

Chemistry Lab Moles



Wilhelm Ostwald coined the name “mole” in German in 1893, and it’s assumed it was derived from the word Molekül (molecule). Ironically, Ostwald's development of the mole concept was directly related to his philosophical opposition to atomic theory, which he disagreed with for most of his career. We can also define the mole using Avagadro’s constant, which is currently accepted as being $6.02214179 \times 10^{23}$ particles per mole.

In this activity, you will work with a partner from your team on the following activities at each station. Please clean up your station after observing and/or using the materials there so that it’s ready for the next group to use. For all calculations, show your work and bubble/box/circle your answers.

Procedure: You may complete the following stations in any order.

Station	Procedure	Calculations/Questions (Please show all your work!)
A	1) Mass the aluminum sample.	1) How many moles of aluminum are present? 2) What mass would be exactly 1 mole of aluminum?
B	1) This station has paper drinking cups. Fill one cup halfway full of water. 2) Measure and record the mass of the cup and water. 3) Drink the water. 4) Measure and record the mass of the empty cup after you've consumed the water.	1) How many molecules of water did you drink?
C	1) Measure and record the mass of the pencil. 2) Write the names of all of your family members on a piece of paper. (At least as many as you remember) 3) Measure and record the mass of the pencil after writing.	1) What substance is in 'pencil lead'? What element is it made of? 2) How many atoms did it take to write the names of your family members on the paper?

D	1) Mass the iron nail.	1) How many moles of iron are present? 2) What mass would be exactly 1 mole of iron?
E	1) Mass a teaspoon full of table salt, using the weighing boat. 2) Return the salt to the beaker of salt when you are finished.	1) How many moles of salt are present? 2) What mass would be exactly 1 mole of salt? 3) How many formula units (molecules) are present in the teaspoon of salt?
F	1) Use the graduated cylinder to measure exactly 1 mole of water. 2) Record the volume of the 1 mole of water. 3) Show Mrs. Riley or Mrs. Rob. your mole.	1) _____ Stamp of approval from Mrs. Riley or Mrs. Rob. 2) Calculate the density of the mole of water? 3) Does the density depend on the quantity of water? Why or why not?
G	1) Using a clean napkin, measure and record the mass of a cookie. Please only take 1 cookie/person! 2) Carefully open the cookie and scrape off the cream with your mouth and eat the cream. 3) Mass the remaining creamless cookie. 4) Eat the rest of the cookie!	1) Assume the Oreo cream filling is all sugar, $C_{12}H_{22}O_{11}$. How many molecules of sugar did you eat? 2) Calculate the % sugar cream filling and the % cookie in an Oreo.

Data Table for Results and Calculations Name _____

Station	Measurements	Calculations/Questions (Please show all your work!)
A		
B		
C		
D		
E		
F		
G		