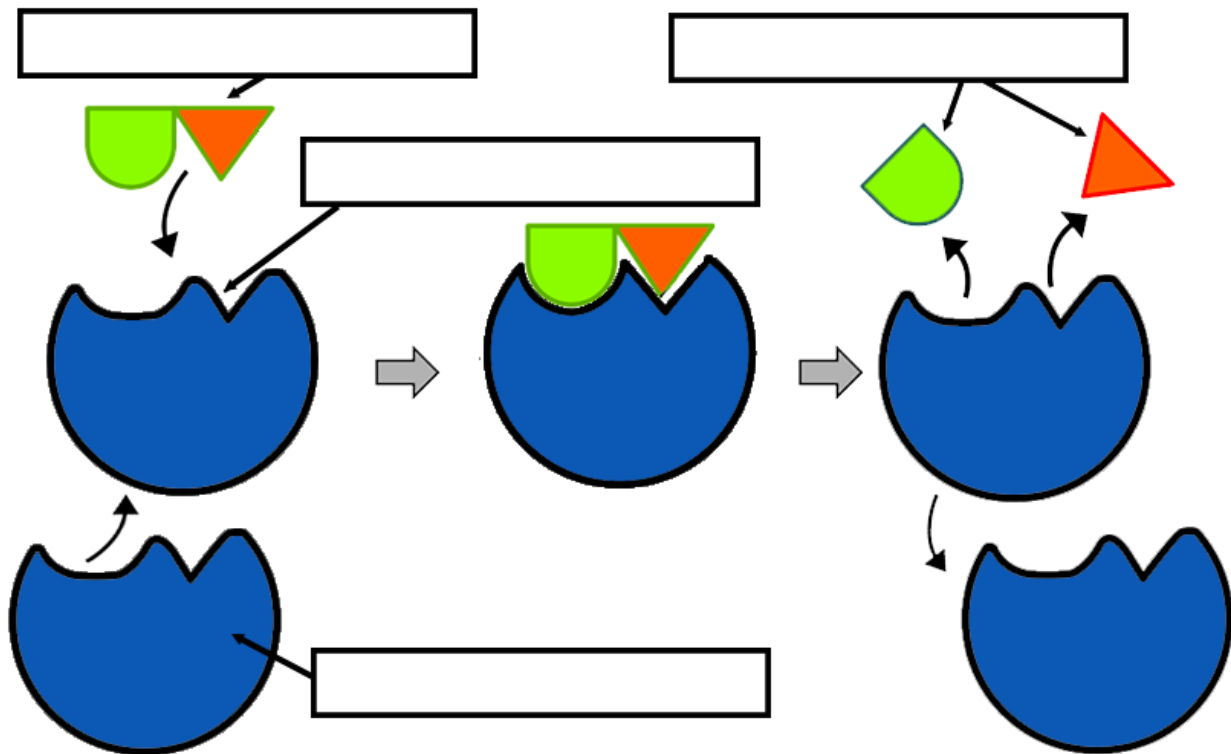


Analyzing Graphics: Enzymes

1. **Enzymes act on substrates.** Label the enzyme, substrate, active site, and products on diagram.



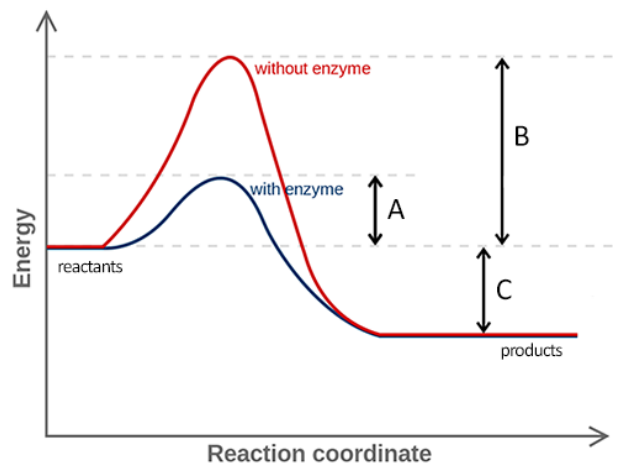
Answer true or false to the following statements based on the graphic:

- _____ Enzymes interact with many different kinds of substrates.
- _____ Enzymes change shape permanently after a reaction occurs.
- _____ An enzyme can be reused with a new substrate.
- _____ The substrate is changed in the reaction.
- _____ If the shape of the enzyme changed, it would no longer work.
- _____ When all substrates are used, the reaction stops.

2. **Enzymes speed up the reaction** by lowering the activation energy needed for the reaction to start. Compare the activation energy with and without the enzyme.

