**Kinetics and Collision Theory Practice Worksheet Answers**

1. How does a catalyst speed up a reaction?

**It provides an easier pathway for the reaction to take place. The overall effect is to lower the activation energy needed for the reaction to proceed**

1. Use collision theory to explain why reactions should occur more slowly as lower temperatures.

**For a collision to be effective, reactant particles must collide with both proper orientation and sufficient energy. At lower temperatures, the reactant molecules have lower average kinetic energy, thus fewer molecules will have a kinetic energy that exceeds the minimum activation energy.**

1. Explain how increasing the concentration of reactants would speed up a reaction

**By increasing the concentration of the reactants, the rate of the reaction (concentration/time) increases because there are physically more particles**

1. What does the activation energy of a reaction represent?

**The activation energy is the “threshold” energy level, which must be reached by the reactant molecules in order to begin the chemical reaction. The first step in a reaction is breaking the existing bonds in the reactants, which take energy. The kinetic energy of the reactants in the collision must be great enough to break these bonds so that new ones can form in the product molecules.**

1. How is the activation energy related to whether or not a collision between molecules is successful?

**If the activation energy is not overcome, then molecules will not have enough energy to collide into each other successfully in order to make a reaction occur.**

1. Why does increasing the temperature speed up the rate of a chemical reaction?

**Higher temperature = higher kinetic energy, thus more molecules in a sample will have sufficient energy to get over the activation energy threshold**

1. What must take place in order for a chemical reaction to happen?

**Reactions only occur when reactant molecules collide in an effective manner. For a collision to be effective, reactant particles must collide with both proper orientation and sufficient energy.**

1. Draw a reaction coordinate and label the activation energy, reactants, and products

