


Name: \_\_\_\_\_

Period: \_\_\_\_\_

## Periodic table boot camp basics

The student will review the periodic trends including neutral atomic size, ion size, ionization energy, electro negativity, and understanding the size change when a neutral atom becomes an ion.

<b>5</b> <b>B</b> <b>B<sup>+3</sup></b> <b>cation</b>
Valance electrons <u>  3  </u> Electron configuration <u>[He] 2s<sup>2</sup>2p<sup>1</sup></u> Dot diagram B Size <div style="text-align: center; margin-top: 10px;">  </div>

**Step 1:** complete the squares for each element. This includes atomic number, neutral element formula, the ion formula, and label cation, anion, or neutral  
**Step 2:** Determine the electron configuration  
**Step 3:** Draw the Lewis dot diagram structure for each element

**Step 4:** use the following colors to shade in the square for each element. You should only color the small square in the upper left hand corner and not the entire card.

Green = Li and Na      Pink = O and S      Blue = Be and Mg      Purple = F and Cl  
 Orange = B and Al      Red = C and Si      Tan = N and P      Yellow = He, Ne, Ar

**Step 5:** Cut the cards and arrange according to atomic number, just like Henry Mosley did. Look at the pattern below. Once you have the cards arranged in the correct order, glue them to a large sheet of construction paper. Also add the arrows on the construction paper to show the periodic trends.

1							2
3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18

**Step 6:** Answer the questions on the back of this worksheet using the information on your periodic table.

<p style="text-align: center;">— <b>B</b> — —</p>	<p style="text-align: center;">— <b>Li</b> — —</p>	<p style="text-align: center;">— <b>Ne</b> — —</p>
<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>B</b></p> <p>Size</p>	<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>Li</b></p> <p>Size</p>	<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>Ne</b></p> <p>Size</p>
<p style="text-align: center;">— <b>He</b> — —</p>	<p style="text-align: center;">— <b>C</b> — —</p>	<p style="text-align: center;">— <b>P</b> — —</p>
<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>He</b></p> <p>Size</p>	<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>C</b></p> <p>Size</p>	<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>P</b></p> <p>Size</p>
<p style="text-align: center;">— <b>S</b> — —</p>	<p style="text-align: center;">— <b>Mg</b> — —</p>	<p style="text-align: center;">— <b>H</b> — —</p>
<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>S</b></p> <p>Size</p>	<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>Mg</b></p> <p>Size</p>	<p>Valance electrons __ Electron configuration _____</p> <p>Dot diagram <b>H</b></p> <p>Size</p>

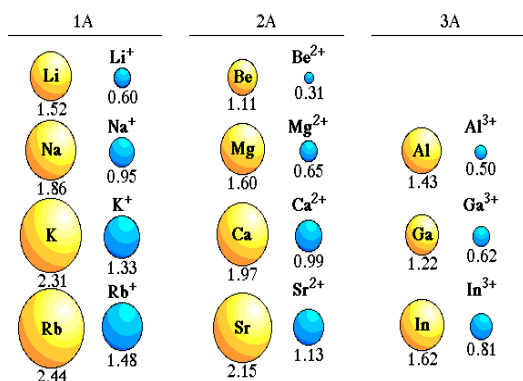
<p style="text-align: center;">N</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>	<p style="text-align: center;">Al</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>	<p style="text-align: center;">F</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>
<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">N</p> <p>Size</p>	<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">Al</p> <p>Size</p>	<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">F</p> <p>Size</p>
<p style="text-align: center;">Ar</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>	<p style="text-align: center;">Si</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>	<p style="text-align: center;">Na</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>
<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">Ar</p> <p>Size</p>	<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">Si</p> <p>Size</p>	<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">Na</p> <p>Size</p>
<p style="text-align: center;">Be</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>	<p style="text-align: center;">O</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>	<p style="text-align: center;">Cl</p> <p style="text-align: center;">—</p> <p style="text-align: center;">_____</p>
<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">Be</p> <p>Size</p>	<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">O</p> <p>Size</p>	<p>Valance electrons __</p> <p>Electron configuration</p> <p>_____</p> <p>Dot diagram</p> <p style="text-align: center;">Cl</p> <p>Size</p>

