Eight Unifying Themes Reflection

Major Themes	Chapter 6	Chapter 7	Chapter 8	Chapter 9	Chapter 10
Science as a Process					The ***Calvin Cycle*** and its intermediate products were determined by using radioactive isotopes (p. 193)
Evolution	The ***endosymbiotic theory***, states that mitochondria & chloroplasts are ancestors of ancient bacteria (p. 98)				
Energy Transfer			Living systems rely on coupled ***exergonic*** and ***endergonic*** reactions (p. 146)	Life's processes require energy that enters the ecosystem in the form of sunlight. ***Energy*** is used for work or dissipated as heat (p. 160)	
Continuity & Change	Replicated DNA is packed in chromosomes that are separated at ***mitosis and meiosis*** to ensure the inheritance of traits (p.102)				

Unit Two Themes Reflection/ AP Biology Name_____

Major Themes	Chapter 6	Chapter 7	Chapter 8	Chapter 9	Chapter 10
Structure vs. Function	When cells are arranged into higher levels of organization (tissues, organs) they are the ***basic units*** of structure and function (p. 94)				
Regulation		Bulk transport across the plasma membrane is regulated by ***exocytosis*** and ***endocytosis*** (p.137)			
Interdependence in Nature	Various modes of cell-to-cell communication such as ***gap junctions*** are necessary for coordinating the actions of heart muscle (p. 121)				
Science, Tech & Society					On a global scale, ***photosynthesis*** is the process that is responsible for the presence of oxygen in our atmosphere (p. 198)

A Brief Explanation of the Major Unifying Themes

I. ***Science as a Process*** – Science is a way of knowing. It can involve a discovery process using inductive reasoning, or it can be a process of hypothesis testing. ***Example: The theory of evolution was developed based on observation and experimentation.***

II. ***Evolution*** – Evolution is the biological change of organisms that occurs over time and is driven by the process of natural selection. Evolution accounts for the diversity of life on Earth. ***Example: Widespread use of antibiotics has selected for antibiotic resistance in disease-causing bacteria.***

III. ***Energy Transfer*** – Energy is the capacity to do work. All living organisms are active (living) because of their abilities to link energy reactions to the biochemical reactions that take place within their cells. ***Example: The energy of sunlight, along with carbon dioxide and water, allows plant cells to make organic materials, synthesize chemical energy molecules, and ultimately release oxygen to the environment.***

IV. ***Continuity and Change***- All species tend to maintain themselves from generation to generation using the same genetic code. However, there are genetic mechanisms that lead to change over time, or evolution. ***Example: Mitosis consistently replicates cells in an organism; meiosis (and hence sexual reproduction) results in genetic variability.***

V. ***Relationship of Structure vs. Function***- The structural levels from molecules to organisms ensure successful functioning in all living organisms and living systems. ***Example: Aerodynamics of a bird's wing permits flight.***

VI. ***Regulation*** – Everything from cells to organisms to ecosystems is in a state of dynamic balance that must be controlled by positive or negative feedback mechanisms. ***Example: Body temperature is regulated by the brain via feedback mechanisms.***

VII. ***Interdependence in Nature*** – Living organisms rarely exist alone in nature. ***Example: Microscopic organisms can live in a symbiotic relationship in the intestinal tract of another organism; the host provides shelter and nutrients, and the microorganism digests the food.***

VIII. ***Science, Technology, and Society*** – Scientific research often leads to technological advances that can have positive and/or negative impacts upon society as a whole. ***Example: Biotechnology has allowed the development of genetically modified plants.***