

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Chemistry****Molar Conversions Stations Activity**

Work with a partner from your team on the following activities at each station. Please clean up your station after observing and/or using the materials there. For all calculations, show your work and circle your answers.

**Station A**

This gray substance is aluminum.

1. Is this sample one mole of aluminum? Explain.

6.02 EE 23

2. Approximately how many atoms of aluminum are in this sample?

$$\frac{7.3 \text{ g Al}}{26.982 \text{ g Al}} \times \frac{1 \text{ mol Al}}{1 \text{ mol Al}} = 6.02 \times 10^{23} \text{ atoms}$$

**Station B**

This station has paper drinking cups. Fill one cup halfway full of water.

3. Measure and record the mass of the cup and water.

Drink the water.

4. Measure and record the mass of the empty cup after you've consumed the water.

5. How many molecules of water did you drink?

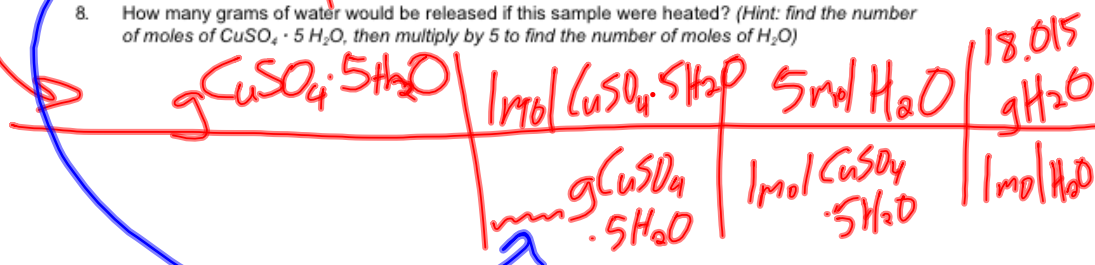
$$\frac{40 \text{ g H}_2\text{O}}{18 \text{ g H}_2\text{O}} \times \frac{1 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 6.02 \times 10^{23} \text{ molecules}$$

Station C

The blue substance in the beaker is copper (II) sulfate pentahydrate. Its formula is  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .

6. What is the mass of this sample?
7. What is the molar mass of copper (II) sulfate pentahydrate?

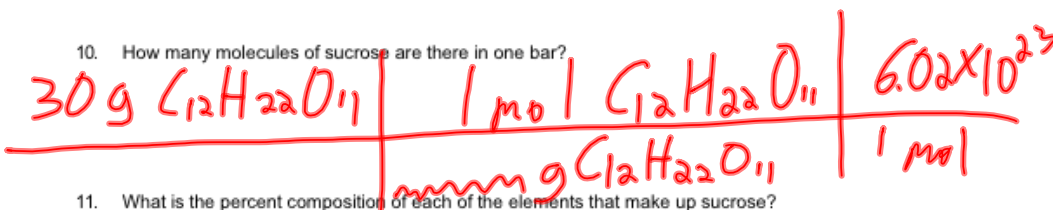
8. How many grams of water would be released if this sample were heated? (Hint: find the number of moles of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , then multiply by 5 to find the number of moles of  $\text{H}_2\text{O}$ )

Station D

Read the label on the Snickers Bar. **DO NOT OPEN IT.**

9. How many grams of sucrose ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) are there in one bar?

10. How many molecules of sucrose are there in one bar?



11. What is the percent composition of each of the elements that make up sucrose?

$$\% \text{C} = \frac{\text{C}_{12}}{\text{C}_{12}\text{H}_{22}\text{O}_{11}} \times 100\%$$

$$\% \text{H} =$$

$$\% \text{O} =$$

**Station E**

This station uses your notched penny from earlier this week. GENTLY rinse the penny and dry it in the oven for about 10 minutes.

12. Measure and record the mass of the penny shell.

13. What happened to the rest of the penny? Why did the acid react with the inside of the penny and not the outside shell?

14. Assuming that a typical penny has a mass of 2.53 g, what percent of a penny's mass is due to copper? How does this compare to the US Mint's accepted value of 2.5%?

$$\frac{g \text{ Cu}}{2.53 \text{ g}} \times 100\%$$

15. How many atoms of zinc were dissolved away by the hydrochloric acid?

$$\frac{g \text{ Zn}}{\text{molar mass } g \text{ Zn}} \times \frac{1 \text{ mol Zn}}{1 \text{ mol Zn}} \times 6.02 \times 10^{23} \text{ atoms}$$

**Station F**

This station has chewing gum and weigh paper.

16. Using a piece of weigh paper, measure and record the mass of an unwrapped piece of bubble gum. DO NOT PLACE THE GUM DIRECTLY ON THE BALANCE.

Chew the gum until all the sugar is dissolved in your mouth (you may wish to come back to this later).

17. Measure and record the mass of the chewed gum.

18. What is the mass of the sugar in the gum?

$$\text{original} - \text{chewed} = \text{sugar}$$

19. How many molecules of sugar ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) did you dissolve?

$$\frac{g \text{ C}_{12}\text{H}_{22}\text{O}_{11}}{\text{molar mass } g \text{ C}_{12}\text{H}_{22}\text{O}_{11}} \times \frac{1 \text{ mol C}_{12}\text{H}_{22}\text{O}_{11}}{1 \text{ mol C}_{12}\text{H}_{22}\text{O}_{11}} \times 6.02 \times 10^{23}$$

↑  
molar mass

**Station G**

The nail in the beaker is made of iron.

20. What is the mass of this nail?
21. How many atoms of iron are in this nail?

See previous stations

**Station H - DO NOT EAT THE OREOS!**

22. Using a piece of weigh paper, measure and record the mass of a plain Oreo cookie.

Carefully open the plain Oreo cookie and scrape off the cream.

23. Find the mass of the cream and the mass of the plain Oreo cookie sides. Discard the plain Oreo.
24. Calculate the percent composition of the cream vs. the total mass of the plain Oreo.

$$\frac{\text{g cream}}{\text{g oreo}} \times 100\% =$$

25. Using a piece of weigh paper, measure and record the mass of a "Doublestuff" Oreo cookie.

Carefully open the Doublestuff Oreo cookie and scrape off the cream.

26. Find the mass of the cream and the mass of the Doublestuff cookie sides. Discard the Doublestuff Oreo.
27. Calculate the percent composition of the cream vs. the total mass of the Doublestuff Oreo.

$$\frac{\text{g DS cream}}{\text{g DS oreo}} \times 100\% =$$

28. Does a Doublestuff Oreo really have twice the cream of a plain Oreo cookie? Explain.

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