Section 2.1

Classifying Matter

EQ: How can matter be classified?

§ 2.1: Classifying Matter

- Matter: Anything that has mass and takes up space (has a volume).
- Chemistry: The study of matter and how it changes.
- Matter can be classified
- NOTE: Matter is either an element (Ex. iron), compound (Ex. water), or mixture (Ex. carrots)

EQ: Why are carbon and copper classified as elements?

–Pure Substance: Fixed composition and definite properties.

- •Element: Substance that cannot be broken down into simpler substances by ordinary chemical means.
  - –Elements are represented by symbols.
  - –Ex: hydrogen (H), oxygen (O), gold (Au)
- •Atom: the smallest unit of an element that keeps the element's chemical properties.
  - –Each element is made of one kind of atom.
- •Atoms that make up a molecule act as a unit.

EQ: Why are carbon and copper classified as elements?

– Pure Substance
  - Atoms that make up a molecule act as a unit.
  - Molecule: the smallest unit of a substance that behaves like the substance.
  - Diatomic Molecules: Hydrogen (H_2), Nitrogen (N_2), Oxygen (O_2), Fluorine (F_2), Chlorine (Cl_2), Bromine (Br_2), Iodine (I_2)
  - Others: Phosphorus (P_4), Sulfur (S_8)

EQ: How are elements related to compounds?

– Pure Substance
  - Compound: A substance made from two or more chemically combined elements.
    - Examples: Carbon dioxide, water, methane
    - Compounds have unique properties
    - Chemical formulas represent compounds

EQ: What is the difference between a pure substance and a mixture?

– Mixture: A combination of substances that are not chemically combined.
  - Examples: Vegetables, Coca-Cola
  - Mixtures are classified by how well the substances mix
  - Miscible: Able to be mixed
  - Immiscible: Unable to be mixed well

EQ: What is the difference between a pure substance and a mixture?

– Mixtures

- Homogeneous: mixture that is the same throughout; Components are evenly distributed
  - Examples: apple juice, atmosphere
- Heterogeneous: mixture that is different throughout; Substances are not evenly distributed
  - Examples: ocean, Italian salad dressing
- Gases can mix with liquids (Ex. Coca Cola)

EQ: What is the difference between a pure substance and a mixture?

– Mixtures

- Colloid: a heterogeneous mixture with particles that are too small to settle out; Examples: soda, tea, fog, hand sanitizer
- The Tyndall Effect: The scattering of light due to the particles in a colloid.

EQ: What is the difference between a pure substance and a mixture?

Compounds vs. Mixtures

	Compound	Mixture
Combination	Are CHEMICALLY combined	Are PHYSICALLY combined
Properties	Loses the properties of its ingredients	Retains the properties of its ingredients
Composition	Have fixed compositions	Have variable compositions