

**Activity: Double-Stuffed Oreos fact or fiction?****Prelab:**

1. What is the purpose of this activity (make sure to use the term percent composition in your answer)?
2. What is the formula for percent composition?
3. What does  $W_a$  stand for? \_\_\_\_\_ What does  $F_i$  stand for? \_\_\_\_\_

**Background:**

In metallurgy, elements are rarely found in pure form but rather as part of minerals. Industries calculate the element percent composition in a mineral by determining the molar mass of the element and then dividing it into the molar mass of the mineral. Theoretically, this is the maximum yield. As we look at this concept, we are going to determine the percent composition of Oreos (regular and double-stuffed) and then decide if double-stuffed Oreos really are what they say. For the purpose of this activity we will use the  $W_a$  symbol for wafer and the  $F_i$  symbol for filling.

**Procedure:**

1. Place the napkin on the balance and zero it. Measure and record the mass of the regular oreo cookie on the napkin using a balance.
2. Repeat step 2 for the double stuff cookie.
3. Unscrew the regular cookie CAREFULLY and use the fork or your fingers to strap off the filling left on the wafer. Record your observations of the amount of filling removed from the wafers.
4. Set the filling aside and measure the mass of both chocolate wafers.
5. Clean up and enjoy!

**Oreo Data:**

	Regular Oreo $W_a F_i$	Double Oreo $W_a F_i^2$
Cookie mass		
Observations of separation of filling from wafers		
Both Wafers mass		

**Data Analysis- SHOW ALL WORK!**

1. Subtract the mass of the cookie from the mass of both wafers to determine the mass of the filling for both types of oreos.
2. Calculate the percent composition for the wafers and the filling of the regular oreo cookie using the formula for percent composition.
3. Calculate the percent composition for the wafers and the filling of the double stuff oreo cookie using the formula for percent composition.
4. Complete the table below.

***Oreo Percent Composition Data:***

	<b>Regular Oreo W<sub>2</sub>Fi</b>	<b>Double Oreo W<sub>2</sub>Fi<sub>2</sub></b>
<b>Filling mass</b>		
<b>% Composition filling</b>		
<b>% Composition wafers</b>		

***Questions:***

1. How much greater was the filling mass of the double-stuff oreo? \_\_\_\_ Was it double? \_\_\_\_
2. How much greater was the % composition of the filling for the double-stuffed oreo than the regular one? \_\_\_\_\_ Was it double? \_\_\_\_\_
3. Which value, mass or percent composition, is better for finding the answer to the double stuff fact or fiction question? Explain.
4. What are the sources of error for this activity (be specific)?