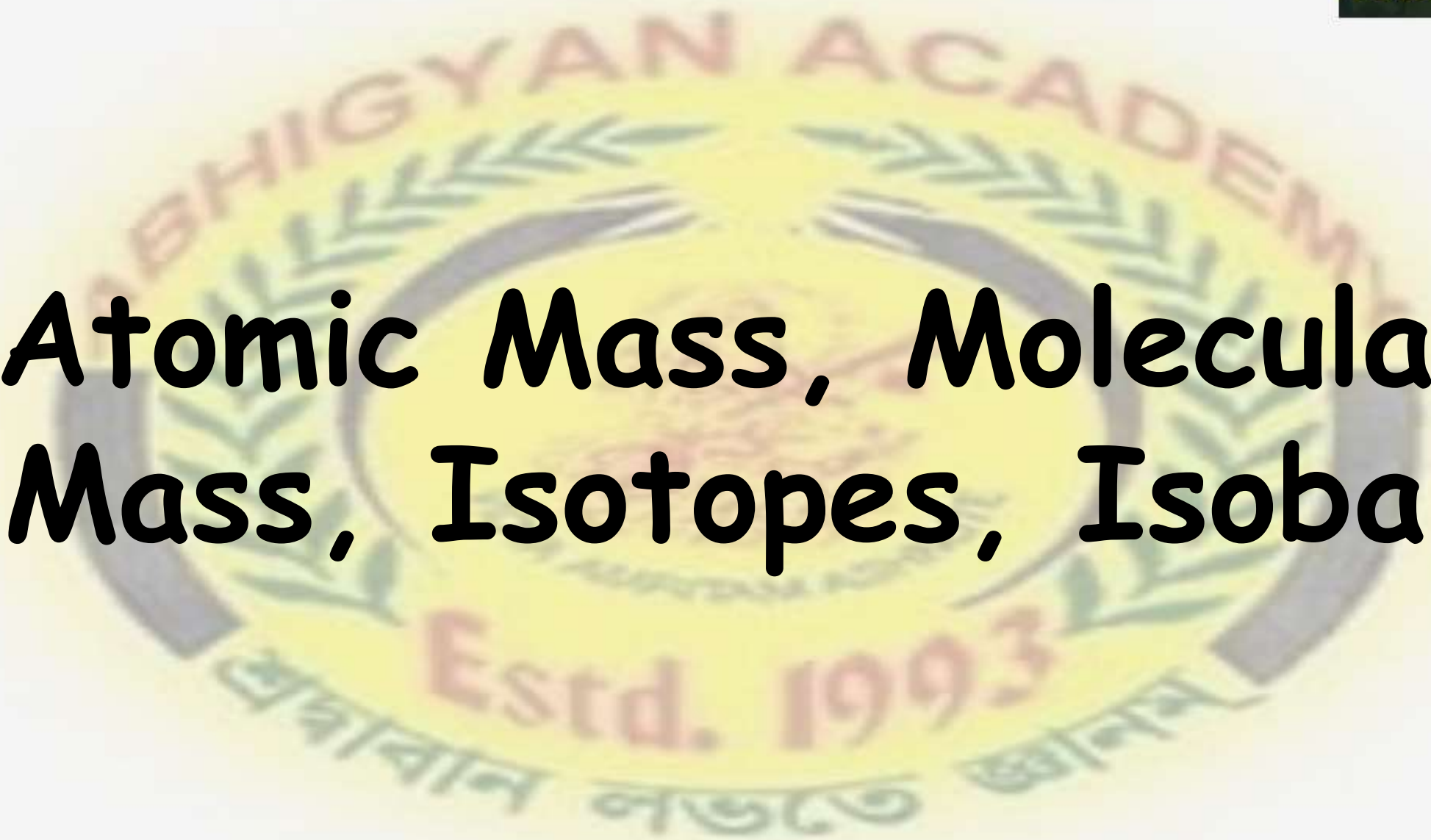


Atomic Mass, Molecular Mass, Isotopes, Isobar



ATOMIC MASS

ATOMIC MASS UNIT IS DEFINED AS A MASS
EXACTLY EQUAL TO ONE-TWELFTH THE
MASS OF ONE CARBON -12 ATOM.

