Proteins

 What elements make up proteins?

Carbon

Hydrogen

Nitrogen

Oxygen

Sulfur

📖 Name the **main** functions of proteins.

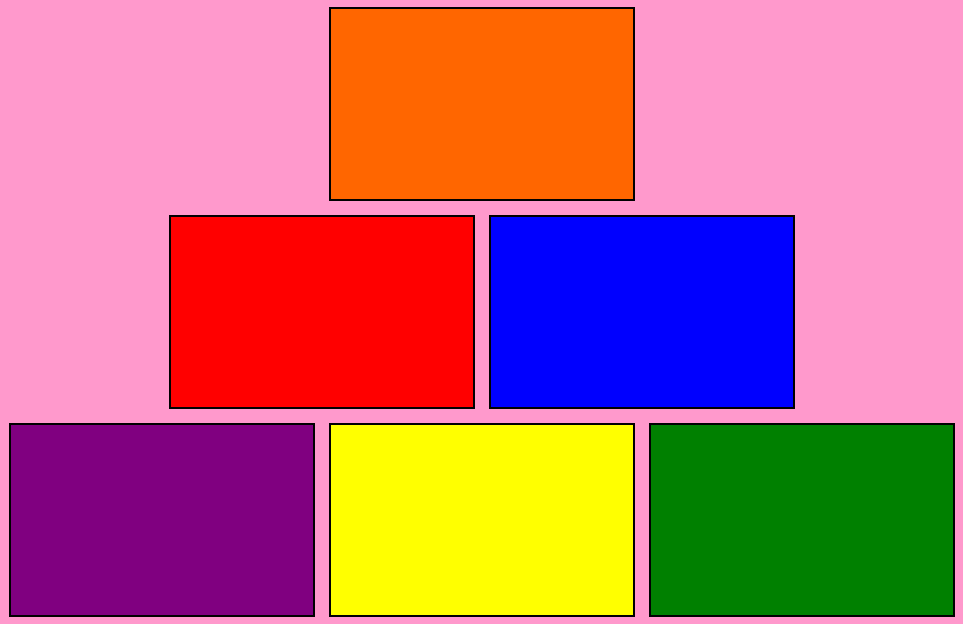
1.) Provides **structure** for tissues and organs.

2.) Helps carry out **cell** **metabolism**.

🗣 ***Cell Metabolism***…**All** the chemical reactions that take place within living organisms.

📖 Name the **basic building blocks** of proteins.

Amino Acids



📖 How **many** **common** amino acids are present?

20

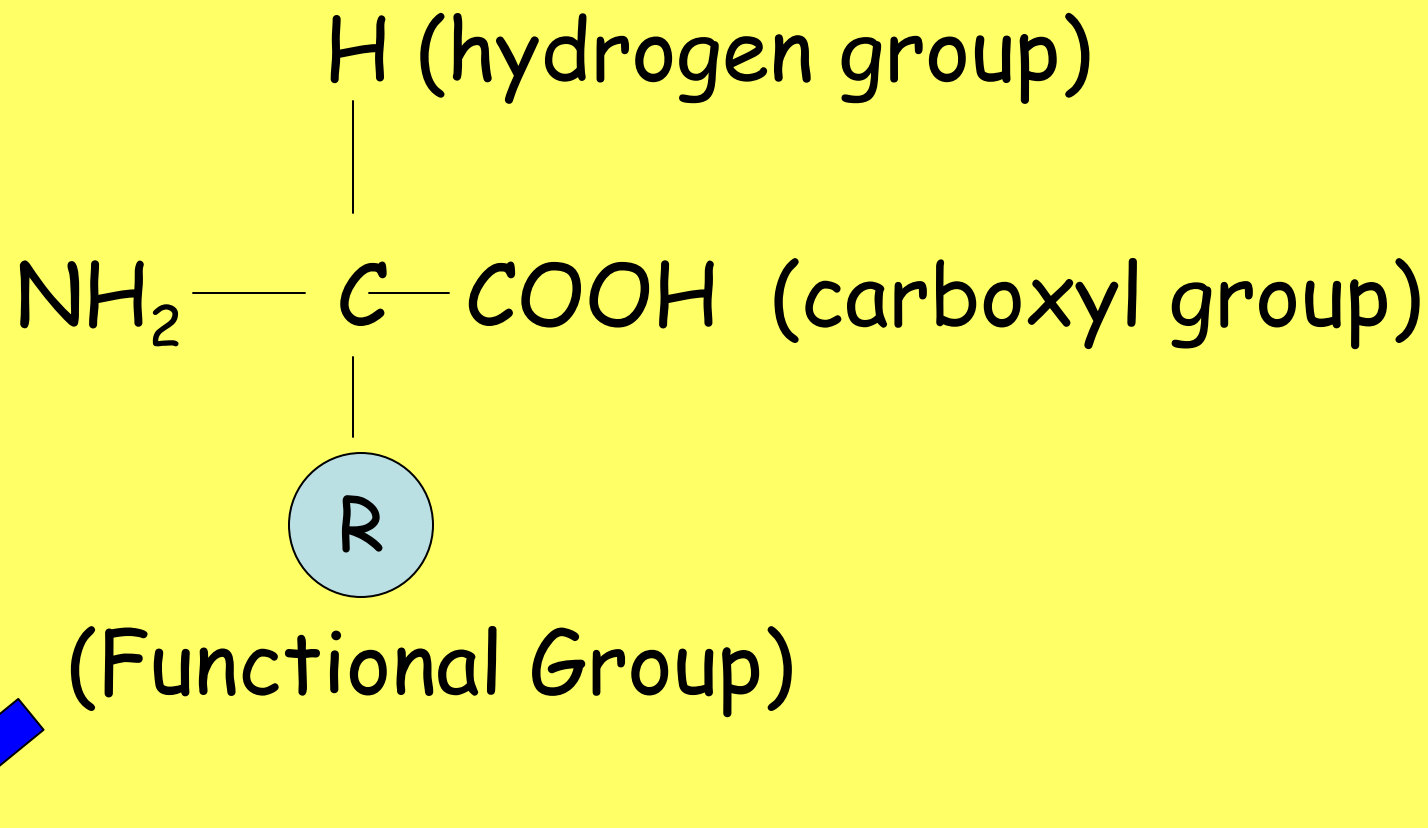
- How many of these 20 are **made within** the **body**?

