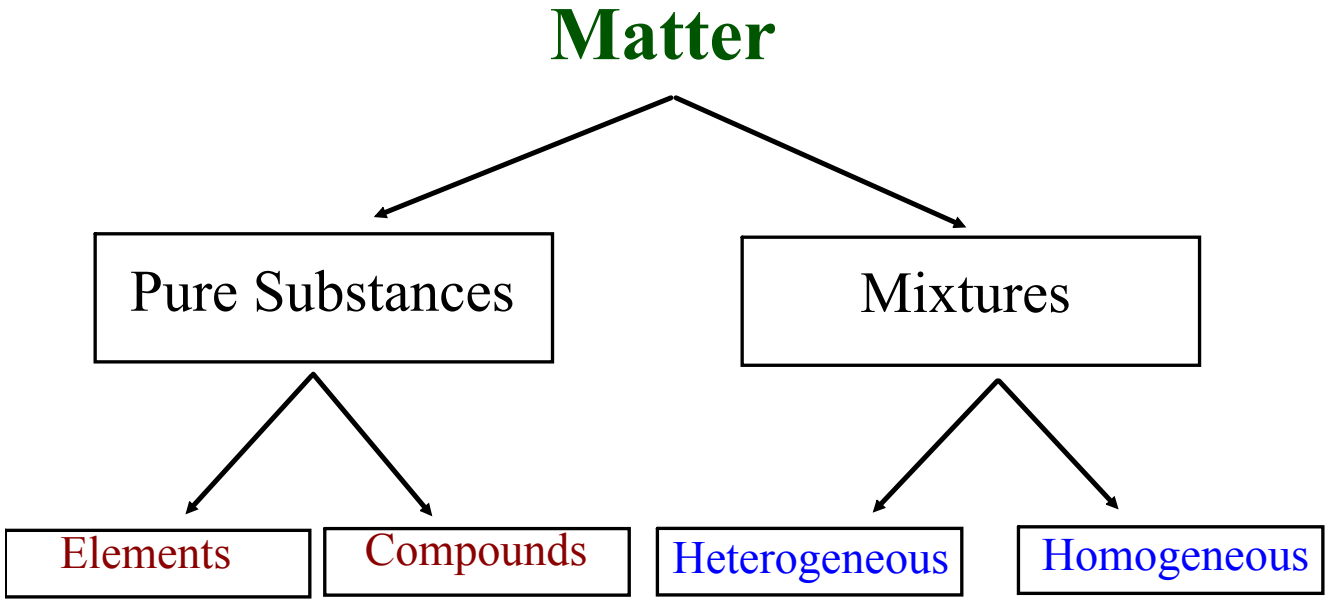
Warm Up

	Element	Compound	Molecule
Fe_2O_3		✓	✓
P_4	✓		✓
Mo	✓		
KF		✓	✓
Na_2CO_3		✓	✓


Matter
Pure Substances
Mixtures
Elements
Compounds
Heterogeneous
Homogeneous

Types of Matter

Pure Substances - matter whose composition is constant and uniform
Ex. gold

Mixtures - impure substances
- matter whose composition varies.

Heterogeneous Mixtures - are non-uniform and may have **more than one phase.**
Ex. cornflakes and milk

Homogeneous Mixtures - are uniform and consist of **one phase**
Ex. salt water (solutions)

Atom - **the smallest particle** into which an element can be separated
- basic building blocks of matter

Elements - a substance made up of only **one type of atom**
- cannot be separated into simpler substances by chemical or physical means

Compounds - substances containing **atoms of more than one element** chemically combined in a definite fixed ratio
- can be separated into simpler substances by chemical means

Molecule - a distinct particle made up of **two or more atoms.**
Ex. H_2O (one molecule of water has two hydrogen atoms and one oxygen atom)

does not have to be two different elements

Ex. H_2, O_2, N_2

It may be easier to think of it this way...

A molecule is formed when two or more atoms join together chemically.

A compound is a molecule that contains at least two different elements.

All compounds are molecules but not all molecules are compounds.

Chemical Formula - a group of symbols representing the number and type of atoms and ions in a chemical substance.

CHEMISTRY 112

Matter & Its Diversity

physical changes - are those in which no new substances are formed.

Ex. boiling - $H_2O_{(l)}$ --> $H_2O_{(g)}$

chemical changes - are those in which a new substance is formed.

Ex. $C + O_2$ --> CO_2

chemical reaction

qualitative knowledge - describes changes in matter not involved with a measured quantity. Ex. color

quantitative knowledge - involves a measure of the **amount** of matter or the **amount** of change in a measurable property of matter.

- involves a number (usually)

Ex. mass of magnesium is 1.2 g

empirical knowledge - observable information that can be measured.

Ex. dinosaurs did exist

theoretical knowledge - explains observations in terms of ideas.

Ex. dinosaurs died 65 million years ago due to an asteroid strike.

"Empirical knowledge derived from investigation, observation, experimentation, or experience, as opposed to theoretical knowledge based on logical or mathematical assumptions."

COMPONENTS OF EXPERIMENTAL DESIGN

Manipulated Variable (independent variable)

- the property that is being changed

Responding Variable (dependent variable)

- the property that changes as a result of the change in the manipulated variable.

Controlled Variable

- a property that is kept constant.

Example: How does sleep affect performance in school?

EXERCISE

p. 52 #20-27

. Section 2.1 notes