CLE 3221.3.3 Explore the mathematics of chemical formulas and equations.

SPI 3221.3.5 Convert among the following quantities of a substance: mass, number of moles, number of particles, molar volume at STP

Molar Volume Demonstration

This demonstration allows students to visualize 22.4 L

Use a strip of paper to make a tape measure that is 43" long. Inflate a large balloon or punch ball until it has a circumference of 43". This volume represents approximately 22.4 L. Label the ball 1 mole at STP.

Calculations:

1. Use the following equation to solve for diameter:

$$\text{Volume of sphere} = \frac{\pi d^3}{6} = 22.4\ dm^3$$

2. Calculate circumference of sphere

$$C = \pi d$$

3. Convert to centimeters, then to inches.

Extension:

Display flasks containing one mole of a solid and one mole of a liquid. Discuss why one mole of a solid and a liquid occupy different volumes.

Inflate several different colored punch balls and discuss how the molar volumes would compare if the balls contained different gases.