

## JSD High School Biology Content

Know about the transfers and transformations of matter and energy that link living things and their physical environment, from molecules to ecosystems.

- *Describe how living things can(have) influence(d) physical conditions on Earth.*
- *Demonstrate an understanding of the laws of conservation of energy/ matter as evidenced in the flow of energy and matter through an ecosystem*
- *Describe the carbon and nitrogen cycle within an ecosystem and how the continual input of energy from sunlight keeps the process going.*
- *Describe the interrelationships of geochemical cycles(i.e., water cycle, carbon cycle, oxygen cycle).*
- *Know that the living environment consists of individuals, populations, and communities.*
- *Identify dynamic factors (e.g., carrying capacity, limiting factors, biodiversity, and productivity) that affect population size.*
- *Relate the carbon cycle to global climate change.*
- *Explore ecological relationships (e.g., competition, niche, feeding relationships, symbiosis).*
- *Analyze the potential impacts of changes (e.g., climate change, habitat loss/gain, cataclysms, human activities) within an ecosystem.*

Know that living things are made up mostly of cells and that all life processes occur in these basic units.

- *Describe the cell theory of life and will be able to identify cellular components and relate them to life processes.*
- *Explain that cells have specialized structures in which chemical reactions occur.*

Understand the structure, function, behavior, development, life cycles, and diversity of living organisms

- *State the function of major physiological systems (i.e., circulatory, excretory, digestive, respiratory, reproductive, nervous, immune, endocrine, musculoskeletal, and integumentary).*
- *Describe the structure-function relationship (e.g., joints, lungs).*
- *Explain the functions of organs of major systems (i.e., respiratory, digestive, circulatory, reproductive, nervous, musculoskeletal, and excretory).*
- *Trace the pathways of the digestive, circulatory, and excretory systems.*
- *Describe the learned behaviors (e.g., classical conditioning, imprinting, trial and error) that are utilized by living organisms to meet the requirements of life.\**
- *Describe the functions and interdependencies of the organs within the immune system and within the endocrine system.*
- *Recognize taxonomic patterns in living organisms and how species diversity create a complex and more stable biosphere .*
- *Describe and compare the characteristics of phyla/divisions from each kingdom.*

Understand how science explains changes in life forms over time, including genetics, heredity, the process of natural selection and biological evolution.

- *Recognize that all organisms have chromosomes made of DNA and that DNA determines traits.*
- *Use probabilities to recognize patterns of inheritance (e.g., Punnett Squares).*

- *Examining issues related to genetics.*
- *Relate the structure of DNA to characteristics of an organism.*
- *Describe the structure and function of DNA, and how this relates to the transmission of hereditary traits, and mechanisms of variation.*

Understand the theory of natural selection as an explanation for evidence of changes in life forms over time.

- *Infer evolutionary pathways from evidence (e.g., fossils, geologic samples, recorded history).*
- *Explain how the processes of natural selection can cause speciation and extinction.*
- *Research how the processes of natural selection cause changes in species over time.*

Describe how the theory of plate tectonics explains the dynamic nature of the Earth's surface.

Understand and describe our local environment.

- *Apply biological concepts within their local environment.*
- *Conduct research and communicate results to solve a problem (e.g., fish and game management, building permits, mineral rights, land use policies).*
- *Analyze the competition for resources by various user groups to describe these interrelationships.*