



**Lab-Aids Correlations for the
Science Georgia Standards of Excellence
High School Biology**

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This document is intended to show how the *Issues and Science, 3rd Edition* program materials align with the [Biology Georgia Standards for Excellence – 2016](#).

ABOUT SEPUP

Materials from the Science Education for Public Understanding Program (SEPUP) are developed at the Lawrence Hall of Science, University of California, Berkeley, and distributed nationally by Lab-Aids, Inc. Development of SEPUP materials is supported by grants from the National Science Foundation. SEPUP programs are available as full year courses, or separately, as units, each taking 3-9 weeks to complete. For more information about SEPUP, visit www.sepuplhs.org.

ABOUT SCIENCE AND GLOBAL ISSUES: BIOLOGY, 3rd EDITION

Science and Global Issues: Biology was developed by SEPUP with grant support from the National Science Foundation. It was field tested nationally in classrooms across the country. The program consists of a student book, equipment kit, print and online teacher resources, and online content for students, including additional print, video, digital simulations and more. The five units in this course look at topics such as human impact on ecosystems, global health, genetically modified organisms, and biodiversity. In each unit, students are challenged to reason scientifically while applying their understanding of the main concepts of that unit: sustainability, ecology, cell biology, genetics, and evolution. Each teacher edition chapter provides detailed information on support for key NGSS core content, practices, crosscutting concepts, use of phenomena, and more. For more information on the *Science and Global Issues: Biology* program, please visit <https://www.lab-aids.com/sgi>.

Science and Global Issues: Biology, 3rd Edition Scope and Sequence

SGL: Biology Unit Name	Activities	Issue Focus
Unit A Sustainability: Changing Human Impact	1-4	Aspects of sustainability from a personal, community and global perspective
Unit B Ecology: Living on Earth	1-17	Sustainability from an ecosystem perspective, with a focus on humans' impacts on ecosystems; Making decisions regarding fisheries management
Unit C Cells: Improving Global Health	1-17	Disparities between developing and developed countries in terms of diseases' impacts on life; Making decisions about priorities for diseases that limit social, economic, and environmental progress
Unit D Genetics: Feeding the World	1-17	Comparison of selective breeding and genetic modification; Use of genetically modified organisms, particularly in the production of agricultural crops
Unit E Evolution: Managing Change	1-15	Conserving genetic, species and ecosystem diversity; Ecosystems services

Georgia Biology Standard	Where addressed in <i>Science and Global Issues</i> Unit Name: Activity #
SB1. Obtain, evaluate, and communicate information to analyze the nature of the relationships between structures and functions in living cells.	
a. Construct an explanation of how cell structures and organelles (including nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, Golgi, endoplasmic reticulum, vacuoles, ribosomes, and mitochondria) interact as a system to maintain homeostasis	<i>Cells: 1, 2, 3, 4, 5, 6, 7, 8</i>
b. Develop and use models to explain the role of cellular reproduction (including binary fission, mitosis, and meiosis) in maintaining genetic continuity.	<i>Cells: 3, 11, 12</i>
c. Construct arguments supported by evidence to relate the structure of macromolecules (carbohydrates, proteins, lipids, and nucleic acids) to their interactions in carrying out cellular processes. (<i>Clarification statement:</i> The function of proteins as enzymes is limited to a conceptual understanding.)	<i>Cells: 5, 6</i>
d. Plan and carry out investigations to determine the role of cellular transport (e.g., active, passive, and osmosis) in maintaining homeostasis.	<i>Cells: 2, 3, 4</i>
e. Ask questions to investigate and provide explanations about the roles of photosynthesis and respiration in the cycling of matter and flow of energy within the cell (e.g., single-celled alga). (<i>Clarification statement:</i> Instruction should focus on understanding the inputs, outputs, and functions of photosynthesis and respiration and the functions of the major sub-processes of each including glycolysis, Krebs cycle, electron transport chain, light reactions, and Calvin cycle.)	<i>Cells: 9, 10, 11, 12, 13, 14, 15, 16</i> <i>Ecology: 11, 12</i>
SB2. Obtain, evaluate, and communicate information to analyze how genetic information is expressed in cells.	
a. Construct an explanation of how the structures of DNA and RNA lead to the expression of information within the cell via the processes of replication, transcription, and translation.	<i>Cells: 6</i> <i>Genetics: 2, 7, 8, 9, 10, 15</i>
b. Construct an argument based on evidence to support the claim that inheritable genetic variations may result from: <ul style="list-style-type: none"> • new genetic combinations through meiosis (crossing over, nondisjunction); • non-lethal errors occurring during replication (insertions, deletions, substitutions); and/or • heritable mutations caused by environmental factors (radiation, chemicals, and viruses). 	<i>Genetics: 11, 12</i>
c. Ask questions to gather and communicate considerations of biotechnology in forensics, medicine, and agriculture. (<i>Clarification statement:</i> The element is intended to include advancements in technology relating to economics and society such as advancements may include Genetically Modified Organisms.)	<i>Genetics: 1, 2, 13, 14, 15, 16, 17</i>

