Science Georgia Standards of Excellence

SCIENCE - Zoology

The Science Georgia Standards of Excellence are designed to provide foundational knowledge and skills for all students to develop proficiency in science. The Project 2061's *Benchmarks for Science Literacy* and the follow up work, *A Framework for K-12 Science Education* were used as the core of the standards to determine appropriate content and process skills for students. The Science Georgia Standards of Excellence focus on a limited number of core disciplinary ideas and crosscutting concepts which build from Kindergarten to high school. The standards are written with the core knowledge to be mastered integrated with the science and engineering practices needed to engage in scientific inquiry and engineering design. Crosscutting concepts are used to make connections across different science disciplines.

The Science Georgia Standards of Excellence drive instruction. Hands-on, student-centered, and inquiry-based approaches should be the emphasis of instruction. The standards are a required minimum set of expectations that show proficiency in science. However, instruction can extend beyond these minimum expectations to meet student needs.

Science consists of a way of thinking and investigating, as well a growing body of knowledge about the natural world. To become literate in science, students need to possess sufficient understanding of fundamental science content knowledge, the ability to engage in the science and engineering practices, and to use scientific and technological information correctly. Technology should be infused into the curriculum and the safety of the student should always be foremost in instruction.

In this course, students will recognize key features of the major body plans that have evolved in animals and how those body plans have changed over time resulting in the diversity of animals that are evident today.

In addition to classification and recognition, this course teaches students about the anatomical and physiological characteristics of animals. These characteristics relate to how an animal functions and can help students see the connections uniting particular animal groups. An understanding of form and function allows students to study how animals have evolved over time and to relate animals to their particular role in an ecosystem.

Finally, students will develop an understanding that all living things are interconnected. Students should realize that the worldwide activities of humans can contribute to animal diversity both positively and negatively. It should also be understood that humans are dependent on animal species for advances in medicine, ecosystem maintenance, and food supply.

SZ1. Obtain, evaluate, and communicate information to derive the phylogeny of animal taxa using informative characteristics.

a. Construct an explanation of the relationships among animal taxa using evidence from morphology, embryology, and biochemistry.
b. Analyze and interpret data to explain patterns in structure and function and construct a classification of representative animal taxa including: Porifera, Cnidaria, Platyhelminthes, Nematoda, Annelida, Mollusca, Arthropoda, Echinodermata, and Chordata.
c. Develop a model (i.e. cladogram, phylogenetic tree) using data to place taxa in a phylogenetic (evolutionary) context to support hypotheses of relationships

SZ2. Obtain, evaluate, and communicate information to explain the evolutionary history of animals over the geological history of Earth.

a. Construct an explanation of the geological history of earth and the effects of major environmental changes.
(*Clarification statement:* Explanations should be based on evidence from the fossil and geologic record. Major events include Cambrian Explosion and the causes of mass extinction events.)
b. Construct an explanation of how evolution allows species to adapt to environmental changes.
(*Clarification statement:* Explanations should address the mechanisms that drive evolution like adaptation, natural selection, convergence, and speciation.)

SZ3.Obtain, evaluate, and communicate information to compare and contrast structure and function of morphological and genetic characteristics across representative taxa.

a. Plan and carry out investigations to determine patterns in morphology (including organ systems, symmetry and body cavities) of representative animal taxa.
b. Construct an explanation of life functions (i.e., reproduction, respiration, digestion) at appropriate level of organization for representative taxa.
c. Construct an explanation based on evidence to relate important structural changes across evolutionary history to key functional transitions.

SZ4. Obtain, evaluate, and communicate information to assess how animals interact with their environment and one another.

a. Construct explanations to relate structure and function of animals to ecological roles, including morphological, physiological, and behavioral adaptations
b. Develop a model to explain patterns in various life cycles found among animals (e.g., polyp and medusa in cnidarians; multiple hosts and stages in the platyhelminthes or nematode life cycle; arthropod metamorphosis; egg, tadpole, adult stages in the amphibian life cycle).
c. Construct an explanation based on evidence of the effects of symbiotic relationships between animals (i.e., parasites and disease vectors) and between animals and other organisms (i.e., algae in coral; protists in termites; parasites).

SZ5. Obtain, evaluate, and communicate information to analyze the relationship between humans and animals within various phyla.

a. Ask questions and define problems identifying the cause and effect of human activities on the biodiversity of organisms (including habitat destruction, overharvesting, water consumption, and pollution).
b. Design a solution to preserve species diversity in natural and captive environments with regard to conservation, habitat restoration, breeding programs and management of genetic diversity at local and global levels.
c. Construct an argument based on evidence of the short-term and long-term impacts of legal, societal, political, ethical, and economic decisions on animal diversity.
(*Clarification statement:* Arguments should include, but are not limited to medical, research, and agricultural use of animals.)