

Mole Lab

Introduction to The Mole Concept



Introduction

Although technically not a laboratory experiment, this activity certainly helps to drive home the main idea behind the mole concept—that chemists can count out infinitesimally small particles by weighing.

Concepts

- Avogadro's number
- Chemical formulas
- Molar mass or molecular weight

Materials (for each lab station, two or three lab pairs can work at each station)

- Aluminum foil
- Ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$, 100 g
- Sodium chloride, NaCl , 500 g
- Water, distilled, 300 mL
- Balance, electronic, 0.01-g precision (if only triple beam balances are available, it is best if there is one for each lab pair)
- Beakers, 600-mL, or cut off 2-L soda bottles, 3 labeled
- Cups, blue, clear, and red plastic, 2–3 of each
- Pipets, Beral-type, 2–3
- Spoons, plastic, 4–6

Materials (for the instructor's station, preferably near the center of the room)

- Copper sheet, 12 pieces*
 - Balance, electronic, 0.01-g precision
 - Cups, blue, clear, and red plastic, 1 each
 - Scoring Standard Table
- *See the Preparation section below for size of copper pieces.*

Safety Precautions

Ammonium sulfate is slightly toxic by ingestion. Wear chemical splash goggles, chemical-resistant gloves, and a chemical-resistant apron. Wash hands thoroughly with soap and water before leaving the laboratory. Follow all laboratory safety guidelines. Please review current Material Safety Data Sheets for additional safety, handling, and disposal information.

Preparation

1. Label three 600-mL beakers “NaCl,” “water,” and “ammonium sulfate” and add to each the corresponding substance. *Note:* Do not write the chemical formula for ammonium sulfate on the beaker; students must determine this.
2. Place 2–3 spoons in each beaker containing a solid substance.
3. Place 2–3 pipets in the beaker of water.
4. Cut twelve pieces of copper sheet according to Table 1 and label with the corresponding numbers 1–12. *Note:* The copper pieces can have any weights you want them to. Using the weights given in the table allows you to use the Scoring Standard table as is. If you use other weights, just modify column C in the table accordingly, as shown in Figure 1 on page 2.

Cu Piece	Mass (g)
#1	4.22
#2	4.78
#3	4.98
#4	5.13
#5	5.44
#6	5.97
#7	6.09
#8	6.55
#9	6.79
#10	7.13
#11	7.65
#12	7.98

Mole Lab Student Guide

Padhraic Smyth



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