

## AP Chemistry Summer Work

### **Google Classroom Code for summer work references and assistance:**

Welcome to AP Chemistry! This rigorous course will prepare you for the AP Chemistry test currently scheduled for May 6, 2024. Throughout the scope of this course we will cover many new topics including thermodynamics, kinetics, equilibrium, electrochemistry, nuclear chemistry, organic chemistry as well as review the topics covered in chemistry one and chemistry two. I promise to provide you with all the tools you need to succeed in this course if you promise to provide an open mind and willingness to learn. I'm very excited for this opportunity to enrich your lives even further with chemistry and am confident that we will have both a fun and educational experience together!

Your summer work focuses on reviewing the theories of the topics covered in chemistry one. These topics include:

- **Chemical Foundations**
- **Atoms, Molecules and Ions**
- **Stoichiometry**
- **Periodicity**

As far as actual summer work, you must complete the attached:

- Naming Review – Differentiate between type I, II, and III compounds and be able to go from name to formula and formula to name.
- Periodicity Review – Quantum numbers, electron configuration, and periodic trends. Periodic trends are referred to often over the course and need to be known.
- Stoichiometry review – This includes all of your conversions, naming, writing, chemical formulas (empirical, molecular, hydrates), and balancing equations and stoichiometry problems.

In the second document, you will find many resources to help aid you in your work. The attached periodic table is the only one that will ever be allowed to be used on a test or quiz and polyatomics will never be available or given. We will discuss the equation sheets upon your return but you should begin to use them and become familiar with them now.

Feel free to find others in the class to work together and problem solve any topics you are struggling with. You are also able to contact me: [amszoke@jacksonsd.org](mailto:amszoke@jacksonsd.org) over the summer – I will be sure to check my email periodically.

If you would like to get a head start for September, after we review chem. one material, we will be starting with gas laws.

Again, I look forward to a great experience this year! Enjoy your summer and come back ready to learn and have fun ☺

Mrs. Szoke



1. Complete the chart:

| Name of the element | Atomic symbol | Atomic number | Protons | Neutrons | Electrons | Atomic mass | Charge | Ion/Isotope/Atom |
|---------------------|---------------|---------------|---------|----------|-----------|-------------|--------|------------------|
| Copper              |               |               |         | 37       | 27        |             |        |                  |
|                     | Kr            |               |         |          |           | 84          | 0      |                  |
|                     |               |               | 99      |          | 99        | 252         |        |                  |
| Antimony            |               |               |         | 71       |           |             | -3     |                  |
|                     |               | 35            |         |          |           | 81          | -1     |                  |
|                     |               |               |         | 0        |           |             | 0      |                  |

2. In a type one compound the first element is a **metal / nonmetal** with a **varying / definite** charge. It always forms a **positive / negative** ion. The second element is a **metal / nonmetal** that always forms a **positive / negative** ion. Polyatomics are seen **as either ion / as only positive ions / as only negative ions / never**. Ruman Numerals **are / are not** used to indicate charge. Finally, prefixes **are / are not** included in the naming of these compounds.
3. In a type two compound the first element is a **metal / nonmetal** with a **varying / definite** charge. It always forms a **positive / negative** ion. The second element is a **metal / nonmetal** that always forms a **positive / negative** ion. Polyatomics are seen **as either ion / as only positive ions / as only negative ions / never**. Ruman Numerals **are / are not** used to indicate charge. Finally, prefixes **are / are not** included in the naming of these compounds.
4. In a type three compound both elements are **metals / nonmetals**. Charges **do / do not** play a part in this type of compound. In type threes, **prefixes / Roman Numerals** are used to indicate how many of each element are needed. Polyatomics are seen **as either ion / as only positive ions / as only negative ions / never**.

