Note Taking Guide: Episode 1301 Name_____

temperature:

- a measure of the Average Kinetic energy of the particles in a sample of matter
- does not depend on the amount of matter in the sample
- symbol is T; unit is °C

heat:

- Total amount of Kinetic energy that flows because of a difference in Temperature.
- depends on mass of sample
- symbol is Q; unit is J (Joule) (1 cal = 4.184 J)

1 Food Calorie = 1000 cal = 1 Kcal = 4.184 J

Kinetic energy is energy in motion

Potential energy is stored

- Potential energy is hiding and cannot be measured.
- Only changes in P.E. can be measured.

specific heat capacity:

- amount of energy required to raise the temperature of 1 gram of substance 1 °C
- symbol is c; unit is joule/g°C

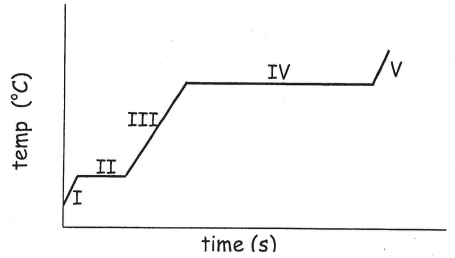
$$Q = m \times C \times \Delta t$$

Q = Heat, m = mass, C = specific heat, Δt = change in Temp

When heat (Q) is absorbed by a system, part of it (C) goes into storage as potential energy and part of it is used to make the molecules move around faster, raising the temperature (Δt).

Why does sand get hotter in the day and colder at night than the water?

Heating Curve for Water



I:

Heat is being used to raise the Temp of the ice.

$Q = m \times C_s \times \Delta T$

II:

Heat is being used to turn solid to Liquid. (phase change)

$Q = m \times \Delta H_{fus}$

heat of fusion - Heat required to change 1g of solid to liquid

III:

Heat is being used to raise the Temp of the liquid.

$Q = m \times C_l \times \Delta T$

IV:

Heat is being used to turn liquid to Vapor. (phase change)

$Q = m \times \Delta H_{vap}$

heat of vaporization - Heat required to change 1g of Liquid to Gas

endothermic change: (Melting is an example.)

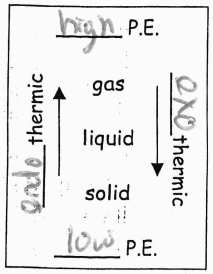
- Physical or Chemical change in which a Systems absorbs Heat from its Surroundings
- KE → PE (Heat seems to Dissappear.)
- PE of system increases and it becomes less STABLE

(Evaporation is another example.)

exothermic change:

- physical or chemical change in which a system gives off heat to its surroundings
- PE → KE
  (Heat seems to Appear out of Nowhere)
- PE of system decreases and it becomes more stable.

Ex. - Why does your skin feel cool when you get out of the pool?
Think about these steps to answer the question:

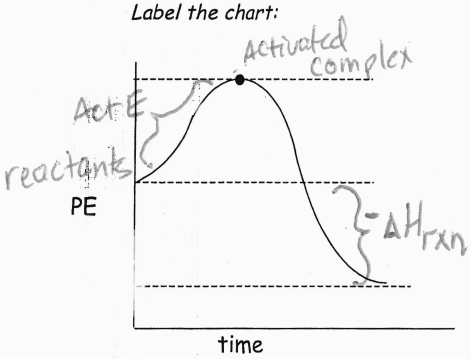


Identify the system - water evaporating
goes from liquid (low P.E.) to Gas (High P.E.).
This is an Endothermic change. In this type of change, the system (the water) Absorb heat from the surroundings.

Identify the surroundings - your skin
Your skin feels cool because it looses heat. The heat was used to evaporate the water.

Why do farmers spray fruit on trees with water when the temperature is going to drop below freezing? *Identify the system and surroundings and make the statements about them (as done above.)*

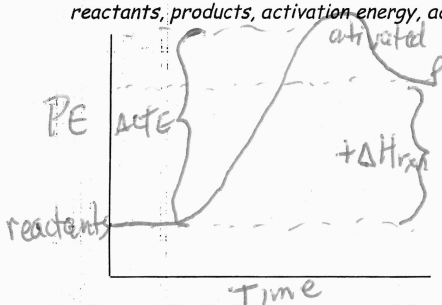
Energy Diagram of a Chemical Change:
Label the chart:



As molecules get closer, their electron clouds repel each other, and their P.E. (increases, decreases).
The Activated complex is highest point in P.E.
The energy required to reach the complex is called the potential energy.

Products are (higher, lower) in P.E. than reactants and are (more, less) stable.
This reaction is exo thermic.

Problem Set #1: Draw the P.E. diagram shown and label the following:
reactants, products, activation energy, activated complex, ΔH_r (+ or -)

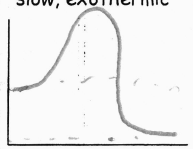


Products are (higher, lower) in P.E. than reactants and are (more, less) stable.
This reaction is endo thermic.

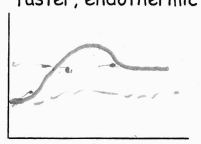
When Act E is high, the reaction is (slow, fast).

Sketch a diagram of these reactions:

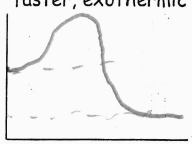
slow, exothermic



faster, endothermic



faster, exothermic



Chemistry Quiz: CR1. CR2. 1. 2. 3.