

PERIODIC LAW LAB

Answer the questions at the end of each section of the lab activity. In each case refer to the periodic table and look for patterns within groups or periods as you test each property.

PART A: SOLUTION COLOR

Using small amount of chemical, make solution with each of the following compounds. Use no more than a pea-size sample of solid and no more than 5-mL of water.

1. copper nitrate
2. iron(III) chloride
3. manganese chloride
4. calcium nitrate
5. sodium nitrate
6. magnesium nitrate
7. aluminum nitrate
8. chromium nitrate
9. gold chloride
10. lead nitrate

QUESTIONS

1. Record the colors of the solution.
2. How do you know that the color is being produced by the underlined element rather than the nitrate or chloride ion?
3. Look up the underlined elements. Elements that tend to produce colored solutions are located in what area of the periodic table?

PART B: DENSITY

Determine the density of each of the following elements. Return the sample to its container when you are done. DO NOT throw them away.

1. lead
2. silicon
3. tin

QUESTIONS

1. Record the density of each element with appropriate units.
2. What is the number of the group in which these elements can be found?
3. According to the results of this experiment, what happens to the density of elements as you go down a family/group?

PART C: REACTIVITY

Determine the relative reactivity of each of the following elements with water.

1. Your teacher will demonstrate sodium and potassium.
2. Put water into a test tube until it is half full. Warm the water by heating the test tube over a Bunsen burner. Place a small sample of magnesium in warm water. Record any evidence of a reaction.
3. Repeat step #2 using calcium in place of magnesium.

QUESTIONS

1. Sodium and potassium belong to which family?
2. Magnesium and calcium belong to which family?
3. According to your results,
 - a) what happens to reactivity as you go down a group/family?
 - b) what happens to reactivity as you go across a period?

PART D: SOLUBILITY

Make solutions of each of the compounds listed in 1-4 below. Use no more than a pea-size sample of solid and 2-3 mL of water.

- | | |
|----------------------|----------------------|
| 1. magnesium nitrate | 3. strontium nitrate |
| 2. calcium nitrate | 4. barium nitrate |

- a) Determine the relative solubility of each of the above compounds by mixing each with 2-3 mL of H_2SO_4 .
- b) Determine the relative solubility of each of the above compounds by mixing each with 2-3 mL of K_2CrO_4 .
- c) Determine the relative solubility of each of the above compounds by mixing each with 2-3 mL of Na_2CO_3 .
- d) Determine the relative solubility of each of the above compound by mixing each with 2-3 mL of $(\text{NH}_4)_2\text{C}_2\text{O}_4$.

QUESTIONS

1. What is the name of the family that includes Mg, Ca, Sr, and Ba?
2. According to your data, what happens to the solubility of the elements as you go down a family/group?

PARTE: ELECTRON CONFIGURATION

Write the electron configuration for each of the following elements.

- | | | |
|--------------|--------------|-------------|
| 1. lithium | 4. beryllium | 7. hydrogen |
| 2. sodium | 5. magnesium | 8. helium |
| 3. potassium | 6. calcium | 9. argon |

QUESTIONS

1. What happens to the number of electrons in the outer energy level of each atom as you go down a group/family?
2. What happens to the number of electrons in the outer energy level of each atom as you go across a period?
3. What is the relationship between the number of outer electrons and the number of the group/family?