12

- Therefore **8** **MUST** come from **plants**.

- These **8** are called ***essential amino acids***.

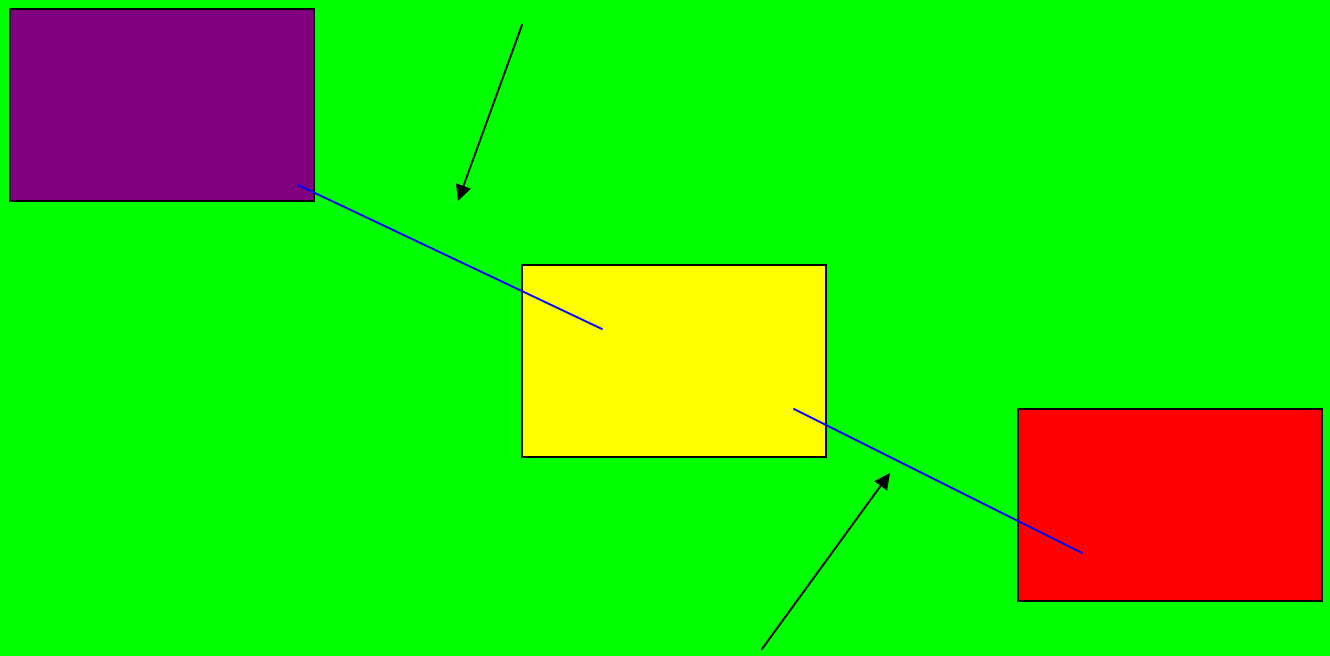
🗣 Structure of Amino Acid



❖ Gives proteins its ***specific structure***…**structure** determines the **specific function**

📖 Name the type of **bond** that links amino acids.

