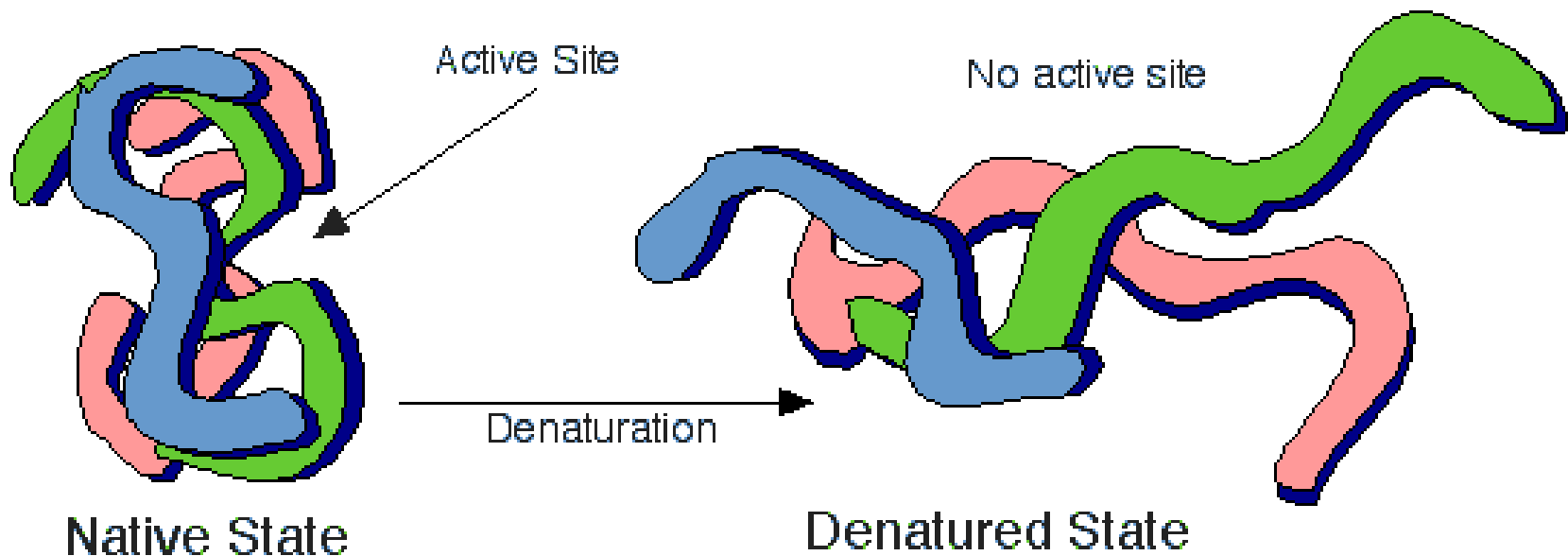


Environmental Control of Enzyme Activity

- As proteins, the tertiary structure of an enzyme is sensitive to
 - pH
 - [Salts]
 - Temperature
- Each enzyme has specific environmental conditions in which its efficiency is optimized

Environmental Control of Enzyme Activity

- Enzymes will denature if the pH, temperature or [salt] is not correct
- Denaturation: loss of the 3D conformation of the protein (it unravels) causing a loss of the functioning of the active site.



