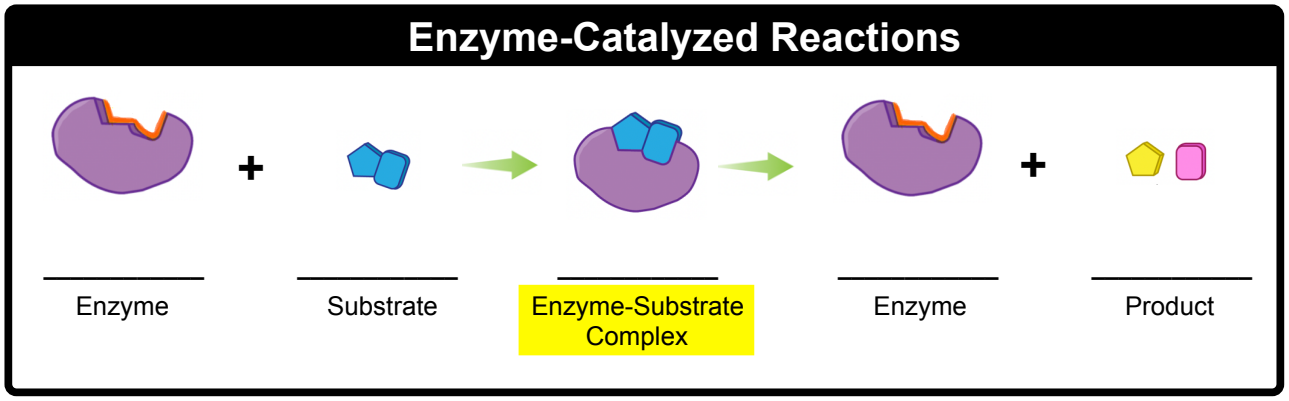
**CONCEPT:** ENZYME-SUBSTRATE COMPLEX

●Enzyme-substrate complex (ES): an *intermediate* formed when the substrate binds to the enzyme's _____.

● **Intermediate:** a temporary structure in the _____ step of a reaction between reactants and the product.

□ **Active Site:** region of the enzyme where the substrate _____ binds and the reaction occurs.

□ The formation of ES ____ energy of activation for the overall reaction.




**EXAMPLE:** Sucrose represents a disaccharide that contains a glucose molecule connected to a fructose molecule. Which of the following correctly labels the components of the following chemical reaction?

Sucrase + Sucrose ⟶ Sucrase–Sucrose ⟶ Sucrase + Glucose + Fructose

a) Sucrase = enzyme, sucrose = enzyme, sucrase–sucrose = ES complex, glucose + fructose = products

b) Sucrase = substrate, sucrose = substrate, sucrase–sucrose = enzyme, glucose + fructose = ES complex

c) Sucrase = substrate, sucrose = enzyme, sucrase–sucrose = ES complex, fructose = enzyme

d) Sucrase = enzyme, sucrose = substrate, sucrase–sucrose = ES complex, glucose + fructose = product

**PRACTICE:** Match the terms (a) enzyme-substrate complex, (b) enzyme and (c) substrate with each of the following:

_____ Has a structure that fits the active site of an enzyme.

_____ Can possess a tertiary structure that recognizes the substrate.

_____ The combination of an enzyme with the substrate.

**PRACTICE:** Match the terms (a) enzyme-substrate complex, (b) enzyme and (c) substrate with each of the following:

_____ pyruvate

_____ lipase

_____ galactose transaminase

_____ amylase