Peptide Bonds



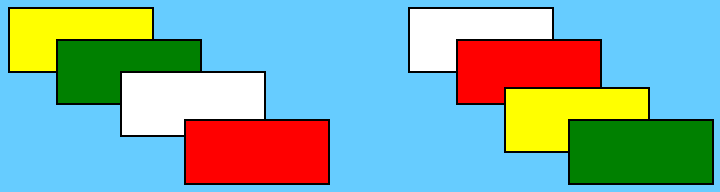
📖 Do proteins **vary** in **shape** and **sizes**?

📖 Name the **2 factors** that affect the shape and size of amino acids.

In other words, what factors affect how proteins fold together…

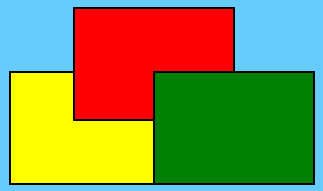
1.) The **number** of amino acids in a chain

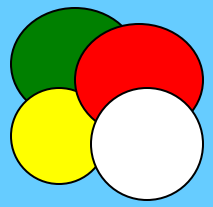
2.) The **sequence** of amino acids in a chain (order)



🗣 Proteins

- ***Shape*** determines the ***specific function*** of a protein.

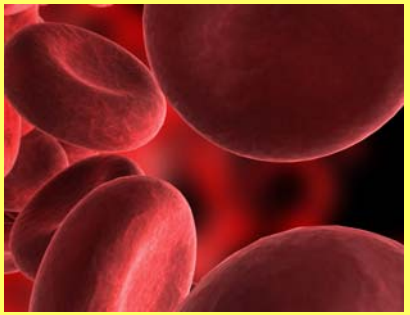




- If the **sequence** of amino acids **changes**…how the proteins **folds changes**…
- Therefore the ***original function*** of that ***particular protein changes*** too.

🗣 Other Functions of Proteins

- Contracting of muscles tissues .
- Transporting oxygen in the blood stream.
- Boosting the immune system.
- Help other proteins carry out their specific function.



📖 Define enzymes

- Proteins that **<u>change</u>** the **<u>rate</u>** of a chemical reaction.

- In other words…helps ***speed up*** the chemical reactions that would occur very slow normally.

📖 What major process in the body are enzymes important for?

Food Digestion

🗣 Enzymes

- Act as catalyst (boosters)

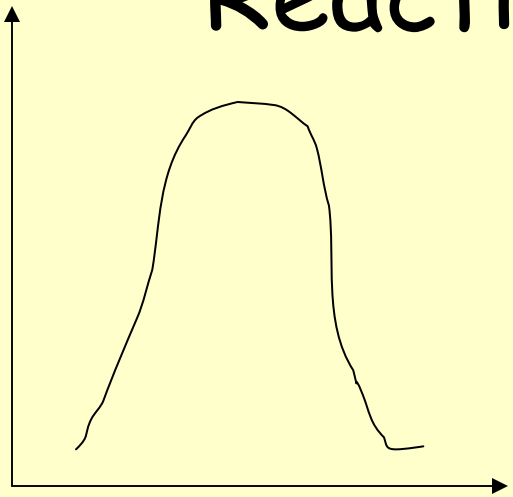
🗣 How do enzymes speed up chemical reactions?

→ By ***lowering*** the ***activation level***

Activation level is the **amount** of **energy** needed to **kick start** a chemical reaction.

Factors that Affect Enzyme Reaction Rates.

