

SPECIFIC HEAT & ENTHALPY IN PHASE CHANGES PRACTICE

Name: _____

Part I: Solve the following specific heat problems ($Q = m * C_p * \Delta T$). Show all work and proper units.

1. How much **heat (in calories)** is required to heat 5.00 grams of steam at 100. °C to 120. °C?
($C_{\text{Steam}} = 0.500 \text{ cal/g}^\circ\text{C}$)

2. How many **grams** of water are present if 1530 calories of heat is applied to raise its temperature by 52.0 °C? ($C_{\text{Water}} = 1.00 \text{ cal/g}^\circ\text{C}$)

3. How much **heat** is gained when 20.0 grams of water increases its temperature from 50.0 °C to 60.0 °C?
($C_{\text{Water}} = 4.184 \text{ J/g}^\circ\text{C}$)

4. Determine the **specific heat** of a metal if 397 grams of the metal absorbs 34,500 Joules of heat as its temperature increases by 97.0 °C. What is the **identity** of the metal?

5. What is the **final temperature** of a 73.2 gram sample of cobalt with an initial temperature of 102 °C, after 6800 Joules of energy is applied? ($C_{\text{Cobal}} = 0.4210 \text{ J/g}^\circ\text{C}$)

Part II: Solve the following enthalpy phase changes problems ($Q = m * \Delta H$). Show all work and proper units.

1. How many **kilojoules (kJ)** of heat is required to melt 10.0 grams of a popsicle at 0°C ? Assume that a popsicle has the same molar heat of fusion of water.
2. How many **grams** of ice at 0°C could be melted by the addition of 0.400 kJ of heat?
3. How much **heat (kJ)** is absorbed when 63.7 grams of water at 100°C is converted into steam at 100°C ?
4. How many **kilojoules (kJ)** of heat is needed to boil 54.0 grams of water at its boiling point?
5. Identify each enthalpy change as either **endothermic** or **exothermic**:
 - a. $1 \text{ mol C}_3\text{H}_8(l) \rightarrow 1 \text{ mol C}_3\text{H}_8(g)$ _____
 - b. $1 \text{ mol Hg}(l) \rightarrow 1 \text{ mol Hg}(s)$ _____
 - c. $1 \text{ mol NH}_3(g) \rightarrow 1 \text{ mol NH}_3(l)$ _____
 - d. $1 \text{ mol NaCl}(s) + 3.88 \text{ kJ} \rightarrow 1 \text{ mol NaCl}(aq)$ _____
 - e. $\text{NaOH}(s) \rightarrow \text{Na}^+(aq) + \text{OH}^-(aq) + 445.1 \text{ kJ}$ _____