

# Biology Pacing Guide

## ELA Common Core Standards

Day	Unit	Topic	Desired Outcome	NGSS	Reading	Writing	S & L	Math	21st Century	Technology
Opening Day 1			Rules, Procedures, Syllabus,							
Opening Day 2			Pre-Test (Benchmark 1), Safety							
1	Unit 1	Biochemistry	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. [Clarification Statement: Emphasis is on using evidence from models and simulations to support explanations.]	HS-LS1-6	RST.11-12.1	WHST.9-12.2, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9	SL.11-12.5	MP.4, HSF-IF.C.7, HSF-BF.A.1	9.1	8.1 & 8.2
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7	Summative Assessment									
8	Unit 1	Biochemistry	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]	HS-LS1-3	RST.11-12.1	WHST.9-12.2, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9	SL.11-12.5	MP.4, HSF-IF.C.7, HSF-BF.A.1	9.1	8.1 & 8.2
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14	Summative Assessment									
15	Summative Assessment									
16	Unit 2	Cell Biology	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. [Clarification Statement: Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.]	HS-LS1-5	RST.11-12.1	WHST.9-12.2, WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9	SL.11-12.5	MP.4, HSF-IF.C.7, HSF-BF.A.1	9.1	8.1 & 8.2
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21	Summative Assessment/RST									

Marking Period 2			ELA Common Core Standards															
Day	Unit	Topic	Desired Outcome	NGSS	Reading	Writing	S & L	Math	21st Century	Technology								
1	Unit 2	Cell Biology	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. [Clarification Statement: Emphasis is on the conceptual understanding of the inputs and outputs of the process of cellular respiration.]	HS-LS1-7	RST.11-12.1	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9	SL.11-12.5	MP.4, HSF-IF.C.7, HSF-BF.A.1	9.1	8.1 & 8.2								
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Summative Assessment																		
Summative Assessment/RST																		
9	Unit 3	Ecology	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. [Clarification Statement: Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate, and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets.] equations to make comparisons.]	HS-LS2-1	RST.9-10.8, RST.11-12.1, RST.11-12.7, RST.11-12.8	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7	SL.11-12.5	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3, HSS-ID.A.1, HSS-IC.A.1, HSS-IC.B.6	9.1	8.1 & 8.2								
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11			Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. [Clarification Statement: Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data.]	HS-LS2-2														
12			of energy in aerobic and anaerobic conditions. [Clarification Statement: Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.]	HS-LS2-3														
13			Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. [Clarification Statement: Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.]	HS-LS2-4														
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15			Summative Assessment															
16			Unit 3	Ecology							Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. [Clarification Statement: Examples of models could include simulations and mathematical models.]	HS-LS2-5	RST.9-10.8, RST.11-12.1, RST.11-12.7, RST.11-12.8	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7	SL.11-12.5	MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3, HSS-ID.A.1, HSS-IC.A.1, HSS-IC.B.6	9.1	8.1 & 8.2
17	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. [Clarification Statement: Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.]	HS-LS2-6																
18	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.* [Clarification Statement: Examples of human activities can include urbanization, building dams, and dissemination of invasive species.]	HS-LS2-7																
19	Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. [Clarification Statement: Emphasis is on: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include flocking, schooling, herding, and cooperative behaviors such as hunting, migrating, and swarming.]	HS-LS2-8																
20	Summative Assessment																	
21	Midterms																	
22	Midterms																	

## Marking Period 3

Day	Unit	Topic	Desired Outcome	NGSS	Reading	Writing	S & L	Math	21st Century	Technology	
1	Unit 4	Genetics	Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	HS-LS3-1	RST.11-12.1, RST.11-12.9	WHST.9-12.1	SL.11-12.5	MP.2	9.1	8.1 & 8.2	
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3			Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. [Clarification Statement: Emphasis is on using data to support arguments for the way variation occurs.] [Assessment Boundary: Assessment does not include the phases of meiosis or the biochemical mechanism of specific steps in the process.]	HS-LS3-2							
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5			Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. [Clarification Statement: Emphasis is on the use of mathematics to describe the probability of traits as it relates to genetic and environmental factors in the expression of traits.]	HS-LS3-3							
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7	Summative Assessment										
8	Unit 4	Genetics	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.	HS-LS1-1	RST.11-12.1	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9	SL.11-12.5	MP.4, HSF-IF.C.7, HSF-BF.A.1	9.1		
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10			Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	HS-LS1-4							
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13	Summative Assessment										
14	Summative Assessment/RST										
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16	Unit 5	Evolution	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. [Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.]	HS-LS4-1	RST.11-12.1, RST.11-12.8	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.9-12.9	SL.11-12.5	MP.2, MP.4	9.1	8.1 & 8.2	
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18			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. [Clarification Statement: Emphasis is on using evidence to explain the influence each of the four factors has on number of organisms, behaviors, morphology, or physiology in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species. Examples of evidence could include mathematical models such as simple distribution graphs and proportional reasoning.]	HS-LS4-2							
19											
20											Summative Assessment
21	Various State Testing on Various Day in Marking Period 3										
22											

## Marking Period 4

Day	Unit	Topic	Desired Outcome	NGSS	Reading	Writing	S & L	Math	21st Century	Technology
1	Unit 5	Evolution	Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. [Clarification Statement: Emphasis is on analyzing shifts in numerical distribution of traits and using these shifts as evidence to support explanations.]	HS-LS4-3	RST.11-12.1, RST.11-12.8	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.9-12.9	SL.11-12.5	MP.2, MP.4	9.1	8.1 & 8.2
2			Construct an explanation based on evidence for how natural selection leads to adaptation of populations. [Clarification Statement: Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.]	HS-LS4-4						
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4			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. [Clarification Statement: Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizers, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species.]	HS-LS4-5						
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6			Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.* [Clarification Statement: Emphasis is on designing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.]	HS-LS4-6						
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9	Summative Assessment									
	Summative Assessment/RST									
10	Unit 6	Anatomy	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.]	HS-LS1-2	RST.11-12.1	WHST.9-12.2, WHST.9-12.5, WHST.9-12.7, WHST.11-12.8, WHST.9-12.9	SL.11-12.5	MP.4, HSF-IF.C.7, HSF-BF.A.1	9.1	8.1 & 8.2
11										
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13										
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15	Summative Assessment									
16	Unit 6	Anatomy	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]	HS-LS1-3						
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20	Summative Assessment									
21	Final Exams									
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