Unit 4 NAME

Class Work 12/3/13

4.7 Atomic Radius

SPARK: (take out 4.5 HW for checking and place project on front counter!)

1. What is another word for temperature?
2. What equation would you use to find the heat of a phase change?
3. Draw the Lewis Dot diagram for Sodium

Objective

SWBAT explain how atomic radius changes as we move down a group and across a period on the periodic table.

BINDER QUIZ!

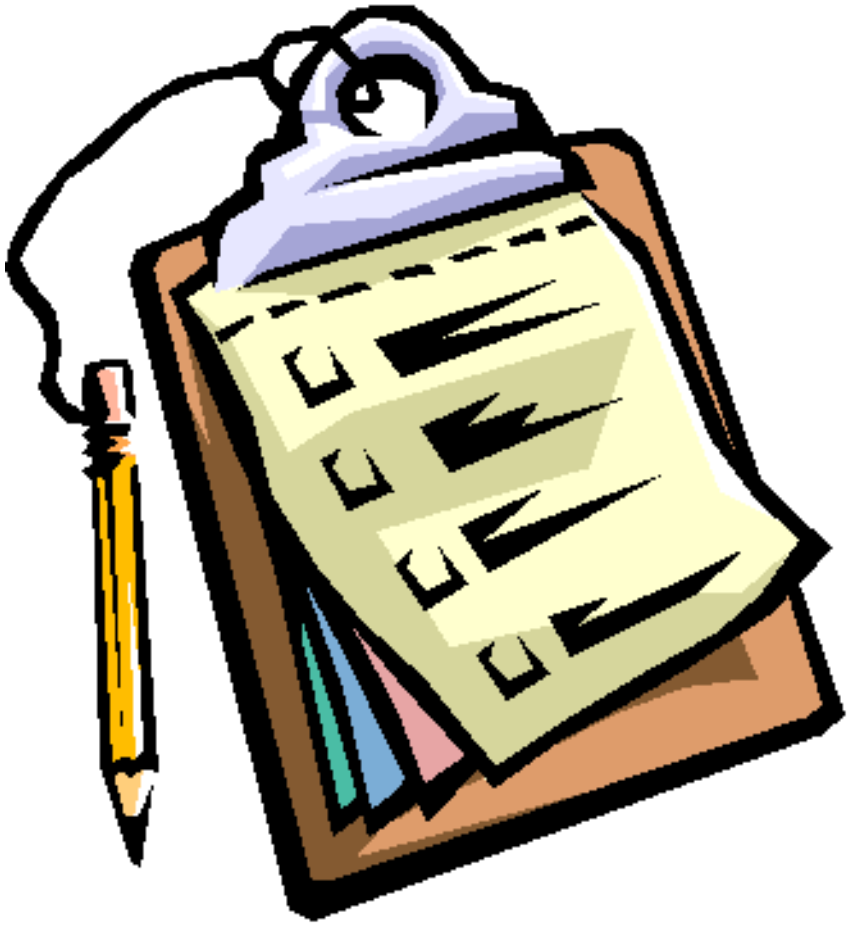
- When you are finished, grab a lab sheet and read the background and objective

Review of HW

- 4.4 and 4.5

Agenda:

- Do Now/Objective
- Lab
- Homework



Objective: SWBAT explain how atomic radius changes as we move down a group and across a period on the periodic table.

Atomic Behavior: "Personality"

- Defined by valence electron configuration!
  - Atomic Size
  - Type and size of ions it will form
  - "Appetite" for electrons
  - Willingness to "associate" with other atoms in chemical bonding

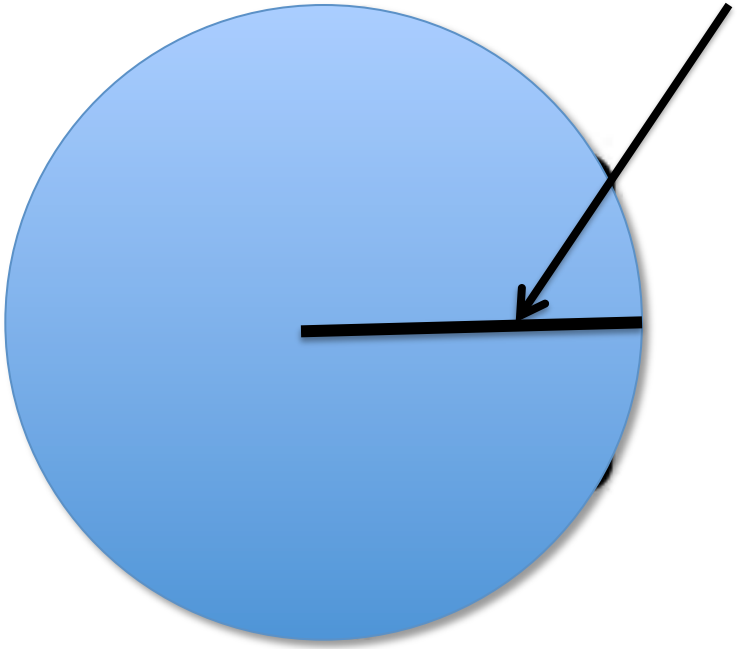
Objective: SWBAT explain how atomic radius changes as we move down a group and across a period on the periodic table.

