**Heat of Fusion**

Hf water = 334 J/g q=mHf q=mCpΔT

1. How much energy does it take to melt 50g of ice at 0°C?
2. How much ice at 0°C can be melted using 3550 Joules of energy?
3. A student wanted to melt 11,000g of ice at its melting point.
   1. How much energy was needed in Joules?
   2. In calories?
   3. In kilocalories?
4. Ninety grams of ice at 0°C was heated to 94°C. How much heat was needed?
5. If you want to freeze 34g of water that is initially at 20°C, how much energy must be removed?
6. You have 25g of ice at -10°C. How much energy does it take to warm it to 25°C?
7. A student needs to cool 450g of water from 60°C to -5°C. How much energy must be removed?

**Heat of Vaporization**

Hv water = 2260 J/g q=mHv q=mCpΔT

1. How much energy does it take to vaporize 30g of water at 100°C?
2. How much energy must be removed from 320g of steam at 100°C to make it liquid water?
3. 40 grams of water at 100°C was heated to 124°C. How much heat was needed?
4. How can you tell when to use Hf versus Hv?
5. How much energy is required to bring 100g of ice at -5°C to 90°C?
6. You have 29g of ice at -15°C that you want to heat to 125°C. How much heat is required?