What Are Enzymes?

Name: _____ Date: _____

Read and Learn

Chemical reactions happen continuously inside living organisms. These reactions break down food, release usable energy, and build substances needed for growth and repair. Together, all the chemical reactions in an organism are called **metabolism**.

Enzymes are biological catalysts. A catalyst speeds up a chemical reaction without being used up. Most enzymes are proteins. They reduce the activation energy—the energy needed to start a reaction—allowing reactions to happen quickly at normal body temperatures.

Enzymes usually act on particular substances called **substrates**. A substrate binds to a region of an enzyme called its **active site**. The enzyme helps convert the substrate into products and can then be used again.

Without enzymes, many essential reactions would happen too slowly to support life.

Enzyme	Example of its role
Amylase	Breaks down starch into smaller sugars during digestion.
Protease	Helps break down proteins into smaller molecules during digestion, eventually producing amino acids.
Lipase	Breaks down fats into fatty acids and glycerol.
Catalase	Breaks down harmful hydrogen peroxide into water and oxygen inside cells.

Multiple Choice

Circle the correct answer.

1. What is an enzyme?

A. A biological catalyst
B. A source of food energy
C. A waste product
D. A type of cell

2. How do enzymes speed up chemical reactions?

A. They increase the energy needed to start reactions.
B. They lower the energy needed to start reactions.
C. They turn all substances into water.
D. They raise the organism’s temperature.

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What Are Enzymes?

3. What happens to an enzyme after it helps a reaction occur?

A. It is always destroyed.
B. It becomes a substrate.
C. It can be used again.
D. It becomes a waste product.

4. Which statement best describes metabolism?

A. Only the digestion of food
B. Only the movement of an organism
C. All the chemical reactions in an organism
D. The transport of oxygen around the body

Match the Enzyme to Its Function

Write the correct letter beside each enzyme.

Enzyme	Answer	Function
1. Amylase	_____	A. Breaks down hydrogen peroxide
2. Protease	_____	B. Breaks down fats
3. Lipase	_____	C. Breaks down starch
4. Catalase	_____	D. Helps break down proteins

Complete the Sentences

Word bank: active site • catalysts • metabolism • substrate

1. Enzymes are biological _____ that speed up reactions.
2. The substance an enzyme acts on is called its _____.
3. A substrate binds to the enzyme's _____.
4. All the chemical reactions in an organism make up its _____.

True or False?

1. Enzymes are used up during the reactions they help. _____

Correction: _____

2. Enzymes are involved in both breaking down substances and building new substances. _____

Correction: _____

3. Enzymes are needed only for digestion. _____

Correction: _____

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What Are Enzymes?

Apply Your Understanding

1. Explain why enzymes are essential for life.

2. A student says, "Enzymes give chemical reactions extra energy." Explain what is wrong with this statement.

3. Hydrogen peroxide is harmful to cells. Explain how catalase helps protect cells.

4. Challenge: A cell has plenty of nutrients, but an enzyme needed to release usable energy stops working. Explain why the cell could still struggle to survive.

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What Are Enzymes?

What Are Enzymes? — Answer Key

Multiple Choice

1. **A** — A biological catalyst
2. **B** — They lower the energy needed to start reactions.
3. **C** — It can be used again.
4. **C** — All the chemical reactions in an organism

Match the Enzyme to Its Function

1. **C** — Amylase breaks down starch.
2. **D** — Protease helps break down proteins.
3. **B** — Lipase breaks down fats.
4. **A** — Catalase breaks down hydrogen peroxide.

Complete the Sentences

1. **catalysts**
2. **substrate**
3. **active site**
4. **metabolism**

True or False?

1. **False.** Enzymes are not used up during the reactions they help. They can be used again.
2. **True.**
3. **False.** Enzymes are involved in many metabolic processes, including digestion, cellular respiration, and building substances needed for growth and repair.

Apply Your Understanding

Accept scientifically correct answers expressed in students' own words.

1. Explain why enzymes are essential for life.

Enzymes speed up essential chemical reactions so they happen quickly enough to support life at normal body temperatures. Without enzymes, many reactions would happen too slowly.

2. A student says, "Enzymes give chemical reactions extra energy." Explain what is wrong with this statement.

Enzymes do not supply extra energy. They lower the activation energy needed to start a reaction.

3. Hydrogen peroxide is harmful to cells. Explain how catalase helps protect cells.

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What Are Enzymes?

Catalase speeds up the breakdown of harmful hydrogen peroxide into water and oxygen, reducing damage to cells.

4. Challenge: A cell has plenty of nutrients, but an enzyme needed to release usable energy stops working. Explain why the cell could still struggle to survive.

Having nutrients is not enough: the cell must carry out reactions to release usable energy from them. Without the enzyme, a necessary reaction may happen too slowly. The cell may then lack enough usable energy for essential processes such as active transport, growth, and repair.

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