Name _____ Date _____

# Enzymes Quick Check: How Enzymes Work and What Changes Their Rate

**Directions:** Answer each question about enzymes; the questions in one group use a table of catalase results.

**1.** Use the word bank to complete these sentences about how an enzyme is built.

| **Word bank** |
| --- |
| substrate • carbohydrates • active site • product • proteins |

Most enzymes are _____, and each enzyme has a region called the _____. The shape of that region fits the enzyme's _____, the molecule the enzyme acts on.

**2.** Hydrogen peroxide breaks down into water and oxygen slowly on its own, but quickly when the enzyme catalase is added. How does catalase speed up the breakdown of hydrogen peroxide?

A. It supplies the energy the reactants need in order to react.

B. It heats the hydrogen peroxide so its molecules move faster.

C. It lowers the activation energy the reaction needs to get started.

D. It raises the activation energy so that more molecules can react.

**3.** After catalase completes one cycle of breaking down hydrogen peroxide into water and oxygen, what happens to the catalase?

A. It is used up, so the cell must make a new catalase molecule.

B. It stays stuck to the products and cannot work again.

C. It becomes part of the water and oxygen that the reaction makes.

D. It returns to its starting form and can catalyze another cycle.

**4.** The enzyme sucrase breaks down the sugar sucrose but does not break down lactose, a sugar of about the same size. Which statement explains why sucrase acts on one sugar but not the other?

A. Lactose does not fit sucrase's active site the way sucrose does.

B. Lactose is too large to be broken down by any enzyme.

C. Sucrase chooses sucrose because the cell needs it more than lactose.

D. Sucrase is used up after it breaks down one sucrose molecule.

**5.** Pepsin is an enzyme that digests proteins in the stomach, and it works best at a pH of about 2. If pepsin is placed in a solution with a pH of 8, what will most likely happen to its activity?

A. It will stay the same, because pH affects only the substrate.

B. It will rise, because pH 8 is closer to the pH inside most cells.

C. It will rise, because a higher pH number means a faster reaction.

D. It will drop, because pH 8 is far from the pH where pepsin works best.

## Catalase at Six Temperatures

In an investigation, catalase and hydrogen peroxide were each held at one of six temperatures for 5 minutes and then mixed. The oxygen gas given off in the next 2 minutes was collected and measured. Every tube had the same amount of catalase, the same amount and concentration of hydrogen peroxide, and the same pH, and each temperature was tested 3 times.

Oxygen gas given off by catalase and hydrogen peroxide at six temperatures. Each value is the average of 3 trials.

| Temperature (°C) | Average oxygen collected in 2 minutes (mL) |
|---|---|
| 10 | 4.1 |
| 20 | 6.8 |
| 30 | 9.5 |
| 40 | 10.2 |
| 50 | 5.3 |
| 60 | 1.2 |

**6.** Which conclusion about catalase and temperature does this test justify?

A. Of the six temperatures tested, 40 °C gave the most oxygen in 2 minutes.

B. A test at 45 °C would give even more oxygen than 40 °C did.

C. Every enzyme works fastest at 40 °C.

D. No oxygen at all was given off at temperatures above 40 °C.

**7.** Suppose the test were repeated at 70 °C, with everything else kept the same. Based on the trend in the table, what is the most likely result?

A. More oxygen than at 40 °C

B. Less oxygen than at 50 °C

C. About as much oxygen as at 40 °C

D. More oxygen than at 50 °C but less than at 40 °C

**8.** Which explanation of why so little oxygen was collected at 60 °C fits how enzymes work?

A. High heat can kill an enzyme in the same way it kills a living cell.

B. High heat makes molecules move more slowly, so the enzyme meets less substrate.

C. High heat can denature an enzyme, changing its active site so the substrate fits poorly.

D. High heat can rearrange the order of an enzyme's amino acids, giving it a new active site.