

Name \_\_\_\_\_ Hour \_\_\_\_\_

## MOLE LAB

### Information:

\*A mole of any substance contains \_\_\_\_\_ particles.

\*A mole of lead will be **heavier or lighter** than a mole of oxygen because \_\_\_\_\_.

\*The mass of a mole of a substance can be found using the \_\_\_\_\_ of the substance.

\*The units of molar mass are \_\_\_\_\_.

### Procedure Part 1: Sugar in gum

1. Find the mass of a piece of gum (in wrapper) before chewing.
2. Chew the gum for 5 minutes.
3. Find the mass of the gum (on the wrapper) after chewing.
4. Throw the gum in the trash.

a. Why was there a change in mass?

Mass before (g)	
Mass after (g)	
Change in mass (g)	

- b. The sugar has a chemical formula of  $C_6H_{12}O_6$ . Calculate the **molar mass** (g/mol).
- c. Calculate the number of **moles** of sugar you consumed while chewing the gum.
- d. Calculate the number of **molecules** of sugar you consumed while chewing the gum.

### Procedure Part 2: Burning a candle

1. Find the before mass of a candle.
2. Light the candle and allow it to burn for 5 minutes. **Do not play with the wax!**
3. Without losing any of the wax, re-mass the candle.

Wax is a mixture of different hydrocarbons. We will assume the chemical formula for wax is

$C_{25}H_{52}$ .

a. Find the **molar mass**. (g/mol)

Mass before (g)	
Mass after (g)	
Change in mass (g)	

- b. How many **atoms** of C are in one molecule of wax? \_\_\_\_\_
- c. How many **atoms** of H are in one molecule of wax? \_\_\_\_\_
- d. What **% of the molar mass is Carbon**? (total mass of C/molar mass) x 100%
- e. How many **grams of Carbon** would have been in the candle before burning?
- f. How many moles of wax were **used up** during burning?

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**Procedure Part 3: Molecules in your name**

1. Find the mass of a crayon.
2. Write your full name on a piece of paper.
3. Find the mass of the crayon again.
4. Repeat steps #1-3 with the chalk.

Substance	Mass (g) Before	Mass (g) After	Mass (g) Used
Crayon			
Chalk			

Crayon

- a. Find the **molar mass** of the crayon. (Made of wax-  $C_{25}H_{52}$ )

- b. How many **moles of wax** were in your name?

- c. How many **molecules of wax** were in your name?

Chalk

- d. Find the **molar mass** of the chalk. ( $CaSO_4$ ) (Did you know chalk isn't made from chalk anymore!!!)

- e. How many **moles of chalk** were in your name?

- f. How many **molecules of chalk** were in your name?

- g. You should have used approximately the same mass of crayon and chalk when writing your name. Why were there **LESS molecules** of chalk used than crayon?

**Procedure Part 4:**

Measure the items and fill in the chart below.

Substance	Mass (g)	Molar Mass (g/mol)	# of moles
Aspirin ( $C_9H_8O_4$ )			
Wood ( $CH_2O$ )			
Al Foil (Al)			

1. A substance has a mass of 90.1 grams and contains  $3.0 \times 10^{23}$  molecules. Which of the 3 substances in the chart above is it? (Solve for moles first using the molecules given, then set up a ratio to find g in 1 mole.)