

Unit 11 Quest: Thermochemistry Study Guide

Define the following vocabulary words.

- 1) Entropy -
- 2) Calorie -
- 3) Joule -
- 4) Enthalpy -
- 5) Specific heat capacity -
- 6) Temperature -
- 7) Endothermic reaction -
- 8) Catalyst -

Short Answer Questions/Conceptual Questions:

- 9) Explain how a calorimeter works and the purpose of calorimetry calculations.

- 10) Explain the connection between calorimetry, the law of conservation of Energy, and the formula
 $Q_{\text{gained}} = -Q_{\text{lost}}$

- 11) Draw a heating curve and provide the following items on the curve:
 - a) label the phase of water found on each segment,
 - b) provide the formula used for each segment
 - c) Identify where the highest entropy is located **and** where the lowest entropy is located.
 - d) Identify where the highest Kinetic Energy is located.

12) Draw a picture of an endothermic reaction. Label the following parts:

- a) Activation energy
- b) Energy stored in the Reactants
- c) Energy stored in the Products
- d) Draw an arrow on the graph that points in the direction of the "forward reaction".

13) Explain how the reverse reaction is different than the forward reaction based on the graph the graph that you drew.

14) Explain the relationship between temperature changes, pressure, and kinetic energy. Explain the why behind the connection.

Math Calculations:

Symbols:

Identify each of the following symbols **and** provide the unit for each

a) m - _____

b) C_p - _____

c) ΔH_{fus} - _____

d) ΔH_{vap} - _____

e) ΔH - _____

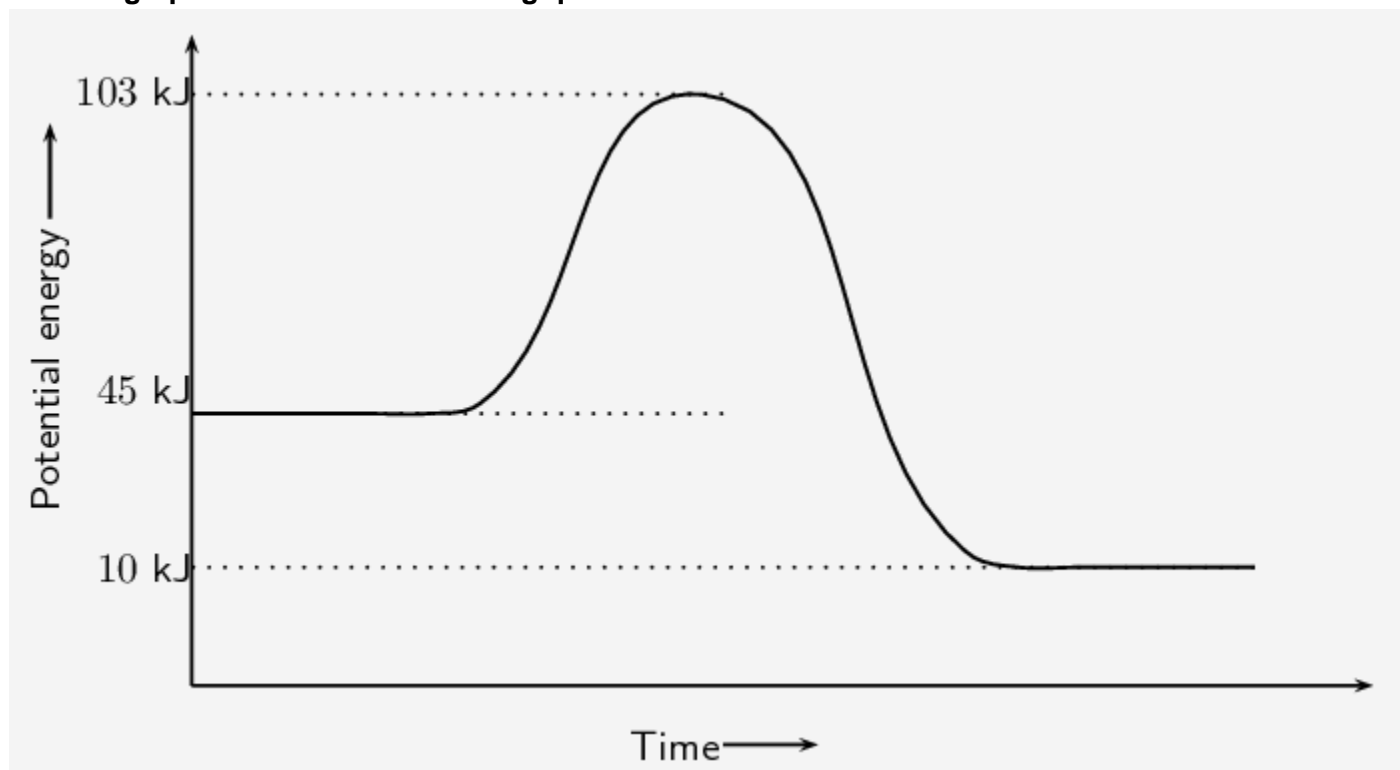
15) How many calories are found in 175 Joules?

