

LAB: WHAT'S IN A NAME? & MOLES IN A SWALLOW

Students: Please read the following information given below, and then come to class on your lab day with the following already prepared in your notebooks:

1) Date, 2) Partner, 3) Title, 4) Purpose, 5) Materials, 6) Safety, 7) Procedures/Observations, and 8) Data & Calculations (collect data in your notebooks)

The last page needs to be printed out. These pages will be turned in. Data for this lab should be collected in your notebooks and later, rewritten in the Data and Calculations section. The data, calculations, and questions will be due three days after performing the lab in class.

Since the start of civilization, humans have tried to count. The concept of numbers was used to facilitate the counting, used to compare the sizes of groups of objects. Often, names are associated with numbers that people use frequently. Common names such as, unit (1), pair (2), dozen (12), gross (144), and mole, Avogadro's Number (6.02×10^{23}).

Most of us are very familiar with the first four names and numbers, which occur in everyday life. What is the Mole and Avogadro's Number? A mole is the number of objects equal to the number of atoms in 12.0000 grams of carbon. It is also the gram formula mass (gfm) of a substance. That number is equal to Avogadro's Number. How big is this number?

Avogadro's Number is an immense number. If you count out loud starting with the number "one" at the rate of one count every second, it may take you about 1,909,577,942,668,696 years to finish. This is roughly 960,000 times the estimated lifetime of our universe (assuming 20 Billion years).

Using a Pentium 450 MHz CPU, it will still take about 4,243,506 years to finish this task. This is a period of time about a thousand times longer than the total span of our civilization!

Part A: What's in a Name?:

Note: all lab members will complete this part of the lab, and keep a record of your individual data only. For this part of the lab, the number of moles and formula units of calcium carbonate in the amount of chalk it takes to write your full name (first, middle, and last) will be determined. Obtain a piece of chalk, and mass it. Then write out your full name on the chalkboard. Remass the chalk. Next, calculate the mass of chalk that was used to write your full name. Calculate the number of moles and formula units used in writing your full name. Place all work (nicely organized) in the data section of your notebook. Show all work and units used.

Part B: Moles in a Swallow:

Note: only one lab member is required to complete this part of the lab, but everyone should keep a record of the data. (IF you want to drink water, then you should do your own data) For this part of the lab, the number of moles and molecules of water in the amount of swallowed water will be determined. Obtain a clean, disposable cup and fill it with clean drinkable water at the eye wash station. Mass the cup of clean water. Take a swallow of water and then reweigh the cup. Calculate the mass of water swallowed. Using the data collected, calculate the number of moles and molecules of water swallowed. Place all work (again nicely organized) in the data section of your notebook.

DO NOT COMPLETE THE FOLLOWING PAGE UNTIL AFTER THE LAB IS COMPLETED AND ALL CALCULATIONS HAVE BEEN ENTERED INTO YOUR NOTEBOOKS FIRST!

Name _____

Date _____

Period _____

Lab Group # _____

LAB: WHAT'S IN A NAME? & MOLES IN A SWALLOW**Data Table A: What's in a Name?:**

Answer: _____ moles of calcium carbonate

Answer: _____ formula units of calcium carbonate

Data Table B: Moles in a Swallow:

Answer: _____ moles of water

Answer: _____ molecules of water

Name _____

Date _____

Period _____

Lab Group # _____

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POSTLAB QUESTIONS:

Directions: Read the wikipedia article about the mole ([https://en.wikipedia.org/wiki/Mole_\(unit\)](https://en.wikipedia.org/wiki/Mole_(unit))) and answer the questions below.

1. What is the numerical value of Avogadro's number?
2. What other absolute number is the mole similar to?
3. According to SI, what is the dimension that the mole has?
4. Name the four units that measure the quantity of a substance whose mass are equal to its formula weight.
5. What two names are also used for a mole of atoms or molecules?
6. Who is given credit for the name mole? What country of origin is this name from?
7. What element is the concept of the mole based on?
8. The mole is useful in chemistry because it allows different substances to be measured how?
9. Explain how many moles are present in the formation of water.
(Hint: Use the entire chemical equation)
10. What is the more useful unit in chemistry calculations, mass, weight, or number of particles?