AMU = ATOMIC MASS UNIT OR UNIFIED
MASS

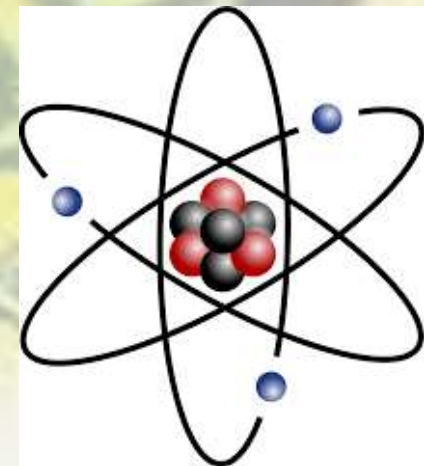
$$1 \text{ a.m.u.} = 1.66056 \times 10^{-24} \text{ g}$$

$$1.67377 \times 10^{-27} \text{ kilograms}$$

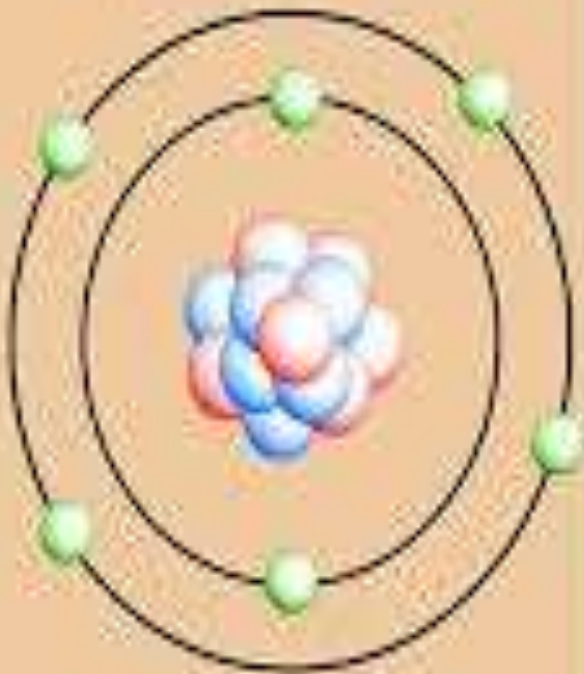
Molecular mass

molecular mass is the sum of atomic masses of
the elements present in a molecule.

6	2
	4
C	
Carbon	
12.011	← Atomic mass



Carbon Atom



- - neutron
- - proton
- - electron

protons = 6
neutrons = 6

$$6 + 6 = 12$$

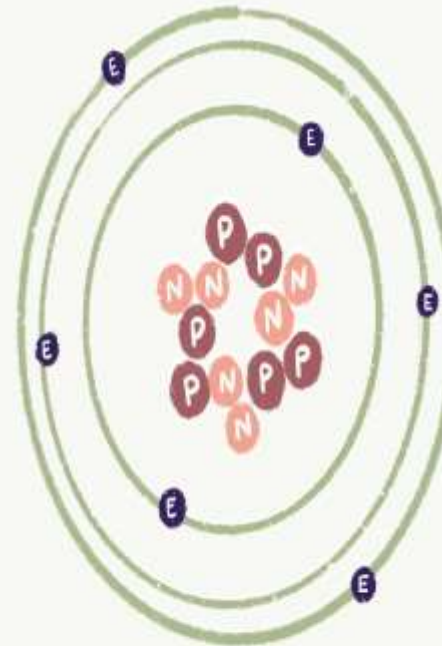
**Atomic
Mass = 12**

WED 15/07

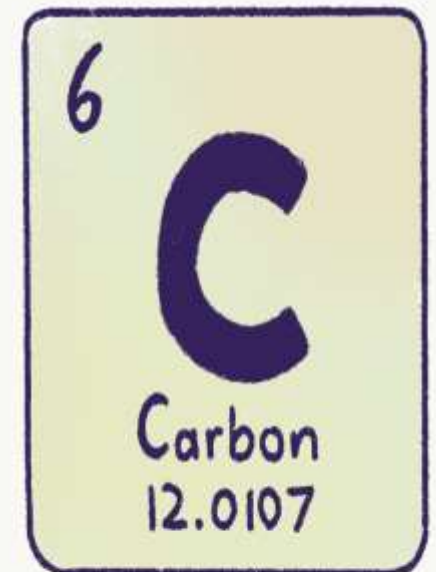
Atomic Weight vs. Atomic Mass

Atomic mass is the sum of protons and neutrons of a single atom.

