LAB-AIDS Correlations for

New York State Science Learning Standards

HIGH SCHOOL LIFE SCIENCES:

BIOLOGY

Mark Koker, Ph D, Director of Curriculum &Professional Development, Lab-Aids
Daniel Seaver, High School Product Manager, Lab-Aids

This document is intended to show the alignment of *Science and Global Issues: Biology* with the *New York State Science Learning Standards*[1] documents and the *Next Generation Science Standards* and *Common Core*[2].

ABOUT OUR PROGRAMS
Lab-Aids Core Science Programs are developed to support current knowledge on the teaching and learning of science. All materials support an inquiry-driven pedagogy, with support for literacy skill development and with assessment programs that clearly show what students know and are able to do from using the programs. All programs have extensive support for technology in the school science classrooms and feature comprehensive teacher support.

ABOUT SEPUP
Materials from the Science Education for Public Understanding Program (SEPUP) are developed at the Lawrence Hall of Science, at the 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.

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[1] www.nysed.gov/common/nysed/files/programs/curriculum-instruction/biology.pdf

[2] http://www.corestandards.org/

ABOUT SCIENCE AND GLOBAL ISSUES BIOLOGY

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, world 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. For more information on the *Science and Global Issues: Biology* program, please visit https://store.lab-aids.com/high-school-curriculum/science-global-issues-biology.

Science in Global Issues Biology Unit Title	Student Book Pages	Issue Focus
Sustainability	1-46	Aspects of sustainability from a personal, community and global perspective
Ecology: Living on Earth	43-154	Sustainability from an ecosystems perspective, with a focus on humans' impacts on ecosystems Making decisions regarding fisheries management
Cell Biology: World Health	155-258	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
Genetics: Feeding the World	259-412	Comparison of selective breeding and genetic modification Use of genetically modified organisms, particularly in the production of agricultural crops
Evolution: Maintaining Diversity	413-512	Conserving genetic, species and ecosystem diversity Ecosystems services and intrinsic value models for conservation

ABOUT THE LAB-AIDS CITATIONS

The following tables are presented in a Disciplinary Core Idea arrangement – Earth Space Science (ESS), Life Science (LS), Physical Science (PS) and Engineering, Technology and Applications of Science (ETS). These are provided first by PE element and later by SGI Bio activity and unit. Some unit content may contain science content that falls outside NGSS specifications and are not listed here.

Citations included in the correlation document are as follows:	
Unit and Activity #	C10, Unit C *Cell Biology*, Activity 10: "Functions of Proteins in Cells"
NGSS Performance Expectations	HS-LS3-3
Science and Engineering Practices	Analyzing and Interpreting Data Developing and Using Models Using Mathematics and Computational Thinking
Crosscutting Concepts	Patterns Systems and System Models
Disciplinary Core Ideas	(ETS1.A)* ETS1.B ETS1.C

*The use of parenthesis () indicates partial coverage

LIFE SCIENCES: BIOLOGY

Topic	Performance Expectation	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	SGI: Biology Unit and Activity #
HS. Structure and Function	HS-LS1- 1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.	Constructing Explanations and Designing Solutions	LS1.A: Structure and Function	Structure and Function	C10, C14, D2, (D3), (D5), D10, D11, (D14), D16, (D17), (D19)
HS. Structure and Function	HS-LS1- 2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Developing and Using Models	LS1.A: Structure and Function	Systems and System Models	C3, C4, C9, C12, C14, C15
HS. Structure and Function	HS-LS1- 3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Planning and Carrying Out Investigations Connections to Nature of Science: Scientific Investigations Use a Variety of Methods	LS1.A: Structure and Function	Stability and Change	Not well addressed
HS. Inheritance and Variation of Traits	HS-LS1- 4: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Developing and Using Models	LS1.B: Growth and Development of Organisms	Systems and System Models	C13, C14, C15, D17

Topic	Performance Expectation	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	SGI: Biology Unit and Activity #
HS. Inheritance and Variation of Traits	HS-LS1- 8: Use models to illustrate how human reproduction and development maintains continuity of life.	Developing and Using Models	LS1.A: Structure and Function LS1.B: Growth and Development of Organisms	Systems and System Models Connections to Nature of Science: Science is a Human Endeavor	Not well addressed
HS. Matter and Energy in Organisms and Ecosystems	HS-LS1- 5: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	Developing and Using Models	LS1.C: Organization for Matter and Energy Flow in Organisms	Energy and Matter	(B9), (B10), (B11), C12
HS. Matter and Energy in Organisms and Ecosystems	HS-LS1- 6: Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	Constructing Explanations and Designing Solutions	LS1.C*: Organization for Matter and Energy Flow in Organisms	Energy and Matter	(B9), B11, C12, Appendix F
HS. Matter and Energy in Organisms and Ecosystems	HS-LS1- 7: Develop a model to describe how food molecules are rearranged through chemical reactions to release energy during cellular respiration and/or form new molecules that support growth as this matter moves through an organism.	Developing and Using Models	LS1.C*: Organization for Matter and Energy Flow in Organisms	Energy and Matter	B9, B10, B11, C12

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HS. Interdependent Relationships in Ecosystems	HS-LS2- 1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	Using Mathematics and Computational Thinking	LS2.A: Independent Relationships in Ecosystems	Scale, Proportion, Quantity	B14, B17
HS. Interdependent Relationships in Ecosystems	HS-LS2- 2: Construct an explanation that predicts patterns of interactions among organisms in a variety of ecosystems.	Using Mathematics and Computational Thinking Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence	LS2.A: Independent Relationships in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience	Scale, Proportion, Quantity	B16, B17
HS. Interdependent Relationships in Ecosystems	HS-LS2- 6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem	Constructing Explanations and Designing Solutions Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence	LS2.C: Ecosystem Dynamics, Functioning, and Resilience	Stability and Change	(B1), (B4), (B5), (B12), (B13), (B14), B16, (B17), (B18), (B19)
HS. Interdependent Relationships in Ecosystems	HS-LS2- 7: Design, evaluate, and refine a solution for reducing the impacts of human activities	Using Mathematics and Computational Thinking	LS2.C: Ecosystem Dynamics, Functioning,	Cause and Effect Stability and Change	(B4), (B15), (B16), (B18), (B19)

