



Honors Biology

The following learning targets represent the major concepts studied and assessed in this course.

Semester 1:

Unit 1: Ecology

- Use mathematical representations to explain factors affecting biodiversity and ecosystem populations.
- Use models to explain the transformation from light energy to chemical energy within plants.
- Use models to explain how matter and energy found in food molecules are used within organisms.
- Model biological processes that cycle carbon and energy within Earth's systems
- Evaluate evidence of complex physical or biological changes that affect ecosystems conditions and stability.
- Evaluate designs that minimize human impacts on the environment and biodiversity.

Unit 2: Macromolecules

- Create and revise explanations based on evidence that organic macromolecules are primarily composed of six elements.

Unit 3: Cells and Homeostasis

- Use models to explain how interacting cells or organs provide specific functions.
- Investigate how life's functions rely upon feedback mechanisms in homeostasis.

Unit 4: Photosynthesis and Cellular Respiration

- Explain with evidence how photosynthesis transforms light energy into chemical energy.
- Explain with evidence how cellular respiration breaks down molecules resulting in net energy.
- Construct an explanation based on evidence, showing the processes of photosynthesis, chemosynthesis, aerobic and anaerobic respiration are responsible for the cycling of matter through ecosystems.

Semester 2:

Unit 5: DNA, RNA and Protein Synthesis

- Model how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through specialized cells.
- Describe why structural changes to genes may affect proteins, which can result in harmful, beneficial, or neutral effects to the structure and function of the organism.

Unit 6: Mitosis, Meiosis and Reproduction

- Communicate the role of mitosis in the producing and maintaining a complex organism.
- Explain how DNA in the form of chromosomes is passed from parent to offspring through the process meiosis and fertilization.
- Explain how variation in organisms' genetic information is a direct result of asexual or sexual reproduction.

Unit 7: Genetics

- Use evidence to make or defend a claim about the causes of inheritable genetic variation.
- Explain the variation and distribution of traits within a population.

Unit 8: Natural Selection

- Use models to explain common ancestry.
- Use pictorial data to compare patterns of similarities in development across multiple species to identify relationships.
- Use evidence to explain that ecological and genetic factors result in evolutionary processes.
- Use a mathematical models to explain the likelihood of an organism with advantageous heritable characteristics will increase.
- Use evidence to support the adaptation of populations through natural selection.
- Evaluate evidence that environmental changes affect species populations over time.