



California State University of Bakersfield, Department of Chemistry

Burn Peanuts Burn



Standards:

KE23 C.4 - Define specific heat capacity and its relationship to calorimetric measurements:

$$q = m \cdot \Delta T \cdot C_p$$

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Introduction:

The ability to retain heat energy is called that material's heat capacity. Specific heat is the amount of heat per unit mass required to raise the temperature by one degree Celsius. If different food samples have a certain mass at the beginning and are then heated to the same temperature will the final temperature of the each mixture be the same? This experiment will help us understand the capacity in each food.

Materials:

- Balance, centigram (0.01 g precision)
- "Soda-can" calorimeter
- Food holder (cork) and pin
- Graduated cylinder, 50 mL
- Ring stand
- Matches
- Food samples (peanuts, chips, etc.)
- Stirring rod
- Thermometer
- Water

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Safety:

- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments.
- Do not taste or ingest any materials in the chemistry laboratory.

Procedure:

1. Place a food sample on the food holder and measure the combined mass. Place the food holder on the ring stand.
2. The can must be open, not sealed. Record the mass of an empty, clean soda can.
3. Add 50 mL of tap water into the can and record the combined mass.
4. Using a metal ring, suspend the can on a ring stand and about 2.5 cm above the food holder. Bend the tab of the can and slide a stirring rod through the hole of it.
5. Measure and record the initial temperature of the water using a thermometer.
6. Place the food sample under the can and light it with a match. Allow the temperature of the water to be heated until the food sample stops burning. Record the max final temperature of the water in the can.
7. Record the final mass of the food holder and the sample.
8. Clean the can. Repeat the procedure using another food sample.

Data and Observations:

Record your observations in this space

	Initial temperature of water	Mass of holder and object before burned	Final temperature of water	Mass of holder and object after burned
Peanut				
Chip				

1. Which item has or contains more heat energy?
2. Why do you think this item contains more heat?

References:

1. <http://www.flinnsci.com/>. (Accessed on July 23).