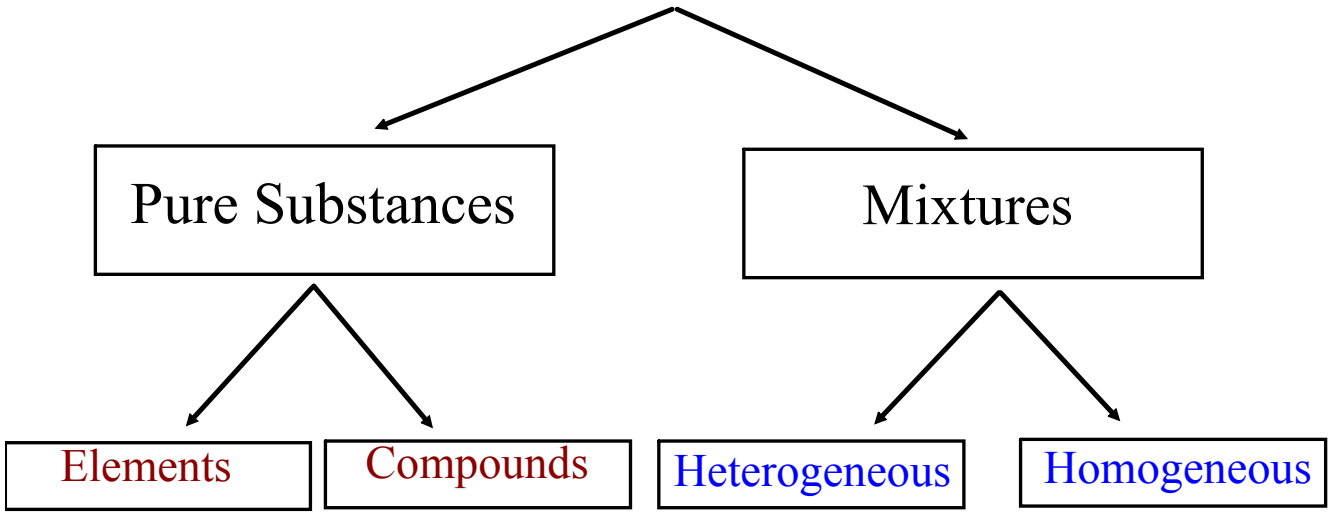
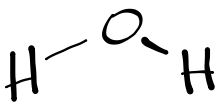
Warm Up

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

Matter


Pure Substances
Mixtures
Elements
Compounds
Heterogeneous
Homogeneous



NaCl

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 - $H_2O_{(l)}$ --> $H_2O_{(g)}$ state of matter

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

Ex. $C + O_2 \rightarrow CO_2$

↓

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 "tested"

theoretical knowledge - explains observations in terms of ideas.

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

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