

Heat Review:

Name

Key

1. What is specific heat capacity? Explain differences between high and low specific heat capacities. Explain how you calculate specific heat capacity.

Specific heat capacity is the amount of heat it takes to raise 1g of a substance by 1°C. Substances with low capacities heat up and cool down quickly. High heat capacities heat up and cool down slowly. To calculate, you use

$$C = \frac{q}{m \cdot \Delta T} \quad \text{where } q \text{ is heat, } m \text{ is mass, } \Delta T \text{ is change in temperature}$$

units are $\frac{\text{J or Cal}}{\text{g} \cdot ^\circ\text{C}}$

2. How does calorimetry work?

Calorimetry allows you to calculate the heat released by something by ~~measuring~~ measuring the temperature change and mass of water, and assuming the heat the water took in is equal to the heat given off by "something"

3. A student burns a piece of food collects the following data:

Mass of food before burning 15.15g

Mass of food after burning 12.35g

Mass of water 100.00g

Temperature of water before burning 25.0 °C

Temperature of water after burning 33.5 °C

$$\begin{aligned} & \text{Mass of food before burning } 15.15\text{g} \\ & \text{Mass of food after burning } 12.35\text{g} \end{aligned} \quad \rightarrow \quad 2.8\text{g} = \text{mass of food burned}$$
$$\begin{aligned} & \text{Temperature of water before burning } 25.0^\circ\text{C} \\ & \text{Temperature of water after burning } 33.5^\circ\text{C} \end{aligned} \quad \rightarrow \quad 8.5^\circ\text{C} = \Delta T$$

Use the data to calculate the heat released by the food into the water.

$$\text{Heat} = \text{mass}_{\text{water}} \times \text{change in temperature of water} \times 0.001 \text{ Cal/g}^\circ\text{C}$$

$$\text{heat} = 100.00\text{g} \times 8.5^\circ\text{C} \times \frac{0.001 \text{ Cal}}{\text{g}^\circ\text{C}} = 0.85 \text{ Cal}$$

Calculate the Calories per gram of food burned.

$$\frac{0.85 \text{ Cal}}{2.8\text{g}} = 0.30 \text{ Cal/g}$$

4. Explain why an experiment should be repeated several times.

People make mistakes. Science should be repeatable and your data needs to be repeatable. If you have more data that supports your findings, then they become more reliable.

5. Explain what a calorie is.

A calorie is a unit of heat/energy just like a Joule.

It is the heat needed to raise 1 gram of water by 1°C .

6. Explain what information you can get from a nutrition label and why it is important.

Serving size, total calories, amt. of fat, protein and carbohydrates. Vitamin information, fiber content, sodium, cholesterol, etc.

It is important for us to make informed decisions regarding what we put into our bodies.

7. If a student gets the following data from the food burning lab where the accepted value is 5.00 Cal/g, what would you suggest to him or her to improve their results?

Trial 1: 3.55 Cal/g

Trial 2: 1.08 Cal/g

Trial 3: 2.47 Cal/g

Your data is all over the place. You need to be more consistent in the way you're collecting your data. Obviously Trial 1 gave you the closest to the accepted, so what you did there should be what you try to replicate.