

Biology Course Syllabus

Description: The Biology course guides students through the study of living and non-living systems and how they interact with one another. Students explore the world they live in by posing questions and seeking answers through scientific inquiry. Discovery takes place through observation and data collection. The students will be introduced to the structure, function, diversity, and evolution of living matter. This is a course with real relevance. It encourages curiosity and provides opportunity for students to work on hands on lab activities and develop relationships through collaboratively learning. Engaging in the study of biological science broadens the picture of the world around us.

Estimated Completion Time: 2 segments / 32–36 weeks

Major Topics and Concepts:

Segment One:

Foundations of Biology:

- Science processes
- Observations and inferences
- Historical frame of reference—scientists and explorers
- Theory vs. law, science vs. pseudoscience
- Technology/Microscopes
- Properties of water
- The origin of life on Earth
- Universal genetic code
- Anaerobic respiration (Honors)
- Discovery of cells

Life's Origins:

- Properties of Carbon Atoms
- Carbohydrates/Proteins/Lipids/Nucleic Acids
- Cell Theory
- Theory of Endosymbiosis (Honors)
- Cell Membrane
- Osmosis/Diffusion
- Active Transport
- Prokaryotic and Eukaryotic Cells
- Comparison of plant and animal cells
- Energy and ATP
- Cell Respiration
- Fermentation

- Glycolysis
- Krebs cycle/Calvin cycle
- Stages of Photosynthesis
- Light Dependent/Independent Reactions

Cell Reproduction:

- Cell Cycle
- Mitosis
- Meiosis
- Binary Fission (Honors)
- Cancer
- History of Genetics
- Discovery of DNA and its role in genetics and heredity
- Principles of Genetics and Heredity
- Mutations
- Biotechnology

Earth's Diversity:

- Levels of Organization
- Biotic and Abiotic Factors
- Energy in the Ecosystem
- Food Chains and Food Webs
- Climate/Climate Zones
- Biomes
- Marine Ecosystems
- Habitat/Niche
- Successions
- Populations
- Threats to Biodiversity
- Air/Water Quality
- Human Population growth
- Cycling Matter
- Making Informed Decisions
- Earth's Hydrologic and Biogeochemical cycles (Honors)

Segment Two:

Scientific Connections:

- Theories on Evolution
- Catastrophism/Gradualism/Uniformitarianism
- Evidence of Evolution
- Artificial Selection
- Natural Selection

- Patterns of Evolution
- Primate Evolution
- Molecular Evolution (Honors)

Classification and Diversity:

- Classification Systems
- Introduction to the kingdoms of life
- Taxonomy of bacteria
- Viruses vs. bacteria
- Taxonomy of protists
- General characteristics of protists
- Taxonomy of Fungi
- General characteristics of fungi
- Taxonomy of plants
- Adaptations of plants
- Structure and function in plants
- Importance of plants
- Plant reproduction, pollination
- Fruits, seeds, seed dispersal
- Taxonomy of animals
- Characteristics of invertebrates
- Characteristics of vertebrates

Human Body Systems:

- Nervous and Endocrine Systems
- Respiratory and Circulatory Systems
- Digestive and Excretory Systems
- Muscular/Skeletal/Integumentary Systems
- Reproductive System
- Immune System

Course Assessment and Participation Requirements:

To achieve success, students are expected to submit work in each course weekly. Students can learn at their own pace; however, “any pace” still means that students must make progress in the course every week. To measure learning, students complete self-checks, practice lessons, multiple choice questions, projects, discussion-based assessments, and discussions. Students are expected to maintain regular contact with instructors; the minimum requirement is monthly. When instructors, students, and parents work together, students are successful.
