

**Georgia Science Grades 9-12
Contents Standards Mapping**

© Boardworks 2009

BIOLOGY	Boardworks High School Biology Presentation
SB1. Students will analyze the nature of the relationships between structures and functions in living cells.	
a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.	Eukaryotic Cells Fluid Mosaic Model Organelles Prokaryotic Cells
b. Explain how enzymes function as catalysts.	Enzymes
c. Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids).	Digestion Lipids Monosaccharides Nucleic Acids Polysaccharides Proteins
d. Explain the impact of water on life processes (i.e., osmosis, diffusion).	Diffusion Osmosis Water
SB2. Students will analyze how biological traits are passed on to successive generations.	
a. Distinguish between DNA and RNA.	Nucleic Acids Transcription and Translation
b. Explain the role of DNA in storing and transmitting cellular information.	Controlling Protein Synthesis DNA Protein Synthesis Transcription and Translation
c. Using Mendel's laws, explain the role of meiosis in reproductive variability.	Gregor Mendel Meiosis
d. Describe the relationships between changes in DNA and potential appearance of new traits including: i. Alterations during replication. ii. Insertions iii. Deletions iv. Substitutions v. Mutagenic factors that can alter DNA. vi. High energy radiation (x-rays and ultraviolet) vii. Chemical	DNA Replication 2 Genetic Mutations Genetic Variation Inherited Diseases

e. Compare the advantages of sexual reproduction and asexual reproduction in different situations.	Asexual Reproduction Meiosis Mitosis
f. Examine the use of DNA technology in forensics, medicine, and agriculture.	Genetic Engineering Genetic Engineering for Health Care
SB3. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.	
a. Explain the cycling of energy through the processes of photosynthesis and respiration.	Aerobic Respiration Photosynthesis 1 Photosynthesis 2
b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals).	Classification
c. Examine the evolutionary basis of modern classification systems.	Classification
d. <i>Compare and contrast viruses with living organisms.</i>	–
SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.	
a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	Describing Populations Ecosystems
b. Explain the flow of matter and energy through ecosystems by arranging components of a food chain according to energy flow: i. Comparing the quantity of energy in the steps of an energy pyramid. ii. Explaining the need for cycling of major nutrients (C, O, H, N, P).	Carbon Cycle Energy Loss in Food Chains Energy Transfer in Food Chains Food Chains Nitrogen Cycle Recycling Nutrients
c. Relate environmental conditions to successional changes in ecosystems.	Ecosystems and Succession
d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption.	Climate Change Extinction Human Impact on the Environment Loss of Diversity
e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions.	Plant Adaptations
f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.	Animal Adaptations
SB5. Students will evaluate the role of natural selection in the development of the theory of evolution.	

a. Trace the history of the theory.	Darwin Evolution The Process of Evolution
<i>b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.</i>	–
c. Explain how fossil and biochemical evidence support the theory.	Evolution Fossil Record
d. Relate natural selection to changes in organisms.	Evolution The Process of Evolution
e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).	Superbugs