

Lab-Aids Correlations for

NEXT GENERATION SCIENCE STANDARDS

HIGH SCHOOL LEVEL, LIFE SCIENCE

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This document is intended to show the alignment of *Science and Global Issues: Biology* with the <u>Next</u> <u>Generation Science Standards</u>.

ABOUT OUR PROGRAMS

Lab-Aids has maintained its home offices and operations in Ronkonkoma, NY, since 1963. We publish over 200 kits and core curriculum programs to support science teaching and learning, grades 6-12. All core curricula 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 as a result of program use. All programs have extensive support for technology and feature comprehensive teacher support. For more information, please visit <u>www.lab-aids.com</u> and navigate to the program of interest.

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. Since 1987, development of SEPUP materials has been supported by grants from the National Science Foundation and other public and private sources. SEPUP programs include student books, equipment kits, teacher materials, and online digital content, and are available as full year courses, or separately, as units.

ABOUT THE NEXT GENERATION SCIENCE STANDARDS

The National Academy of Sciences, Achieve, the American Association for the Advancement of Science, and the National Science Teachers Association have collaborated over several years to develop the *Next Generation Science Standards* (NGSS). The first step of the process was led by The National Academies of Science, a non-governmental organization commissioned in 1863 to advise the nation on scientific and engineering issues. On July 19, 2011, the National Research Council (NRC), the functional staffing arm of the National Academy of Sciences, released the *Framework for K-12 Science Education*.

The *Framework* was a critical first step because it is grounded in the most current research on science and science learning, and it identifies the science all K–12 students should know. The second step in the process was the development of standards grounded in the NRC Framework. A group of 26 lead states and writers, in a process managed by Achieve, has been working since the release of the Framework to develop K-12 *Next Generation Science Standards*. The final release of the Standards was in April 2013. States, districts, and schools have worked to implement these standards since then.

The Next Generation Science Standards (NGSS) provide an important opportunity to improve not only science education but also student achievement. Based on the *Framework*, the NGSS are intended to reflect a new vision for American science education. *The Next Generation Science Standards* are student performance expectations – not curriculum. These performance expectations clarify the expectations of what students will know and be able to do by the end of the grade or grade band.

As the reader knows, the *NGSS* represent content from several domains: (1) science and engineering practices; (2) crosscutting concepts; (3) the disciplines of life, earth, and physical science, as set forth in the *Next Generation Science Framework* (NRC, 2012). The Standards themselves are written as performance indicators, and content from the Common Core (http://www.corestandards.org/) is included. The following high school level standard from the life sciences is used to show the basic structure. Standards, as performance indicators, are in the white box on top, and the relevant Practices, Disciplinary Core Ideas, and Crosscutting Concepts are listed below in the blue, orange, and green boxes, respectively. Clarification Statements, in red, list assessment boundaries or further describe the standard.

Various other appendices from the Standards documents describe other important elements, such as DCI progressions, STS, nature of science, and more.

 Students who demonstrate understanding can: HS-LS1- 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. [Assessment Boundary: Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.] 							
The performance expectation above was deve	eloped using the following elements from the NRC docum	ent A Framework for K-12 Science Education:					
Science and Engineering Practices Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 9-12 builds on K-8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. • Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.	Disciplinary Core Ideas LS1.4: Structure and Function 9. Systems of specialized cells within organisms help them perform the essential functions of life. 4. All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.)	ent A Framework for K-12 Science Education: Crosscutting Concepts Structure and Function • Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.					
Connections to other DCIs in this grade-band:							
HS.LSS.A Articulation of DCIs across grade-bands: MS.LS1.A : MS.LS3.A : MS.LS3.B							
Common Core State Standards Connections: ELA/Literacy- RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS1-1) WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS1-1)							

ABOUT THE LAB-AIDS CITATIONS

Citations included in the correlation document are as follows:					
 * indicates where Performance Expectation is assessed Unit title, Activity Number Cells: 2, 3, 4, 5, 6*, 7*, 8 					
NGSS Performance Expectations	HS-LS1-1				
Disciplinary Core Ideas	LS1.A				
Science and Engineering Practices	Constructing Explanations and Designing Solutions				
Crosscutting Concepts	Scale, Proportion, and Quantity				
Common Core ELA	SL.11-12.5				
Common Core Math	MP.4				