Enzyme Reaction Rate

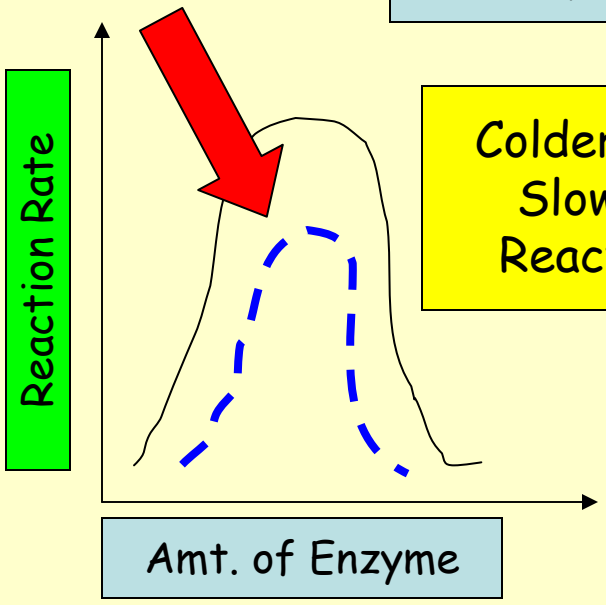


Amt. of Enzyme

Normal Enzyme Reaction Rate

Bell Shape Curve

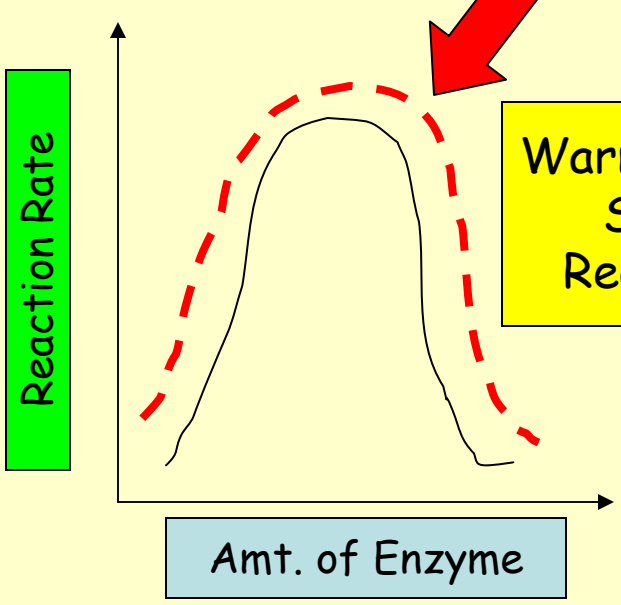
Reaction Rate



Amt. of Enzyme

Colder Temps = Slows Down Reaction Rate

Reaction Rate



Amt. of Enzyme

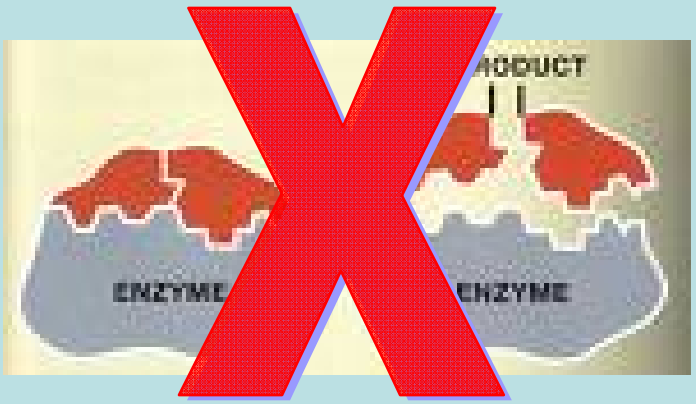
Warmer Temps = Speed Up Reaction Rate

Factors that Affect Enzyme Reaction Rates.