Atomic weight is the weighted average of the atomic mass of all natural isotopes of an element.



Carbon-6 Atom
Atomic Mass = 12

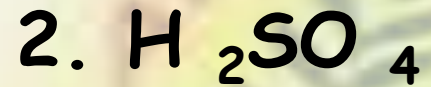
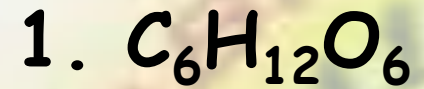


Carbon
Atomic Weight = 12.0107

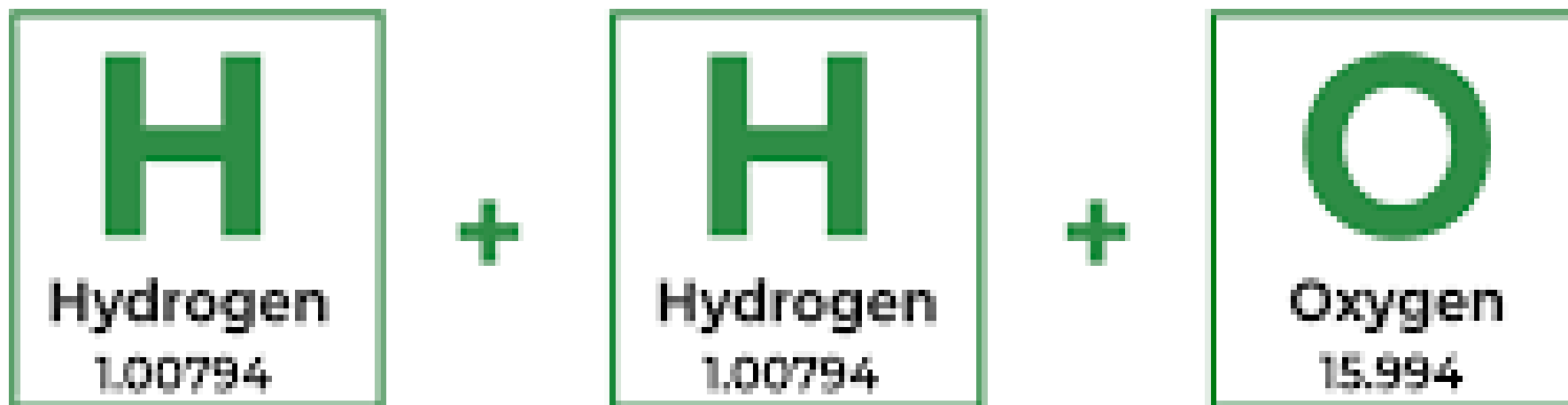
ThoughtCo.

Element name	Atomic number	Atomic mass	Element name	Atomic number	Atomic mass
Hydrogen	1	1	Sodium	11	23
Helium	2	4	Magnesium	12	24
Lithium	3	7	Aluminium	13	27
Beryllium	4	9	Silicon	14	28
Boron	5	11	Phosphorus	15	31
Carbon	6	12	Sulphur	16	32
Nitrogen	7	14	Chlorine	17	35.5
Oxygen	8	16	Argon	18	40
Fluorine	9	19	Potassium	19	39
Neon	10	20	Calcium	20	40