Temperature influences enzyme activity

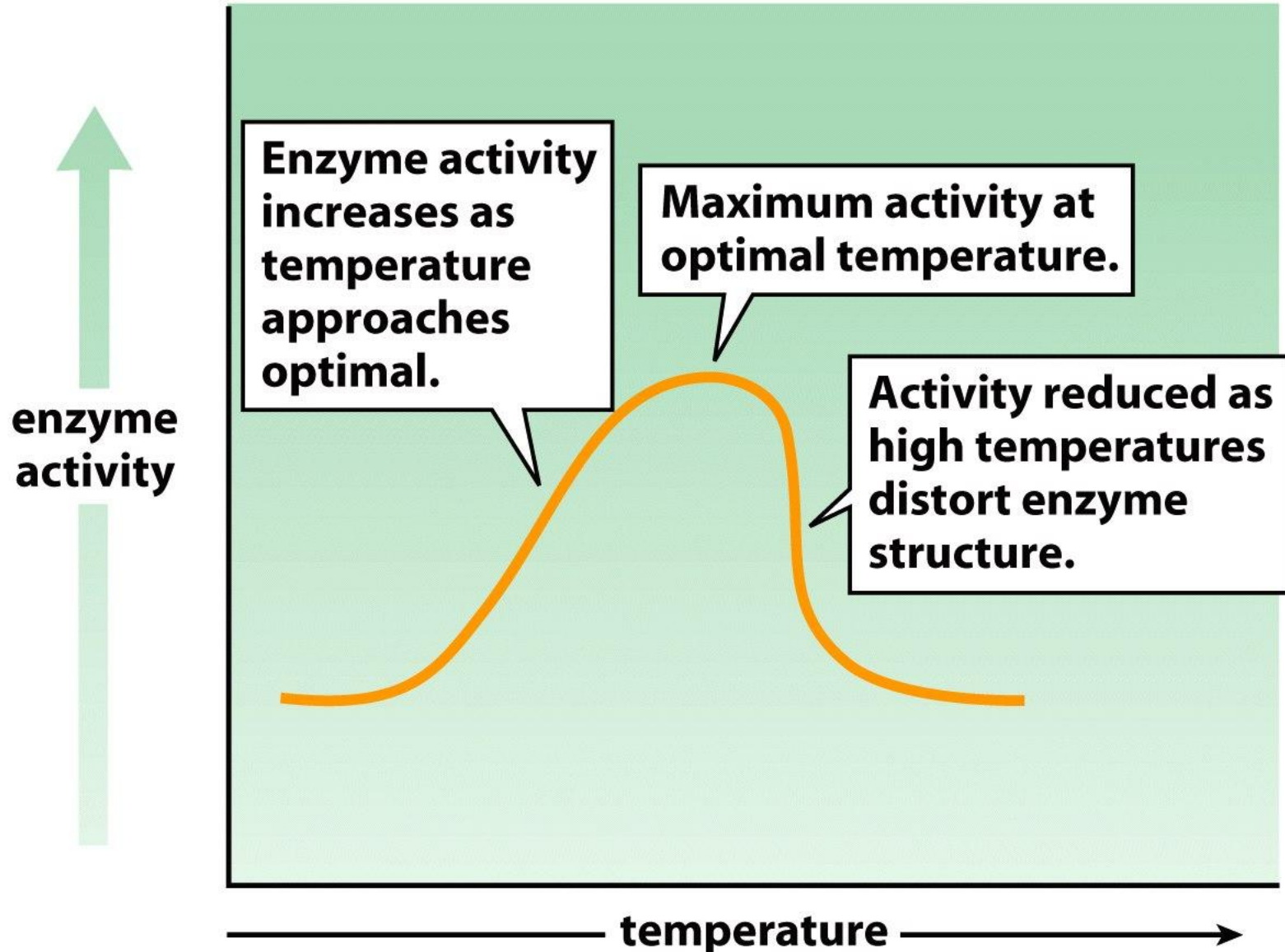
