

Lab: Stoichiometry of S'mores Name: _____

Purpose: Determine the limiting reactant in the synthesis of S'mores. Perform stoichiometry calculations using macroscale objects to promote understanding.

Materials:

- 1 "sample bag" of chocolate bars per group
- 1 "sample bag" of marshmallows per group
- 1 "sample bag" of graham crackers per group
- 1 paper plate per group member
- 1 napkin per group member
- Access to an electronic balance
- Access to a microwave suitable for edible items

Procedure:

DO NOT OPEN THE "SAMPLE BAGS" UNTIL STEP #6

1. Use the following "molar mass" and "atomic mass" data for all calculations.

chocolate (C_4)= 14.25 grams " molar mass"

graham cracker (G_2)= 7.5 grams " molar mass"

marshmallow (M)= 6.25 grams "atomic mass"

2. Balance the following "synthesis equation" for building a S'more.



3. Weigh your samples on the balance. Do not remove them from the bag. The bag weight (to be subtracted from the total) is 9 grams. You may write the weight on the outside of the bag.
4. Calculate the number of "moles" of each reactant.

Chocolate
Graham cracker
Marshmallow

5. Using stoichiometry calculations, predict how many S'mores you will be able to build, what your limiting reactant will be and how much of each non limiting reactant you will have remaining. You must show your work! **Your group must obtain approval (signature) of Ms. Neiman before continuing to the next part!!!**

Lab: Stoichiometry of S'mores Name: _____

6. Build your S'more according to the equation in procedure step #2.
7. Calculate the "molar mass" of your product- The S'More.
8. Using your napkin or plate as a barrier between your product and the electronic balance, weigh your actual product. (don't forget to tare the balance to remove the weight of the plate/napkin)

Actual weight of product: _____
9. Cause your reaction to go to completion by forming as many of the products as you possibly can. How much product were you able to form?

Number: _____

Mass: _____
10. Once you are certain you have all necessary data, you may heat your product in the microwave if you wish and enjoy the product of your reaction. If your group requires additional supplies to create one S'more for each person please see Ms. Neiman.
11. Clean up your area (crumbs, trash etc.) and place any extra "reactants" in the indicated areas.
12. YOUR DATA SETION SHOULD INCLUDE INFORMATION FROM THE FOLLOWING PROCEDURE STEPS: #2, 3, 4, 5, 7, 8, and 9 NEATLY IN A CHART OR SOME OTHER ORDERLY PRESENTATION.

Questions:

1. What law, from chapter 4, would explain the relationship between the mass of the S'more and the mass of the reactants used to make it?
2. What was your limiting reactant for the creation of a S'more?
3. How much (in grams) of each non-limiting reactant remained after your S'more "reaction" went to completion?
4. How many S'mores could you make if you started with 1000 grams of each reactant?
5. What would be the limiting reactant in this scenario?
6. How much (in grams) of each non limiting reactant would be left over in this scenario?