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
HS-LS1-1: Construct an	Cells: 6	LS1.A	Constructing	Scale, Proportion,	ELA/Literacy:
explanation based on			Explanations and	and Quantity	SL.11-12.5
evidence for how the			Designing Solutions		WHST.9-12.9
structure of DNA				Structure and	
determines the structure of proteins, which carry			Developing and Using Models	Function	
out the essential				Systems and	
functions of life through				System Models	
systems of specialized					
cells.					
	Genetics: 2, 7, 8, 9, 10*,	LS1.A	Asking Questions and	Cause and Effect	ELA/Literacy:
	15		Defining Problems		WHST.9-12.2
		LS1.B		Patterns	WHST.9-12.9
			Constructing		
		LS4.B	Explanations and	Scale, Proportion,	Mathematics:
			Designing Solutions	and Quantity	MP.4
		LS4.C			
			Developing and Using	Structure and	
			Models	Function	
			Obtaining, Evaluating,	Systems and	
			and Communicating	System Models	
			Information		
HS-LS1-2: Develop and	Cells: 2, 3, 4, 5, 6*, 7*, 8	LS1.A	Analyzing and	Cause and Effect	ELA/Literacy:
use a model to illustrate			Interpreting Data		RST.9-10.1
the hierarchical				Scale, Proportion,	RST.9-10.7
organization of			Connections to Nature of	and Quantity	RST.11-12.3
interacting systems that			Science		RST.11-12.9
provide specific functions					SL.11-12.5

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
within multicellular			Constructing	Stability and	WHST.9-12.9
organisms.			Explanations and	Change	
			Designing Solutions		
				Structure and	
			Developing and Using	Function	
			Models		
				Systems and	
			Planning and Carrying	System Models	
			Out investigations		
HS-LS1-3: Plan and	Cells: 1, 2, 3, 4, 5, 7, 8, 9	LS1.A	Analyzing and	Cause and Effect	ELA/Literacy:
conduct an investigation			Interpreting Data		RST.9-10.1
to provide evidence that		LS1.C		Energy and	RST.9-10.7
feedback mechanisms			Asking Questions and	Matter	RST.11-12.3
maintain homeostasis.		ETS1.B	Defining Problems		RST.11-12.7
				Patterns	RST.11-12.9
			Connections to Nature of		
			Science	Scale, Proportion,	
				and Quantity	
			Constructing		
			Explanations and	Stability and	
			Designing Solutions	Change	
			Developing and Using	Systems and	
			Models	System Models	
			Planning and Carrying		
			Out Investigations		

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
HS-LS1-4: Use a model to illustrate the role of cellular division (mitosis)	Genetics: 3, 8*	LS1.A LS1.B	Developing and Using Models	Systems and Systems Models	Mathematics: MP.4
producing and maintaining complex organisms.		LS3.A		Function	
HS-LS1-5: Use a model to illustrate how	Cells: 11*, 12, 13, 15	LS1.C	Connections to Nature of Science	Cause and Effect	ELA/Literacy: RST.9-10.1
photosynthesis		LS1.B		Connections to	RST.11-12.3
transforms light energy			Constructing	Nature of Science	RST.11-12.7
into stored chemical			Explanations and		WHST.9-12.9
energy.			Designing Solutions	Energy and	
				Matter	Mathematics:
			Models	Patterns	IVIP.2
			Planning and Carrying	Scale, Proportion,	
			Out Investigations	and Quantity	
			Using Mathematics and	Stability and	
			Computational Thinking	Change	
HS-LS1-6: Construct and	Cells: 9, 10, 11, 13, 14, 15,	LS1.A	Analyzing and	Cause and Effect	ELA/Literacy:
revise an explanation	16*		Interpreting Data		RST.9-10.1
based on evidence for		LS1.C		Connections to	RST.11-12.3
how carbon, hydrogen,			Connections to Nature of	Nature of Science	RST.11-12.7
and oxygen from sugar		LS2.B	Science		WHST.9-12.2
molecules may combine				Energy and	WHST.9-12.9
with other elements to		ETS1.B		Matter	Mathematica
form amino acids and/or					iviathematics:

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
other large carbon-based			Constructing	Patterns	MP.2
molecules.			Explanations and		
			Designing Solutions	Scale, Proportion, and Quantity	
			Developing and Using		
			Models	Stability and	
				Change	
			Engaging in Argument		
			from Evidence	Systems and	
				System Models	
			Planning and Conducting		
			Investigations		
			Using Mathematics and		
			Computational Thinking		
HS-IS1-7: Use a model to	Cells: 9 10 14 15* 16	Ι \$1 Δ	Analyzing and	Cause and Effect	FLA/Literacy:
illustrate that cellular		201.7	Interpreting Data		RST.11-12.3
respiration is a chemical		LS1.C		Energy and	RST.11-12.7
process whereby the			Connections to Nature of	Matter	WHST.9-12.2
bonds of food molecules		LS2.B	Science		WHST.9-12.9
and oxygen molecules				Scale, Proportion,	
are broken and the		ETS1.B	Constructing	and Quantity	
bonds in new compounds			Explanations and		
are formed, resulting in a			Designing Solutions	Patterns	
net transfer of energy.					
			Developing and Using	Systems and	
			Models	System Models	

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
HS-LS2-1: Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	Ecology: 1, 2, 3*, 4	LS2.A LS2.C	Engaging in Argument from Evidence Planning and Conducting Investigations Analyzing and Interpreting Data Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Developing and Using Models Obtaining, Evaluating, and Communicating Information Using Mathematics and	Cause and Effect Patterns Scale, Proportion, and Quantity Stability and Change Systems and System Models	ELA/ Literacy: RST.11-12.5 Mathematics: MP.2 MP.4 HSN.Q.A.1 HSN.Q.A.2 HSS-IC.A.1
HS-LS2-2: Use mathematical representations to support and revise explanations based on evidence about factors	Ecology: 3, 4, 5*	LS2.A LS2.C	Analyzing and Interpreting Data Connections	Cause and Effect Patterns	ELA/ Literacy: RST.11-12.5 Mathematics: MP.2

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
affecting biodiversity and populations in ecosystems of different scales.			to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence Constructing Explanations and Designing Solutions Developing and Using Models Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity Systems and System Models	MP.4 HSN.Q.A.1 HSN.Q.A.2 HSS-IC.A.1
HS-LS2-3: Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	Ecology: 6, 7, 8*	LS2.B	Constructing Explanations and Designing Solutions Connections to Nature of Science: Knowledge is	Energy and Matter	ELA/ Literacy: RST.11-12.7 RST.11-12.9

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
			Open to Revision in Light of New Evidence Obtaining, Evaluating, and Communicating Information	Scale, Proportion, and Quantity	
			Using Mathematics and Computational Thinking		
	Cells: 10, 15*	LS1.C LS2.B	Connections to Nature of Science Constructing Explanations and Designing Solutions Developing and Using Models	Energy and Matter Scale, Proportion, and Quantity Systems and System Models	ELA/Literacy: RST.11-12.3 WHST.9-12.9
			Engaging in Argument from Evidence		
HS-LS2-4: Use mathematical representations to support claims for the	Ecology: 6, 7, 9, 10*	LS2.B	Constructing Explanations and Designing Solutions	Energy and Matter Scale, Proportion,	ELA/ Literacy: RST.11-12.7 RST.11-12.9
cycling of matter and flow of energy among organisms in an ecosystem.			Developing and Using Models	and Quantity Systems and System Models	Mathematics: MP.2 MP.4

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
			Engaging in Argument from Evidence Using Mathematics and Computational Thinking		-
HS-LS2-5: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Ecology: 11, 12*	LS2.B PS3.D	Analyzing and Interpreting Data Developing and Using Models	Energy and Matter Systems and System Models	ELA/ Literacy: RST.11-12.5 Mathematics: MP.2 MP.4
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.	Ecology: 13, 14*, 15, 16	LS2.A LS2.C LS4.D ETS1.A ETS1.B	Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Connections to Nature of Science: Scientific Knowledge is Open to	Cause and Effect Stability and Change	ELA/ Literacy: RST.11-12.5 RST.11-12.7 RST.11-12.9 WHST.9- 12.1 WHST.9- 12.7 Mathematics: MP.2 HSS-IC.B.6