16) How many calories are found in 135 kilojoules?

17) Before you run you take off your pure gold necklace and lay it on the car seat. The necklace weighs 150 grams. When you come back the temperature of the car has increased 10 degrees Celsius. How much energy was required to heat up the gold necklace to the new temperature.

18) What is the specific heat of a 450 gram substance if the amount of energy needed to raise the temperature by 25 degrees Celsius was 7829 Joules?

Use the graph to answer the following questions:



19) How much energy is stored in the reactants? _____

20) How much energy is stored in the products? _____

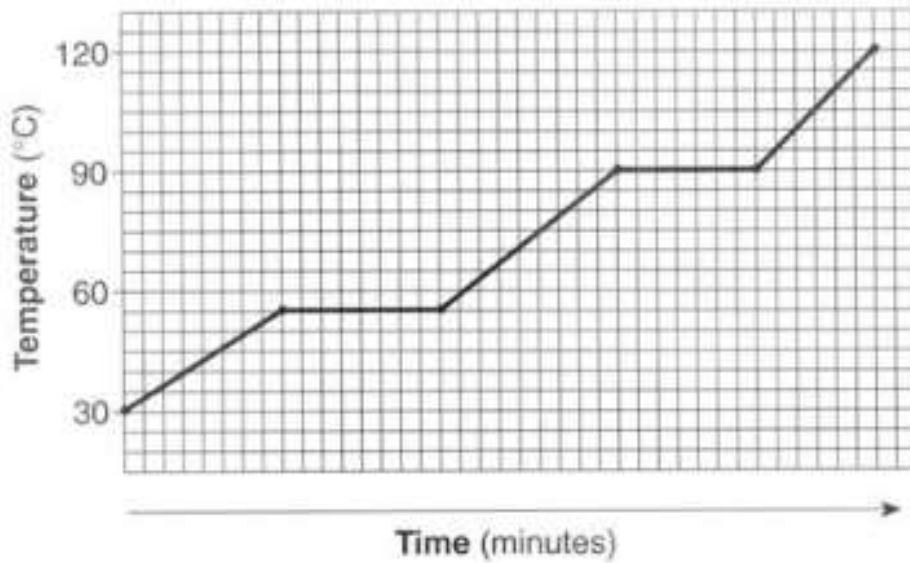
21) Is this an exothermic or endothermic reaction? _____

22) Is energy released or stored in this reaction? _____

23) Quantify the amount of energy released or stored in this reaction. _____

24) How much activation energy is put into this system? _____

Use the graph to answer the following questions:



25) At what temperature does the substance melt?

26) At what temperature does the substance evaporate?

27) Label the states of matter found on each section of the graph.

28) Is this showing a heating or cooling curve?

29) Will the heat of vaporization or heat of fusion be larger (In other words will it take more energy to melt or evaporate the object)? Explain your reasoning using the graph.

30) How much energy is needed to increase a 250 gram piece of aluminum from 30 to 45°C