Enzymes Concept Questions

1. Using examples, describe the two ways most enzymes are named. (Enzymes are most often named from the name of the substrate or by describing the reaction it performs and adding the -ase ending.)

2. State at least three characteristics of enzymes. (Answers will vary but can include points such as enzymes are proteins, have active sites, are specific, can be controlled, area affected by a variety of conditions, *etc*.)

3. Discuss the importance of enzymes to the life of a cell. (Enzymes allow reactions to proceed at biological temperature. Enzymes also allow reactions to proceed more quickly by lowering the activation energy.)

4. Explain why most enzymes catalyze only one specific reaction. (The shape of active site is specific to the substrate.)

5. Describe how enzymes speed up chemical reactions. (Enzymes lower activation energy, allowing reactions to proceed more quickly.)

6. Explain why changing the pH and/or salt concentration of a solution containing an enzyme can affect the enzyme activity. (Changing pH or adding salt changes the number of ions in the solution which interferes with the electrostatic interactions between amino acids, denaturing the enzyme.)

7. Explain how temperature can sometimes increase, sometimes decrease, and sometimes stop enzyme activity. (At low temperature, increasing the temperature increases molecular motion and moves reactants closer to the activation energy. Above the optimal temperature, the enzyme begins to denature. At a high enough temperature, the enzyme would be completely denatured and the reaction would stop.)

8. Explain how changing the shape of an enzyme can affect the rate at which it can catalyze reactions. (Changing the shape of the active site makes it more difficult for substrate to enter in the correct orientation.)

9. Describe the purpose of a fever. Explain why a high fever is dangerous. (A fever speeds up metabolic reactions to help combat bacteria because some bacteria are less resistant to temperature changes than human cells. A high fever is dangerous because it could denature enzymes.)

10. When Siamese cats are born, their coloration is very light over their entire body. After many months, fur on their ears, paws, tail and nose darkens (these parts of the body are cooler than the rest). From what you know about the effect of temperature on enzyme activity, propose a hypothesis that might account for this phenomenon. (The enzyme that converts the pigment from light to dark is only active at the lower temperature.)

11. Explain why the rate of an enzyme-catalyzed reaction does not increase with increasing substrate concentration indefinitely. (Once the enzyme becomes saturated, it cannot catalyze reactions any faster.)