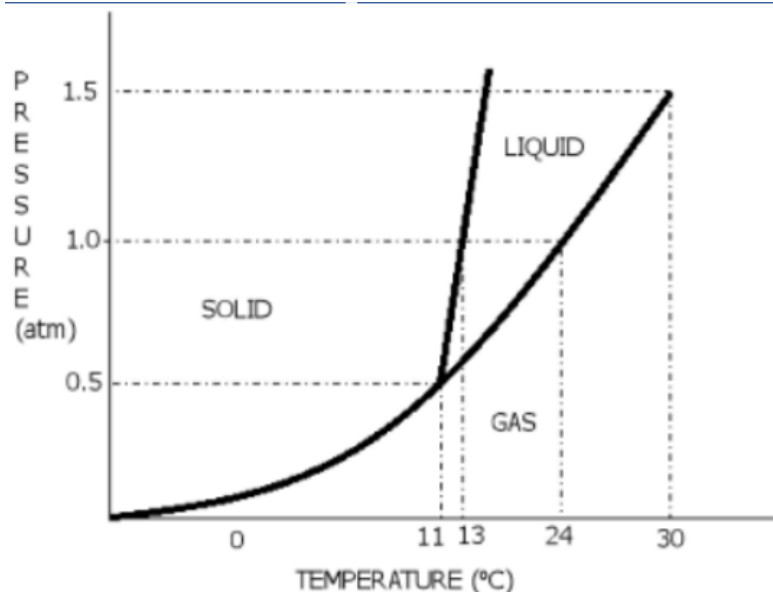


**Unit 11 Review Answers**



1. Triple point? **11°C and 0.5 atm**
2. Critical temperature? **30°C**
3. Normal MP? **13°C**  
Normal BP? **24°C**
4. Sublimation at 1 atm? **no**
5. State(s) of matter:
  - (A) 32°C and 1.5 atm **G**
  - (B) 11°C and 0.5 atm **S, L, G**
  - (C) 13°C and 1.0 atm **S, L**
  - (D) 0°C and 0.75 atm **solid**
  - (E) 22°C and 1.05 atm **liquid**
  - (F) 24°C and 1.0 atm **L, G**

6. How many Joules of heat are required to boil a 29.3 gram sample of water at 100.0°C?

$$q = m \cdot H_v$$

$$q = 29.3 \cdot 2260$$

$$q = 66,218 \text{ J}$$

7. How many Joules of heat are required to heat a 29.3 gram sample of steam from 100.0°C to 117.3°C?

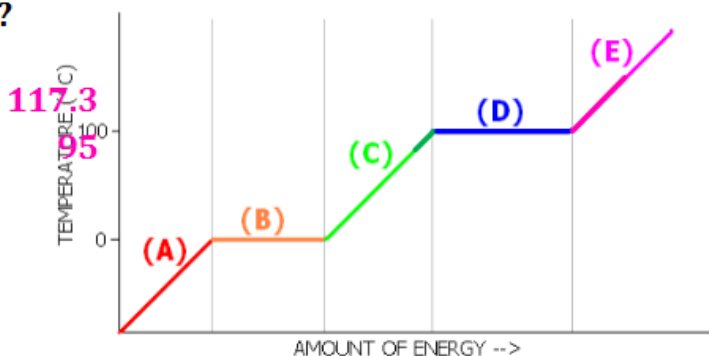
$$q = 29.3 \cdot 2.02 \cdot (117.3 - 100.0)$$

$$q = 29.3 \cdot 2.02 \cdot 17.3$$

$$q = 1023.9178 \text{ J}$$

8. How many Joules of heat are required to heat a 15.75 gram sample of water from 95.0°C to steam at 117.3°C?

$$\begin{array}{r} \text{TOTAL} = \quad 329.175 \\ \quad \quad 35595 \\ + \quad \quad 550.3995 \\ \hline \boxed{36474.5745 \text{ J}} \end{array}$$



Step 1 - water @95°C to water @ 100°C

$$\begin{aligned} q &= m \cdot C_p \cdot \Delta T \\ q &= 15.75 \cdot 4.18 \cdot 5 \\ q &= 329.175 \text{ J} \end{aligned}$$

temp change --> 100 - 95 = 5

$C_p = 4.18$  b/c it is liquid water

Step 2 - water @ 100°C to steam @ 100°C

$$\begin{aligned} q &= m \cdot H_v \\ q &= 15.75 \cdot 2260 \\ q &= 35595 \text{ J} \end{aligned}$$

no temp change, phase change use  $H_v$  b/c change is between liquid --> gas

Step 3 - steam @100°C to steam @117.3°C

$$\begin{aligned} q &= m \cdot C_p \cdot \Delta T \\ q &= 15.75 \cdot 2.02 \cdot 17.3 \\ q &= 550.3995 \text{ J} \end{aligned}$$

temp change --> 117.3 - 100 = 17.3  
 $C_p = 2.02$  b/c it is now steam

### Unit 12 Answers

1. At what temperature does 135 grams of KI dissolved in 100 grams of water form a saturated solution? about 10°C
2. How many grams of  $\text{KNO}_3$  will dissolve in 400 grams of water at 60°C? about 440
3. If 10 grams of  $\text{KClO}_3$  are dissolved in 100 grams of water at 30°C, is the solution saturated, **unsaturated**, or supersaturated?
4. How many grams of solid precipitate will form if a saturated  $\text{NaNO}_3$  solution is cooled from 80°C to 20°C? 145 - 87 = 58 g ppt.
5. How many grams of  $\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_3$  are needed to dissolve to make 350. mL of a 2.50 M solution? 204 g
6. What is the molarity of a solution made by diluting 17.3 mL of 12 M hydrochloric acid to 550. mL? 0.38 M
7.  $\text{Ca}(\text{NO}_3)_2 (\text{aq}) + \text{Na}_2\text{CO}_3 (\text{aq}) \rightarrow \text{NaNO}_3 (\text{aq}) + \text{CaCO}_3 (\text{s})$
8.  $\text{Zn}(\text{NO}_3)_2 (\text{aq}) + \text{K}_3\text{PO}_4 (\text{aq}) \rightarrow \text{KNO}_3 (\text{aq}) + \text{Zn}_3(\text{PO}_4)_2 (\text{s})$   
 $\text{Ca}^{+2}(\text{aq}) + \text{CO}_3^{-2}(\text{aq}) \rightarrow \text{CaCO}_3 (\text{s})$   
 $3 \text{Zn}^{+2}(\text{aq}) + 2 \text{PO}_4^{-3}(\text{aq}) \rightarrow \text{Zn}_3(\text{PO}_4)_2 (\text{s})$