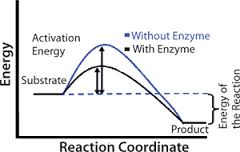
**SC.912.L.18.11 Explain the role of enzymes as catalysts.** Identify factors, such as pH and temperature, and their effect on enzyme activity.

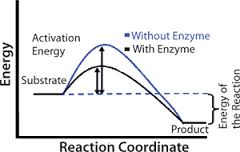
* Flow of energy through life
* Life is built on chemical reactions
* Nothing works without enzymes!
* How important are enzymes?
  + \_\_\_\_\_ chemical reactions in living organisms require \_\_\_\_\_\_\_\_\_\_\_\_\_ to work
  + building molecules
    - synthesis enzymes
  + breaking down molecules
    - digestive enzymes
* enzymes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Review – What is the monomer of a protein?
* How do Enzymes Work?
  + Enzymes are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ up a chemical reaction
    - Lower the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ required for a chemical reaction to occur.



* Enzymes aren’t used up
* Enzymes are \_\_\_\_\_\_ changed by the reaction
  + used only temporarily
  + \_\_\_\_\_\_\_\_\_\_ again for the same reaction with other molecules
  + very little enzyme needed to help in many reactions
* It’s shape that matters!
* Lock & Key model
  + shape of protein allows enzyme & substrate to fit
  + \_\_\_\_\_\_\_\_\_\_\_\_ enzyme for each \_\_\_\_\_\_\_\_\_\_\_\_\_ reaction
* Enzyme vocabulary
* Enzyme
  + helper protein molecule
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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  + molecule that enzymes work on
* Products
  + what the enzyme helps \_\_\_\_\_\_\_\_\_\_\_ from the reaction
* \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  + part of enzyme that substrate molecule fits into
* Factors Affecting Enzymes
* Temperature
  + Effect on rates of enzyme activity
    - \_\_\_\_\_\_\_\_\_\_\_\_ temperature
    - \_\_\_\_\_\_\_\_ number of collisions between enzyme & substrate
    - human enzymes 35°- 40°C (body temp = 37°C)
  + Raise temperature (boiling)
    - \_\_\_\_\_\_\_\_\_\_\_ protein = unfold = lose shape
  + Lower temperature T°
    - molecules move slower
    - \_\_\_\_\_\_\_\_\_ collisions between enzyme & substrate
* pH
  + Effect on rates of enzyme activity
    - changes in pH \_\_\_\_\_\_\_\_\_\_ protein shape
    - most human enzymes = pH 6-8
    - depends on where in body
    - pepsin (stomach) = pH 3
    - trypsin (small intestines) = pH 8
* Enzyme concentration
  + Effect on rates of enzyme activity
    - as \_\_\_\_ enzyme = \_\_\_\_\_\_ reaction rate
      * more enzymes = more frequently collide with substrate
    - reaction rate levels off
      * substrate becomes \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_
      * not all enzyme molecules can find substrate
* Substrate concentration
  + Effect on rates of enzyme activity
    - as \_\_\_\_\_ substrate = \_\_\_\_\_ reaction rate
      * more \_\_\_\_\_\_\_ = more frequently collide with enzymes
    - reaction rate levels off
      * all enzymes have active site engaged
      * enzyme is \_\_\_\_\_\_\_\_
      * maximum rate of reaction
* \_\_\_\_\_\_\_\_\_\_\_\_\_
  + molecule that enzymes work on
* Products
  + what the enzyme helps \_\_\_\_\_\_\_\_\_\_\_ from the reaction
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