Lab: Caloric Content of Food

Purpose: How many calories are in a peanut? How does it compare to other nuts?

Materials: 250 ml beaker, ring stand, paper clip, balance, graduated cylinder, thermometer, aluminum foil, peanut, 3 or more other types of nuts, lighter.

Background information: We measure the energy that foods give us in terms of Calories. A Calorie is the amount of energy required to raise 1000 grams (1 kg) of water one degree Celsius. Our bodies burn up calories through growth and exercise. When you take in more Calories than you use, the excess Calories are stored in your body as fat. This leads to an increase in one’s weight.

Hypothesis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Procedure: 1) Weigh your unshelled peanut on the balance to the nearest
 tenth of a gram. Record the weight in the data table.

2) Using the graduated cylinder, measure out 100 ml (100 g) of

 water.

1. Carefully pour the water into the beaker and record the temperature of the water (degrees Celsius) in the data table. Leave the thermometer in the beaker.
2. Construct a simple calorimeter as illustrated below:



1. Use a paper clip to make a stand that will hold the peanut above the base of the ring stand.
2. Make a shield around the peanut with aluminum foil. This will help to reduce heat loss to the surrounding environment. You will need to make some small holes in the foil to allow oxygen in to sustain the flame.
3. Light the peanut on fire and lower the can so that it is immediately above the flame.
4. When the flame has consumed the peanut, determine the temperature of the water (degrees Celsius) and record this in the data table.

Data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of nut | Mass (g) | Beginning Temperature  | Final Temperature | Temperature increase |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Calculations: Record the following calculations for each type on nut.

1. Find the number of Calories contained in the each nut by doing the following:

 Calories = temperature increase
 10

1. Determine the number of calories per gram by dividing the mass of the peanut:

Calories per gram = Calories

#  Mass of nut

|  |  |  |
| --- | --- | --- |
| Type of nut | Calories | Calories per gram |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Graph: Calories vs. Nut Calories per gram vs. Nut

Calories calories

 per

 gram

 peanut almond etc etc peanut almond etc etc

Conclusion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Postlab Questions:

1. A student says, “A macadamia has more calories than a peanut, so you should not eat macadamia.” Why is this not necessarily good advice?
2. A 150-pound person will burn approximately 750 Calories per hour playing a full court game of basketball. According to your data, how many peanuts would they need to eat to give them enough energy to play a one-hour game? *SHOW WORK*
3. Do you think that this lab resulted in a higher or lower Caloric value than the true Caloric content for the foods tested? Explain why this might have happened?

4) How might the experiment be improved to obtain a more accurate value for the Caloric content of the foods?