ERHS SCIENCE Specific & Latent Heats Of Water WS Name:_____
Marine Science Date_____Period_____

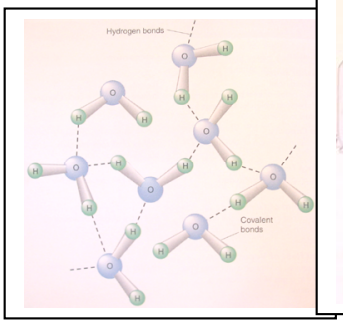
Background: The structure of the water molecule is very significant and has an important role in water's physical properties. The hydrogen bonds that allow water to retain a strong surface tension are also important in the changes of state of matter as well as water's ability to absorb an extreme amount of energy. The specific heat of water is described as:

The heat required to raise 1 g H_2O(l) by 1°C = 1 cal

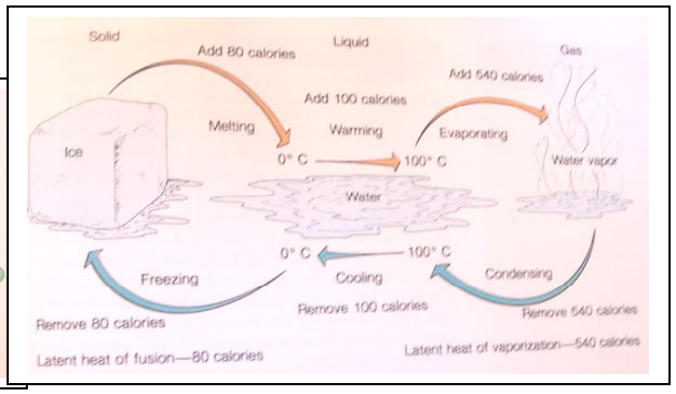
Solid & vapor water has a specific heat of 0.5 cal, so one cal will raise the temperature of ice or steam 2°C.

Latent Heat of fusion: the heat required to change it from a solid to a liquid. **Water = 80 cal**

Latent Heat of Vaporization: the heat required to change it from a liquid to a gas. **Water = 540 cal.**



Water's arrangement



Heats of Fusion & Vaporization.

DIRECTIONS: Use the information above to work the following problems. For each one consider if there is a phase change or not. SHOW YOUR MATH WORK!! **Energy = m x C_p x ΔT**

Energy = mass x specific heat x change in temp°C(in the same state of matter)

1) A sample of 100g water is at 3°C and is heated to 75°C. How much heat was added?

2) A sample of 10g water at -4°C is heated until it melts (Hint: what temp does water melt at?) How much heat is required?

3) 25mL of water is heated from 35°C to 99°C. How much heat was required?

4) How much energy is required to raise the temperature of 50 g of liquid water by 70°C?

5) What heat is required to change 1g of liquid water at 98°C to steam at 101°C?

**6) What is the total change of heat required to raise the temperature of 10g ice at -4°C all the way to steam at 102°C (THIS HAS MULTIPLE PARTS TO IT!)?