Names: _____

Is The Double Stuffed Oreo Really Double the Stuff???

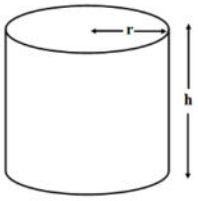
Problem: At the grocery store the other day Mrs. Seon was wondering whether "Double Stuff" Oreos really have double the amount of stuff in them. Help her find out.

Hypothesis:

Procedure:

1. Obtain 1 regular Oreo cookie and 1 Double Stuff Oreo cookie for your group. Please DO NOT EAT the cookies. You are violating a safety rule if you do.
2. Carefully remove the crème filling from the cookies. Weigh the crème filing from each cookie individually. Record data to the nearest hundredth of a gram (0.XX).
3. Determining volume the crème filling by using the volume of a regularly shaped object method. Measure the height and diameter of the regular Oreo crème filing. Record data to the nearest millimeter. Do the same for the double stuff cookie filling.
4. Next, calculate the volume of the cream in each cookie using this formula:

$V = \pi r^2 h$



Where V = volume, π = 3.14, h = height

5. Record the volume in the data table. Then calculate the density of the crème filling using your measurements.
6. Determining the volume of an object using displacement: Collect your cream fillings and a 50ml graduated cylinder.
7. Pour 20 ml of water into the graduated cylinder.
8. Gently fold the crème filling into four. Place one of the cream fillings in the water.
9. Measure and record the displacement.
10. Calculate the density of the crème filling.
11. Repeat steps 6 through 10 for the other filling.
12. Clean up and wash your hands.

Data: Method 1: Volume of Crème filling using a regular shaped object method.

Crème Filling	Mass of Crème Filling (g)	Height (cm)	Diameter (cm) And Radius (cm)	Volume (cm^3)	Density of the crème filing (g/cm^3)
Regular Filling					
Double Stuff Filling					
Class Avg. Regular Filling					
Class Avg. Double Stuff Filling					
Filling Multiplication Factor = Double/Single					

Method 2: Volume of Crème filling using the displacement method.

Filling	Regular 1	Double Stuff
Mass of Filling (see data from above table)		
Initial volume of water (mL)		
Final Volume of water (mL)		
Displacement (mL) = The volume of the filling		
Density in (g/mL) D = m/v		
Class Average Filling volume (mL)		
Class Average Filling Mass (g)		
Class Average Density (g/mL)		

Conclusion:

1. Based on your data, are Double Stuff Oreos double stuffed? Support your answer by presenting the data that we collected as a class.

2. How did the density calculated using method one compare to the density obtained by the displacement method (method 2)? Explain why there may have been differences in the densities of the double and regular "stuff" filling.

3. Account for some errors that could have occurred during this experiment.