5. Complete the following table:

| Name                 | Formula                      | Type |
|----------------------|------------------------------|------|
| zinc phosphate       |                              |      |
|                      | $\text{SnBr}_2$              |      |
| lithium nitrate      |                              |      |
| tungsten(VI) sulfite |                              |      |
|                      | $\text{P}_4\text{O}_{10}$    |      |
|                      | $\text{Hg}_3(\text{PO}_4)_2$ |      |
| barium nitride       |                              |      |
|                      | $\text{Rb}_2\text{CrO}_4$    |      |
|                      | $\text{PtO}_2$               |      |
| lead(IV) sulfate     |                              |      |
| aluminum hydroxide   |                              |      |
|                      | $\text{Fe}_2\text{O}_3$      |      |
| ammonium sulfate     |                              |      |
|                      | $\text{PtCl}_2$              |      |
|                      | $\text{Mg}_3\text{N}_2$      |      |
| dinitrogen pentoxide |                              |      |
|                      | $\text{NiCO}_3$              |      |
| iron (II) acetate    |                              |      |
|                      | $\text{CO}_2$                |      |

6. Define:

- atomic radius
- ionization energy
- electron affinity
- electronegativity

7. What are the trends (AND WHY) for:
- a. Atomic radius
    - i. Down a group
  
    - ii. Across a period (left to right)
  
  - b. Ionization energy
    - i. Down a group
  
    - ii. Across a period (left to right)
  
  - c. Electron affinity
    - i. Down a group
  
    - ii. Across a period (left to right)
  
  - d. Electronegativity
    - i. Down a group
  
    - ii. Across a period (left to right)

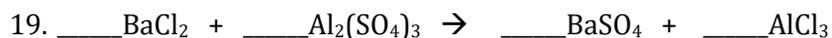
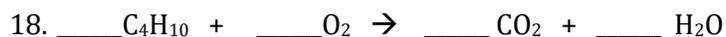
8. Complete the following table:

| Isotope | Mass (amu) | Abundance |
|---------|------------|-----------|
| Si-28   | 27.98      |           |
| Si-29   |            | 4.70%     |
| Si-30   | 29.97      | 3.09%     |

9. Calculate the mass of  $\text{Ca}_3(\text{PO}_4)_2$  and percent composition of the elements in the compound.
10. What mass is present in 6.72 moles of  $(\text{NH}_4)_2\text{S}$
11. How many atoms are present in 11.29 g of  $\text{AgCl}$ ?
12. A compound is found to have 46.67% nitrogen, 6.70% hydrogen, 19.98% carbon and 26.65% oxygen. What is its empirical formula?
13. A certain blue solid contains 36.84% N with the remainder being oxygen. What is the empirical formula of this compound?
14. A compound is analyzed and found to contain 68.54% carbon, 8.63% hydrogen, and 22.83% oxygen. The molecular weight of this compound is known to be approximately 140 g/mol. What is the empirical formula? What is the molecular formula?

15. During lab, 1.04 g of hydrated  $\text{NiSO}_4$  were heated. After heating, only 0.61 g of  $\text{NiSO}_4$  remained. What was the formula of the original hydrate?

**Balance and identify the type of reaction:**



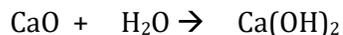
***Solve:***

20. How many grams are necessary to make 100mL of 0.5 M solution of calcium hydroxide?

21. What is the molarity of a solution containing 11.2 grams of lithium bromide in 250 mL of solution?

22. Calculate how many grams of iron can be made from combining 16.5 grams of iron(III) oxide with hydrogen gas forming solid iron and water.

23. How many grams of calcium hydroxide will be formed when you combine 4.44 g of calcium oxide and 7.77 g of water are available to react? Also identify the limiting and excess reactants. (Balance the equation first)



24. If 15 grams of copper (II) chloride react with 20 grams of sodium nitrate how much sodium chloride can be formed? If 12.2 grams of sodium chloride is collected in lab, what is your percent yield and percent error? (Balance first!)



25. 3.2 grams of copper react with 1.8 grams of silver nitrate in a single replacement reaction. If this process is carried out in lab with a percent yield of silver of 83.7%, how many grams of silver were you able to recover? What was your percent error? (Balance first)

