

Name: _____

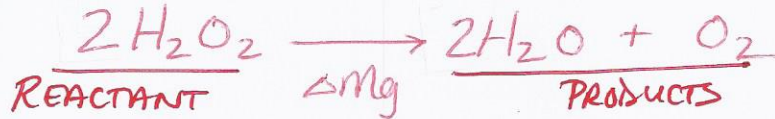
Class Period: _____

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Chapter 3: Chemistry of Life

Section 4: Energy and Metabolism

Before we begin I will demonstrate a chemical reaction.



Mg IS A CATALYST (LIKE AN ENZYME)

Read page 64-65 then answer the following questions.

1. Energy is the ability to MOVE or change MATTER.
2. Energy exists in many forms including LIGHT, HEAT, CHEMICAL energy, MECHANICAL energy, and ELECTRICAL energy and can be converted from one form to another.

Changing Matter

1. A PHYSICAL change occurs when only the FORM or SHAPE of matter changes.
2. What is an example of a physical change? SUGAR MIXING WITH TEA
3. A CHEMICAL change occurs when a substance changes into a DIFFERENT substance.
4. What is an example of a chemical change? WOOD BURNING + OXYGEN INTO CO₂ AND H₂O
5. Law of Conservation of Mass: Matter cannot be CREATED or DESTROYED.
6. Law of Conservation of Energy: Energy may change form but the total amount of energy DOES NOT change.

Chemical Reactions

1. Changing a substance requires a CHEMICAL REACTION. During this process, BONDS between atoms are BROKEN, and new ones are FORMED.
↑
IONIC/COVALENT
2. A REACTANT is a substance that is CHANGED in a chemical reaction. (what goes in)
3. A PRODUCT is a substance that is formed in a chemical reaction. (what comes out)
4. The arrow means CHANGES TO or FORMS. A double arrow indicates that the products can REFORM into reactants.
5. Activation Energy is the minimum amount of ENERGY required to start a chemical reaction.
6. Chemical reactions can occur only when the ACTIVATION ENERGY is available and the correct atoms are ALIGNED.

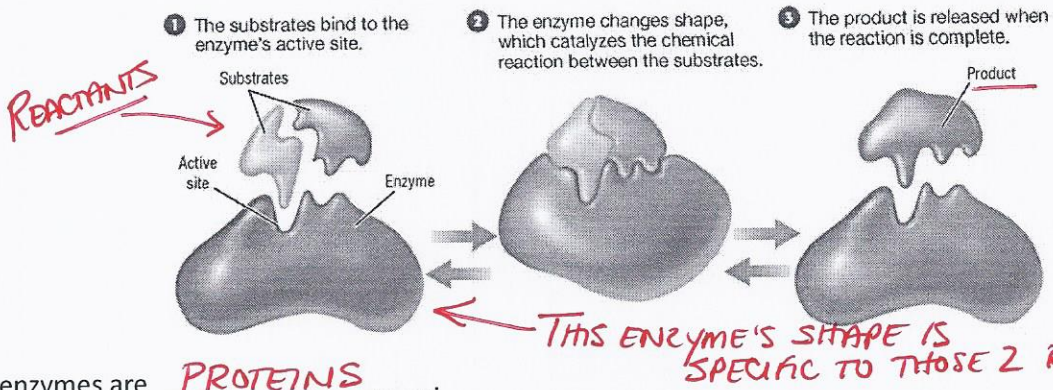
Read page 66 then answer the following questions.

Biological Reactions

1. Living things carry out many CHEMICAL reactions that help maintain a stable internal environment. This characteristic of life is called HOMEOSTASIS.
2. An ENZYME is a molecule that increases the speed of biochemical reactions.
3. Without enzymes, chemical reactions would not occur QUICKLY and EASILY enough for life to go on.
4. Enzymes fit with reactants like a KEY fits a LOCK.

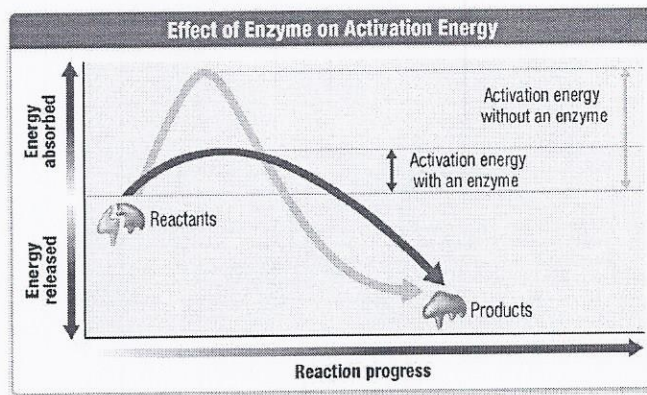


Note: Substrates are the reactants of the chemical reaction.



5. Many enzymes are PROTEINS.

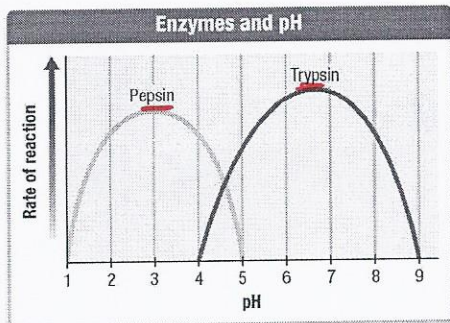
6. Changes in TEMPERATURE and pH can change the protein's SHAPE. Most enzymes need a certain range of temperature and pH.



7. Refer to the Figure 16 in book or in image above. Enzymes DECREASE the amount of energy needed to start a chemical reaction without changing the amount of energy contained in either the REACTANTS or the PRODUCTS.

Pause for a Practice Problem:

This graph shows the relationship between pH and the activity of two digestive enzymes, pepsin and trypsin. Use the graph to answer the following questions.



- At what pH does pepsin work best? 3
Pepsin works in the stomach while trypsin works in the small intestine.
- Would you consider the environment in the stomach to be acidic or basic? 3 = ACIDIC
- Would you consider the environment in the small intestine to be acidic or basic? 6.5 = ACIDIC

Use the glossary of your book to define the following term.

Metabolism: THE SUM OF ALL CHEMICAL REACTIONS/PROCESSES THAT OCCUR IN AN ORGANISM.