pH

If an enzyme's environment is **TOO ACIDIC** or **TOO BASIC**…

If an enzyme's environment is **EXTREMELY COLD** or **EXTREMELY HOT**…



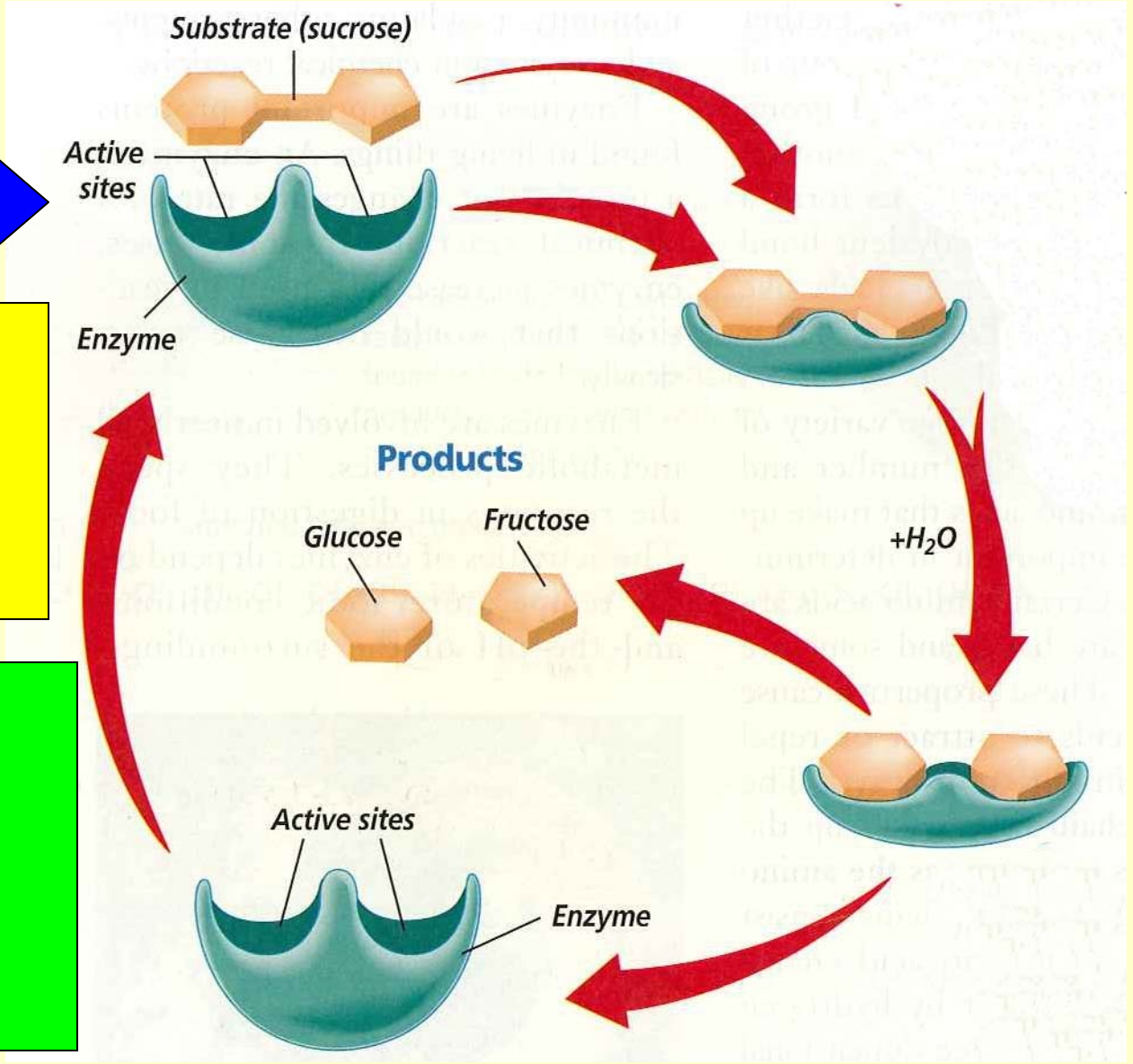
Denature = When enzymes **break down** and **die**.

How Do Enzymes Change the Rate of a Reaction?

