G-E-T High School Curriculum
Align, Explore, Empower
Scope and Sequence
Biology

Unit 1 - What is Life?	Length of Unit - 2 weeks block / 4 weeks period
- Students will learn the components to what it means to be "living," which will set the tone for the rest of the course.	
In this unit, students will … - Understand the criteria for what it means to be living vs nonliving - Determine and explain if something is living or nonliving	

Standards for Biology Unit 1-What is Life?
LS1-3 : Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 2 - Cells	Length of Unit - 2 weeks block / 4 weeks period

- Students will learn about the structure and function of different types of cells and their organelles. Students will look at cells under a microscope, identify different organelles, understand their functions, and learn how different types of cells are similar and different.

In this unit, students will …

- Understand cells and their parts

Standards for Biology Unit 2-Cells
LS1-2 : Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. LS1-3 : Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. LS1-6 : 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.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com

Unit 3 - Cellular Energy Length of Unit - 2 weeks block / 4 weeks period

- Students will learn the processes of how energy is converted in cells, starting with energy from the sun and photosynthesis to cellular respiration in living organisms.

In this unit, students will …

- Understand the flow of energy within an ecosystem
- Understand cells and their parts

Standards for Biology Unit 3-Cellular Energy
LS1-2 : Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
LS1-3 : Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
LS1-5 : Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
LS1-6 : 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.
LS1-7 : 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.
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.
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.
LS2-7 : Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
LS4-6 : Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 4 - Cell Cycle	Length of Unit - 2 weeks block/ 4 weeks period
- Students learn the processes of mitosis and meiosis, as well as how different organisms reproduce.	
In this unit, students will … - Understand cells and their parts - Understand how cells grow and reproduce	

Standards for Biology Unit 4-Cell Cycle
LS1-2 : Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. LS1-3 : Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. LS1-4 : Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. LS1-6 : 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.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 5 - Genetics Length of Unit - 2.5 weeks block / 5 weeks period

- Students will connect how meiosis is related to genetics, how genetic information is passed from generation to generation, and problems that can arise genetically due to meiosis not performing correctly.

In this unit, students will …

- Explain how traits are passed on from one generation to the next
- Understand genetic variation due to DNA mutations

Standards for Biology Unit 5-Genetics

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.

LS3-1 : Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

LS3-2 : 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.

LS3-3 : Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 6 - Evolution Length of Unit - 2 weeks block / 4 weeks period

- Students will learn what evolution truly is, the mechanisms by how it happens, and how it drives the diversity of life as we know it.

In this unit, students will …

- Understand how evolution drives the unity and diversity of life

Standards for Biology Unit 6-Evolution

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.

LS4-1 : Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

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.

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.

LS4-4 : Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

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.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 7 - DNA	Length of Unit - 2 weeks block / 4 weeks period
- Students will learn the composition of DNA, how it functions, replicates, and relates to evolution at the molecular level.	
In this unit, students will … - Understand genetic variation due to DNA mutations	

Standards for Biology Unit 7-DNA
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. LS3-1 : Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. LS3-2 : 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.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 8 - Ecology Length of Unit - 3 weeks block / 6 weeks period

- Students will use aspects from each of the previous units to look at a much larger scale of life and how populations of organisms interact with each other, as well as the different cycles of matter and flow of energy within an ecosystem.

In this unit, students will …

- Develop an understanding of ecology
- Understand the flow of energy within an ecosystem

Standards for Biology Unit 8-Ecology

LS1-5 : Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
LS1-7 : 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.
LS2-1 : Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
LS2-2 : Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
LS2-3 : Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.
LS2-4 : Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
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.
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.
LS2-7 : Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
LS4-6 : Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

Resource(s): Textbook: Biology Miller and Lavine 2019; Explore Learning (https://gizmos.explorelearning.com)

Unit 0 - Scientific Method, Inquiry, and Laboratory Skills	Length of Unit - Entirety of Course
- The Scientific Method and inquiry based labs will be used throughout each of the different units.	
In this unit, students will … - Use the scientific process to solve problems - Demonstrate appropriate laboratory skills by using materials and equipment effectively to design and conduct a scientifically valid experiment	

Standards for Biology-Scientific Method, Inquiry, and Laboratory Skills
Most NGSS Standards

Instructor reserves the right to change the order of the units depending on the time of year the course is taken, and change the length of the unit depending on the needs of students.