

Enzymes Virtual Lab

Today you will be learning about enzymes and their role in chemical reactions.

Go to the website:

http://www.phschool.com/science/biology_place/labbench/lab2/intro.html. Read the page and then click on “next.”

1. What is the function of an enzyme?
2. What is a substrate?
3. What happens to the enzyme and the substrate during a chemical reaction?
4. What does it mean by enzymes being “specific”?
5. What does catalase do? Use the terms substrate and product in your response.
6. How can you tell that catalase has been added to hydrogen peroxide?
7. (Click on the picture) What are enzymes?
8. Why is the active site specific for only one type of substrate?
9. Draw a schematic model of an enzyme.

10. What happens when a substrate with a different shape from the active site tries to enter the active site?

11. What are 2 important influences on enzymatic activity? What happens when these factors are significantly altered?

1.

2.

12. Provide 2 examples of enzymes and the pH of the environment in which it works.

13. Describe the effect of temperature on enzyme function. Do not do experiment here.

14. Click on

http://www.glencoe.com/sites/common_assets/advanced_placement/mader10e/virtual_labs_2K8/labs/BL_02/index.html. In this experiment you will determine the effects of substrate concentration and pH on the initial rate of an enzyme-catalyzed reaction.

15. What is different in people who suffer from lactose intolerance when compared with “normal individuals”?

16. Read the objectives and procedures. Click the monitor and watch the video about enzyme action. Summarize the video.

17. Conduct the experiment based on the directions specified under procedures. In test tube 1, adjust the pH to 3; test tube 2, adjust the pH to 5; test tube 3, leave the pH at 7; test tube 4, adjust the pH to 9 and in test tube 5, adjust the pH to 11. Add 0.5 g of substrate in each of the 5 test tubes.

18. Why was 0.5g of substrate added to all of the tubes instead of varying amounts of substrate?

19. What is the independent variable in this experiment?

20. What is the dependent variable in this experiment?

21. Record the data in the data table and in the data table below and repeat the experiment again using the 1.0g lactose. Record your results in the data table and the table below. Repeat the experiment again using 2.0g lactose. Record the data in the data table and in the data table below. Repeat the experiment again using 4.0g lactose. Record the data in the data table and in the data table below. Repeat the experiment again using 8.0g lactose. Record the data in the data table and in the data table below.

Amount of substrate	pH3	pH5	pH7	pH9	pH11
0.5g					
1.0g					
2.0g					
4.0g					
8.0g					

22. When your online data table is complete, click on “graph”. Draw the graph in the space provided below or attach a copy of the graph to this assignment.

23. What does your data indicate about the optimum substrate concentration for this lactase-catalyzed reaction?

24. What does your data indicate about the optimum pH level for this lactase-catalyzed reaction?

25. People with lactose intolerance are able to take products such as Lactaid that contain the lactase enzyme with their meals. These products can be taken in pill form. Considering the fact that the pill form of the enzyme would have to travel through the person's stomach, what special consideration would the producer of this product need to be concerned about?

26. Explain why the maximum initial reaction rate cannot be reached at low lactose concentrations.

27. Describe the relationship between substrate concentration and the number of glucose and galactose molecules formed during the first minute.

28. Describe the relationship between pH and the number of glucose and galactose molecules formed during the first minute.