

Matter

# Changes

- Physical changes do not alter the chemical make-up of the substance. May change the shape of the substance or the distance between the particles.
- Ex. Crushing, bending, tearing, phase changes.
- Chemical changes require a permanent change to the chemical make-up resulting in a new substance with different properties.

Conservation of matter –matter cannot be created or destroyed though any physical or chemical process

# Properties of Matter

- Physical properties – can be determined without chemically changing the substance.
- Ex. Density, color, melting point, boiling point, freezing point, condensing point, magnetic, heat and electric conductivity, luster, malleability, crystal structure, etc
- Chemical properties – require a chemical reaction to determine.
- Ex. Reaction with oxygen, reaction with water, reaction with sulfur, etc.

# Definitions

- Element – substance that can not be separated into simpler substances by a chemical change.
- Atom – smallest particle of an element that retains the properties of the element.
- Compound – two or more atoms bonded together to make a new substance.
- Pure substance – substance made of one type of particle that has its own set of chemical and physical properties.
- Can be an atom or a compound.

# Mixtures

- Mixture – a physical blend of two or more pure substances.
- Can be separated by their individual physical properties. Examples:
  - Filtering – separation by particle size
  - Distillation – separation by boiling point
  - Decanting – separation by density
- Heterogeneous mixture – particles are not evenly distributed (chocolate chip cookies)
- Homogeneous – particles are evenly distributed (air, salt water)

# Types of mixtures

- Solution – homogeneous mixture where small particles (atoms, ions, molecules) are evenly distributed throughout. (salt water) Cannot be filtered!
- Colloid – homogeneous mixture where larger particles (large enough to see with a microscope) are evenly distributed and will not settle out. (milk fat)
- Suspension – heterogeneous mixture where very large particles are mixed but will eventually settle out. (muddy water)