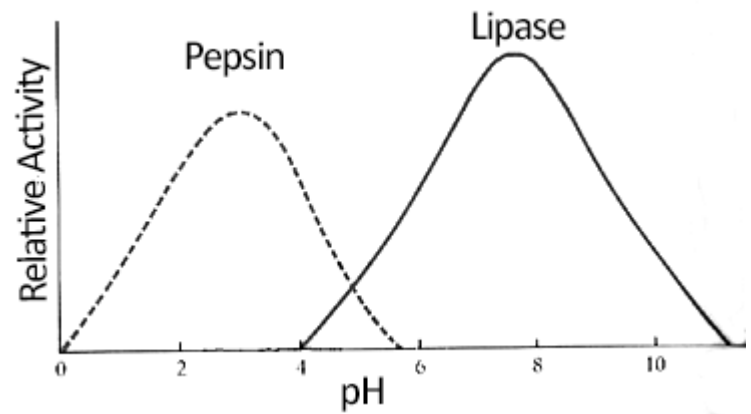
Identify the part of the graph that shows:

- ___ Overall energy released during reaction
- ___ Activation energy with enzyme
- ___ Activation energy without enzyme



3. Enzymes work best at optimal temperature and pH values. For example, the enzyme, pepsin, in your stomach must be able to function in a highly acidic environment to break peptide bonds found in proteins.

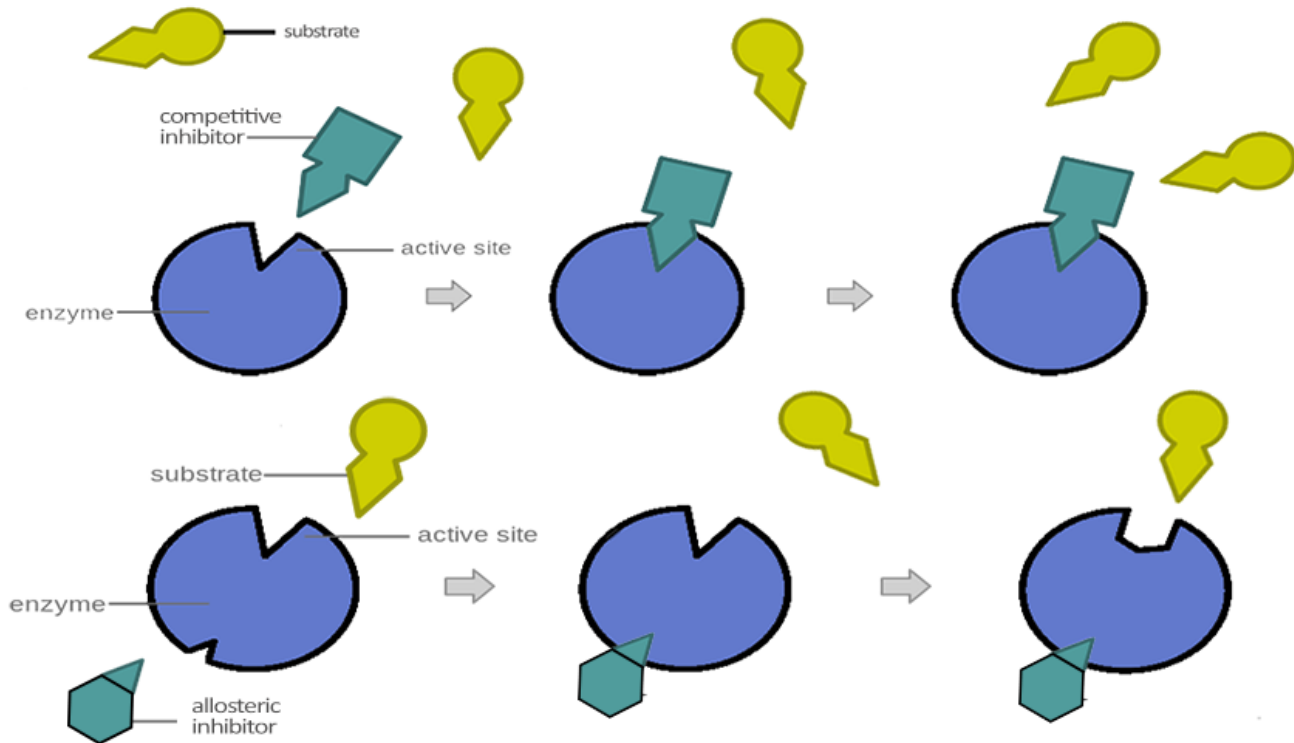
Acidic or basic conditions can disrupt the hydrogen bonds between the loops of the protein chains. If this disruption occurs near the active site, the enzyme can become distorted and not fit the substrate perfectly. The rate of reaction is reduced as more enzymes become denatured.



a) What is the optimal pH for pepsin? _____ For lipase? _____

b) Do you think lipase is an enzyme that is found in the stomach? Why or why not?

4. Enzymes can be inhibited. Inhibitors can slow down or stop enzymatic reactions. There are two types of inhibition: competitive and allosteric.



Answer true or false to the following statements based on the graphic:

- _____ Increasing the number of inhibitors will decrease the overall rate of reaction.
- _____ Allosteric inhibitors block the active site.
- _____ Allosteric inhibitors change the shape of the enzyme.
- _____ Adding a competitive inhibitor will increase the number of products in the reaction.
- _____ Competitive inhibitors bind to the substrates.