1. Where are the electrons? Why this trends?

Name ANSWERS

Period

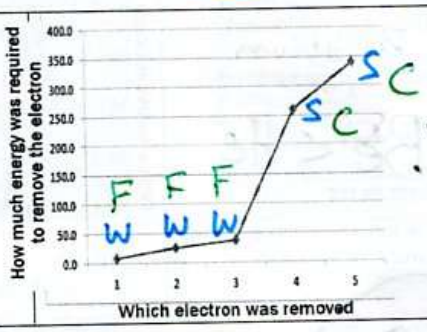
Periods and Groups

1. How many elements are in Group 1? seven
2. How many elements are in Group 18? six (seven?)
3. How many elements are in Period 2? eight
4. What is the Group name for Group 1? ALKALI METALS
5. What is the Group name for Group 18? NOBLE GASES

6. Which should be harder to remove,
   a. an electron that is close to the nucleus
   b. an electron that is far from the nucleus

7. Which should be harder to remove,
   a. an electron that is in an atom with 5 protons
   b. an electron that is in an atom with 6 protons

8. Next to each data point, depending on how strongly the nucleus attracts that electron, write a letter for (S)trong or (W)eak.or (M)edium.



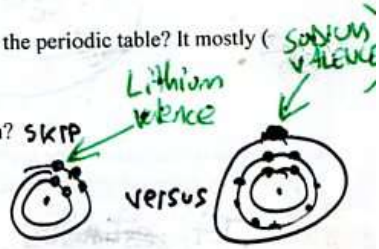
9. Now, next to each data point, based on your answers so far, either write (F)ar or (C)lose next to each data point, to indicate that electron's distance from the nucleus.

10. Look at your notes from today. How does the atomic radius change as going from left to right on the periodic table? It mostly (shrinks / stays the same / grows)

11. How does the atomic radius change as going from hydrogen to lithium to sodium on the periodic table? It mostly (shrinks / stays the same / grows)

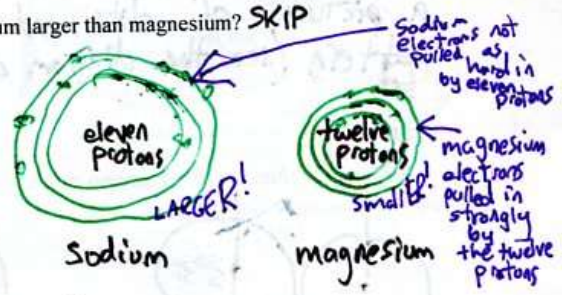
12. For full credit, answer in an a complete sentence. Why is sodium larger than lithium? SKIP

Lithium's valence e⁻ are in a closer level:

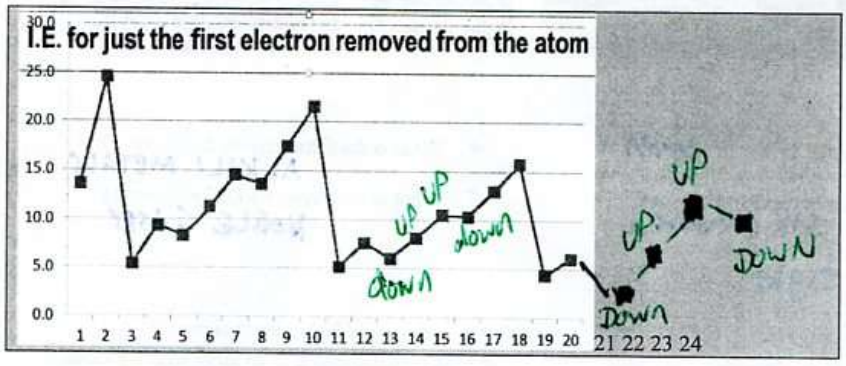


13. For full credit, answer in an a complete sentence. Why is sodium larger than magnesium? SKIP

Sodium has fewer protons in the nucleus so it pulls less.



14. Look at the pattern from electron #3 to electron #10 and then how it repeats from #11 to #18 . In the grey space to the right, extend the pattern by drawing where you think the next four dots should be . Be brave!