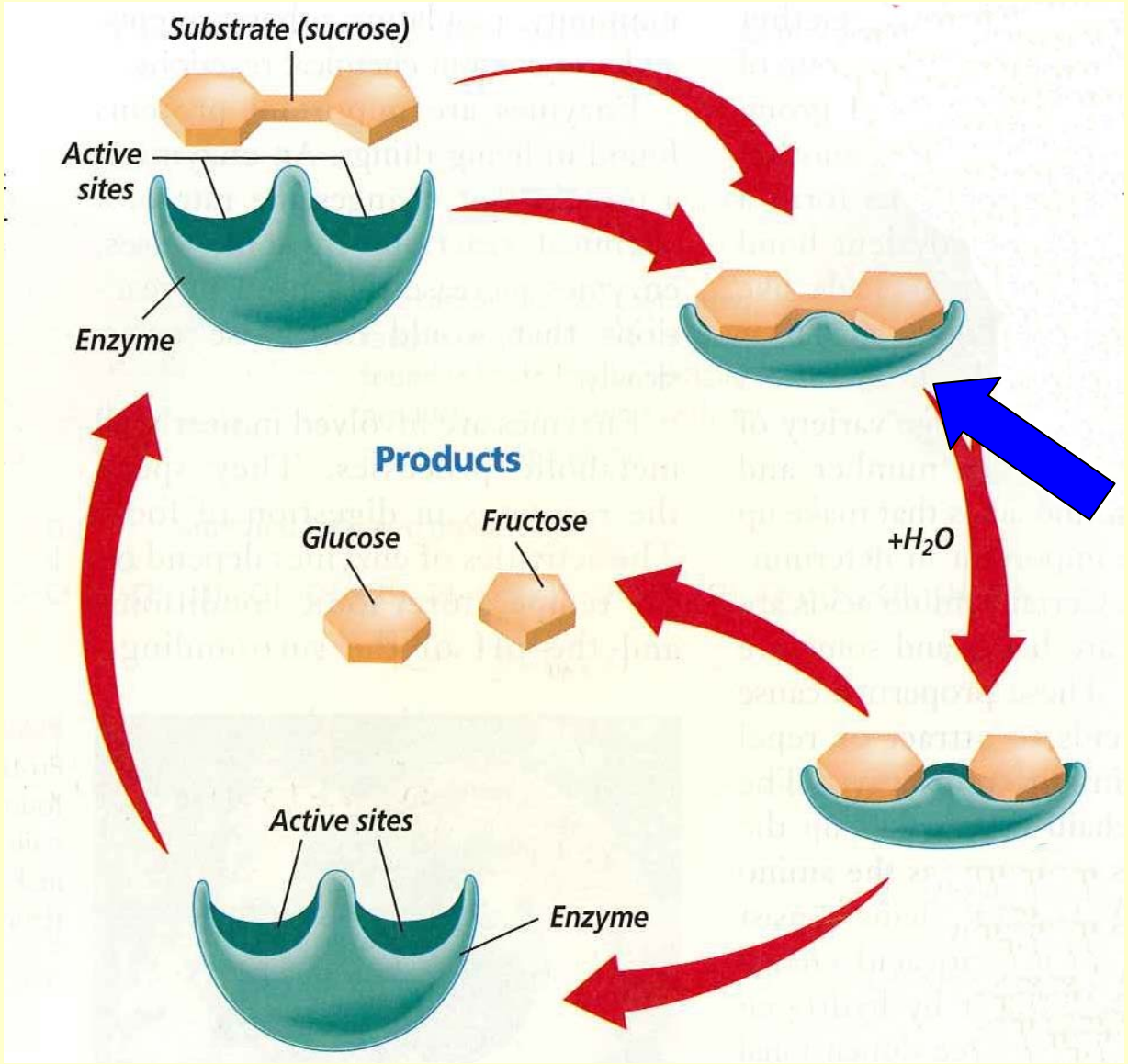
Step #1

Enzymes bind to **specific substrates** at the active site.

Substrate is the compound being broken down into smaller molecules.



