**Cheeto Lab: Energy of Foods**

**Objective**: To be able to calculate the number of calories in one Cheeto by using the formula for specific heat.



**Materials**:

Thermometer, Ring stand w/ ring clamp, 100 mL graduated cylinder, Food holder (paper clip), Lighter, Stir rod, Electronic balance, Soda can, Cheetos, Water

**Note**: ALWAYS leave the plastic boat on a balance. It helps protect the balance from stains and marks. **DON’T set the can down anywhere - it is messy!**

**Procedure**:

1. Obtain one Cheeto and place on the exposed end of the paper clip. Find and record the initial mass of the food sample + food holder (paper clip). **Do NOT eat in the lab!**
2. Measure about 70 mL of water with the graduated cylinder. Record the precise volume and mass of the water in the data table. Pour the water into the soda can.
3. Assemble calorimetry apparatus as shown: the can should be suspended *about* 2.5 cm above the food sample. Include a piece of aluminum foil underneath the food sample for easier clean-up.
4. Place the thermometer into the soda can. Record the initial temperature and place the information in the data table.
5. Contact your teacher to help set the Cheeto on fire. Be sure the burning Cheeto is directly beneath the center of the can. Make sure the ENTIRE Cheeto is burning before removing the lighter.
6. Record the highest temperature of the water as the *final temperature* in the data table.
7. Determine and record the final mass of the burned Cheeto + food holder (paper clip) in the data table.
8. Place burned food sample into the trash once it has cooled - keep the food holder (paper clip) and aluminum foil.

**Data**

|  |  |
| --- | --- |
|  | **Flamin’ Hot Cheeto** |
| Initial mass of food and holder |  |
| Final mass of food and holder |  |
| Volume of water |  |
| Mass of water |  |
| Initial temperature, T*i* |  |
| Final temperature, T*f* |  |

**Calculations/Analysis**

1. Show the calculation for the change in temperature of the water, ΔT.

2. Calculate the heat absorbed by the water, q. For water, C is 4.18 J/g°C. **Convert your final answer to kJ.**

3. Show the calculation to determine the mass (in g) of your food sample that burned.

4. Show the calculation to calculate the energy content (in kJ/g) of your food sample. (Use answers #2 and #3).

5. Based on your answer to #4, calculate the number of kilojoules in a 28 g serving of Cheetos. **USE DIMENSIONAL ANALYSIS TO RECEIVE CREDIT.**

1. Based on your answer to #5, calculate the number of Calories in a 28 g serving of Cheetos. (There are 4.18 kJ in one Calorie.) **USE DIMENSIONAL ANALYSIS TO RECEIVE CREDIT.**
2. According to the package, how many Calories are in a 28 g serving of Cheetos? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Calculate your percent error:
4. Identify one or more sources of error that might have led to your calculated percent error.