Calculate the molecular mass of the following-



Molar Mass of H_2O

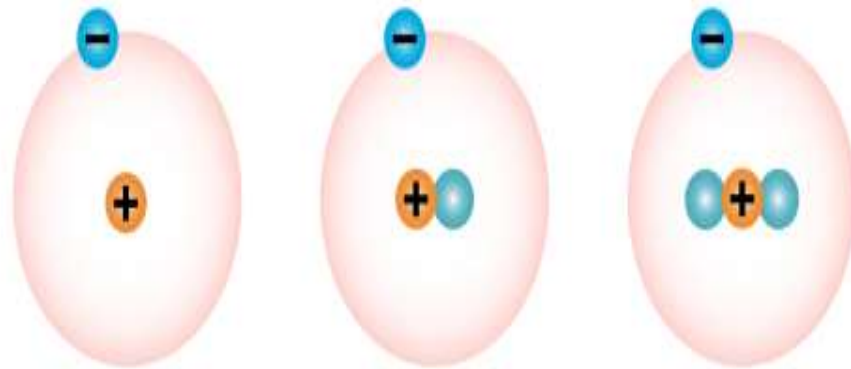


$$\text{Molar Mass} = 1.00794 + 1.00794 + 15.994$$

$$\text{Molar Mass} = 18.01528 \text{ g/mol}$$

What are Isotopes?

Isotopes can be defined as the variants of chemical elements that possess the same number of protons and electrons, but a different number of neutrons.



Protium

1 Electrons
 1 Protons
 0 Neutrons

$$= 1 + 0 = 1$$

Deuterium

1 Electrons
 1 Protons
 1 Neutrons

$$= 1 + 1 = 2$$

Tritium

1 Electrons
 1 Protons
 2 Neutrons

$$= 1 + 2 = 3$$

ISOTOPES OF CARBON

Carbon-12

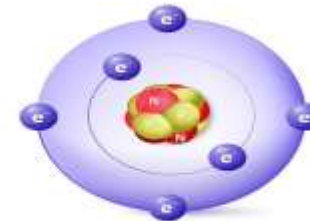
6
 6
 6
 Stable

Carbon-13

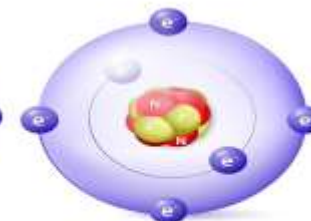
6
 7
 6
 Stable

Carbon-14

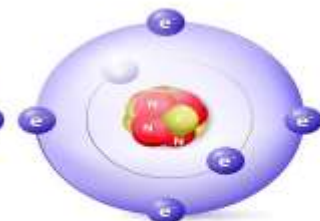
6
 8
 6
 Radioactive



electron -1 (orbit)



