



Syllabus for Biology I

Biology I is a one semester course with no prerequisites. The curriculum includes inquiry in the following areas:

Strand 1: From Molecules to Organisms

Strand 3: Heredity - Inheritance and Variation of Traits

Strand 2: Ecosystem Interactions - Energy and Dynamics

Strand 4: Biological Evolution - Unity and Diversity

Required Materials: 3-ring binder (1 or 1 ½ inch), paper, pencil, pen, chromebook, earbuds

Suggested Materials: Graph paper, colored pencils, calculator, 10 dividers, 3 x 5 notecards

Students taking biology can expect an engaging, hands-on, and inquiry-based learning experience. Relevant examples from the scientific community will be incorporated into lessons and activities. Students will be prepared to enter and become a part of a rapidly changing world as scientific advances are altering the way we live.

Semester Goals

Essential Question: How is scientific inquiry used as a tool to understand the world?

1. You will learn how to ask significant scientific questions.
2. You will know how to work safely.
3. You will learn how to plan and do scientific experiments through:
 - Creating a testable hypothesis.
 - Identifying variables and using a control group when appropriate.
 - Selecting and using appropriate experimental materials.
 - Collecting, recording, organizing, and analyzing data.
 - Communicating findings to others.
4. You will critique scientific investigations for quality by asking the following questions: Is your sample large enough? If you or another person were to repeat the experiment, would the same results be obtained? Are there different ways to test your question? Are there other ways that you could explain your results?

Strand 1: From Molecules to Organisms

Essential Question: What are living things made of?

1. You will understand the structure and function of the basic molecules from which all living things are made including: carbohydrates, lipids, proteins, and nucleic acids.
2. You will learn the basic structure and function of enzymes and their importance to living things.
3. You will understand the basic chemical reactions that living things use to obtain and transform energy including: aerobic respiration, anaerobic respiration, and photosynthesis.

***Essential Questions: What are cells made of? How are they specialized for their function?
How do they maintain homeostasis?***

1. You will learn that cells contain organelles including: the plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes.
2. You will learn that stem cells are unspecialized cells that can differentiate to become specialized to a particular function.
3. You will investigate how cells move materials in and out including: passive transport (diffusion, osmosis), active transport, and the role of ATP as a source of energy.

Essential Question: How and why do cells divide?

1. You will learn that certain conditions make it necessary for cells to divide and that a cell goes through certain steps (mitosis and cytokinesis) to divide. This allows for growth and cell repair, but also has implications for cancer.

Essential Question: How does DNA control a cell's activities?

1. You will analyze the molecular basis of heredity including: DNA and RNA structure, DNA replication, protein synthesis, mutations and their effect on the resulting protein, and gene regulation.

Strand 2: Ecosystem Interactions - Energy and Dynamics

Essential Question: How are living things related within the biosphere?

1. You will investigate and analyze how living things are related to one another within their population, communities, and ecosystems. To do this, we will focus on these topics:

The abiotic and biotic factors within a community and how they interact.

Factors that affect the growth of a population.

The basic elements used by all living things and how these materials are recycled within an ecosystem.

The movement of energy through an ecosystem.

2. You will investigate and analyze the impact of human populations on both local and global environments, including:

Historic and future changes in human population growth.

How factors such as climate change and resource use relate to human activities.

Methods for conserving and minimizing destructive human impact on the environment.

Strand 3: Heredity - Inheritance and Variation of Traits

Essential Question: How does DNA technology impact individuals and society today?

1. You will interpret and predict patterns of inheritance including the following: dominant, recessive, and intermediate traits, multiple alleles, polygenic inheritance, sex-linked traits, independent assortment, pedigrees, and Punnett squares.

2. You will assess the impact of the Human Genome Project and look at applications of biotechnology such as gel electrophoresis and transgenic organisms.

Strand 4: Biological Evolution - Unity and Diversity

Essential Question: How can knowledge of DNA help us understand the way that organisms are related to each other and how organisms change over time?

1. You will examine the theory of evolution by natural selection focusing on: fossil and biochemical evidence, mechanisms of evolution, and applications such as pesticide and antibiotic resistance.

2. You will look at how scientists classify organisms based on their evolutionary relationships.

3. You will learn how to identify an organism using a dichotomous key.

Essential Questions: How do living things accomplish life functions?

1. You will analyze the processes by which organisms accomplish basic life functions of transport and excretion, respiration, nutrition, reproduction, and growth and development

2. You will compare asexual and sexual reproduction.

3. You will examine how internal and external factors affect the health of an organism.

4. You will analyze patterns of animal behavior.

Students enrolled in the Honors level can expect to address the content with greater complexity. Honors students will have opportunities to take increased responsibility for their learning and will show a distinguishable difference in the quality of their work. Honors students will carry out projects to encourage the development of content mastery, lab skill mastery and critical thinking mastery. Honors students will be asked to complete more challenging lab exercises and produce more in-depth projects. Honors students will be asked to demonstrate their content mastery by writing in essay form that will prepare them for essays required in Advanced Placement (AP) courses.

Your biology grade will be based on the following: tests and quizzes, class participation, papers and homework, lab work, projects and notebook organization. The final grade will be determined by the three grading period grades and the EOC.

25% 1st grading period, 25% 2nd grading period, 25% 3rd grading period, 25% EOC

Percentage	Letter Grade
90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F

- Make-up work vs. Late work: Make-up work is available to students as per county policy. Students may have to schedule time outside of class for labs. **Late work will earn half credit and may need to be completed in the room with your teacher. Assignments are due when they are due, but you will have until I am done collecting work for a term to earn half credit on late assignments.**
- In the event of remote learning days or any absences, the expectation is that students will check canvas for lesson plans and email me if they have any questions or need extensions due to illness.