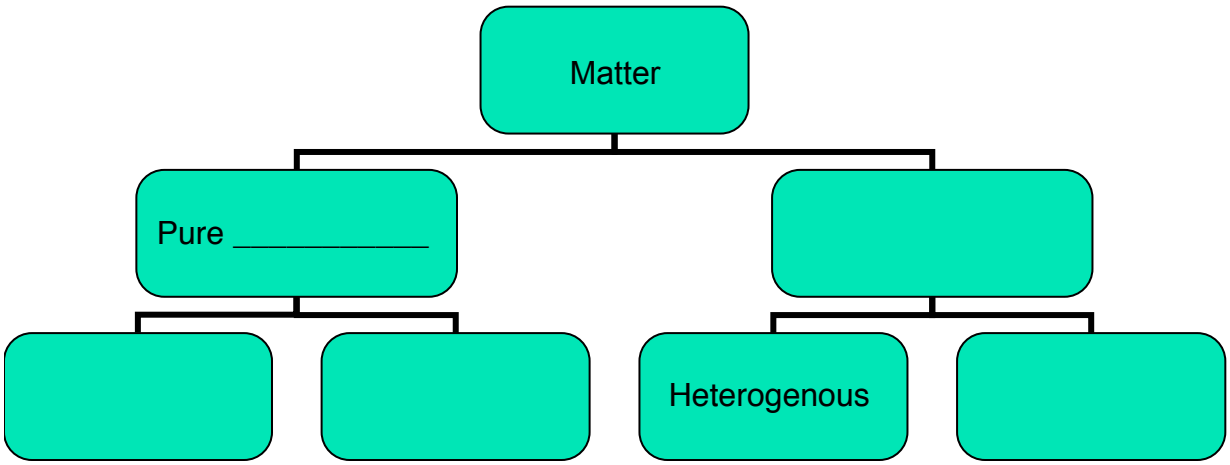
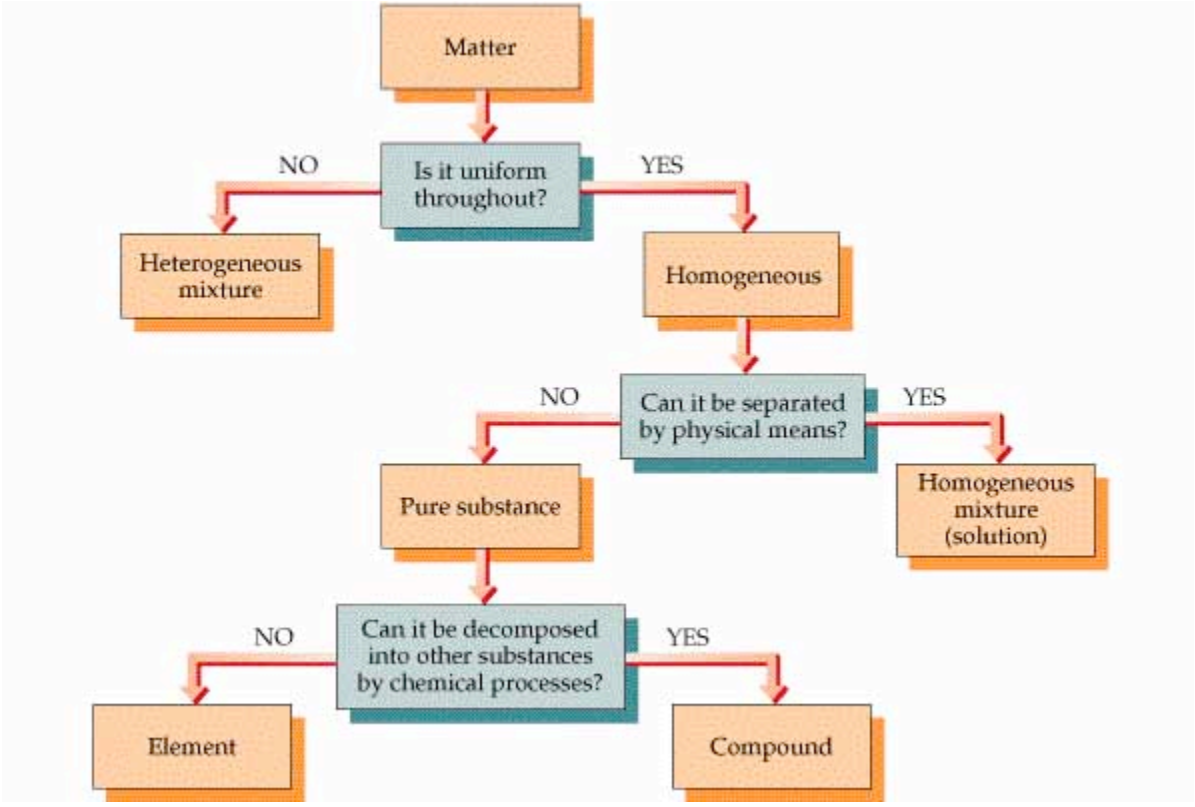
Classification of Matter Flow Charts (fill in):



