Georgia Science

Botany

Adopted 2019

Obtain, evaluate, and communicate information to analyze the nature of the relationships between plant morphological structures and anatomical structures, functions, and processes. SB01

a. **Ask questions to investigate and provide explanations about the basic plant structures (i.e., major organs, tissues, and cells) in relation to their functions.** SB01.A

b. **Construct an explanation supported by evidence relating plant structures to plant processes (photosynthesis, respiration, transport, growth, reproduction, and dispersal).** SB01.B

c. **Develop and use a model to trace the origin of changes of major plant structures and organs through geological time, in response to major changes in the environment (i.e., development of vascular tissues, change from spores to seed formers).** SB01.C

d. **Construct an explanation about the coevolution of plant morphological and anatomical structures with animals (i.e., pollination), Rhizobium (i.e., nitrogen fixation), and Mycorrhiza (i.e., fungi in rhizosphere).** SB01.D

e. **Use mathematical models to predict the effect of hormones on structural growth of a plant in response to an external stimulus. (Focus on phototropism, geotropism, and thigmotropism).** SB01.E

Obtain, evaluate, and communicate information to delineate the plant divisions based on current plant phylogenetic and taxonomic principles. SB02

a. **Construct an explanation based on evidence to compare nonvascular to vascular plants and seedless to seed plants.** SB02.A

b. **Construct an argument based on evidence from traditional methods and emerging technologies (i.e., using physical characteristics and molecular evidences) to classify plants into major plant divisions.** SB02.B

c. **Analyze and interpret data to develop models (i.e., cladograms and phylogenetic trees) based on patterns of common ancestry or convergence.** SB02.C

Obtain, evaluate, and communicate information to describe Georgia's major physiographic ecoregions, their representative natural

a. **Analyze and interpret data using taxonomic keys to identify and compare the major plant forms that dominate natural plant communities growing in aquatic and terrestrial habitats and the ecosystems they support in Georgia.** SB03.A

b. **Construct an argument based on evidence of the impact of non-native invasive plants on Georgia's natural communities.** SB03.B

plant communities, and their conservation. SB03	c. Construct explanations of the factors that cause plants to become endangered and design solutions to prevent extinction. SB03.C
	d. Design a solution to create sustainable plant communities within Georgia's ecoregions and reduce negative human impact. SB03.D
Obtain, evaluate, and communicate information to analyze the impact of plant diseases and pests on plant defense systems and agriculture. SB04	a. Ask questions based on observational, investigative or research evidence to develop sustainable management strategies for common plant diseases. SB04.A
	b. Construct an explanation based on research (i.e., case studies) to evaluate how plant diseases affect humans, animals, and the economy. SB04.B
	c. Plan and carry out an investigation to determine how plants respond to insect pests and pathogens, and note the plant defense mechanism. SB04.C
Obtain, evaluate, and communicate information to analyze the diversity of plant adaptations and responses to changing environmental conditions. SB05	a. Construct an explanation to describe the diversity of plants and their adaptations in relation to differing ecosystems and changing environments, both long term (climate) and short term (seasonal and diurnal). SB05.A
	b. Construct an argument based on evidence to predict which plant adaptions increase survival in different stressful environments (i.e., water extremes, saline environment, and extreme temperature). SB05.B
	c. Develop and use models to analyze how change and disruptions in major nutrient cycles (i.e., C, H, O, N, P) might affect plant responses. SB05.C
Obtain, evaluate, and communicate information to analyze the economic and ecological importance of plants in human society. SB06	a. Construct an explanation of how plants are used in different societies (agriculture, horticulture, industry, medicine, biotechnology). SB06.A
	b. Develop a model to explain how plants impact the environment by providing diverse habitats for birds, insects, and other wildlife in ecosystems. SB06.B
	c. Construct an argument based on evidence to explain the use and potential benefits of genetically modified plants through traditional and modern molecular techniques and investigate the bio-ethical issues related to genetic engineering of plants. SB06.C