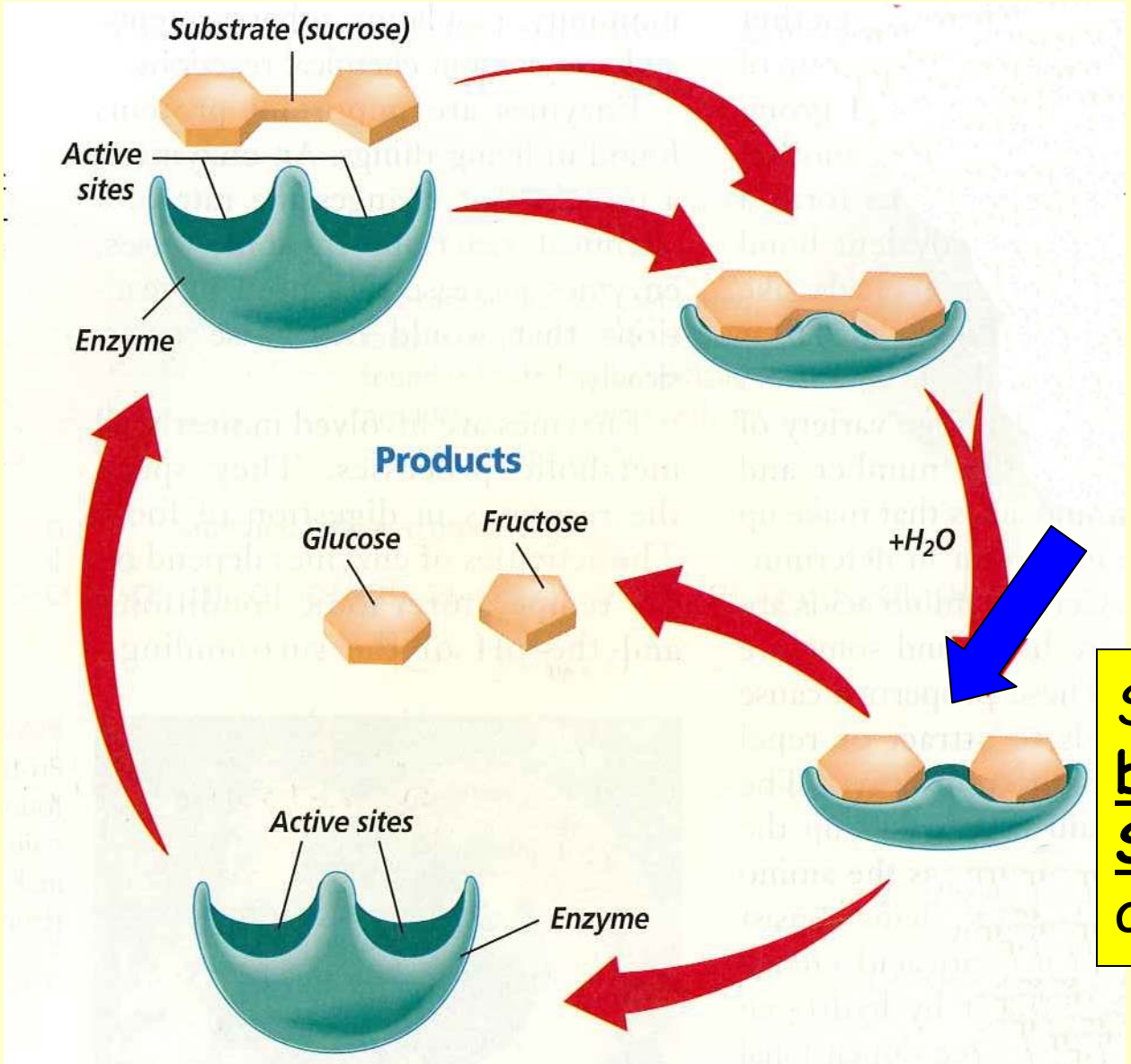
Enzyme Reaction Rate



Step #2

Enzymes **change shape** in order to bind with the substrate.

