case with milk or vinegar and water mixed together, then it is called a solution.



If we can see the individual parts of a mixture, like a pizza or a chocolate chip cookie, then we call that mixture a heterogeneous mixture ("hetero"=different).



Elements and Compounds

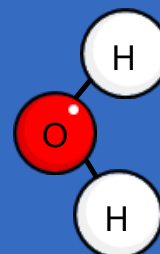
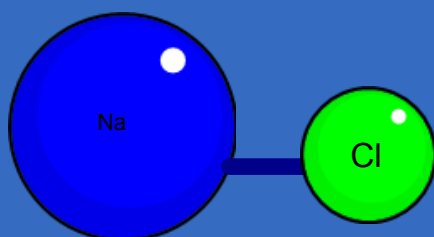


Elements: pure substances that cannot be broken down into smaller substances.

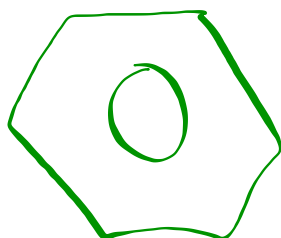
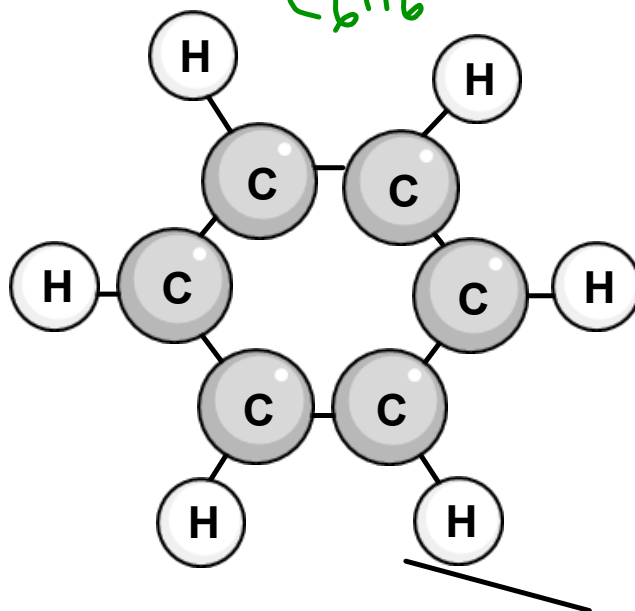
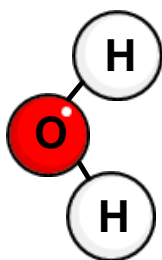
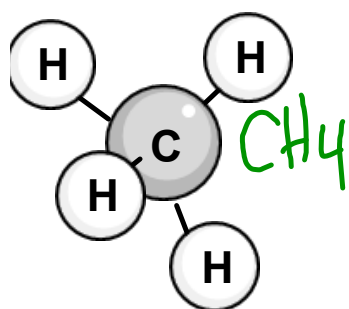
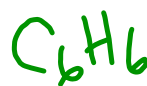
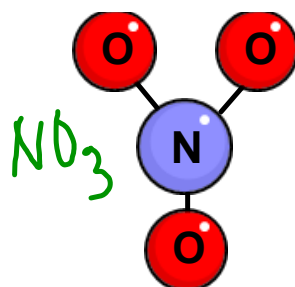
Example: hydrogen, oxygen, carbon, phosphorus

Compounds: pure substances that contain two or more different elements.

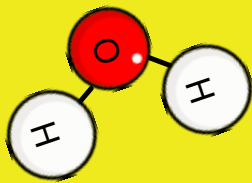
Example: water (H_2O) and salt (NaCl).



Compounds



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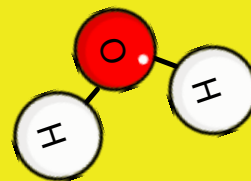


Atom: the smallest amount of an element.

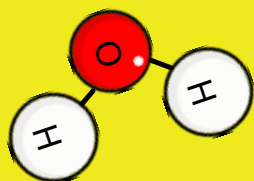
Example: In water there are two hydrogen atoms and one oxygen atom. H

Molecule: a combination of two or more atoms.

Molecules can be made up of all the same kind of atom like O_2 or different atoms like H_2O .



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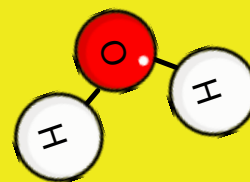


A **compound** is a **molecule** that contains at least two different **elements**.

✗ **All compounds are molecules but not all molecules are compounds.**

Example:

Molecular hydrogen (H_2), molecular oxygen (O_2) and molecular nitrogen (N_2) are not compounds because each is composed of a single element

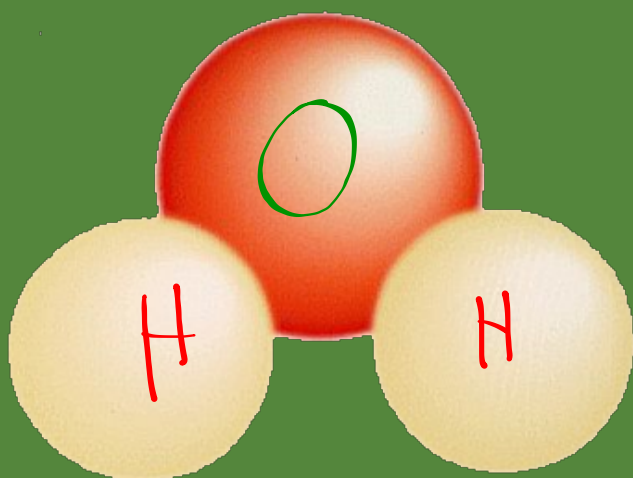


| | Molecule | Compound | Element |
|----------|----------|----------|---------|
| N_2 | ✓ | X | X |
| NO_2 | ✓ | ✓ | X |
| ∴ N | X | X | ✓ |
| CH_4 | ✓ | ✓ | X |
| Cl | X | X | ✓ |
| Cl_2 | ✓ | X | X |
| $MgCl$ | ✓ | ✓ | X |