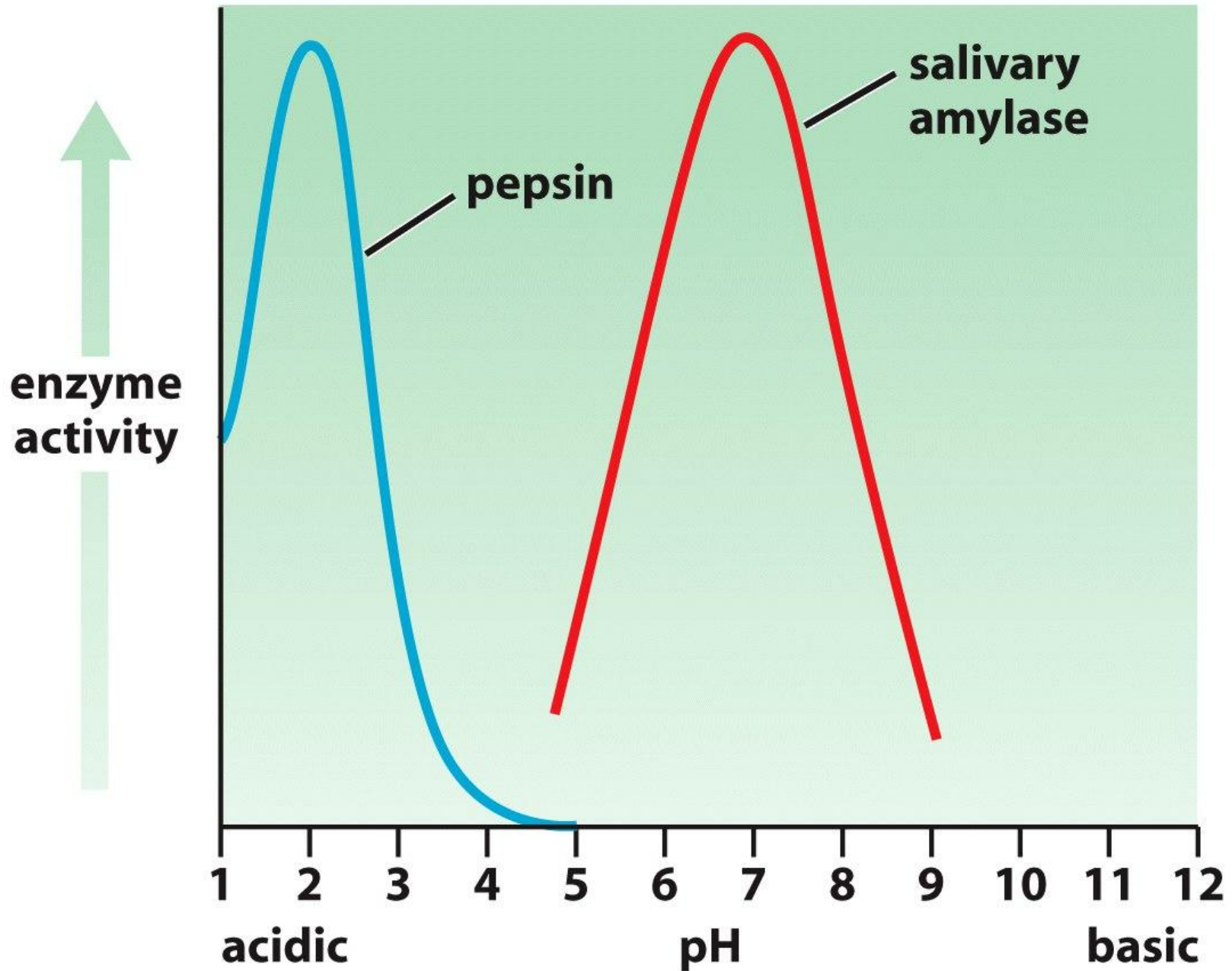


