

PERIODIC TRENDS WORKSHEET

- Choose which statement about the alkali metals lithium and cesium is correct.
 - as the atomic number increases, the Electronegativity of the elements increases
 - as the atomic number increases, the melting point of the elements increases
 - as the atomic number increases, the first ionization energy of the elements decreases
 - as the atomic number increases, the atomic radius decreases
 - as the atomic number increases, the electron affinity increases
- The following elements and ions are isoelectronic (same number of electrons). Determine which of the following shows the correct order of their increasing radii:
 - $K^+ > Ar > Ca^{2+}$
 - $Ar > K^+ > Ca^{2+}$
 - $Ca^{2+} > K^+ > Ar$
 - $Ca^{2+} > Ar > K$
 - They all have the same radii
- Determine which element you would expect to have the lowest first ionization energy.
Li Cs H He Ba
- Identify which atom should have the largest value for the electron affinity:
He F Na Si Mn
- The following is a list of the usual charge found on the ions of a series of elements:
Y⁻ W²⁺ Z²⁻ V³⁺ X⁺
State which elements are most likely to be metals:
a) V, W and X b) V and W c) X and Y d) Y and Z e) only X
- Describe the relationship between the group number and the electron configuration of the elements in a group.
- Arrange the following elements in order of decreasing atomic size: sulfur, chlorine, aluminum and sodium. Explain if your arrangement demonstrates a periodic trend or a group trend
- Indicate whether the following properties increase or decrease from left to right across the periodic table. Account for the trend using the atomic model.
 - atomic radius (excluding noble gases)
 - first ionization energy
 - electronegativity
 - metallic character
 - electron affinity
- Describe the relationship between
 - ionization energy and electron affinity
 - electron affinity and electronegativity
- Would you expect the ionization energies for two isotopes of the same element to be the same or different? Justify your answer.
- When a chlorine atom forms an ion its radius increases, but when a sodium atom forms an ion its radius decreases. Explain this apparent contradiction.

1. Provide definitions for the following:

Ionization Energy:

Electron Affinity:

2. Fill in the blank:

Ionization energy _____ as you move down a group, and _____ as you move from left to right in a family.

Electron affinity _____ as you move up a group, and _____ as you move from right to left in a family.

3. Why is the electron affinity of bromine favorable, while for gallium it is not?

4. Why is the ionization energy of potassium much lower than that of iron?

5. Answer the following questions by circling the correct element.

Which is more electronegative?	Na	Rb
Which has the smallest radius?	Mo	Y
Which has the lower ionization energy?	Ga	Se
Which has the higher electron affinity?	Al	S
Which is less electronegative?	Ir	Co
Which has the larger radius?	W	Os
Which has the higher ionization energy?	Be	Ba
Which has the lower electron affinity?	Rb	Sr
Which has the smallest radius?	Au	Ag
Which is less electronegative?	Br	F

For the following pairs of atoms, circle the element with the stronger electronegativity.

1. Mg Na
2. C N

Name: _____

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Worksheet-Trends

3. S Se

4. O N

5. Cr Ti

For the following pairs of atoms, circle the element with the larger atomic radius.

6. Mg Sr

7. O N

8. S O

9. O F

10. Mn Ti

For the following pairs of atoms, circle the element with the higher ionization energy.

11. Na K

12. Si Ge

13. Cl F

14. O S

15. Cu V

For the following pairs of atoms, circle the element with the larger electron affinity.

16. Na Li

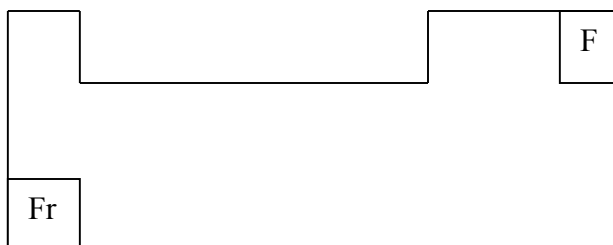
17. Si C

18. Cl Br

19. O N

20. Cu Au

Draw arrows that indicate the direction that each trend (ionization energy and electron affinity) increases on the periodic table.



Answer the following questions by circling the correct element.

1. Which is less electronegative? Na Rb
2. Which has the smallest radius? Mo Zr
3. Which has the lower electronegativity? Ge Sn
4. Which has the higher electron affinity? Al S
5. Which is less electronegative? I Cd
6. Which has the larger radius? W Cr
7. Which has the higher ionization energy? Be Ba
8. Which has the higher chemical activity? Rb Fr
9. Which has the smallest radius? Ni Ag
10. Which has less electron affinity? Br Te
11. Order the following in terms of increasing ionization energy: Mn, Co, V, Sc, Zn
12. Order the following in terms of increasing electron affinity: Al, In, Tl, B, Ga
13. Order the following in terms of decreasing atomic radius: Ba, Cs, Hf, La, Ta
14. Order the following in terms of increasing electronegativity: N, F, C, O, B

Circle T for a true statement, F for a false statement.

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|---|---|--|
| T | F | 16. Technetium is more electronegative than zirconium. |
| T | F | 17. Sulfur has a smaller atomic radius than silicon. |
| T | F | 18. Potassium has a higher ionization energy than cesium. |
| T | F | 19. Chlorine is less electronegative than fluorine. |
| T | F | 20. Aluminum has a higher chemical activity than sodium. |
| T | F | 21. Tin has a larger electron affinity than iodine. |
| T | F | 22. Arsenic is more likely to gain an electron than bromine. |
| T | F | 23. Manganese has a lower electron affinity than nickel. |
| T | F | 24. Calcium will lose an electron easier than beryllium. |