Atomic Size

Purpose: Identify trends in atomic size.

How do we discuss the size of a sphere??

Atomic radius will tell us the size of an atom.



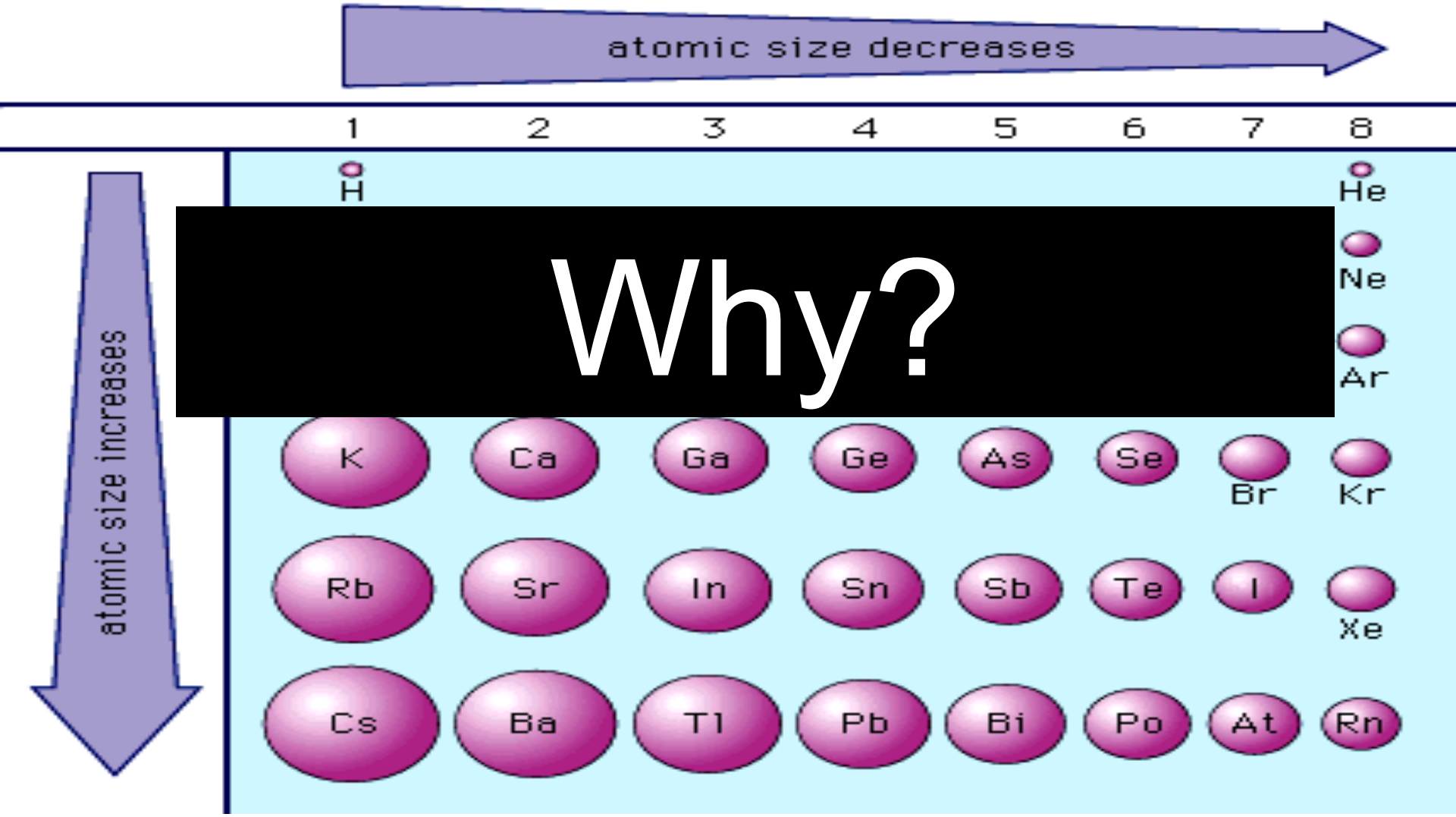
Objective: SWBAT explain how atomic radius changes as we move down a group and across a period on the periodic table.