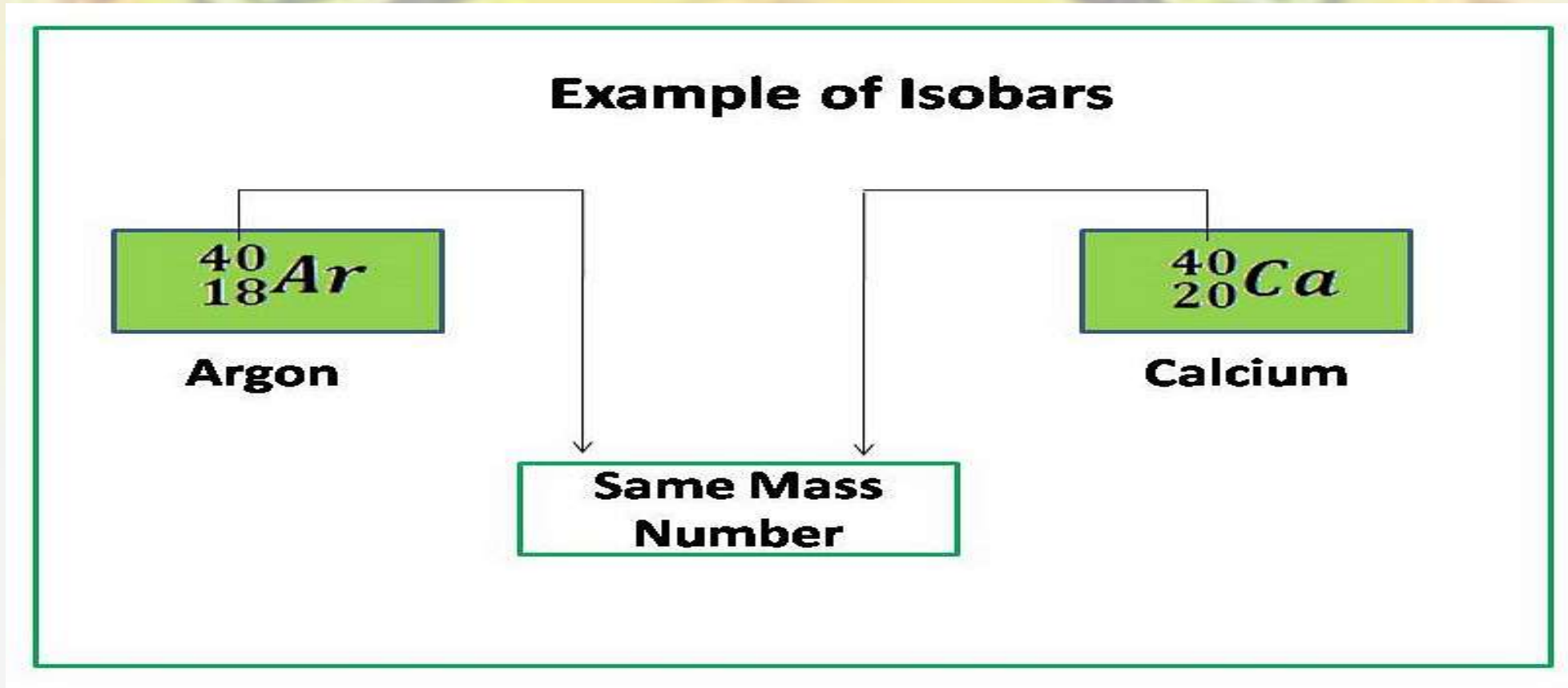
neutron 0 (nucleus)



proton +1 (nucleus)

Isobars

- Isobars are atoms of different elements with different atomic numbers but have the same mass number.
- Electronic configurations of isobars differ.



COMPOUNDS

A compound is a substance composed of two or more elements, chemically combined with one another in a fixed proportion.

What do we get when two or more elements are combined?

E.g: IONIC Compound

COVALENT Compound

METALLIC Compound

NaCl, KCl, MgCl₂, CaCl₂

H₂O, HCl, CCl₄

Au, Ag.

What is a Mixture?

Mixtures are constituted by more than one kind of pure form of matter.

Mixtures are substances that are formed by physically mixing two or more substances

TYPES OF MIXTURES

Depending upon the nature of the components that form a mixture, we can have different types of mixtures.

HOMOGENEOUS MIXTURE

Mixture which has a uniform composition throughout are called homogeneous mixtures.

Examples of such mixtures are: (i) salt dissolved in water and (ii) sugar dissolved in water.

HETEROGENEOUS MIXTURES

Mixtures which contain physically distinct parts and have non-uniform compositions are called heterogeneous mixtures.

Mixtures of sodium chloride and iron filings, salt and sulphur, and oil and water are examples of heterogeneous mixture

Homogeneous Mixture Examples



Coffee



Wine



Air



Brass



Steel



Natural Gas



Vinegar



Blood

Homogeneous Mixture Examples

Homogeneous Mixture



composed of a
uniform composition
of particles

Solid



brass

Liquid



coffee

Gaseous



air

Heterogeneous Mixtures

A heterogeneous mixture is a type of mixture in which the components are not uniformly distributed.

Fruit Salad



Solid

Vegetable Soup



Liquid

Egg



Gas

Homogeneous

Vs

Hetrogeneous





Examples of Homogeneous and Heterogeneous Mixtures

Sand

+



=



Heterogeneous Mixture

Sugar

+



=



Homogeneous Mixture

Mixtures

1. Elements or compounds just mix compounds. together to
2. A mixture has a variable composition. substance is always
3. A mixture shows the properties of the constituents different properties
4. The constituents can be separated only fairly easily by physical methods. reactions.

Compound

1. Elements react to form new form mixture
2. The composition of each new fixed.
3. The new substance has totally constituent substances.
4. The constituents can be separated by chemical or electrochemical