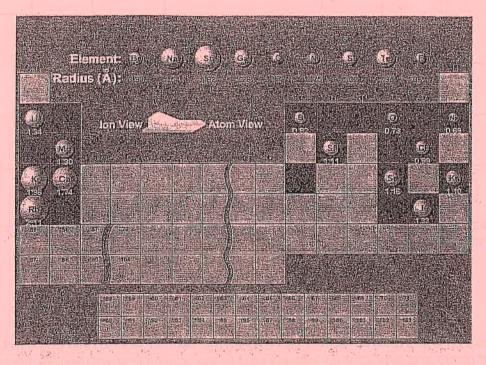
Atomic Radius

The atomic radius of an atom can be used to predict all of the other trends on the periodic table. If you can understand what the trend is, and more important, why the trend is what it is, the rest of this unit should fall into place!

Google: Labactivity on periodicity SP05

Question: How do we use the model of the electronic structure of the atom to understand periodic trends of the elements? Using a web browser access the following address: http://www.chem.iastate.edu/group/Greenbowe/sections/projectfolder/flashfiles/matters/periodicTbl2.html

When the animation starts you will see Figure I below: MAKE SURE YOU ARE ON ATOM VIEW



Answer the following questions in complete sentences.

- 1. Explain what the numbers below each of the 'pictures' of atoms measure?
- 2. What property is this animation showing you?
- 3. Describe the two trends for atomic sizes you see on this diagram.

*Using the mouse, click on an atom in the row of atoms above the periodic table and drag them to their respective location in the periodic table.

*Select one of the Groups (1, 2, 16, or 17) and complete the following table:

Table 1: Group data

	Group a						
(a) Element symbol	(b) Atomic Radius	(c) # of protons	(d) Total # of electrons	(e) Electron configuration	(f) # of inner core electrons	(g) # of valence electrons	(h) Energy level occupied by valance electrons
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Use Table 1 to assist in answering the following questions.

1) Which column (c-h) in Table 1 cannot explain the trend of atomic radii observed in your group and why?

2) Which columns (c-h) in Table 1 can explain the trend in atomic radii observed in your group and why?(put an asterisk next to the column that you believe best explains the trend)

3) Explain how atomic radius changes as you go down a Group and why it changes. You must reference electron shielding in your response.

*Select one of the Periods and complete the following table:

Table 2: Period data

	ole 2: Per	iou uata	(4)	(0)	(6)	(a)	(h)
(a) Element symbol	(b) Atomic Radius	(c) # of protons	(d) Total # of electrons	(e) Electron configuration	(f) # of inner core electrons	(g) # of valence electrons	(h) Energy level occupied by valance electrons
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Use Table 2 to assist in answering the following questions.

- 4) Which columns (c-h) in Table 2 cannot explain the trend in atomic radii observed in your period and why?
- 5) Which column (c-h) in Table 2 best explains the trend in atomic radii observed in your period and why?
- 6) Explain how atomic radius changes as your go across a period and why it changes.

*You will need to switch back and forth between ion view and atom view to collect the data for the last table

Table 3: ions and atoms

1		J. IOIIS at						
	(a) Element symbol	(b) Atomic Radius	(c) # of protons	(d) Total # of electrons	(e) Electron configuration	(f) # of inner core electrons	(g) # of valence electrons	(h) Energy level occupied by valance electrons
	Na							
141	Na ⁺			1111111 E III E	10 15 10 10 10 10 10 10 10 10 10 10 10 10 10		(0.000) (1.100)	\$ 00 mark 10 m p \ 60
	Mg	-						
	Ne							
	CI							
	Cl						2	

Use Table 3 to assist in answering the following questions.

7) There is only 1 proton and electron difference between Ne and Na yet their atomic radii are very different. Explain (making sure to reference different amount of energy levels or electron shells).

8) Explain why Na and Mg have a similar atomic radius. (make sure to reference amount of electron shells)

9) Explain why Mg is smaller than Na.	
10) Explain why Na is bigger than Cl.	
11) Which is bigger, Na or Na ⁺ ? Explain why there the same element when it becomes an ion.	is a change in atomic radius for
12) Which is bigger, CI or CI? Explain why there is same element when it becomes an ion.	a change in atomic radium for the
13) Which is bigger, Na⁺ or Cl⁻? Explain.	

Connecting Atomic Radius to the other trends

infecting Atomic Nations to the other fields
14) Define electronegativity
15) Define electron shielding
16) Explain why as you go down a group electronegativity decreases. (make sure to reference electron shielding/electron shells)
17) Explain why electronegativity increases as you go across a period. (make sure to reference protons and shells of electrons)
18) Define ionization energy
19) Explain why ionization energy is low when a metal is very reactive
20) Explain why ionization energy decreases as you go down a group. (make sure to reference electron shielding/electron shells)
21) Explain why ionization energy increases as you go across a period. Make sure to reference protons and shells of electrons)