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
			Revision in Light of New Evidence		
			Obtaining, Evaluating,		
			and Communicating Information		
HS-LS2-7: Design,	Ecology: 13, 14, 15, 16,	LS2.A	Constructing	Cause and Effect	ELA/ Literacy:
evaluate, and refine a	17*		Explanations and		RST.11-12.5
solution for reducing the		LS2.C	Designing Solutions	Stability and	RST.11-12.7
impacts of human				Change	RST.11-12.9
activities on the		LS4.D	Engaging in Argument		WHS1.9-12.1
biodiversity			from Evidence		VVII31.9-12.7
biodiversity.		EISI.A	Connections to Nature of		Mathematics:
		ETC1 D	Science: Scientific		MP.2
			Knowledge is Open to		
		52 C	Revision in Light of New		HSS-IC.B.6
		52.0	Evidence		
			Obtaining Evaluating		
			and Communicating		
			Information		
	Cells: 1, 2, 3, 7, 13, 17	LS1.A	Asking Questions and	Cause and Effect	ELA/ Literacy:
			Defining Problems		RST.9-10.1
		LS1.C		Connections to	RST.11-12.3
			Constructing	Nature of Science	RST.11-12.7
		LS2.B	Explanations and		SL.11-12.5
			Designing Solutions	Energy and	
		ETS1.B		Matter	
					Mathematics:

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
			Developing and Using	Patterns	MP.2
			Models	Scale Proportion	
			Planning and Carrying	and Quantity	
			Out Investigations	and Quantity	
				Stability and	
			Using Mathematics and	Change	
			Computational Thinking		
				Systems and	
	Constinue 10, 17		Anglusing and	System Models	
	Genetics: 16, 17	LSZ.C	Analyzing and	Patterns	ELA/ Literacy:
		ISA B	Interpreting Data	Stability and	WHST 9- 12 9
		L34.D	Constructing	Change	WII51.5 12.5
		LS4.C	Explanations and	enange	
			Designing Solutions		
		LS4.D			
		ETS1.B			
	Evolution: 10, 13, 14*, 15*	ETS1.B	Constructing	Cause and Effect	ELA/ Literacy:
			Explanations and		RST.9-10.8
		LS2.C	Designing Solutions	Connections to	RST.11-12.1
				Engineering,	RST.11-12.7
		LS4.A	Obtaining, Evaluating,	Technology, and	RST.11-12.8
			and Communicating	Applications of	SL.11-12.4
		LS4.B	Information	of Science	WHST 0- 12.2
		154 C	Using Mathematics and	Engineering and	VVIIJI.J- 12./
		L34.U	Computational Thinking		Mathematics:
					HSN.QA.1

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
		LS4.D		Society and the Natural World Patterns Stability and Change	MP.2 MP.4
				Systems and System Models	
HS-LS2-8: Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Evolution: 1, 3*	LS2.D LS4.B LS4.C	Analyzing and Interpreting Data Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence Constructing Explanations and Designing Solutions Engaging in Argument from Evidence	Cause and Effect Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems Patterns	ELA/Literacy: RST.9-12.2 RST.11-12.1 RST.11-12.7 RST.11-12.8 Mathematics: MP.2 MP.4
HS-LS3-1: Ask questions	Genetics: 4, 5, 7, 10, 11*,	LS1.A	Analyzing and	Cause and Effect	ELA/Literacy:
about the role of DNA and chromosomes in coding the instructions		LS3.A LS3.B	Interpreting Data	Scale, Proportion, and Quantity	K51.11-12.1 RST.11-12.9 WHST.9-12.1 WHST.9-12.2

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
for characteristic traits			Asking Questions and	Structure and	WHST.9-12.9
passed from parents to			Defining Problems	Function	Mathanation
onspring.			Constructing	Systems and	MP 2
			Explanations and	System Models	1416.2
			Designing Solutions	System Wodels	
			Developing and Using		
			Models		
			Engaging in Argument		
			from Evidence		
			Using Mathematics and		
			Computational Thinking		
HS-LS3-2: Make and	Genetics: 1, 6, 11, 12, 13*	LS1.A	Analyzing and	Cause and Effect	ELA/Literacy:
defend a claim based on			Interpreting Data		RST.11-12.1
evidence that inheritable		LS3.A		Scale, Proportion,	RST.11-12.9
genetic variations may			Asking Questions and	and Quantity	WHST.9-12.1
result from (1) new		LS3.B	Defining Problems		WHST.9-12.2
genetic combinations				Systems and	WHS1.9-12.9
viable errors occurring			Developing and Using	System Models	
during replication.			woulds		Mathematics:
and/or (3) mutations			Engaging in Argument		MP.2
caused by environmental			from Evidence		
factors.					
HS-LS3-3: Apply concepts	Genetics: 4, 5, 6*, 14*	LS3.A	Analyzing and	Cause and Effect	ELA/Literacy:
of statistics and			Interpreting Data		RST.11-12.1
probability to explain the					RST.11-12.9