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	on the environment and biodiversity.	Constructing Explanations and Designing Solutions	and Resilience LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions		
HS. Interdependent Relationships in Ecosystems	HS-LS2- 8: Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Constructing Explanations and Designing Solutions Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence	LS2.D: Social Interactions and Group Behavior	Cause and Effect	Not well addressed
HS. Matter and Energy in Organisms and Ecosystems	HS-LS2- 3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	Constructing Explanations and Designing Solutions Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence	LS2.B: Cycles of Matter and Energy Transfer in Ecosystems	Energy and Matter	(B8), (B9), (B10), (B11), (B12)
HS. Matter and Energy in Organisms and	HS-LS2- 4: Construct an argument supported by empirical evidence that	Using Mathematics and Computational Thinking	LS2.B: Cycles of Matter and Energy Transfer	Energy and Matter	(B7), (B8)

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Ecosystems	changes to physical or biological components of an ecosystem affect populations.		in Ecosystems		
HS. Matter and Energy in Organisms and Ecosystems	HS-LS2- 5: Evaluate competing design solutions for maintaining biodiversity and protecting ecosystem stability.	Developing and Using Models	LS2.B: Cycles of Matter and Energy Transfer in Ecosystems	Systems and Systems Models	(B8), B9
HS. Inheritance and Variation of Traits	HS-LS3- 1: Develop and use a model to explain why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	Asking Questions and Defining Problems	LS3.A Inheritance of Traits LS1.A: Structure and Function	Cause and Effect	D1, D2, D3, D5, D10, D11, D15, D16
HS. Inheritance and Variation of Traits	HS-LS3- 2: Develop and use a model to describe how asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	Engaging in Argument from Evidence	LS3.B: Variation of Traits	Cause and Effect Connections to Nature of Science: Science is a Human Endeavor	(C13,) D12, D13, D14, D16
HS. Inheritance and Variation of Traits	HS-LS3- 3: Apply concepts of statistics and probability to explain the variation and distribution of expressed	Analyzing and Interpreting Data	LS3.B: Variation of Traits	Scale, Proportion and Quantity Connections to	D4, D5, D6, D7, D12

Topic	Performance Expectation	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	SGI: Biology Unit and Activity #
	traits in a population.			Nature of Science: Science is a Human Endeavor	
HS. Natural Selection and Evolution	HS-LS4- 1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	Obtaining, Evaluating, and Communicating Information	LS4.A: Evidence of Common Ancestry and Diversity	Patterns	E4, E5, E6, E7, E8, E9, E10, E11, E13, E14
HS. Natural Selection and Evolution	HS-LS4- 2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	Analyzing and Interpreting Data	LS4.B: Natural Selection LS4.C: Adaption	Cause and Effect	E4, E11, E12, E13
HS. Natural Selection and Evolution	HS-LS4- 3: Apply concepts of statistics and probability to support explanations	Analyzing and Interpreting Data	LS4.B: Natural Selection	Patterns	E11, E12

Topic	Performance Expectation	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts	SGI: Biology Unit and Activity #
	that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	Connections to Nature of Science: Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena	LS4.C: Adaption		
HS. Natural Selection and Evolution	HS-LS4- 4: Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	Analyzing and Interpreting Data Connections to Nature of Science: Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena	LS4.C: Adaption	Cause and Effect	E4, E5, E6, E7, (E8), E11, E12, E13
HS. Natural Selection and Evolution	HS-LS4- 5: Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	Analyzing and Interpreting Data Connections to Nature of Science: Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena	LS4.C: Adaption	Cause and Effect	E3, E4, E5, E6, E7, (E8), E10, E11, E12, E13, E14
HS. Earth Systems	HS- ESS2-6: (The biochemistry aspects of carbon cycling.)	Developing and Using Models	ESS2.D: Weather and Climate	Energy and Matter	(B8, B9, B10) B11
HS. Earth's Systems	HS- ESS2-7: (Changes in the atmosphere from plants and other organisms related to	Engaging in Argument from Evidence	ESS2.E: Biogeology	Stability and Change	(B8, B9, B10, B11)

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	carbon cycling and feedback mechanisms related to co-evolution.)				
HS. Engineering Design	HS- ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	Asking Questions and Defining Problems	ETS1.A: Defining and Delimiting Engineering Problems	Connections to Engineering, Technology, and Applications of Science: Influence of Science, Engineering, and Technology on Society and the Natural World	A1, A2, A3, A4, A5, A6, (B1), (B4), (B18), (B19), C1, C17, C18, (D1), (D15), (D20), (E1), (E2), (E9), (E15)
HS. Engineering Design	HS- ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	Constructing Explanations and Designing Solutions	ETS1.C: Optimizing the Design Solution		Not well addressed
HS. Engineering Design	HS- ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	Constructing Explanations and Designing Solutions	ETS1.B: Developing Possible Solutions	Connections to Engineering, Technology, and Applications of Science: Influence of Science, Engineering, and Technology on Society and the Natural World	(A3), A6, B1, B4, B18, B19, C17, C18, D6, D15, D18, D19, D20, E9, E15

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HS. Engineering Design	HS- ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	Using Mathematics and Computational Thinking	ETS1.B: Developing Possible Solutions	Systems and System Models	Not well addressed