

Molar Relationships & Stoichiometry— Demonstration Summaries and Concepts



Mole Creativity—Make-a-Mole Pattern

What is a mole? Why is it so important in chemistry? Let your students use their creativity to make their very own mole mascots—small, furry, stuffed animals that will serve as a remembrance of all kinds of moles, great and small.

How Big Is a Mole?—Imagining the Mole Activities

When John Dalton first proposed his “modern” atomic theory in 1808, he wrote that trying to imagine the number of atoms in a sample is like trying to count the number of stars in the universe. The number is too big to even imagine. This demonstration presents some mental math and hands-on activities that can be used to help students visualize and appreciate the enormous size of Avogadro’s number.

Mole Samples and Molar Mass—Authentic Assessment

What makes a mole of carbon different from a mole of sulfur? What is the molar mass of a compound? Use this two-part activity to introduce students to the concept of molar mass and evaluate their ability to carry out mole and molar mass calculations. After viewing a variety of mole element samples on display, students are assigned a “mole baggie” in Part B. These mole sample bags contain premeasured amounts of white mystery compounds. Students must calculate the molar mass of the compound and identify it from a list of possibilities.

Stoichiometry Balloon Races—Limiting and Excess Reactants

Most stoichiometry calculations in the classroom are performed using exact (stoichiometric) mole ratios of reactants and products. In real life, however, many commercial processes use an excess amount of one reactant (and thus a limiting amount of another reactant) to obtain better yields of products. This demonstration uses balloons to compare the amount of carbon dioxide generated when varying amounts of sodium bicarbonate are allowed to react with a constant amount of acetic acid. The great stoichiometry balloon race provides a nice visual cue to help students identify limiting and excess reactants.

Stoichiometry and Solubility—Mole Ratios and Chemical Formulas

Double replacement reactions are generally considered to be irreversible. The formation of an insoluble precipitate provides a driving force that makes the reaction proceed in one direction only. The purpose of this demonstration is to find the optimum mole ratio for the formation of a precipitate in a double replacement reaction and use this information to predict the chemical formula of the precipitate.

Concepts

- Moles

- Avogadro’s number
- Mole
- Molar mass

- Mole
- Molar mass

- Stoichiometry
- Mole ratio
- Limiting reactant
- Excess reactant

- Stoichiometry
- Mole ratio
- Double replacement reaction
- Solubility rules