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
variation and distribution		LS3.B	Asking Questions and	Patterns	WHST.9-12.1
of expressed traits in a			Defining Problems		WHST.9-12.9
population.		LS4.B		Scale, Proportion,	
			Engaging in Argument	and Quantity	Mathematics:
		LS4.C	from Evidence		MP.2
			Obtaining, Evaluating,		
			and Communicating		
			Information		
			Using Mathematics and		
			Computational Thinking		
HS-LS4-1: Communicate	Evolution: 6, 7, 8, 9, 10	LS2.C	Analyzing and	Cause and Effect	
scientific information			Interpreting Data		ELA/Literacy:
that common ancestry		LS4.A		Patterns	RST.11-12.1
and biological evolution			Constructing		RST.11-12.7
are supported by		LS4.B	Explanations and	Connections to	RST.11-12.8
multiple lines of			Designing Solutions	Nature of Science:	SL.11-12.4
empirical evidence.		LS4.C		Scientific	WHST.9-12.2
			Engaging in Argument	Knowledge	WHST.9-12.9
		LS4.D	from Evidence	Assumes an Order	
				and Consistency in	Mathematics:
			Obtaining, Evaluating,	Natural Systems	MP.2
			and Communicating		
			Information	Scale, Proportion,	
				and Quantity	
				Stability and	
				Change	

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
HS-LS4-2: Construct an	Evolution: 1, 2, 3, 4, 5*, 6,	LS2.D	Analyzing and	Cause and Effect	ELA/Literacy:
explanation based on	12		Interpreting Data		RST.11-12.1
evidence that the		LS4.A		Patterns	RST.11-12.7
process of evolution			Connections to Nature of		RST.11-12.8
primarily		LS4.B	Science: Scientific	Connections to	SL.11-12.4
results from four factors:			Knowledge is Open to	Nature of Science:	WHST.9-12.2
(1) the potential for a		LS4.C	Revision in Light of New	Scientific	WHST.9-12.9
species to increase in			Evidence	Knowledge	
number, (2) the heritable		LS4.D		Assumes an Order	Mathematics:
genetic variation of			Constructing	and Consistency in	MP.2
individuals in a species			Explanations and	Natural Systems	MP.4
due to mutation and			Designing Solutions		
sexual reproduction, (3)					
competition for limited			Engaging in Argument		
resources, and (4) the			from Evidence		
proliferation of those					
organisms that are better			Obtaining, Evaluating,		
able to survive and			and Communicating		
reproduce in the			Information		
environment.					
			Using Mathematics and		
			Computational Thinking		
HS-LS4-3: Apply concepts	Genetics: 14, 15, 16	LS1.A	Analyzing and	Patterns	ELA/Literacy:
of statistics and			Interpreting Data		RST.11-12.8
probability to support		LS2.C		Scale, Proportion,	WHST.9-12.9
explanations that			Asking Questions and	and Quantity	
organisms with an		LS3.B	Defining Problems		Mathematics:
advantageous heritable				Stability and	MP.2
trait tend to increase in		LS4.B		Change	

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
proportion to organisms lacking this trait.	Evolution: 1, 2, 3, 4*, 5, 6	LS4.C LS4.D ETS1.B LS2.D LS4.A LS4.B LS4.C	Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information Analyzing and Interpreting Data Connections to Nature of Science: Scientific Knowledge is Open to Revision in Light of New Evidence Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Using Mathematics and	Structure and Function Cause and Effect Patterns Connections to Nature of Science: Scientific Knowledge Assumes an Order and Consistency in Natural Systems	ELA/Literacy: RST.11-12.1 RST.11-12.7 RST.11-12.8 SL.11-12.4 WHST.9-12.2 WHST.9-12.9 Mathematics: MP.2 MP.4
HS-LS4-4: Construct an explanation based on evidence for how natural selection leads to	Evolution: 1, 2, 3, 4, 5, 6*, 11, 12	LS2.D LS4.A	Computational Thinking Analyzing and Interpreting Data Connections to Nature of Science: Scientific	Cause and Effect Patterns	ELA/Literacy: RST.11-12.1 RST.11-12.7 RST.11-12.8 SL.11-12.4

