College Biology

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

Semester 1:

Unit 1: Cells

- Identify three types of bonding between atoms and explain how they are important to life.
- Complete and balance chemical reactions that are necessary for life.
- Explain how water is essential for life.
- Identify the different organic compounds (carbohydrates, lipids, proteins, and nucleic acids) and explain their functions
- Identify the two major categories of cells.
- Explain the functions of the major organelles within a cell.
- Explain how the cell gains and uses energy
- Describe how an enzyme works.
- Identify the different types of cellular transport and describe how each allows molecules to move across the membrane
- Explain the steps involved in cellular respiration.
- Describe the differences between anaerobic and aerobic respiration.
- Explain the steps involved in photosynthesis.

Unit 2: Genetics

- Describe the steps involved in mitosis.
- Explain the purpose of mitosis.
- Describe the steps involved in meiosis.
- Explain the purpose of meiosis.
- Identify the differences between mitosis and meiosis.
- Explain Mendel's Law of Segregation.
- Use Mendel's Law of Segregation to complete monohybrid and dihybrid crosses to find the probability of traits in offspring
- Use family pedigrees to show how traits are passed from parent to offspring.
- Use variations in Mendel's Law to identify phenotypes of incomplete and codominance of traits.
- Show how sex-linked genes can be passed from parent to offspring.
- Diagram the structure of DNA and explain how DNA replicates
- Explain the steps of protein synthesis.
- Identify the different types of mutations and how they can affect an organism.
- Explain how genes are regulated.
- Explain the different methods of genetic engineering and their applications.

Semester 2:

Unit 3: Evolution and Diversity

- Name and classify life correctly.
- Use evidence to explain how organisms have changed over time.
- Explain the mechanisms of evolution.
- Describe what a species is.
- Explain the different methods of speciation and give examples.
- Describe the mechanisms of macroevolution.
- Classify organisms based on homologous characteristics.
- Describe the four-stage hypothesis for the origin of life.
- Describe the structure and function of prokaryotes

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Semester 2:

Unit 3: Evolution and Diversity of Life Cont'

- Describe the ecological impact of prokaryotes.
- Explain the two main branches of prokaryotic evolution.
- Describe the evolutionary processes of plants and fungi.
- Describe the differences between the different groups of plants.
- Describe the major invertebrate phyla.

Unit 4: Ecology

- Describe the interactions between living organisms and the nonliving portion of their environment.
- Describe the major biomes of planet Earth.
- Use population age structure diagrams to predict population growth or decline.
- Describe the different survivorship curves.
- Apply population ecology principles to predict how management, invasive species, and human activities influence organism's populations.
- Explain what biodiversity is and why it is important.
- Identify causes of declining biodiversity.
- Explain how energy flows through ecosystems and how this energy flow can be disrupted.
- Describe how humans are positively affecting ecosystems.