



UNITED NATIONS SCHOOL I.E.D.
PEI: COMPREHENSIVE TRAINING OF COMPETENT ENTREPRENEURIAL LEADERS, WITH
DEMOCRATIC, TECHNOLOGICAL, CULTURAL AND SPORTS PRINCIPLES
MOTTO: "EDUCATION, SCIENCE, CULTURE AND SPORT TO TRANSCEND"

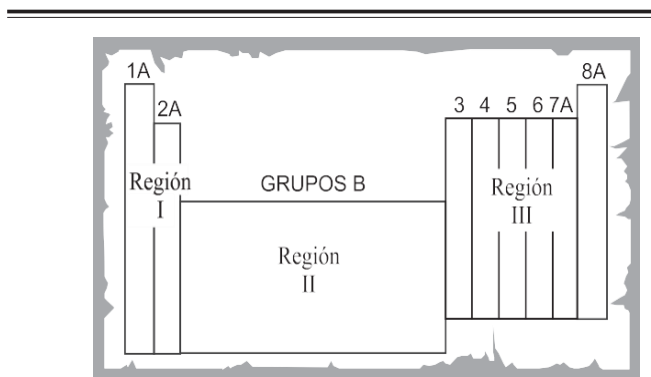
PREPARATION WORKSHOP FOR THE FIRST PERIOD
CHEMISTRY
TENTH GRADE
TEACHER HEISEL QUESADA

The preparation workshop must be carried out in the Chemistry notebook as a requirement to take the competency test

Delivery date: April 1

The work of two scientists, Meyer and Medeleiev, led to the organization of chemical elements into groups and periods according to their physical and chemical properties. This organization is known today as the Periodic Table of the Elements.

This table is based on the law of chemical periodicity. It is possible to predict some characteristics about the behavior of atoms, molecules, ions and compounds, and in general about their interaction with themselves and with other systems with different chemical and physical environments.



1. Who were Mendeleev and Meyer? Check out their biographies
2. How periodicity can be applied to the periodic table
3. From the current atomic model, predict how the structure of the periodic table can be realized

According to the diagram of the periodic table, locate the following elements and predict their properties

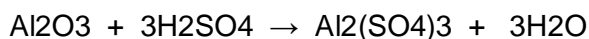
4. Escandio
5. Praseodimio
6. Cobalto
7. Hafnio
8. Radio
9. Make the atomic diagrams for the above chemical elements indicating whether they are in region I, II, or III and the corresponding group
10. Based on the diagram of the periodic table, explain the current atomic model

The following table shows the electron configuration, the group in the periodic table, and some properties of three elements, which have been symbolized as M, G, and T. The number in the group indicates the number of valence electrons.

element	Electronic distribution	group	property
M	$1s^2 2s^1$	1A	It's shiny, solid, conducts electric current. It forms cations and reacts with oxygen
G	$1s^2 2s^2 2p^3$	5A	It's found in a gaseous state and is very electropositive. It reacts with oxygen and hydrogen
T	$1s^2 2s^2 2p^5$	7A	It's gaseous at room temperature in its group and has the highest electronegativity. It's a very active element and forms anions

- Write the properties of the M, G, and T elements
- According to the table, write the atomic numbers of the elements M, G, and T
- In which areas the given elements would be located and how many valence electrons each one has
- Based on the properties of the given elements, predict whether they are metals, non-metals, or metalloids
- Which of these elements has the electron configuration most similar to a noble gas, and how does this affect its reactivity?
- How do you think electron distribution affects an element's ability to form compounds with other elements?
- What relationship can you establish between the electronic distribution and the properties of the elements in the table?
- predicts the position of these elements in the periodic table based on their electron distribution and chemical properties
- What implications does the electron distribution of these elements have on their ability to form compounds with other elements in the periodic table?
- Propose the electronic distribution for three elements that are at the same level as those supplied in the table

Aluminium sulphate, with the formula $Al_2(SO_4)_3$, is an essential inorganic compound in many industrial processes and applications. It is formed from the reaction of aluminum oxide Al_2O_3 with sulfuric acid H_2SO_4 in a process known as acid-base neutralization:



In this reaction, aluminum oxide reacts with sulfuric acid to form aluminum sulfate and water as products. The resulting aluminum sulfate is a water-soluble white solid, which can be found in a variety of forms, such as crystals, powder, or liquid.

One of the most common uses of aluminum sulfate is in the treatment of drinking water and wastewater. It is used as a coagulant to remove impurities, suspended particles, and organic matter, by forming flocs that can be easily removed by sedimentation or filtration.

- Design a hands-on experiment to demonstrate how aluminum sulfate is used as a coagulant in water treatment. You can simulate a cloudy water clarification process using aluminum sulfate and observe the results.
- Propose a method for calculating the molecular weights of each compound involved in the reaction.

Calculate molecular weights

23. If you have 200g of each substance, what is the equivalent in moles and molecules?
24. It investigates the environmental impact of using aluminium sulphate in water treatment and explores more sustainable alternatives or greener production processes.
25. It performs a comparative analysis between aluminum sulfate and other coagulants used in water treatment, such as ferric chloride or cationic polymer, in terms of effectiveness, costs, and environmental impact.
26. What would happen if you changed the aluminum hydroxide to indium hydroxide? Predict the reaction formed
27. Calculate the molecular weights of the previous reaction
28. Imagine you're cooking and need to add a specific amount of water to a recipe. How would you use the molecular weight of water to measure the proper amount in grams?
29. How does the molecular weight of a compound relate to its density? Give an example in everyday life where this relationship is relevant
30. How would a change in the molecular mass of a compound affect its chemical behavior? Can you think of any examples where this is important?