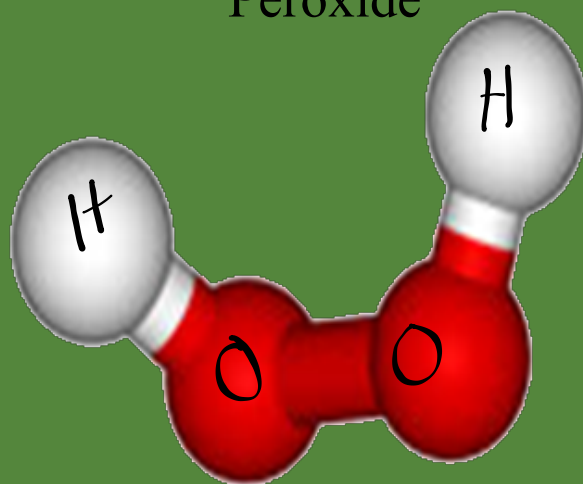
Different Molecules from the Same Elements

Both only contain hydrogen and oxygen elements

Water H_2O



H_2O_2
Hydrogen
Peroxide

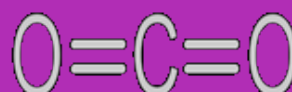
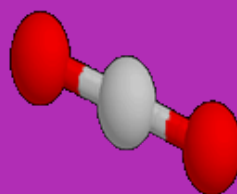
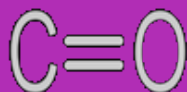
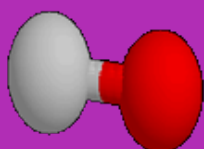
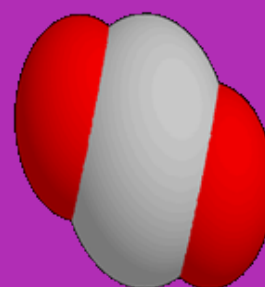
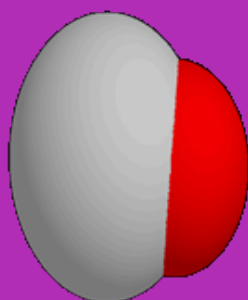


Different Molecules from the Same Elements

Both only contain carbon and oxygen elements

Carbon Monoxide

Carbon Dioxide



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Do questions 1 ab, 2, 3, 4 a,b,c

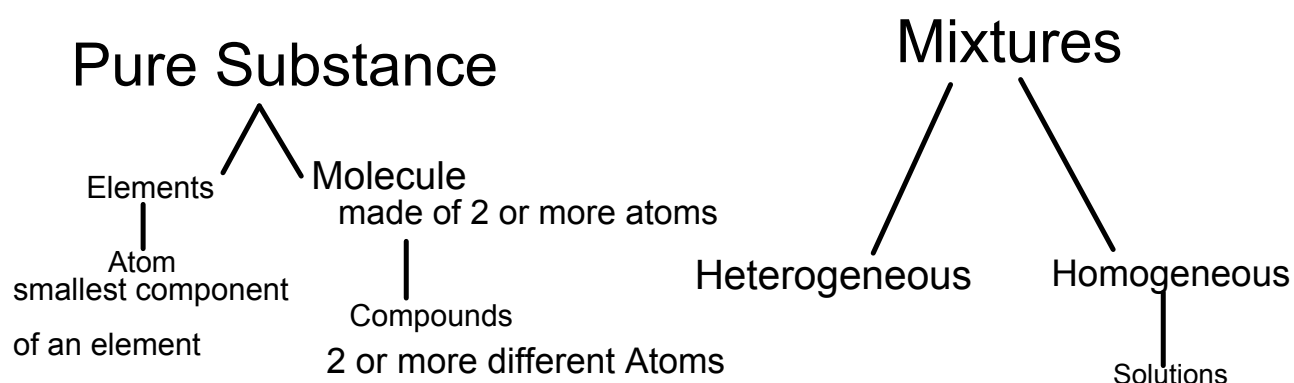
1a) A pure substance is made up of one type of element or compound.

A mixture is made up of two or more pure substances.

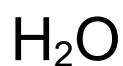
b) A solution (Homogenous mixture) is made up of two or more substances that are blended so you can't see individual parts.

Heterogeneous mixture is made up of two or more substance and each substance can be identified when looking at it.

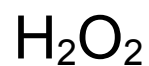
2) Categories of Substances



3) Two molecules made for the same type of atoms are:



Hydrogen Dioxide



Hydrogen Peroxide



Carbon Dioxide



Carbon monoxide

4) a) A clear, colorless liquid that can be split into two gasses with different properties.

Compound

b) A yellow solid that always has the same properties and cannot break down.

Element

c) A colorless gas that burns to produce carbon dioxide and water

Compound

Attachments

atoms.avi

Periodic Table.avi

compounds and mixtures.avi