

The Mole Lab

Name: _____

80/1200

Objective: Students will get to practice all types of mole math and master it. We will convert back and forth between mass, particles, and volumes of gases with our "Mole Island Diagrams" to guide us through the steps.

Safety: DO NOT OPEN ANY CONTAINERS. No goggles required.

There are 12 stations in this lab, you will move from one to another. Make your measurements, you have 5 minutes at each station, you might not have time to complete the math required for some stations until later.

Some stations contain jars containing exactly ONE MOLE of an element. Your job is to determine what element is inside of each jar. To do this: mass each jar, then subtract the mass of that container (which is indicated on each jar). The difference is the MASS of just the element inside. Record this in table A. Turn to your Periodic Table to find the element who's molar mass is closest to your measurement.

Some stations contain jars with ionic compounds. Name these compounds from the formulas that are provided. Measure the mass of these jars (subtracting the jar mass again) and calculate the number of moles of that compound present. To do this you must calculate the MOLAR MASS for that compound, then convert mass into moles. One jar contains a gas, from the mass you will calculate the volume of gas present.

This lab counts for 40 points (not the usual 25) because it's very important and there are lots of things to prove you know.

This lab requires:	This information	POINTS
Cover	title and short intro	1 point
2	Stations 1-6	6 points
3	Stations 7-12	12 points
4	11 Q	11 points
5	Conclusion Write about the connection between the mole & gases, the connection between the mole & particles, and the connection between the mole & mass. Give examples of converting moles to each of those 3. Explain what molar mass is, what the gram formula mass, and what the gram molecular mass is as well. Give an example for each of these.	10 points
Report due on: _____		40 points

Stations	Total mass of Jar + Element	Mass of the Jar	Mass of JUST the ELEMENT (the molar mass)	Element Name + Symbol
Station 1 A + B				
Station 1 C + D				
Station 3 E + F				
Station 4 G + H				
Station 5 I + J				
Station 6 I + J				

Take the measurements necessary. You must show all work.

Station 7: Measure the jar of this compound $\text{NiSO}_4(\text{s})$

Subtract the mass of the jar, ROUND THIS MASS to the nearest whole number of grams.

Rounded Mass of NiSO_4 _____ grams

Calculate the MOLAR MASS of NiSO_4 _____ g/mole

Using the rounded mass, how many moles of NiSO_4 are present in this jar? _____ MOLES

Station 8: Measure the jar of this compound $\text{K}_2\text{Cr}_2\text{O}_7(\text{s})$

Subtract the mass of the jar, ROUND THIS MASS to the nearest whole number of grams.

Rounded Mass of $\text{K}_2\text{Cr}_2\text{O}_7$ _____ grams

Calculate the MOLAR MASS of $\text{K}_2\text{Cr}_2\text{O}_7$ _____ g/mole

Using the rounded mass, how many moles of $\text{K}_2\text{Cr}_2\text{O}_7$ are present in this jar? _____ MOLES

Station 9 Measure the jar of this compound $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2(\text{s})$

Subtract the mass of the jar, ROUND THIS MASS to the nearest whole number of grams.

Rounded Mass of $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$ _____ grams

Calculate the MOLAR MASS of $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$ _____ g/mole

Using the rounded mass, how many formula units of $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$ are in the jar? _____ FU's

Station 10: Measure the jar of this compound $\text{SO}_3(\text{G})$

Subtract the mass of the jar, ROUND THIS MASS to the nearest whole number of grams.

Rounded Mass of SO_3 _____ grams

Calculate the MOLAR MASS of SO_3 _____ g/mole

Using the rounded mass, how many LITERS of SO_3 are present in this jar? _____ LITERS

Station 11: Measure the jar of this compound $\text{CuSO}_4(\text{s})$

Subtract the mass of the jar, ROUND THIS MASS to the nearest whole number of grams.

Rounded Mass of CuSO_4 _____ grams

Calculate the MOLAR MASS of CuSO_4 _____ g/mole

Using the rounded mass, how many formula units of CuSO_4 are in the jar? _____ FU's

12: Measure the jar of this compound $\text{Na}_2\text{C}_2\text{O}_4(\text{s})$

Subtract the mass of the jar, ROUND THIS MASS to the nearest whole number of grams.

Rounded Mass of $\text{Na}_2\text{C}_2\text{O}_4$ _____ grams

Calculate the MOLAR MASS of $\text{Na}_2\text{C}_2\text{O}_4$ _____ g/mole

Using the rounded mass, how many moles of $\text{Na}_2\text{C}_2\text{O}_4$ are present in this jar? _____ MOLES

The Mole Lab - 11 Questions

Put answers on the right. Put work on white paper, and then staple it to the lab. Make sure that your work is clearly labeled 1-11 so that I can check it.

1. You have 25.6 moles of carbon. How many grams is that?
2. Convert 975 liters of carbon dioxide at STP to moles.
3. Convert 4.82 moles of silver into atoms.
4. If you find 1.33×10^{26} atoms of gold, how many moles is that?
5. If you breathe in 4.48×10^{27} molecules of oxygen in a day, how many liters is that at STP?
(write answer as a whole number, not in scientific notation)
6. What mass does 4.48×10^{27} molecules of iron have?
7. You have 162 liters of CH_4 (methane) at STP. What is the mass?
8. What is the gram molecular mass of octane? (C_8H_{18})
9. What is the gram formula mass of ammonium sulfate?
10. What is the molar mass of lead (IV) chloride?
11. What is the percent composition by mass of carbon in octane?

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