Enzyme Reaction Rate

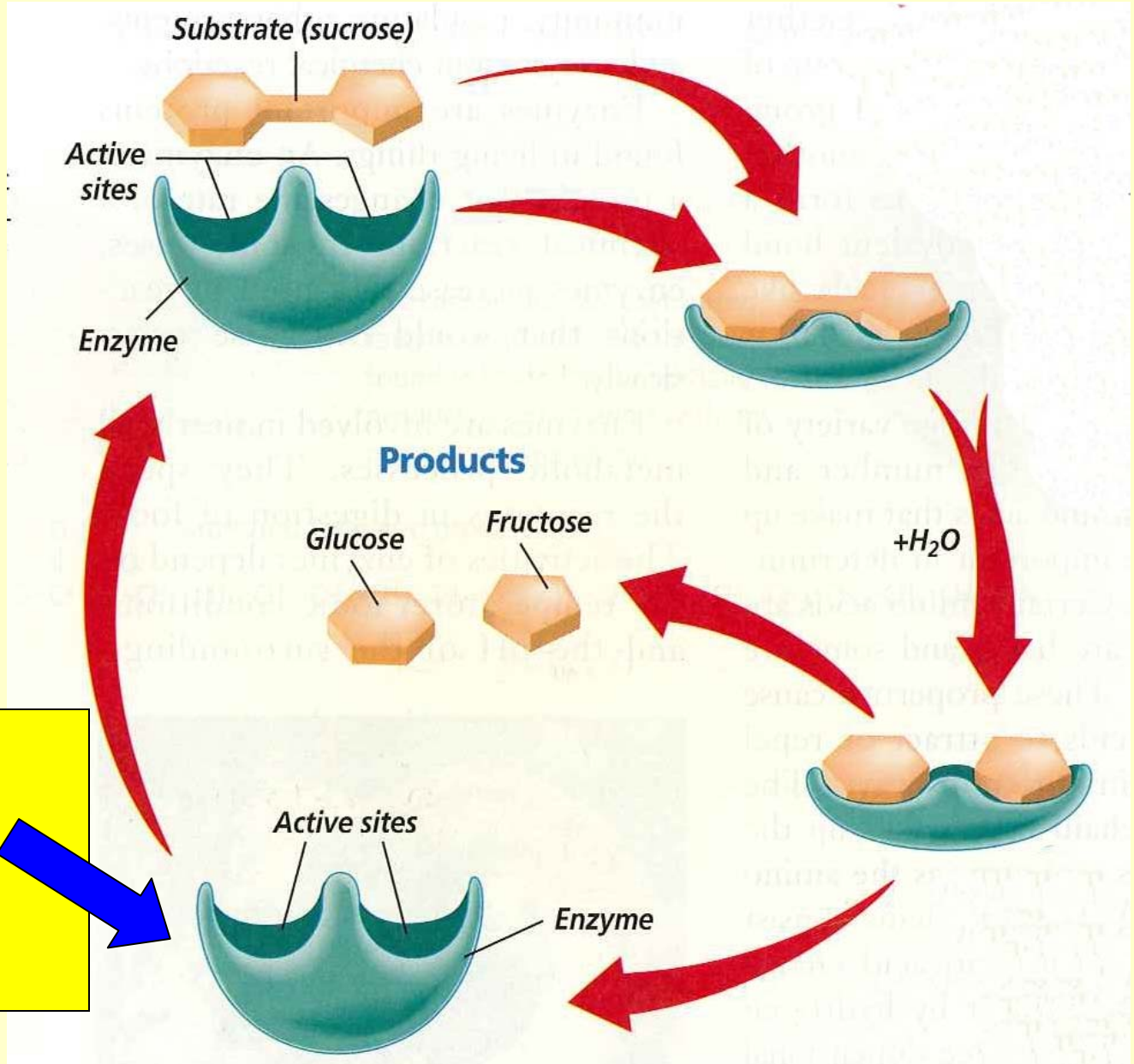


Step #3

Substrate **bond** is **broken**.
Smaller molecules are released.

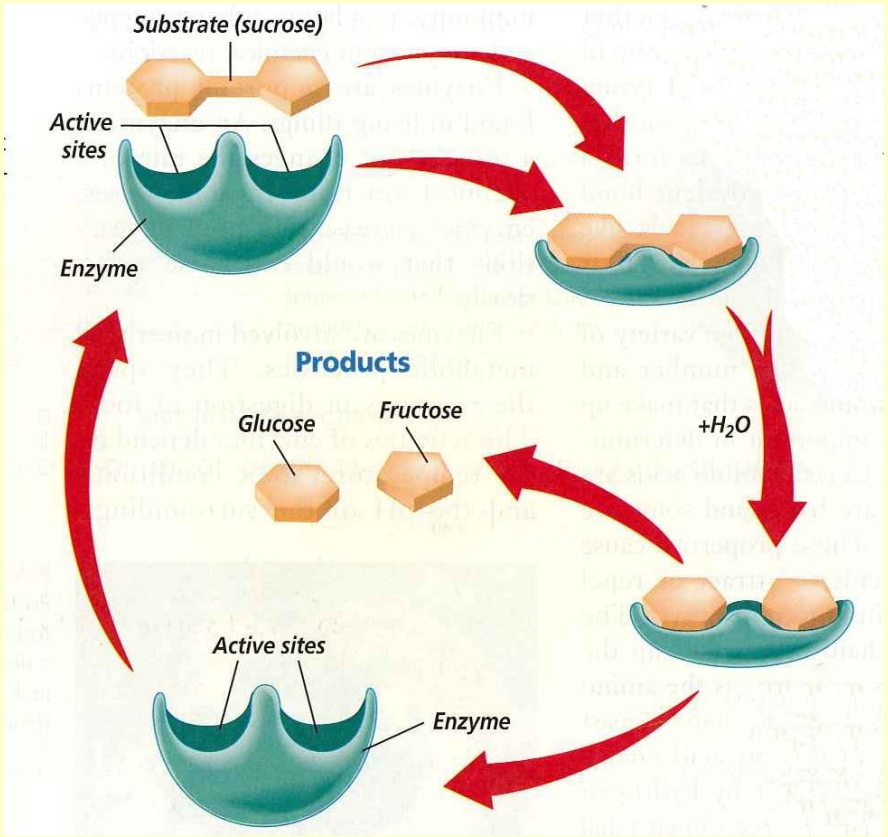
Enzyme Reaction Rate

Step #4



Enzyme returns back to **original shape**.
Cycle repeats.

Enzyme Reaction Rate



Lock and Key Method