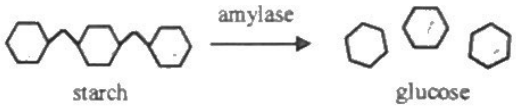
Name: _____ Date: _____

Activity Sheets
Enzymes and Their Functions



What are Enzymes?

Enzymes are compounds that assist chemical reactions by increasing the rate at which they occur. For example, the food that you eat is broken down by digestive enzymes into tiny pieces that are small enough to travel through your blood stream and enter cells. Enzymes are proteins that are found in all living organisms. Without enzymes, most chemicals reactions within cells would occur so slowly that cells would not be able to work properly. Enzymes function as catalysts. **Catalysts** accelerate the rate of a chemical reaction without being destroyed or changed. They can be reused for the same chemical reaction over and over, just like a key can be reused to open a door many times. Enzymes are generally named after the substrate affected, and their names usually end in -*ase*. For example, enzymes that break down proteins are called proteases. While lipases break down lipids, carbohydrases break down carbohydrates.

The compounds that enzymes act upon are known as **substrates**. The substrate can bind to a specific place in the enzyme called the **active site**. By temporarily binding to the substrate, an enzyme can lower the energy needed for a reaction to occur, thus making this reaction faster. The energy required for a chemical reaction to occur is known as the **activation energy**. Once the reaction between an enzyme and a substrate is complete, the substrate is changed to a **product** while the enzyme remains unchanged. The rate of the reaction between an enzyme and a substrate can be affected by different factors. Some of the factors that can affect enzyme activity are temperature, pH, concentration of the enzyme and concentration of the substrate. In living organisms, enzymes work best at certain temperatures and pH values depending on the type of enzyme.

1. What are enzymes? _____
2. What is a catalyst? _____
2. How do enzymes work? _____
3. An example of an enzyme: _____

Enzymes

ppt Questions

Enzyme Structure & Function

1. Most enzymes are what type of macromolecule?

2. Most enzymes are _____ or _____ structures.

3. Enzymes act as _____ in reactions.

4. Are enzymes permanently changed in the chemical reactions they are involved in?

5. Will an enzyme work on any substance? Explain.

6. Can enzymes be reused?

7. What ending is found on many enzymes?

8. Give 3 examples of enzymes with this ending.

9. How does an enzyme work?

10. What effect does an enzyme have on activation energy needed to start a reaction?

11. Hydrogen peroxide H_2O_2 is a common waste product of cells. Enzymes called catalases in cells break this down into harmless _____.

12. What is meant by the term substrate?

13. What is meant by active site?

14. Sketch and label the enzyme-substrate complex.

15. What is meant by induced fit?

16. What induces an enzyme to change the shape of its active site?

17. List 4 factors that can affect enzyme activity.

18. What is the effect of high temperature on an enzyme (running fever)?

19. What temperature do most enzymes do best at?

20. Most enzymes like a pH near _____.

21. To denature an enzyme means the enzyme becomes _____ and can no longer work properly.

22. Name 3 inorganic substances (cofactors) that are often needed for enzymes to work properly.

23. Give an example of an enzyme & its needed inorganic substance.

24. Give one example of an enzyme inhibitor.

25. Explain how competitive inhibitors work.

26. If a competitive inhibitor blocks the active site, the _____

can't fit.

27. Explain noncompetitive inhibitors.

28. Do noncompetitive inhibitors bind to the active site? Explain.

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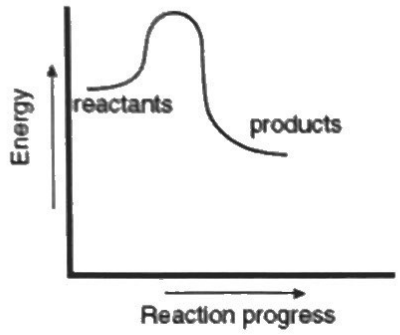
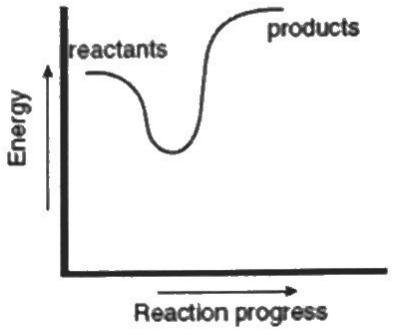
Enzyme Quiz

1. Which of the following diagrams correctly shows the reaction pathway of a reaction that absorbs energy? Circle the correct letter.

A.



B.



2. The energy needed to get a reaction started is referred to as:
   a. adhesion energy
   b. activation energy
   c. cohesion energy
   d. chemical energy

3. Which of the following statements is true about catalysts?
   a. Catalysts slow down the rate of chemical reactions.
   b. All catalysts are enzymes.
   c. Catalysts are used up during a chemical reaction.
   d. Catalysts lower the activation energy of a chemical reaction.

4. The part of the enzyme where the substrate binds is called the:
   a. active site
   b. catalyst
   c. inhibitor
   d. large subunit

5. When a piece of potato is dropped into hydrogen peroxide, the peroxide bubbles vigorously as a result of what reaction?
   a. peroxide being broken into water and oxygen
   b. peroxide is destroying germs in the potato
   c. more peroxide is being created by the potato
   d. potato and peroxide are joining together to make a new protein