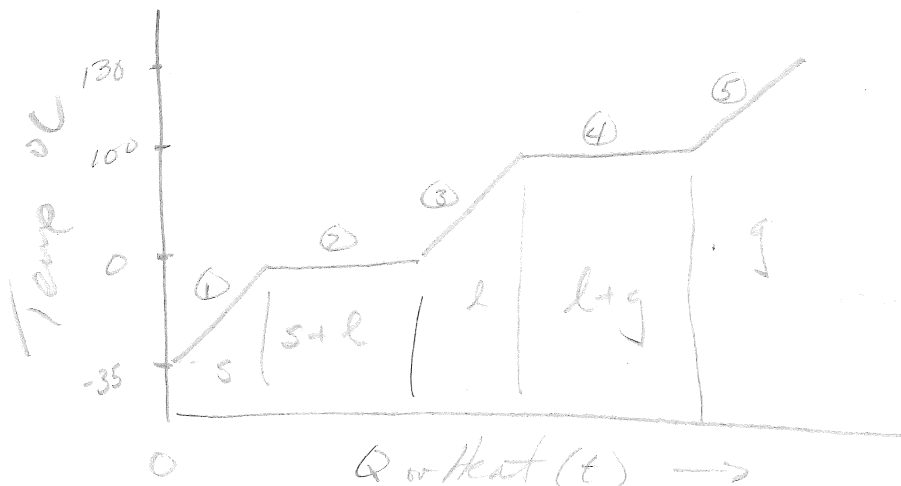


PHASE CHANGE PRACTICE PROBLEMS

1. Draw a heat curve for ice at -35°C being changed into steam at 130°C .



2. Label the following on the graph above. Write the corresponding formula to the right.

<u>Label Above</u>	<u>Formula</u>
① Ice Warming	$Q = m C_p \Delta T$
② Melting	$Q = m H_f$
③ Water Warming	$Q = m C_p \Delta T$
④ Water Vaporizing	$Q = m H_v$
⑤ Vapor Warming	$Q = m C_p \Delta T$

3. Complete the following table for water.

Value	Joules
C_p (ice)	$2.06 \text{ J/g}^{\circ}\text{C}$
H_f (water)	334 J/g
C_p (liq. water)	$4.184 \text{ J/g}^{\circ}\text{C}$
H_v (liq. water)	2260 J/g
C_p (water vapor)	$2.03 \text{ J/g}^{\circ}\text{C}$

4. Label the phases solid, liquid, and gas on the graph above. (see graph)

5. How many joules are needed to warm 125.0 g of ice at -35.0°C to ice at 0.0°C ? Show the formula and your work!

$\Delta T = 35.0^{\circ}\text{C}$ (no negatives) $m = 125.0 \text{ g}$ $C_p = 2.03 \text{ J/g}^{\circ}\text{C}$
 $Q = m C_p \Delta T$

$$\frac{125.0 \text{ g} \times 2.06 \text{ J/g}^{\circ}\text{C} \times 35.0^{\circ}\text{C}}{1} = 9010 \text{ J}$$

6. How many joules are needed to melt 125.0 g of ice at 0.0°C? Show the formula and your work!

$$Q = m H_f$$

$$\frac{125.0 \text{ g}}{1 \text{ g}} \times \frac{334 \text{ J}}{\text{g}} = \boxed{41800 \text{ J}}$$

7. How many joules are needed to warm 125.0 g of liquid water at 0.0°C to liquid water at 100.0°C? Show the formula and your work!

$$Q = m C_p \Delta T$$

$$\frac{125.0 \text{ g}}{1 \text{ g}} \times \frac{4.184 \text{ J}}{\text{g}^\circ\text{C}} \times 100.0^\circ\text{C} = \boxed{5.230 \times 10^4 \text{ J}}$$

8. How many joules are needed to vaporize 125.0 g of liquid water at 100.0°C? Show the formula and your work!

$$Q = m H_v$$

$$\frac{125.0 \text{ g}}{1 \text{ g}} \times \frac{2260 \text{ J}}{\text{g}} = \boxed{283000 \text{ J}}$$

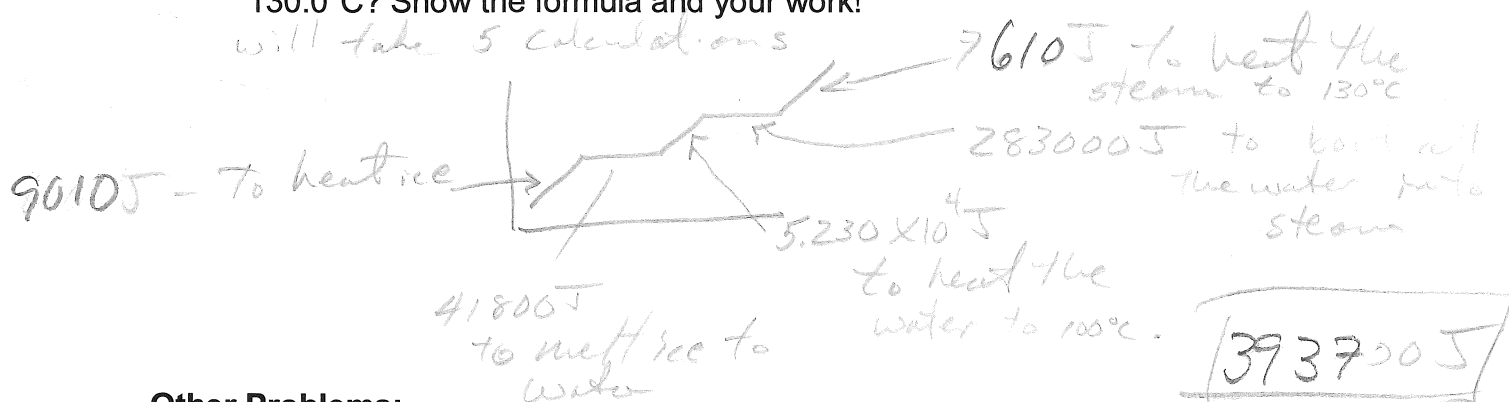
9. How many joules are needed to heat 125.0 g of water vapor from 100.0°C to steam at 130.0°C? Show the formula and your work!

$$Q = m C_p \Delta T$$

$$\frac{125.0 \text{ g}}{1 \text{ g}} \times \frac{2.03 \text{ J}}{\text{g}^\circ\text{C}} \times 30.0^\circ\text{C} = \boxed{7610 \text{ J}}$$

10. How many joules are needed to heat 125.0 g of ice at -35.0°C to steam at 130.0°C? Show the formula and your work!

will take 5 calculations



Other Problems:

11. How many joules are required to melt 325.0 kg of ice at 0.0°C?

$$Q = m H_f$$

$$\frac{325.0 \text{ kg}}{1 \text{ kg}} \times \frac{334 \text{ J}}{\text{g}} = 109,000,000 \text{ J}$$

12. $3.750 \times 10^3 \text{ J}$ can boil what mass of water at 100.0°C?

$$m = Q / H_v$$

$$\frac{3.750 \times 10^3 \text{ J}}{2260 \text{ J/g}} = 1.66 \text{ g}$$

13. How many joules are released when 500.0 g of water vapor condenses at 100.0°C?

$$Q = m H_v$$

$$\frac{500.0 \text{ g}}{1 \text{ g}} \times \frac{2260 \text{ J}}{\text{g}} = \boxed{1,130,000 \text{ J}}$$