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
adaptation of		LS4.B	Knowledge is Open to	Connections to	WHST.9-12.2
populations.		154 C	Findence	Scientific	WHS1.9-12.9
		254.0		Knowledge	Mathematics:
		LS4.D	Constructing	Assumes an Order	MP.2
			Explanations and	and Consistency in	MP.4
			Designing Solutions	Natural Systems	
			Developing and Using		
			Models		
			Engaging in Argument		
			from Evidence		
			Obtaining, Evaluating,		
			and Communicating		
			Information		
			Using Mathematics and		
			Computational Thinking		
HS-LS 4-5: Evaluate the	Evolution: 6, 7, 8*, 9, 10	LS2.C	Analyzing and	Cause and Effect	
evidence supporting			Interpreting Data		ELA/Literacy:
claims that changes in		LS4.A		Patterns	RST.11-12.1
environmental conditions			Constructing		RST.11-12.7
may result in (1)		LS4.B	Explanations and	Connections to	RST.11-12.8
increases in the number			Designing Solutions	Nature of Science:	SL.11-12.4
of individuals of some		LS4.C		Scientific	WHST.9-12.2
species, (2) the			Engaging in Argument	Knowledge	WHST.9-12.9
emergence of new		LS4.D	from Evidence	Assumes an Order	
species over time, and (3)					Mathematics:

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
the extinction of other species.			Obtaining, Evaluating, and Communicating Information	and Consistency in Natural Systems Scale, Proportion, and Quantity Stability and	MP.2
HS-LS4-6: Create or	Evolution: 12, 13, 14*	ETS1.B	Constructing	Change Cause and Effect	ELA/Literacy:
revise a simulation to			Explanations and		RST.11-12.7
test a solution to mitigate adverse impacts		LS2.C	Designing Solutions	Connections to Engineering,	RST.11-12.8 WHST.9-12.7
of human activity on biodiversity.		LS4.B	Obtaining, Evaluating, and Communicating	Technology, and Applications of	Mathematics:
		LS4.C	Information	Science: Influence of Science.	HSN.QA.1 MP.2
		LS4.D	Using Mathematics and Computational Thinking	Engineering, and Technology on Society and the Natural World	MP.4
				Patterns	
				Stability and Change	
				Systems and System Models	

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
HS-ETS1-3: Evaluate a	Evolution: 13, 14*	ETS1.B	Constructing	Cause and Effect	ELA/Literacy:
solution to a complex			Explanations and		RST.11-12.8
real-world problem		LS2.C	Designing Solutions	Connections to	WHST.9-12.7
based on prioritized				Engineering,	
criteria and trade-offs		LS4.B	Using Mathematics and	Technology, and	Mathematics:
that account for a range			Computational Thinking	Applications of	HSN.QA.1
of constraints, including		LS4.C		Science: Influence	MP.2
cost, safety, reliability,				of Science,	MP.4
and aesthetics as well as		LS4.D		Engineering, and	
possible social, cultural,				Technology on	
and environmental				Society and the	
impacts.				Natural World	
				Stability and	
				Change	
				Systems and	
				System Models	
HS-ETS1-4: Use a	Evolution: 13, 14*	ETS1.B	Constructing	Cause and Effect	ELA/Literacy:
computer simulation to			Explanations and		RST.11-12.8
model the impact of		LS2.C	Designing Solutions	Connections to	WHST.9-12.7
proposed solutions to a				Engineering,	
complex real-world		LS4.B	Using Mathematics and	Technology, and	Mathematics:
problem with numerous			Computational Thinking	Applications of	HSN.QA.1
criteria and constraints		LS4.C		Science: Influence	MP.2
on interactions within				of Science,	MP.4
and between systems		LS4.D		Engineering, and	
relevant to the problem.				Technology on	

Performance Expectation	SGI Biology: Unit and Activity Number.	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core ELA/Math
				Society and the	
				Stability and	
				Change	
				Systems and	
				System Models	