Lesson 147: Thermochemistry Notes

Temperature:

- a measure of the _____ _____ energy of the particles in a sample of matter
- does not depend on the amount of _____ in the sample
- symbol is _____; unit is _____

heat:

- _____ amount of _____ energy that flows because of a difference in _____.
- depends on _____ of sample
- symbol is _____; unit is ____(_____) (1 cal = 4.18 __)

> Kinetic energy is _____ in _____
>
> Potential energy is _____ _____
>
> - Potential energy is hiding and cannot be _____.
> - Only _____ in P.E. can be measured.

specific heat capacity:

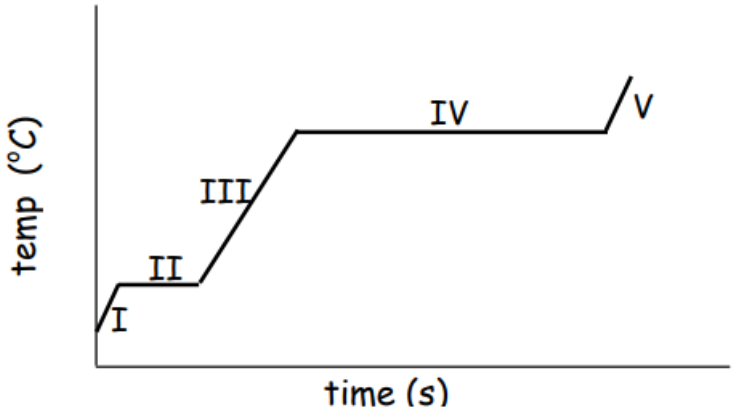
- amount of _____ required to raise the _____ of 1 ___ of substance 1 _____
- symbol is _____; unit is _____

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

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

Q = _____ x _____ x _____

II:

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

Q = _____ x _____

heat of fusion - _____ required to change 1 g of _____ to _____

III:

Heat is being used to raise the _____ of the _____.

Q = _____ x _____ x _____

IV:

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

Q = _____ x _____

heat of vaporization - _____ required to change 1g of _____ to _____

endothermic change: (_____ is an example.)

- _____ or _____ change in which a _____ absorbs _____ from its _____
- _____ → _____ (Heat seems to _____.)
- _____ of system _____ and it becomes less _____. (_____ is another example.)

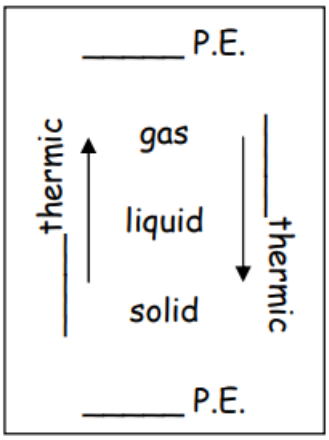
exothermic change:

- physical or chemical _____ in which a system _____ _____ heat to its _____

- _____ → _____ (Heat seems to _____ out of _____)
- _____ of system _____ and it becomes _____ 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 - _____

goes from liquid (_____ P.E.) to _____ (_____ P.E.)

This is an _____ change. In this type of change, the system (the water) _____ heat from the surroundings.

Identify the surroundings - _____

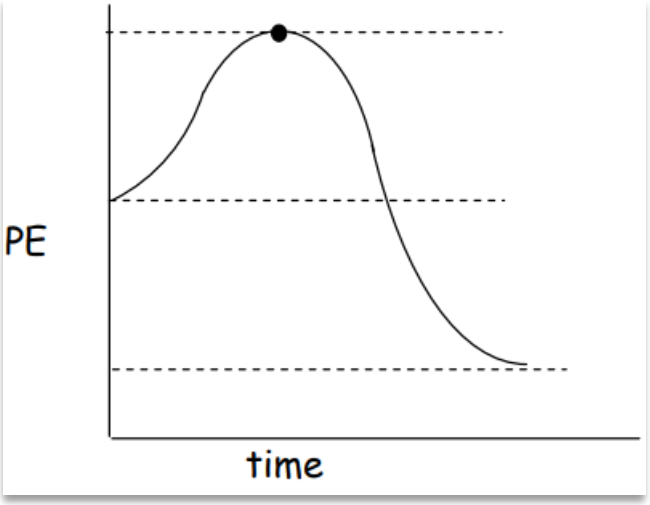
Your skin feels _____ because it _____ heat. The heat was used to _____ the water.

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)*.

Lesson 147: Thermochemistry Notes (cont.)

Energy Diagram of Chemical Change:

Label the chart:



As molecules get closer, their electron clouds _____ each other, and their P.E. (increases, decreases)

The _____ complex is highest point in P.E.

The energy required to reach the complex is called the _____ energy.

Products are (higher, lower) in P.E. than reactants and are (more, less) stable.

This reaction is _____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 (more, less) stable.

This reaction is _____thermic.

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

Sketch a diagram for these reactions:

slow, exothermic

faster, endothermic

faster, exothermic

The Chemistry Quiz

CR1. _____ CR2. _____ 1. _____ 2. _____ 3. _____