A GRAPHING EXPERIENCE!

Ionization Energy vs. Atomic Number

Purpose: To graphically represent the variation in atomic radius within the first 20 elements on the periodic table.

Questions to consider:

1. What is "Ionization Energy?"
2. How does Ionization Energy vary within a horizontal row on the periodic table?
3. How does Ionization Energy vary within a column on the periodic table?
4. What causes these changes?

Directions: READ THESE !!!!! **USE CHROME!!!**

Part A ---- Getting the DATA

1. Open a google sheet.
2. In a separate window in the browser, open howechem.net
3. Go to the homework section of the website and click on the ionization energy table.

4. In column A of the google sheet, enter the atomic numbers of the **first 20** elements on the periodic table.
5. In column B, enter the Ionization Energy data from the web link above

Part B ---- Making the GRAPH

1. Highlight all of the information on the spreadsheet.
2. Under the "insert" menu, choose "chart."

3. When the “chart editor” pops up, be sure that “line chart” is the chart type and that the “use column A as labels” box is checked.
4. Click on the "CUSTOMIZE" tab.

5. Using the “chart and axis titles drop down menu, title the graph as follows:
   Δ Ionization Energy Vs. ATOMIC NUMBER
   (Δ is option or alt J depending on your keyboard.)
6. Bo back up to the “Type” drop down menu and label the horizontal axis "Atomic Number."

7. Repeat step 6 and label the Y axis "Ionization Energy (KJ/mole)"
8. Scroll down to series and make the point size 10 px.

9. Also under “series,” select your favorite point shape
10. PRINT one per person, and answer the following questions.

Questions:

1. What is the **biggest** element on the graph?(from the atomic radius data) _____
2. What is the **smallest** element on the graph? (from the atomic radius data) _____
3. Which of these has the largest ionization energy? _____
4. Which of these has the smallest ionization energy? _____

5. How does ionization energy change from Li to Ne? _____

6. How does ionization energy change from H to He? _____

7. How does ionization energy change from Na to Ar? _____

8. How does ionization energy change within any row on the periodic table? _____

9. Which has a higher IE? S or Si? _____

10. Which is more protons? S or Si? _____

11. Which has more protons? Na or Ar? _____

12. Which has a higher IE? Na or Ar? _____

13. **SO FAR**, how does the number of protons affect ionization energy? _____

14. Arrange the following from LOW IE to HIGH IE: Li, K, Na, H _____

15. Arrange the following from LOW IE to HIGH IE: Ar, He, Ne _____

16. Which has a higher I E larger? O or S? _____

17. How does ionization energy change going down a column on the periodic table? _____

18. Which has more protons: Na or K? _____

19. Which has a higher IE? Na or K? _____

20. DOES YOUR ANSWER TO 13 still MAKE SENSE? _____

21. WHAT OTHER FACTOR (besides protons) might affect ionization energy? _____

22. What is the effect of inner shell electrons on the outer shell? _____

SUMMARY:
As long as atoms are in the same horizontal row, more protons will cause atoms to be _____ and their ionization energy to be _____.
When moving down a column, the addition of _____ _____ SHIELDS the outer shell from the _____, which causes the atom to be _____ even though there are more protons. This causes their ionization energy to be _____.

BOTTOM LINE:

Atoms get _____ when moving from left to right on the periodic table, which causes their ionization energy to be _____ and _____ when moving from top to bottom, which causes their ionization energy to be _____.