Calorimeter Lab

Bonus Lab: Calorimeter

Name:_____ **Date:**_____

In this laboratory exercise we will determine the energy values of different snack foods. Small samples of each food will be burned under a container of water. The change in temperature of the water will allow us to determine the amount of heat energy (calories) released by the food.

A calorie is a unit of energy. A calorie is the amount of energy (heat) it takes to raise the temperature of one gram of water by one degree Celsius.

MATERIALS

- Calorimeter (Aluminum can)
- Ring stand & support
- Weighing boat (2)
- Scale
- Distilled Water
- Wire & stand
- Pipette
- Thermometer, digital
- Food samples
- Tweezers

PROCEDURE

1. Use the scale to weigh 100 grams of water into the aluminum can. Gently pour the water into the can until you get close to 100 grams. Use the pipette to precisely add the final few grams.

2. Weigh the food sample to be tested. Record the starting mass of the food on your data table.

3. Mount the food sample onto the coiled wire on the stand and place onto the base of the ring stand.

4. Hang the cans with the S-hooks from the ring stand support. Position the support so the top of the food sample is roughly ½ inch from the can.

5. Measure the starting temperature of the water in the can and record on your data table.

6. Have a teacher ignite the food sample.

7. After the sample has burned completely, record the temperature of the water. (Keep the thermometer in the water for about one minute because the temperature will continue to rise after the flame goes out.) **Be careful, the can will be hot!**

8. Carefully transfer the burned sample into a weigh boat and record the final mass on your data table.

Working With Our Data

Bonus Lab: Calorimeter

Name:_____ **Date:**_____

Record your measurements on the tables below.

FOOD SAMPLE _____

STARTING MASS OF FOOD (IN GRAMS)	
FINAL MASS OF FOOD (IN GRAMS)	
SUBTRACT THE FINAL MASS FROM THE STARTING MASS TO FIND THE CHANGE IN MASS	BOX A

STARTING TEMPERATURE OF WATER (IN °C)	
FINAL TEMPERATURE OF WATER (IN °C)	
SUBTRACT THE STARTING TEMPERATURE FROM THE FINAL TEMPERATURE TO GET THE CHANGE IN TEMPERATURE	BOX B

Energy Yield – How many calories are in the food sample?

We measured the amount of energy released from the food by the change in temperature of the water.

To find out how many heat calories were released, multiple the total mass of the water (100g) by the change in temperature of the water (Box B):

100 x _____ = _____ calories

Next, divide the number of calories by the change in mass of the food (Box A):

_____ ÷ _____ = _____ calories/gram

Remember, a food calorie is 1000 calories. To find of the food calories per gram divide the previous answer by 1000.

_____ ÷ 1000 = _____ **Food Calories per gram**

Understanding Our Data

Bonus Lab: Calorimeter

Name:_____ **Date:**_____

Write the values your class calculated for Food Calories per gram of each food sample:

FOOD 1	
FOOD CALORIES PER GRAM	

FOOD 2	
FOOD CALORIES PER GRAM	

Using the food labels for the foods you tested, find out how many calories are in one serving and how many grams are in one serving. Divide the number of calories in one serving by the number of grams to find the actual Food Calories per gram.

FOOD 1: _____

_____ ÷ _____ = _____

Calories/serving Grams/Serving Food Calories/gram

FOOD 2: _____

_____ ÷ _____ = _____

Calories/serving Grams/Serving Food Calories/gram

1. How do the values you calculated compare to the actual values?

2. Why do you think they are different?

3. Is there anything you could change about the experiment to make the calculated values more accurate?