**You have cut and pasted the element blocks and ARROWS at this point and you are ready to answer the questions!!!!!!**

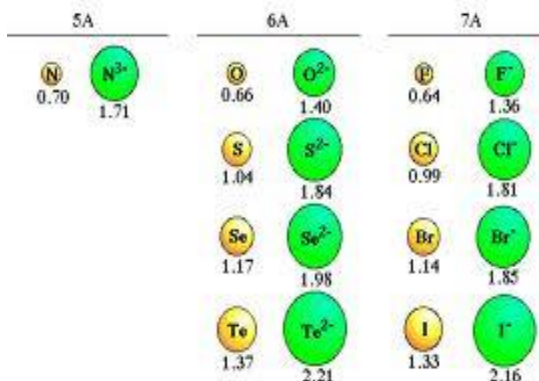
Periodic table basics:

1. What happens to the size of the atomic radius of an atom going down a group? \_\_\_\_\_
2. What happens to the size of the atomic radius of an atom going across a period? \_\_\_\_\_
3. A \_\_\_\_\_ is when an atom or group of atoms have gained or lost an electron.
4. The energy required to remove one electron from a neutral atom of an element is the \_\_\_\_\_.
5. The green colored elements represent the \_\_\_\_\_ family.
6. The purple colored elements represent the \_\_\_\_\_ family.
7. The blue colored elements represent the \_\_\_\_\_ family.
8. The yellow colored elements represent the \_\_\_\_\_ family.

Atomic/Ionic Radii



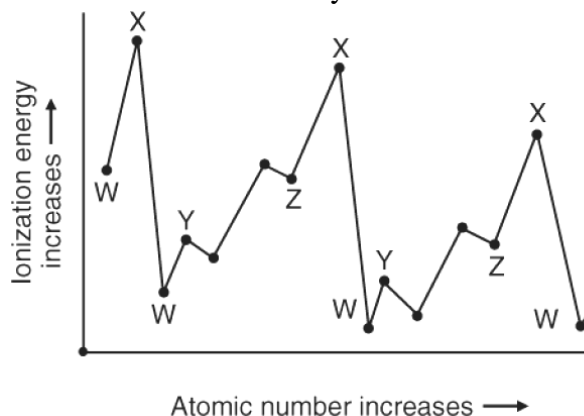
Atomic/Ionic Radii



# Recognizing Periodic Trends

## IONIZATION ENERGIES

This is a graph of the ionization energies for the first 20 elements by atomic number.



Use the information on this chart to determine which families are W, X, and Y:

	1	2	3	14	15	16	17	18
1	H 1	<b>Ionization Energy</b>						He 2
2	Li 3	Be 4	B 5	C 6	N 7	O 8	F 9	Ne 10
3	Na 11	Mg 12	Al 13	Si 14	P 15	S 16	Cl 17	Ar 18
4	K 19	Ca 20						

9. W is the \_\_\_\_\_ family.
10. X is the \_\_\_\_\_ family.
11. Y is the \_\_\_\_\_ family.

## SIZES OF ATOMS & IONS

For each pair, circle the LARGER one (size, not mass):

12. N                      F
13. Ne                      Ar
14. Mg                      Mg<sup>2+</sup>
15. Br                      Br<sup>-</sup>
16. K                      Ca
17. Si                      O
18. O                      O<sup>2-</sup>
19. Al                      Al<sup>3+</sup>
20. S                      Ar
21. Na                      F

In each group of atoms, circle the atom with the...

