**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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* 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
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