CLASS COPY

Enzymes

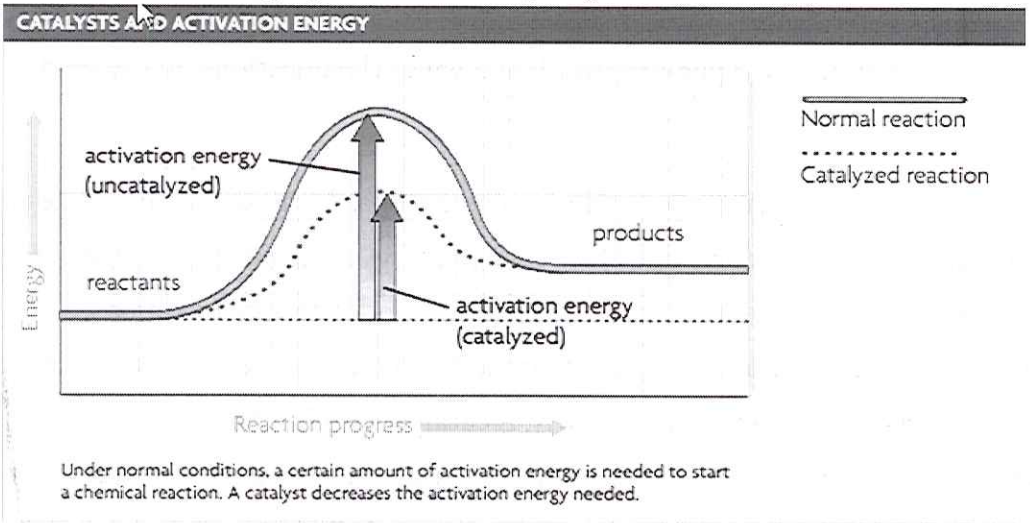
Directions: Read the following two paragraphs, then answer the questions on the next page.

A catalyst lowers activation energy. Activation energy for a chemical reaction is like the energy that is needed to push a rock up a hill. Once enough energy is added to get the rock to the top of the hill, the rock can roll down the other side by itself. Under normal conditions, a reaction requires a certain amount of activation energy, and it occurs at a certain rate. Even after a chemical reaction starts, it may happen very slowly. A catalyst (KAT-l-ihst) is a substance that decreases the activation energy needed to start a chemical reaction. As a result, a catalyst also increases the rate of the chemical reaction, or makes the products form faster. A catalyst takes part in a chemical reaction, but it does not get changed or used up. Therefore, a catalyst is not considered a reactant or a product.

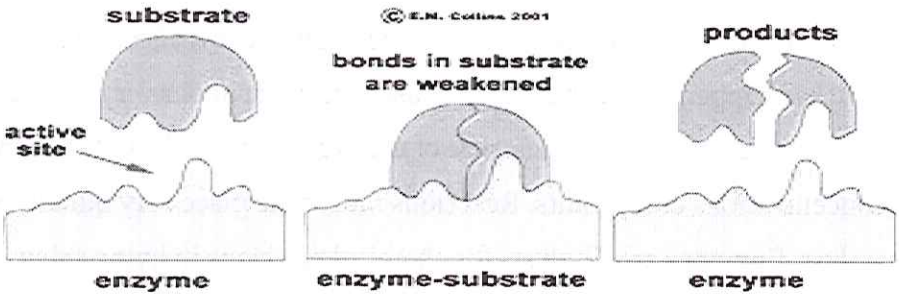
Enzymes allow chemical reactions to occur under tightly controlled conditions. Chemical reactions that happen inside organisms must take place under very specific conditions. They have to occur at the temperature of the organism's body. Often, they have to occur with low concentrations of reactants. Reactions must take place very quickly, so they usually need a catalyst. Enzymes are catalysts for chemical reactions in living things. Like other catalysts, enzymes lower the activation energy of chemical reactions and make the reactions happen more quickly. Enzymes are involved in almost every process in organisms. They are needed to break down food, to build proteins, and for your immune system to work. Almost all enzymes are proteins. Like other proteins, enzymes are made of long chains of amino acids. Each enzyme binds a particular reactant, or substrate. The substrate fits into a part of the enzyme, like a key fits into a lock. Just like a specific key opens a specific lock, each enzyme acts on a specific substrate. The place on the enzyme where the substrate fits—the lock that the key fits into—is called the active site. Like other proteins, enzymes also depend on structure to function properly. Enzyme structure is important because the shape of an enzyme allows only certain molecules to bind to an enzyme's active site.

Taken from: http://www.monarchknights.com/teacherwebpages/cimock/documents/125_interactivereader.pdf

Directions: Draw the graph below exactly as you see it.



Directions: Draw the lock and key model, and write the descriptions that are occurring at each step.



Directions: Using the article you just read and your enzyme/chemical reaction notes, answer the following questions using complete sentences:

1. A catalyst for reactions in living things is an _____.
2. A _____ is a reactant that binds to a catalyst.
3. An enzyme is a kind of _____.
4. What are two ways a catalyst affects a chemical reaction?

_____.

5. A catalyst is not a product or a reactant of a chemical reaction. Why not?

Answer true of false to the following statements:

6. _____ Enzymes interact with specific substrates
7. _____ Enzymes change shape after a reaction occurs
8. _____ Enzymes speed up reactions
9. _____ One enzyme can be used for many different types of chemical reactions.

Circle the correct effect:

10. Raising the temperature slightly will [increase | decrease | not change] the rate of reaction
11. Boiling temperature will [increase | decrease | not change] the rate of reaction.
12. Changing the pH toward the optimal pH will [increase | decrease | not change] the rate of reaction.

Place a check mark next to the things that are expected to INCREASE the rate of an enzymatic reaction.

13. _____ Add more enzyme
14. _____ Add more substrate
15. _____ Adjust pH to optimal level
16. _____ Freezing