Lab #10 – Graphing Atomic Radii

- Read the background and objectives of the lab.
- You have the rest of the first period to complete the lab, analysis and conclusions!

Objective: SWBAT explain how atomic radius changes as we move down a group and across a period on the periodic table.

Atomic Radius



Why?

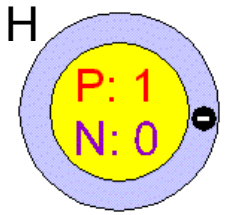
Atomic Radius

Depends on how far away the electrons are.

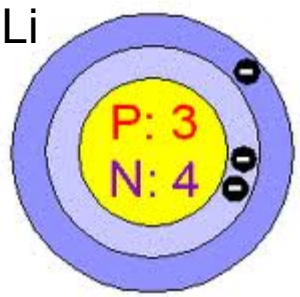
Recall unlike charges  and like charge 

1. As you go across a period (left to right) each added proton attracts the valence electrons more strongly
2. Even though electrons repel each other, the added electron does not repel strongly enough to overcome the extra attraction.
3. The attractive force ALWAYS increases more than the repulsive force until …

   an electron is forced to go into a higher energy level and start a new row.



Trend: Atomic Radius



- Down a Group: atomic radii increases because you are adding electrons to a higher energy level (shell), farther from the nucleus

- Across a Period: atomic radii decreases because you are adding a proton and an electron each time you go to the right, ***but*** the electrons are in the ***same energy level***, and more protons means a stronger pull on the electrons in that energy level, pulling them in tighter

Arrange these Atoms

In order of biggest to smallest atomic radius

- Li, C, F
  - All are in the **same period** and thus have the **same number of energy levels**.
    - Therefore, the important factor is the **number of protons**
  - Li – largest (smallest number of protons that pull the electrons toward the nucleus less than the others)
  - F – smallest (largest number of protons that pull the electrons toward the nucleus more than the others)
- Li, Na, K
  - All are in the **same group.**
    - Therefore, the important factor is the number of energy levels.
  - Li – smallest (uses the smallest number of electron energy levels)
  - K – largest (uses the largest number of electron energy levels)

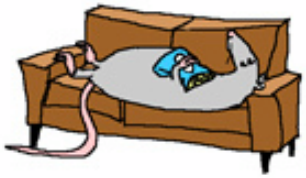
Ways to remember!

- **L**azy **R**ats **G**et **P**oorer

- **T**rickster **B**ees **A**ct **S**uperior

Unlock the Trends in 2 Steps!

- **Step 1: Across a Period**



- **L**eft → **R**ight:
  - **G**ain **P**rotons (**s**ame **s**hell) → **G**reater **P**ull (**s**hell **s**maller)

- **Step 2: Down a Group**
- **T**op → **B**ottom
  - **A**dditional **S**hell → **A**dded **S**pace

Trend: Atomic Radius
Use the Steps!

- **Step 1: L**eft → **R**ight:
  - **G**ain **P**rotons (**s**ame **s**hell) → **G**reater **P**ull (**s**hell **s**maller)
  - Adding protons (positive charge is increasing)
  - Adding electrons to the same energy level (same shell)
  - More protons means a stronger pull on the electrons in that energy level, pulling them in tighter

- **Step 2: T**op → **B**ottom
  - **A**dditional **S**hell → **A**dded **S**pace
  - Adding electrons to a higher energy level (shell)
  - Electrons are farther from the nucleus

Independent work

- Answer questions on the back of your guided notes
- You may work with the person next to you.
- You have until 5 minutes before the period is over to finish or it becomes homework!

Atomic Radius

Exit Ticket: What are the trends on the periodic table for the atomic radius of elements?

HOMEWORK

Finish independent work or lab!

Quiz on valence electrons tomorrow!

Objective: SWBAT to classify an element as a metal, non-metal, or metalloid based on its properties and location on the periodic table.