

Success 24/7 Chemistry: Calculations with q

Equation:

$$q = mc\Delta T$$

Variables you need to know:

$$q = \text{heat (J or cal)}$$

$$m = \text{mass (g)}$$

$$C = \text{specific heat (} \frac{\text{cal}}{\text{g}^\circ\text{C}} \text{ or } \frac{\text{J}}{\text{g}^\circ\text{C}} \text{)}$$

$$\Delta T = \text{change in temperature (}^\circ\text{C)}$$

$$\Delta T = T_{\text{final}} - T_{\text{initial}}$$

Practice Problems:

1. Gold has a specific heat of $0.129 \frac{\text{J}}{\text{g}^\circ\text{C}}$. How many joules of heat energy are required to raise the temperature of 15 grams of gold from 22 °C to 85 °C?

2. An unknown substance with a mass of 100. grams absorbs 1000. J while undergoing a temperature increase of 15 °C. What is the specific heat of the substance?

3. Copper has a specific heat of $0.385 \frac{J}{g^{\circ}C}$. A piece of copper absorbs 5000. J of energy and undergoes a temperature change from 100. °C to 200. °C. What is the mass of the piece of copper?
4. If 335 g of water at 65.5 °C loses 9750 J of heat, what is the final temperature of the water?
Liquid water has a specific heat of $4.18 \frac{J}{g^{\circ}C}$.