Georgia Biology Standard	Where addressed in <i>Science and Global Issues</i> Unit Name: Activity #
SB3. Obtain, evaluate, and communicate information to analyze how biological traits are passed on to successive generations.	
a. Use Mendel’s laws (segregation and independent assortment) to ask questions and define problems that explain the role of meiosis in reproductive variability.	<i>Genetics: 11, 12</i>
b. Use mathematical models to predict and explain patterns of inheritance. (<i>Clarification statement:</i> Students should be able to use Punnett squares (monohybrid and dihybrid crosses) and/or rules of probability, to analyze the following inheritance patterns: dominance, codominance, incomplete dominance.)	<i>Genetics: 4, 5, 6, 10</i>
c. Construct an argument to support a claim about the relative advantages and disadvantages of sexual and asexual reproduction.	<i>Genetics: 3, 11, 12</i>
SB4. Obtain, evaluate, and communicate information to illustrate the organization of interacting systems within single-celled and multi-celled organisms.	
a. Construct an argument supported by scientific information to explain patterns in structures and function among clades of organisms, including the origin of eukaryotes by endosymbiosis. Clades should include: <ul style="list-style-type: none"> • archaea • bacteria • eukaryotes <ul style="list-style-type: none"> • fungi • plants • animals <i>(Clarification statement:</i> This is reflective of 21 st century classification schemes and nested hierarchy of clades and is intended to develop a foundation for comparing major groups of organisms. The term 'protist' is useful in describing those eukaryotes that are not within the animal, fungal or plant clades but the term does not describe a well-defined clade or a natural taxonomic group.)	<i>Evolution: 9</i> <i>Appendix F: Science</i> <i>References - Classifying Living</i> <i>Organisms*</i>
b. Analyze and interpret data to develop models (i.e., cladograms and phylogenetic trees) based on patterns of common ancestry and the theory of evolution to determine relationships among major groups of organisms.	<i>Evolution: 6, 9*</i>
c. Construct an argument supported by empirical evidence to compare and contrast the characteristics of viruses and organisms.	<i>Not Addressed</i>
SB5. Obtain, evaluate, and communicate information to assess the interdependence of all organisms on one another and their environment.	

* Denotes partial coverage

Georgia Biology Standard	Where addressed in <i>Science and Global Issues</i> Unit Name: Activity #
a. Plan and carry out investigations and analyze data to support explanations about factors affecting biodiversity and populations in ecosystems. (<i>Clarification statement:</i> Factors include population size, carrying capacity, response to limiting factors, and keystone species.)	<i>Ecology:</i> 2, 3, 4, 5
b. Develop and use models to analyze the cycling of matter and flow of energy within ecosystems through the processes of photosynthesis and respiration. <ul style="list-style-type: none"> • Arranging components of a food web according to energy flow. • Comparing the quantity of energy in the steps of an energy pyramid. • Explaining the need for cycling of major biochemical elements (C, O, N, P, and H). 	<i>Ecology:</i> 6, 7, 8, 9, 11
c. Construct an argument to predict the impact of environmental change on the stability of an ecosystem.	<i>Ecology:</i> 11, 12, 13, 14, 15, 16, 17 <i>Evolution:</i> 8, 10, 11, 12, 13, 14, 15
d. Design a solution to reduce the impact of a human activity on the environment. (<i>Clarification statement:</i> Human activities may include chemical use, natural resources consumption, introduction of non-native species, greenhouse gas production.)	<i>Ecology:</i> 17 <i>Evolution:</i> 14, 15
e. Construct explanations that predict an organism’s ability to survive within changing environmental limits (e.g., temperature, pH, drought, fire).	<i>Evolution:</i> 1, 2, 3, 5
SB6. Obtain, evaluate, and communicate information to assess the theory of evolution.	
a. Construct an explanation of how new understandings of Earth’s history, the emergence of new species from pre-existing species, and our understanding of genetics have influenced our understanding of biology.	<i>Evolution:</i> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
b. Analyze and interpret data to explain patterns in biodiversity that result from speciation.	<i>Evolution:</i> 5, 6, 7
c. Construct an argument using valid and reliable sources to support the claim that evidence from comparative morphology (analogous vs. homologous structures), embryology, biochemistry (protein sequence) and genetics support the theory that all living organisms are related by way of common descent.	<i>Evolution:</i> 7, 9
d. Develop and use mathematical models to support explanations of how undirected genetic changes in natural selection and genetic drift have led to changes in populations of organisms. (<i>Clarification statement:</i> Element is intended to focus	<i>Evolution:</i> 4, 5, 6, 9, 11*

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Georgia Biology Standard	Where addressed in <i>Science and Global Issues</i> Unit Name: Activity #
on basic statistical and graphic analysis. Hardy Weinberg would be an optional application to address this element.)	
e. Develop a model to explain the role natural selection plays in causing biological resistance (e.g., pesticides, antibiotic resistance, and influenza vaccines).	<i>Evolution: 11, 12</i>

