

Matter

Matter

- anything that has
 - **Mass:** measure of the amount of matter (stuff) an object has
 - measured in grams (g)
 - with a balance
 - **Volume:** the amount of 3-D space an object occupies
 - measured in liters (L)
 - with a graduated cylinder or calculated with a formula
- **Kinetic Theory:** particles of matter are in constant motion.
 - The motion depends on the phase and temperature
- can be classified by
 - **Phase** (state)
 - **Ability** to be separated by physical means

Classifying Matter by Phase:

Phase	Shape	Volume	Molecule Kinetic Energy
Solid	definite	definite	vibrating
Liquid	variable	definite	moderate
Gas	variable	variable	fast

Phase changes:

- Melting: $S \rightarrow L$
- Evaporation: $L \rightarrow G$
- Condensation: $G \rightarrow L$
- Solidification: $L \rightarrow S$
- Sublimation: $S \rightarrow G$
- Deposition: $G \rightarrow S$

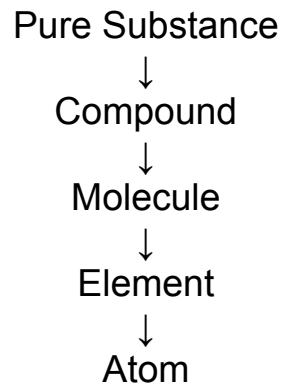
Classifying Matter by the Ability to Separate by Physical Means

- Cannot \rightarrow Pure Substance
- Can \rightarrow Mixture

Pure Substances

- Have the same:
 - Characteristic properties
 - Chemical composition

- **Element:** cannot be broken down into a more simple substance chemically
 - e.g.) hydrogen = H, oxygen = O
 - **Atom:** smallest form of an element that maintains the properties of that element
- **Compound:** can be broken down into constituent elements chemically
 - e.g.) water: $\text{H}_2\text{O} \rightarrow 2\text{H} + \text{O}$
 » $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
 - **Molecule:** smallest form of a compound



Mixture

- Blend of two or more substances
- 2 Types based on composition:
 - **Homogeneous:** uniform composition throughout
 - **Heterogeneous:** not uniform composition throughout

Matter

