

Chapter 1

Chemistry

Elements

- You must memorize the following element names and symbols
- Elements 1-30, Silver, Gold, Platinum, Tin, Lead, Mercury, Bromine, Titanium
- Quizzes
 - First 1-10, then 1-18, then all

Objectives

- **Define** chemistry.
- **List** examples of the branches of chemistry.
- **Compare and contrast** basic research, applied research, and technological development

What is Chemistry

- **Chemistry** is the study of the composition, structure, and properties of matter, the processes that matter undergoes, and the energy changes that accompany these processes



Branches of Chem

1. **Organic chemistry**
2. **Inorganic chemistry**
3. **Physical chemistry**

Branches of Chem (cont)

4. **Analytical chemistry**
5. **Biochemistry**
6. **Theoretical chemistry**

Branches (cont)

- All of these branches have one thing in common, they work with chemicals.
- A **chemical** is any substance that has a definite composition.
 - What does definite mean?

Research

- **Basic Research** is carried out for the sake of increasing knowledge.
 - how and why a specific reaction occurs
 - what the properties of a substance are
 - the discovery of Teflon™
- **Applied Research** is generally carried out to
 - Reduce carbon emissions
 - Increase mpg

Research

- **Technological Development** (Technology) typically involves the production and use of products that improve our quality of life.
 - Technology is the application of science
 - computers
 - catalytic converters in cars
 - biodegradable materials
- Basic research, applied research, and technological development often overlap

Assignment

- SG – 1.1
- Q - None

Section 1.2

Objectives

- **Distinguish** between the physical properties and chemical properties of matter.
- **Classify** changes of matter as physical or chemical.
- **Explain** the gas, liquid, and solid states in terms of particles.
- **Explain** how the law of conservation of energy applies to changes of matter.
- **Distinguish** between a mixture and a pure substance.

Demo

- Does air have mass?

Matter

- *Volume* is the amount of three dimensional space an object occupies.
- **Mass** is a measure of the amount of _____.
- **Matter** is anything that _____.

- **Weight** is a measure of mass and the force of _____ on an object.

4 Corners

- An **atom** is the _____ unit of an element that maintains the chemical identity of that element.
- An **element** is a _____

- A **compound** is a substance that can be broken down into simple stable substances. Each compound is made from the atoms of _____ elements that are chemically bonded.

Properties

- **Extensive properties** _____ on the amount of matter that is present.

- **Intensive properties** _____ on the amount of matter present.

In Class Activity

- Determine if the following are In or Ex Props
 - Freezing point
 - Amount of energy in a substance
 - Color
 - Shape
 - Conductivity
 - Amount of NRG to melt something

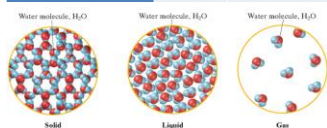
- ** Be careful when answering questions...
- EX. Give an example of an IP for water

Physical...

- A **physical property** is a characteristic that can be observed or measured _____ changing the identity of the substance.
- A **physical change** is a change in a substance that _____ involve a change in the identity of the substance.
- A **change of state** is a _____ change of a substance from one state to another.

Put this in your notes!

State of matter	Def V	Def Shape
Solid		
Liquid		
Gas		
Plasma		



Demo

- Beaker with paper spheres
 - Lightly shaking =
 - Moderate shaking =
 - Vigorous shaking =

Chemical...

- **Chemical property** relates to a substance's ability to undergo changes that transform it into _____ substances
- A change in which one or more substances are converted into different substances is called a _____ **change** or _____ **reaction**.

Demo

- Alka-Seltzer in water

Chemical Rxns

- **Reactants** = react (_____ side)
- **Products** – Are produced (_____ side)



Evidence of Chem Rxn

- Bubbles – (Alka in water)
- Forms a ppt
- NRG is released (light and/or heat) - Fireworks
- Color change (most of the time) – Leaf



a When acetic acid, in vinegar, and sodium hydrogen carbonate, or baking soda, are mixed, the solution bubbles as carbon dioxide forms.



b When solutions of sodium sulfide and cadmium nitrate are mixed, cadmium sulfide, a solid precipitate, forms.



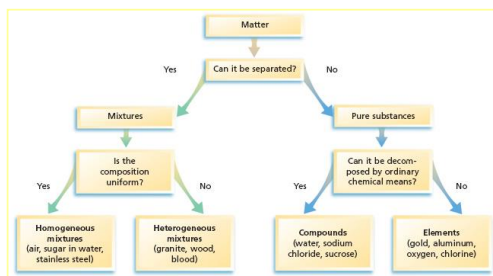
c When aluminum reacts with iron(III) oxide in the clay pot, energy is released as heat and light.



d When phenolphthalein is added to ammonia dissolved in water, a color change from colorless to pink occurs.

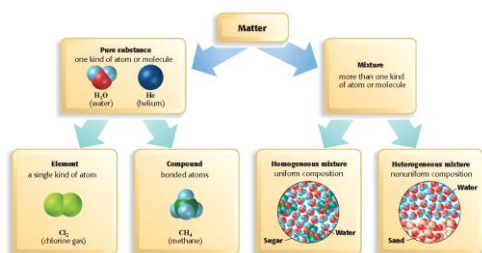
Small Groups

Classification of Matter



- Put in Notes – Make a nice one = Bonus

Classification of Matter (cont)



Mixtures

- A **mixture** is a blend of two or more kinds of matter, each of which retains its own identity and properties.
- mixed together physically
 - can usually be separated

Mixtures

- _____ mixtures are called **solutions**
 - uniform in composition
- _____ mixtures not uniform throughout
- Separating Mixtures
 - Chromatography
 - Filtration (size)
 - Centrifuge (density)
 - Magnetism

Pure Substance

- A **pure substance** has a _____ composition.
- Pure substances are either _____ or _____.
- A pure substance differs from a mixture in the following ways:

Quick Activity

- Determine if the following are mixtures (and type) or pure substance

Assignment

- SG – 1.2
- Q – 1,2,4

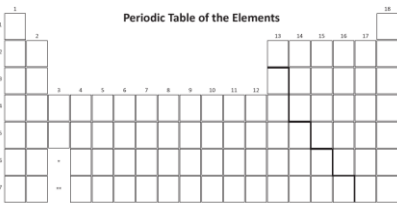
Section 1.3

Objectives

- **Use** a periodic table to name elements, given their symbols.
- **Use** a periodic table to write the symbols of elements, given their names.
- **Describe** the arrangement of the periodic table.
- **List** the characteristics that distinguish metals, nonmetals, and metalloids

Draw a PT on board and label the following:

1. Group
2. Period
3. Metals
4. Nonmetals
5. Metalloids
6. Noble Gases
7. Family



Periodic Table of the Elements

1	2																	18
2																		
3																		
4																		
5																		
6																		
7																		

18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1

- **Group (Family)**- _____
– Similar Properties
- **Period** – _____ Row
- Chem and Physical Props change “regularly” across period

- **Metals** – Good Conductor of heat and electricity
 - Solid at RT
 - Malleable – Thin Sheets
 - Ductile – Wire
 - Ex. Copper, Ni, Al, Sn
- **Nonmetals** – Poor conductor of heat and electricity
 - Mostly gases
 - Brittle
 - Ex. C, H, He
- **Metalloid** – Characteristics of both M and NM
 - Solid at RT
 - Semiconductor of electricity
- **Noble Gases**
 - Group 18
 - Unreactive
 - Gas at RT

Assignment

- 1.3 Wkst
- Optional - End of Chapter Questions (EOCQ) – 4-24,26-29