How to figure out what type composition you have:



Pure Substances: Elements

- Matter that _____ be broken down into simpler substances under normal lab conditions
- Contains only _____ kind of atom
- Draw pictures below of a(n):
    - **Atom** **Molecule** (two or more atoms of the same element)

- Elements (symbols): Na, Au, C
- Where can you find a list of all the elements?
  _____

Pure Substances: Compounds

- Can be _____ into elements
- Composed of two or more elements that combine in a _____ reaction
- Combine in a _____ proportion
- Examples: NaCl, H_2O, $Fe(NO_3)_3$

Which are elements and which are compounds?

- Compounds contain more than one element. They always have the same composition, regardless of source (law of constant composition; law of definite proportions).

Mixtures

- A ***blend or combination*** of two or more _____
- _____ ***chemically combined***
- Composition of mixtures is _____

Mixtures: Heterogeneous

- A _____ **mixture** is one that does not blend smoothly throughout and in which the individual substances remain distinct.
- Mixture with _____ different parts.
    - Examples:
        - _____
        - _____
        - _____

Mixtures: Homogeneous

- A _____ **mixture** has constant composition throughout; it always has a single phase.
- Mixture with _____ _____ different parts.
    - Sea water: _____
    - Air: _____

Practice Classifying Matter

- Make a list of 3 things (and their parts) found in the classroom. Classify these as
  - Solid, liquid, or gas
  - pure substances or mixtures
  - homogeneous or heterogeneous
  - elements or compounds
- Be prepared to share your classifications.

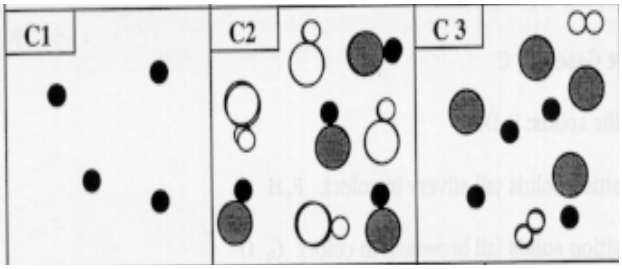
1. _____

2. _____

3._____

Classifying Practice (Use the picture)

- Which one is:
  - a mixture
  - a pure substance
  - an element
  - a compound



- Draw a picture that represents a pure compound below:

Classify

- Classify each of the following as, a homogenous or heterogeneous mixture, pure substance; element or compound. Draw atomic level pictures of each substance.
  - CH_4 (methane gas)
  - $KMnO_4$ (potassium permanganate)
  - Co (cobalt)
  - $Al + H_2O$ (aluminum and water)

Law of Definite Proportions

- The mass of the compound is equal to the sum of the masses of the elements that make up the compound.
- The ratio of the mass of each element to the total mass of the compound is a percentage called the _____ .
- Equation (fill in):

$$\text{percent by mass (\%)} = \frac{\qquad\qquad}{\qquad\qquad} \times 100$$

Review Questions

Identify each of the following as an example of a homogeneous mixture or heterogeneous mixture.

A. a pile of rusty iron filings _____
B. 70% isopropyl rubbing alcohol _____
C. Saltwater _____
D. Gasoline _____

Identify each of the following as an example of an element or a compound.

A. sucrose (table sugar) _____
B. the helium in a balloon (He) _____
C. baking soda (sodium bicarbonate, $NaHCO_3$) _____
D. a diamond (carbon, C) _____

A 134.50-g sample of aspirin is made up of 6.03 g of hydrogen, 80.70 g of carbon, and 47.77 g of oxygen. What is the percent by mass of each element in aspirin?

A 2.89-g sample of sulfur reacts with 5.72 g of copper to form a black compound. What is the percentage composition of the compound?

Calculate the % mass of each element in $C_6H_{12}O_6$ (Atomic mass of C = 12, H=1, O=16)