



High School Science Virtual Learning

**Chemistry**

**Limiting Reactants**

April 27, 2020



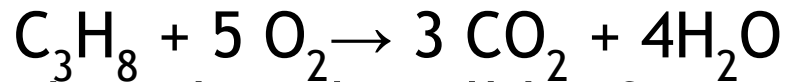
# High School Chemistry

## Lesson: April 27, 2020

### **Objective/Learning Target:**

Students will be able to calculate theoretical yields in a limiting reactant problem.

Let's Get Started:



1. How much carbon dioxide will be formed if 12.5 grams of oxygen reacts with 7.2 grams of propane ( $\text{C}_3\text{H}_8$ )?
2. Under normal conditions, which reactant would typically be limiting in this reaction? Under what conditions would the other reactant be limiting?

## Let's Get Started: Answer Key

1. How much carbon dioxide will be formed if 12.5 grams of oxygen reacts with 7.2 grams of propane ( $C_3H_8$ )? **10.3 g  $CO_2$**

$$12.5 \text{ g } O_2 \left| \frac{1 \text{ mol } O_2}{31.998 \text{ g } O_2} \right| \frac{3 \text{ mol } CO_2}{5 \text{ mol } O_2} \left| \frac{44.009 \text{ g } CO_2}{1 \text{ mol } CO_2} \right| = \boxed{10.3 \text{ g } CO_2}$$

$$1$$

$$7.2 \text{ g } C_3H_8 \left| \frac{1 \text{ mol } C_3H_8}{44.097 \text{ g } C_3H_8} \right| \frac{3 \text{ mol } CO_2}{1 \text{ mol } C_3H_8} \left| \frac{44.009 \text{ g } CO_2}{1 \text{ mol } CO_2} \right| = 22 \text{ g } CO_2$$

$$1$$

## Let's Get Started: Answer Key

2. Under normal conditions,  $C_3H_8$  would be the limiting reactant because there is a very large amount of oxygen in any room. You rarely run out of oxygen when you burn something, and this reaction is a combustion reaction.

You could make oxygen the limiting reactant (like Question 1) by performing this reaction in a closed container.



# Lesson Activity:

## Directions:

1. Watch this [video](#) and take notes on the example.



# Practice

*Complete the following questions using the information you learned during the lesson activity.*

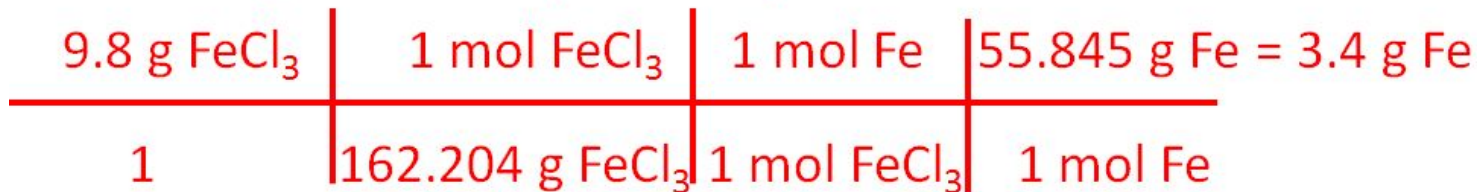
Questions:  $\text{Al} + \text{FeCl}_3 \rightarrow \text{Fe} + \text{AlCl}_3$

1. 3.6 grams of aluminum are put in a container with 9.8 grams of  $\text{FeCl}_3$ . How many grams of iron can be produced?
2. In Question 1, identify the limiting reactant and the excess reactant.
3. If 2.5 g of Fe resulted from the reaction, what was the percent yield.



Once you have completed the practice questions check with the **answer** key.

1. **3.4 g Fe**





Once you have completed the practice questions check with the **answer** key.

2.  $\text{FeCl}_3$  was the **limiting** reagent. **Al** was the **excess** reagent.
3.  $2.5 \text{ g} / 3.4 \text{ g} \times 100\% = \mathbf{73.5\%}$

## More Practice:

Follow the links below to do more practice.

1. [Limiting Reactants Worksheet #1](#)
2. [Limiting Reactants Worksheet # 2](#)



Additional Practice:  
Click on this [link](#) for additional practice.