Figure 6-19b Biology: Life on Earth, 8/e
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pH influences enzyme activity

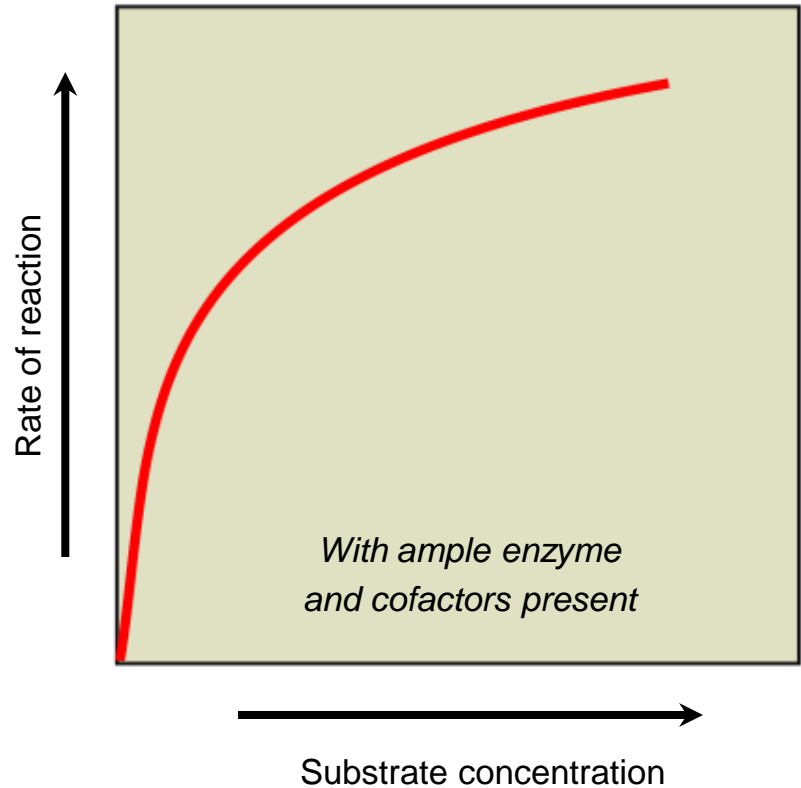


Effect of Temperature

- 50 toothpicks to start each round
- Hand in ice for 1 minute
- Collect data “number of toothpicks metabolized”
 - 10 sec
 - 30 sec
 - 60 sec
- Calculate rate of reaction at each time interval
- Collect class data (rate at each time)
- Find mean rate at each time
- Graph mean rate over time
- Explain graph in words
- Compare graph to baseline

Substrate Concentration Effect on Enzyme Activity

- Assuming that the amount of enzyme is constant, an increase in substrate concentration causes a diminishing increase in the reaction rate.
- A maximum rate is obtained at a certain substrate concentration where all enzymes are occupied by substrate. The reaction rate cannot increase further.

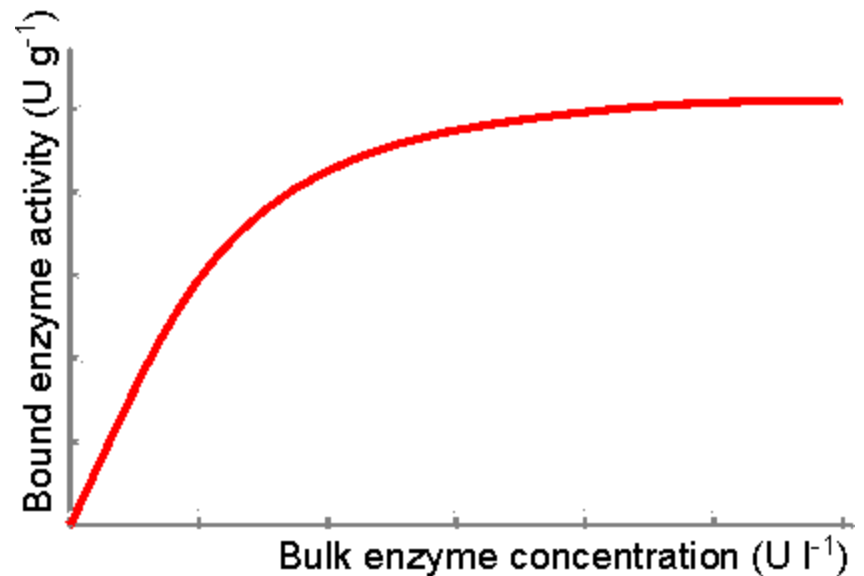


Increase concentration of substrate

- Unlimited number of toothpicks
- Collect data “number of toothpicks metabolized”
 - 10 sec
 - 30 sec
 - 60 sec
- Calculate rate of reaction at each time interval
- Collect class data (rate at each time)
- Find mean rate at each time
- Graph mean rate over time
- Explain graph in words
- Compare graph to baseline

Enzyme Concentration and Enzyme Activity

- An increase in enzyme concentration causes an increase in the reaction rate.
- Reaction rate will eventually level off as all available substrates are used up



Increase concentration of enzyme

- 50 toothpicks to start each round
- 1, 2 or 3 enzymes working simultaneously
- Collect data “number of toothpicks metabolized”
- Calculate rate of reaction at each time interval
- Collect class data (rate at each time)
- Find mean rate at each time
- Graph mean rate over time
- Explain graph in words
- Compare graph to baseline