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**Introduction:**

“Stiochio” means element and “metry” means the process of measuring. The mass and quantity relationships among reactants and products in a reaction are found using the process of stoichiometry. In this activity, students will explore the principles of stoichiometry by building S’mores, the delicious, chocolate, marshmallow, and graham cracker treats.

**Objective:**

1) Write a synthesis reaction using the information from the table below for the components of a s’more.

2) Balance the equation

3) Mass each of the components

4) Calculate % yeild

5) Identify the Limiting and Excess Reactants

6) Make Fire (attached sheet)

6) Make S’mores

**Materials for S’more Calculations:**

5 Graham Crackers

1 Chocolate bar

6 Marshmallows

4 Wooden splint

4 Napkins

Electronic balance (leave on back table)

**Materials for Fire:**

100 mL beaker

Evaporating Dish

Hot pad

(Leave Chemicals at front tables)

Ethanol

Calcium Acetate

Fill in the following table in all blank squares.

|  |  |  |
| --- | --- | --- |
| Components | Symbol | Mass (g) |
| Graham Cracker | S |   |
| Chocolate Piece | Mm |  |
| Marshmallows | Or |  |
| S’more |  |  |

1) Write the product of the synthesis reaction and balance it. To form one s’more, you will need 2 graham crackers halves, 1 marshmallow and 3 chocolate squares.

2) Cause the reaction to go to completion by forming as many of the products as you possibly can. Mass and record **ONE** of the representative products.

 Actual mass of ONE s’more \_\_\_\_\_\_\_\_\_\_\_\_\_\_g

 Theoretical mass of s’more \_\_\_\_\_\_\_\_\_\_\_\_\_\_g

3) Calculate Percent Yield for the s’mores. (see section 12.3 for help with this calucation)

4) A limiting reactant is the material responsible for a reaction reaching completion. In the reaction, what was the limiting reactant?

5) What reacts, if any, where in excess? Mass and record the total of each excess reactant below.

6) How many S’mores could you make if you had started with 100g of each reactant? What would be the limiting reactant?

7) Lets make S’mores! Use the directions on the following page to set up the fire.