22. largest atomic radius

Li	Be
Na	Mg

23. largest ionization energy

C	N
Al	Si

24. smallest atomic radius

S	Cl
Se	Br

25. smallest ionization energy

Cl	Ar
Br	Kr

26. Iodine, I, would have properties most like:

N, nitrogen

Cl, chlorine

Te, tellurium

Xe, xenon

27. Who is the most reactive alkali metal (group1)?

28. Which element is the most electronegative and found in the halogen family?

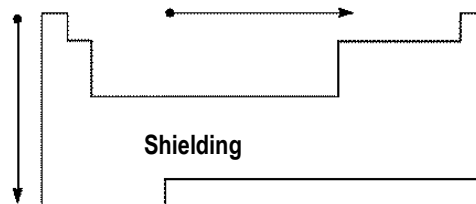
### Periodic Trend Definitions and Practice

29. Fill in the trend above each arrow (increasing, decreasing) or other.

Define shielding:

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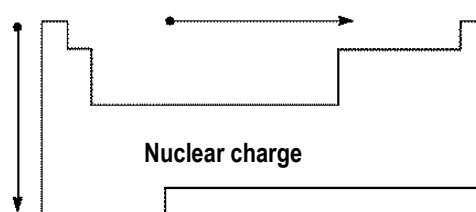


30. Fill in the trend above each arrow (increasing, decreasing) or other.

Define nuclear charge:

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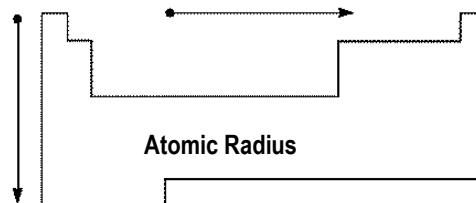


31. Fill in the trend above each arrow (increasing, decreasing) or other.

Define atomic radius:

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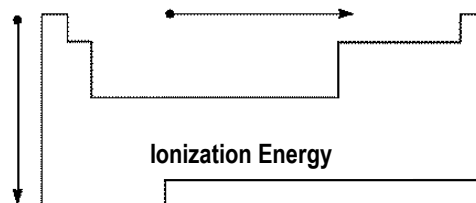


32. Fill in the trend above each arrow (increasing, decreasing) or other.

Define ionization energy:

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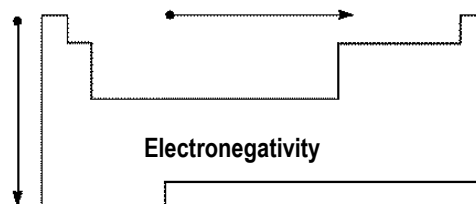


33. Fill in the trend above each arrow (increasing, decreasing) or other.

Define electronegativity:

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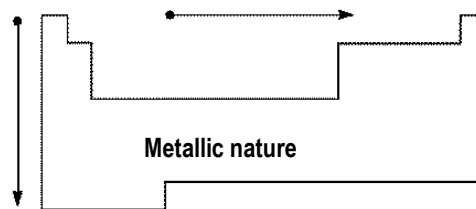


34. Fill in the trend above each arrow (increasing, decreasing) or other.

Describe some reasons why this trend might exist:

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35. For each of the following pairs, circle the atom with the lower ionization energy.

a. Li or Na

b. Cs or Ba

c. Cl or Br

d. O or F

36. For each of the following pairs, circle the atom with the greater atomic size.

a. Li or Na

b. Cs or Ba

c. Cl or Br

d. O or F

37. For each of the following pairs, circle the atom with the greater electronegativity.

a. Li or Na

b. Cs or Ba

c. Cl or Br

d. O or F

38. What is the name or group number given to the group of elements that have the following valence shell electron configurations?

\_\_\_\_\_ a.  $s^2$

\_\_\_\_\_ b.  $s^2p^6$

\_\_\_\_\_ c.  $s^2p^5$

\_\_\_\_\_ d.  $s^1$

\_\_\_\_\_ e.  $s^2p^2$

\_\_\_\_\_ f.  $s^2d^6$

Match the following orbital diagrams with the family. A. Alkali metal, B. Alkaline earth metal, C. Halogen, D. Transition metal, E. Noble Gas. Then write the symbol for the element.

