

Scope and Sequence – Biology IB

2018-19



Course	Biology IB (0.5 credits)
Text	Pearson Biology by Miller and Levine, E.O. Wilson’s Life on Earth
Prerequisite	N/A
Grade	Sophomore
Course Description	Biology IB covers the ecological and evolutionary units. This course is designed to prepare students for the science standards and benchmarks and to give each student a relevant look at their ecological surroundings. Included are life science content standards as well as some selected earth science standards. The course is designed to introduce students to fundamental biology concepts. After success in this class, students are encouraged take the advanced level classes we offer in genetics, ecology, and evolution.
Units	<p>Unit 1 (3 weeks): Origin of Life Content Standards Covered (Codes only): HS-ESS2-7</p> <p>CCSS Literacy Standards Covered (Codes only): See NGSS</p>
	<p>Unit 2 (5 weeks): Mechanisms of Evolution Content Standards Covered (Codes only): HS-LS4-1 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5</p> <p>CCSS Literacy Standards Covered (Codes only): See NGSS</p>
	<p>Unit 3 (4 weeks): Ecology Content Standards Covered (Codes only): HS-ESS2-6 HS-LS2-1 HS-LS2-2 HS-LS2-4 HS-LS2-6</p> <p>CCSS Literacy Standards Covered (Codes only): See NGSS</p>
EA Opportunities	None
CRLE	None

Opportunities	
Work Sample Opportunities	None

Unit 1:		Origin of Life
Time Frame	3 weeks	
Summary of Unit		<i>Students will investigate the scientific theories of the origins of life, calculate the age of fossils using relative and absolute dating and research the main events in all geological time periods.</i>
NGSSs	Code	Next Generation Science Standard
	HS-ES S2-7	Construct an argument based on evidence about the simultaneous coevolution of Earth’s systems and life on Earth.
CCSSs	Code	CCSS Literacy Standard
	SL.11-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Major Assignments/ Learning Activities		-Geological Time Scale Children’s Book -Summative Assessment
Learning Targets	LT1	I can explain, and place in order, the major events and evolution of the Biosphere using historical evidence .
Academic		I can read and use informational texts about Earth’s history to answer relevant questions.

<i>Vocabulary</i>	I can develop and use a model to illustrate the timeline of Earth's history..
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<i>Unit 2:</i>		Mechanisms of Evolution
<i>Time Frame</i>	5 weeks	
<i>Summary of Unit</i>		<i>Students will investigate evidence for evolution and how natural selection affects a population and the allelic frequency of traits.</i>
<i>NGSSs</i>	Code	Next Generation Science Standard
	HS-LS4-1	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
	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.
	HS-LS4-3	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.
	HS-LS4-4	Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
	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.
<i>CCSSs</i>	Code	CCSS Literacy Standard

	<i>RST.11-12.1</i>	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.
	<i>WHST.9-12.2</i>	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
Major Assignments/ Learning Activities		-Survival of the Fittest Lab (Natural Selection) -Creating a Cladogram -Mapping of Hominid Migration -Summative assessment
Learning Targets	LT2 LT3	I can explain how Natural Selection and heredity can pass on beneficial traits from generation to generation and how those traits can build up over time.. I can explain how evolution is not a step by step process but rather a “branching” with the best adapted surviving and passing their genetics on.
Supporting Targets		I can analyze and interpret data about the lineage of different organisms.. I can read and use informational texts about evolution to answer relevant questions. I can construct and revise an explanation based on evidence for how hominids have evolved. I can use a model to illustrate how a cladogram is used to show the relationships of organisms.

Unit 3:		Ecology
Time Frame	4 weeks	
Summary of Unit		While investigating biomes, students will analyze examples of population dynamics, describe how energy is dispersed within food webs and energy pyramids, compare the relationship between biodiversity and habitat, and interpret various biotic and abiotic factors that affect the environment.
NGSSs	Code	Next Generation Science Standard
	HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales
	HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
	HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem
	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

CCSSs	Code	CCSS Literacy Standard
	<i>WHST.9-12.7</i>	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
	<i>WHST.11-12.8</i>	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
Major Assignments/ Learning Activities		-Food Web -Population Graphs
Learning Targets	LT1 LT2	I can explain how Energy moves through and ecosystem. I can explain how biotic and abiotics factors can affect population density.
Supporting Targets		I can read and use informational texts about energy in an ecosystem to answer relevant questions I can plan and conduct an investigation to provide evidence on how varying factors can affect populations. I can develop and use a model to illustrate the hierarchical organization of interacting systems that provide energy within an ecosystem.