

Classification of Matter

Matter: anything that has mass and occupies space. Made from elements found on the periodic table.

Particle Theory of Matter:

- all matter is made up of particles
- in a pure substance all particles are the same (elements or molecules), a different pure substance has a different type of particles
- all particles are attracted to each other
- all particles are in continuous motion
- the higher the temperature of a substance, the faster the particles move

Classification Based on Appearance:

Homogeneous: matter looks the same throughout, uniform composition throughout, single phase (air, water, salt, kool-aid)

Heterogeneous: matter does not look the same throughout, non-uniform composition, more than one phase (pizza, people, rocks)

Classification Based on Particles:

Pure Substance: only one type of particle is present (appears homogeneous)

Element:

- one type of atom only, found on the periodic table
- examples:

Fe iron

S sulphur

C carbon

H hydrogen

He helium

O₂ oxygen

Au gold

Compound:

- more than one type of atom chemically bonded together into a molecule
- will have a chemical formula (i.e. H₂O)
- examples:

CO₂ carbon dioxide

CO carbon monoxide

NaCl table salt

CaCO₃ limestone

SiO_2	quartz
$\text{C}_6\text{H}_{12}\text{O}_6$	glucose (sugar)
$\text{C}_2\text{H}_6\text{O}$	alcohol

Mixture: two or more types of particles are present, could be homogeneous or heterogeneous

Solution:

- homogeneous
- more than one type of particle, could be a mixture of elements or compounds or both
- mixed at the atomic or molecular level (as well mixed as possible)
- examples:
 - solution of sugar in water
 - vinegar
 - air (nitrogen, oxygen, argon, CO_2 +)

Colloid:

- like a solution except the particles are bigger (very large molecules or small clumps of molecules)
- homogeneous
- particles **do not separate** out over time
- Tyndall Effect is possible (flash light in fog)
- examples:

homogenized milk
mayonnaise
toothpaste

Suspension:

- like a colloid except the particles are bigger still
- homogeneous 1 heterogeneous (depends on how closely you look)
- particles are just large enough to be seen
- particles will separate out over time
- Tyndall Effect is possible
- example:
soil in water

Mechanical Mixture:

- mixture with large visible particles
- heterogeneous
- two or more clearly visible phases
- examples:
mixed nuts
pizza
vegetable soup

ALL MATTER	Pure Substance	Element
		Compound
	Mixture	Solution
		Colloid
		Suspension
		Mechanical Mixture