

**LESSON**  
**77**  
**LAB**

# What's in a Mole?

## Molar Mass

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### Part I: Molar Mass

1. Use a periodic table to complete the second column in the table. You will complete the last column in Part 2.

Chemical formula	Molar mass g/mol	Mole of what?	Equivalent to:
Cu( <i>s</i> )	63.55 g	Cu atoms	50 ft of 20-gauge copper wire
O <sub>2</sub> ( <i>g</i> )	32.00 g	O <sub>2</sub> molecules	22.4 L oxygen gas at STP
Ni( <i>s</i> )		Ni atoms	
Al( <i>s</i> )		Al atoms	
H <sub>2</sub> O( <i>l</i> )		H <sub>2</sub> O molecules	
He( <i>g</i> )		He atoms	22.4 L helium gas at STP
NaCl( <i>s</i> )		NaCl units	
Hg( <i>l</i> )		Hg atoms	14.7 mL mercury
Fe( <i>s</i> )		Fe atoms	
C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ( <i>s</i> )		sugar molecules	0.75 lb sugar

2. How many copper atoms are in 63.55 g of copper?
3. Copper has a larger molar mass than aluminum. Explain what this means.
4. Which contains more moles, 1.0 g Al(*s*) or 1.0 g Hg(*l*)? Explain your thinking.
5. Explain how you determined the molar mass of sugar. Show your work.

6. Explain why the table says “NaCl units.”
7. What do you think the volume of a mole of carbon dioxide gas would be? Explain your reasoning.

## Part 2: Mole Challenge

### Procedure

1. There are weighing stations around the room. With your group, visit the stations and create 1-mole samples of the items found at each station. These samples must be close to a mole, but they do not have to be exact.
2. Bring your mole samples back to your desk. Be ready to show them to your teacher and to explain how you determined the amount of each substance.
3. Enter the amounts in the last column of the table in Part 1.

### Questions (Show your work.)

1. How many moles of aluminum do you need to make a six-pack of cans?
2. How many iron nails do you need in order to have 223.40 g of iron atoms?
3. What volume of water do you need in order to have 25 moles of H<sub>2</sub>O molecules?
4. **Making Sense** Suppose you have 1 g of sugar and 1 g of water. Which one has more molecules? Explain how you arrived at your answer.
5. **If You Finish Early** The average teenager drinks 868 cans of soda per year. Determine how many aluminum cans per year this represents for your school by estimating the number of students. How many moles of aluminum atoms does this represent?