

# [7.4]

# Percent Yield



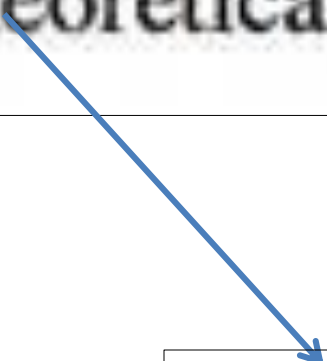
## PERCENTAGE YIELD

The Experimental Yield divided by the Theoretical Yield multiplied by  
100%

# Percent Yield

Based on lab experiments



$$\text{percent yield} = \frac{\text{actual yield}}{\text{theoretical yield}} \times 100\%$$


Based on stoichiometry calculations

# Vocabulary

- **Theoretical Yield (expected yield):** The mass of the product that we expect to form from stoichiometry calculations
- **Experimental Yield (actual yield):** The mass of the product that is actually obtained from doing experimentation



You buy a cookie package to make cookies at home. The package says you can make 24 cookies. But you only were able to make 21 cookies 😞

What was the theoretical yield?

What was the actual yield?

What is the percent yield?



You buy a cookie package to make cookies at home. The package says you can make 24 cookies. But you only were able to make 21 cookies 😞

What was the theoretical yield?

**24 cookies**

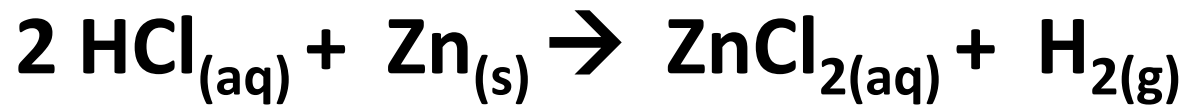
What was the actual yield?

**21 cookies**

What is the percent yield?

**$(21 \div 24) \times 100\% = 87.5\%$**

# Practice Problem #1



Using the reaction above, 45.0 g of HCl is reacted with 10.5 g of Zn.

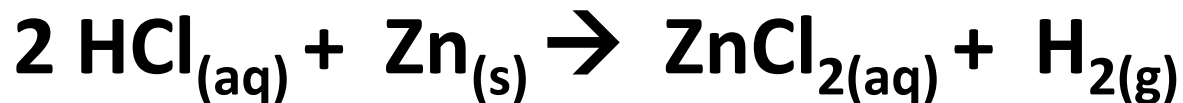
- What is the limiting reagent?
- What is the theoretical mass of  $\text{ZnCl}_2$  that can be produced?
- If only 15.8 g of  $\text{ZnCl}_2$  was produced in an experiment, what was the percent yield of  $\text{ZnCl}_2$ ?

# Practice Problem #1



a. What is the limiting reagent?

# Practice Problem #1



a. What is the limiting reagent?

$$45.0 \text{ g HCl} \times \frac{1 \text{ mol HCl}}{36.5 \text{ g}} \times \frac{1 \text{ mol ZnCl}_2}{2 \text{ mol HCl}} \times \frac{136.4 \text{ g ZnCl}_2}{1 \text{ mol ZnCl}_2} = 84.1 \text{ g ZnCl}_2$$

$$10.5 \text{ g Zn} \times \frac{1 \text{ mol Zn}}{65.4 \text{ g}} \times \frac{1 \text{ mol ZnCl}_2}{1 \text{ mol Zn}} \times \frac{136.4 \text{ g ZnCl}_2}{1 \text{ mol ZnCl}_2} = 21.9 \text{ g ZnCl}_2$$



# Practice Problem #1



b. What is the theoretical mass of  $\text{ZnCl}_2$  that can be produced?

**21.9 g  $\text{ZnCl}_2$**

# Practice Problem #1



- c. If only 15.8 g of  $\text{ZnCl}_2$  was produced in an experiment, what was the percent yield of  $\text{ZnCl}_2$ ?

# Practice Problem #1



c. If only 15.8 g of  $\text{ZnCl}_2$  was produced in an experiment, what was the percent yield of  $\text{ZnCl}_2$ ?

$$\% \text{ yield} = \frac{15.8 \text{ g ZnCl}_2}{21.9 \text{ g ZnCl}_2} \times 100\% = \mathbf{72.1\%}$$

# Your Turn to Practice

- Tomorrow you have a quiz, so please take this time to study and work through the following problems

