

Burning Peanuts Laboratory:

Lisa Morine

Students' Guide

Goals

- To learn about the energy content of food
- To learn about energy transfer

The Laboratory

In this laboratory, you will burn a peanut, and use the heat that it gives off to heat a can of water in order to understand the meaning of calories and energy.

Materials for Each Group

- Electronic balance
- Several peanuts
- A piece of wire
- Cork stopper to hold wire
- 4"x4" aluminum foil to protect cork from the fire, and a sheet of aluminum foil
- Two empty tin cans
- 250 ml graduated cylinder
- A stand with ring clamp
- A thermometer
- Matches
- Tap water

SAFETY

Wear goggles at all times during the laboratory period.

Take extra care when working with fire.

Stay away from flammable liquids (alcohol, ethers, acetone, etc) and do not touch hot parts with bare hands. work on a sheet of aluminum foil to avoid burning the bench-top.

Instructions

1. Weigh a peanut on the semi-analytical balance.
2. Stick the peanut on one end of a wire.
3. Stick the other end of the wire through a piece of aluminum foil and into a cork stopper.
4. Place the cork with the peanut on the base of a stand, under the ring clamp.

Burning Peanuts Laboratory: Students' Guide, page 2

5. Weigh an empty 250 ml graduated cylinder on the semi-analytical balance: _____
6. Measure exactly 200 ml of tap water into the cylinder. The accuracy of the amount of water is very important for this calculation.
7. Weigh the cylinder with water: _____
8. Pour the water into the can and measure its temperature with a thermometer: _____
9. Take out the thermometer.
10. Put the can on the ring clamp above the peanut, at a distance of more than 2 inches.
11. Set the peanut on fire, and make sure that the fire heats the can. If it doesn't, repeat the procedure, after you readjust the height of the can.
12. Notice the changes, which occur during burning: _____

13. Burn the peanut. Wait until it burns out. When the fire extinguishes, take a temperature reading: _____

14. What is the temperature difference in the water, before and after the peanut was burned? _____

15. A calorie is the quantity of heat required to raise 1gr of water by 10°C. Calculate how many calories were released in the heating process by dividing the temperature change into the exact mass of water (in grams):

16. Weigh the left-over material from the burning peanut: _____
17. Calculate the mass that was burnt, from the difference between the original and left-over mass: _____

18. How many grams of peanut did you burn, in order to heat 200 g (200 ml) of water by one degree centigrade? _____
How many grams of peanut will you burn to heat one gram of water by 10°C? How many calories is that?

Summary

Does a peanut have a high or a low energy content? _____

Which do you think is the most abundant of the five food groups in peanut? Why? _____

Check your answer with the teacher.