

Chemistry 221 - Lect 2 - 9/28

If you missed the first day of class:

- Access class notes, etc using the web site
- <http://web.pdx.edu/~shusteg>

You must attend your lab this week.

You may enroll in CH 299 - Chem Workshops

How do we learn about chemicals?

- Classify them by their behaviors
- Categories allow us to predict other behaviors (e.g., drug design)
- Do tests or experiments
- Identify their properties

Question: How do iron and silver differ?

How can I tell them apart?

- Ideas?

What experiment might I run?

They behave differently when exposed to air and water !!!

This is example of a Chemical Property

Demonstration: other behaviors

Mixture: Oil, Water, Food Coloring

- Which layer does food coloring mix with?
- Which layer is on bottom?
- Which physical property relates to this observation?

Physical Properties?

Allow us to recognize and distinguish a substance from other substances

- Density
- Color
- Odor
- Melting point
- Boiling point
- Hardness

Density = Mass per unit volume
 $= m/V = \text{g/cm}^3 = \text{g/mL}$

Density of water $\sim 1 \text{ g/cm}^3$
 $= 0.997 \text{ g/cm}^3 @ 25 \text{ }^\circ\text{C}$

Is oil more or less dense than water?

- What would you see if more dense?
- What would you see if less dense?

How are steel and silver different?

- Same physical properties?
- Same chemical properties?

Why not?

- Composed of different elements
- Elements: basic building blocks of matter - composed of only one kind of atom.
- Steel is more than one element!

Identification of Elements:

Elements were first identified by chemical properties

- Gave rise to element names

Now: number of protons identifies element

- atomic number
- still use name....

Element Representation

Chemical symbols:

- Based on name of element
- Found on the periodic table
- Hydrogen - H Helium - He

Vocabulary of chemists:

H ₂ O	water
CO ₂	carbon dioxide

Classification of Elements

Periodic table - lists in order of atomic #

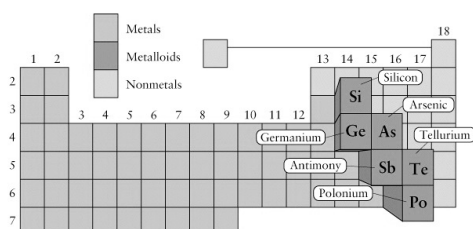
Three basic classifications:

- *Metals, nonmetals, metalloids*
- How would you describe a metal?

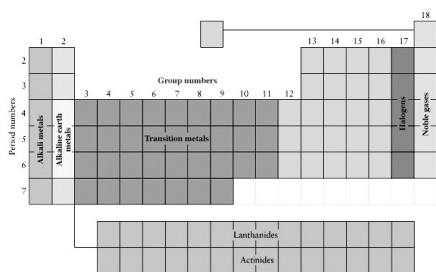
Organization also has further groupings:

- columns are called *groups* - names

Classification of Elements



Element Groups



Cooperative Problems

- Things to think about
 - What assumptions are you making?
 - What approximations?
 - Challenge each other
 - All contribute
- Set up groups
 - minimum of 3, max of 5
 - pick a recorder
 - introduce yourself
 - record names

Problems: do as many as you can

1. Ping Pong Balls
 2. Haiku challenge
 3. Coke/Diet Coke Demo:
 - What is happening and why?
 - How would you test your hypothesis
 - Detail some experiments
- Turn in with names of group members

Ping Pong Balls

Determine the number of ping pong balls needed to fill the lecture hall.

Report your answer in both English and metric units.

Supplies: rulers and ping pong balls

Haiku Challenge

(courtesy of Targol Saedi)

A haiku is a poem that has the following rhyme pattern:

- Line one: five syllables
- Line two: seven syllables
- Line three: five syllables

Create two separate haiku with the following elements using their NAMES not symbols:

Haiku

- Two elements that are in the same family can not be used in the same poem.
- Elements that are in the same period must be in the same line.
- Each line may not have a mass of more than 250 amu.

The elements are:

Ag, Mn, Li, Ni, Se, Cu, P, Sr, Ti, C, Cr, Zn, Cl

Form a HYPOTHESIS:

A tentative explanation of some regularity of nature.

What would your hypothesis be??

What experiments would you do to test your hypothesis?
