

# Lesson 1: Energy Changes in Chemical Reactions

## Assignment 1: Sections 1-1 to 1-7

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1. Define "potential energy" and "kinetic energy". Give some specific examples of each form of energy.
2. What is the SI unit for energy?
3. State the Law of Conservation of Energy. What is another name for this Law?
4. What is the relationship between the amount of kinetic energy a particle has and how fast it is moving? Pick one of the following:
  - A. Slower moving particles have more kinetic energy than faster particles.
  - B. Faster moving particles have more kinetic energy than slower particles.
  - C. Speed of motion and kinetic energy are not related.
5.
  - A. Convert the following to Kelvin temperatures:  $10^{\circ}\text{C}$  ,  $-20^{\circ}\text{C}$
  - B. Convert the following to Celsius temperatures: 25 K, 300 K
6. Identify each of the following as either endothermic or exothermic:
  - A.  $\text{Cu(s)} + \text{Cl}_2\text{(g)} \rightarrow \text{CuCl}_2\text{(s)} + 220.1 \text{ kJ}$
  - B.  $6 \text{ CO}_2\text{(g)} + 6 \text{ H}_2\text{O(l)} + 2802 \text{ kJ} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6\text{(s)} + 6 \text{ O}_2\text{(g)}$
7. If you were holding reaction 6A in your hand, would your hand feel warmer or colder? Explain.
8. When potassium nitrate dissolves in water, the beaker containing the solution gets cooler. Is dissolving this salt an exothermic or endothermic process? Explain.
9. What is calorimetry?
10. How much heat would have to be absorbed by 2000 grams of water to change its temperature from  $20^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ ? Use the value  $4.2 \text{ J/(g}^{\circ}\text{C)}$  for the specific heat of water. Show your calculations.

**Hint:** You will need to use the formula:  $Q = mc\Delta T$ . Solve for Q

11. If 500 grams of water at  $25^{\circ}\text{C}$  loses  $1.05 \times 10^4$  joules of heat, what will be the final temperature of the water? Show your work.

**Hint:** You will use the formula  $Q = mc\Delta T$ . Solve for  $\Delta T$ , then find the final water temperature.