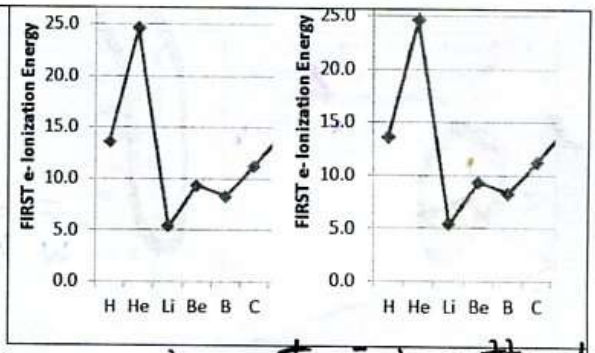
15. According to this chart, which requires more energy removing one electron from Beryllium or Lithium?

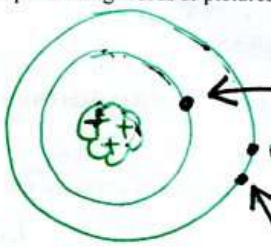
Beryllium

Arrange these three elements in order, from easiest to ionize to most difficult.
{He, Li, Be}

Li < Be < He

Why does the trend for I.E. for these three elements go down and then up again? (explain using words & pictures)





Helium's outermost e⁻ is pretty close to the nucleus so it's hard to ionize it away

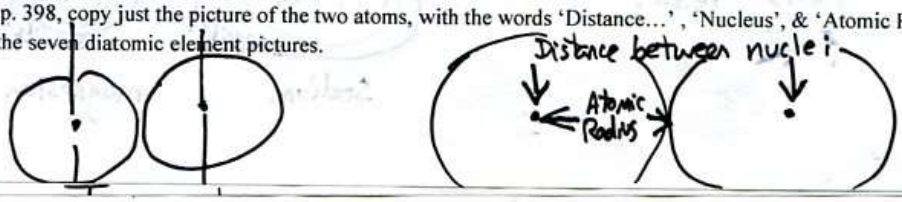
Lithium valence e⁻ farther out, easier to steal

Beryllium far out BUT more protons in nucleus than for Lithium! So HARDER to steal

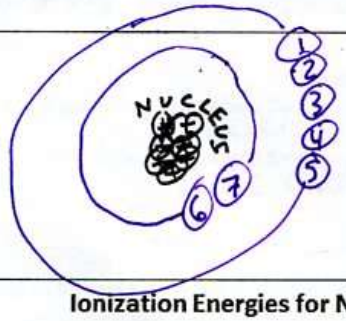
16. (p. 398 in the textbook. The textbook is available at the class website next to today's date) How does XRay diffraction provide an estimate of the distance between two nuclei?

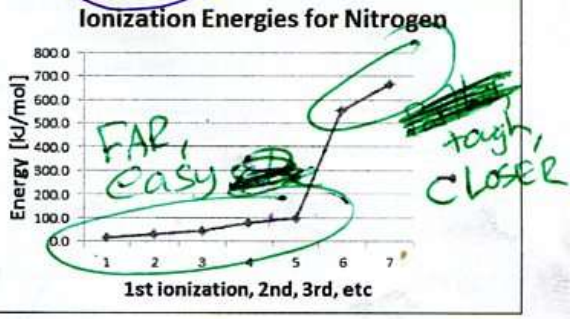
It estimates the distance by taking a picture of dots and analyzing the pattern (see the diagram on p. 398)

17. From p. 398, copy just the picture of the two atoms, with the words 'Distance…' , 'Nucleus', & 'Atomic Radius'. Don't copy the seven diatomic element pictures.



18. In the white box at right sketch an atom in a cartoon style similar to the one shown at left but make it different in two ways:
    - Make it a sketch for the nitrogen atom with the ionization energy graph below
    - where each electron should be, write a number that matches each of the numbered ionizations from the graph below





19. In the white box sketch an atom in a cartoon style similar to the one shown here but make it different in two ways:
    - Make it a sketch for the magnesium atom with the ionization energy graph shown below
    - where each electron should be, write a number that matches each of the numbered ionizations from the graph below