

5 Enzymes and the lock and key — Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
catalyst	催化剂	_____	_____	_____
chemical reaction	化学反应	_____	_____	_____
Enzymes	酶	_____	_____	_____
proteins	蛋白质	_____	_____	_____
metabolism	新陈代谢	_____	_____	_____
active site	活性位点	_____	_____	_____
substrate	底物	_____	_____	_____
products	产物	_____	_____	_____
complementary	互补	_____	_____	_____
specific	专一	_____	_____	_____

Recall

A **catalyst** 催化剂 speeds up a **chemical reaction** 化学反应 but is **not** used up, so it can be used again and again.

New ideas

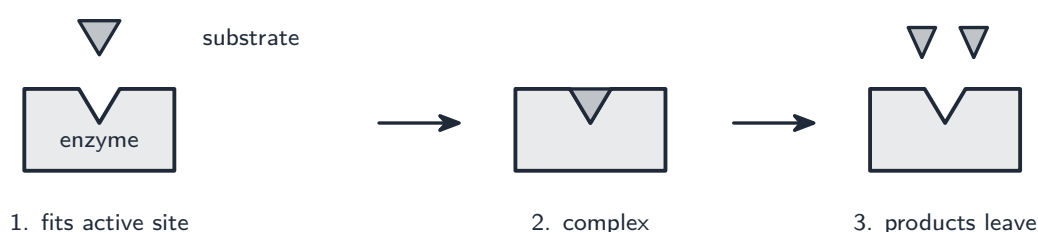
Read these first, then do the Practice.

■ 1 What enzymes are

Enzymes 酶 are biological catalysts — catalysts made by living cells. They are **proteins** 蛋白质, and they control almost every reaction of **metabolism** 新陈代谢. Without them, life's reactions would be far too slow.

■ 2 The lock and key

Each enzyme has a pocket called the **active site** 活性位点. The molecule it works on, the **substrate** 底物, fits the active site like a key in a lock:



The substrate slots in, the reaction happens, and the **products** 产物 leave. The enzyme is then free to be used again.

■ 3 Enzymes are specific

The active site has a shape **complementary** 互补 to the substrate, so each enzyme is **specific** 专一 — it works on only one substrate. The wrong substrate does not fit:



Watch out: an enzyme is **specific** because the substrate must fit its **active site** like a key in a lock — the wrong substrate does not fit. The enzyme is **not used up**, so a little enzyme can convert a lot of substrate.

Practice

Try these in order.

5.1 What is a *catalyst*? [2]

5.2 Enzymes are made of which type of molecule? [1]

5.3 What name is given to the pocket where the substrate fits? [1]

5.4 What does it mean to say an enzyme is “specific”? [1]

5.5 After the reaction, what happens to the enzyme? [1]

5.6 Challenge. An enzyme that breaks down starch has no effect on protein. Explain why, using the lock-and-key idea. [2]