

Course Syllabus

Biology 1

Credits: 1

Estimated Completion Time: 2 segments / 32–36 weeks

Pre-Requisites:

This course is recommended for students in 9th–12th grade. There are no prerequisites for the Biology course.

Description

The Biology course is a two-segment study that builds on the foundations of life science, scientific practices, and scientific thinking skills. In this course, students will explore the relationships between living things and their environments. Students will develop an understanding of biological concepts through scientific inquiry, investigations, interactive experiences, higher-order thinking, real-world applications, interpreting and collecting data, and virtual and hands-on experiences. The key big ideas of the Biology course are molecular, cellular, heredity, evolution, classification, organisms, populations, and ecosystems. Students will enhance their mastery of biological concepts, which will enable them to make real-world connections and apply their understanding to everyday life.

Major Topics and Concepts

Segment One

- Identify the different types of biology
- Explain scientific processes and investigation
- Describe each step of the scientific method
- Differentiate between repetition and replication
- Analyze data and draw conclusion
- Describe the structure and function of each macromolecule
- Explain why macromolecules are essential for living things
- Explain the origins of life on Earth
- Describe the properties of water
- Differentiate between the different types of cells
- Describe each type of microscope
- Identify the parts of the microscope
- Describe the structure and function of cell organelles
- Explain how materials are transported through the cell membrane
- Differentiate between passive and active transport
- Describe the function of ATP
- Explain what happens to ATP when it is broken down
- Identify the products of photosynthesis and cellular respiration
- Explain how photosynthesis and cellular respiration are interrelated
- Describe each phase of the cell cycle
- Explain what happens if cell division is not regulated
- Describe the function of DNA and RNA
- Explain DNA replication
- Explain transcription and translation
- Describe the different types of mutations

- Create a monohybrid and dihybrid cross
- Explain how genetics is passed down from parent to offspring
- Describe the different types of biotechnology
- Explain the benefits and disadvantages of biotechnology

Segment Two

- Compare biotic and abiotic factors
- Explain the interrelationship between organisms and their environments
- Describe the different types of symbiosis
- Describe the different biomes in the biosphere
- Explain how food chains and trophic levels are related
- Analyze energy transfer in food webs
- Identify the factors that determine climate
- Describe the factors that affect population size
- Differentiate between primary and secondary succession
- Identify the limiting factors that affect population growth
- Explain the human impacts on the environment
- Identify the different types of pollution
- Describe environmental sustainability
- Describe the water and carbon cycle
- Identify nonrenewable and renewable environmental resources
- Explain the theory of evolution
- Compare natural and artificial selection
- Recognize the names and relative ages of extinct hominids
- Describe classification by cladistic and phylogeny
- Describe the characteristics of the three domains
- Explain how bacteria cause disease
- Describe the characteristics of each kingdom in the classification system
- Describe the structure and function of the major plant parts
- Identify the parts of the human brain
- Describe the flow of blood through the cardiovascular system
- Describe the structure and function of the male and female reproductive system
- Describe each development during each stage of pregnancy
- Summarize how the cells of the immune system respond to pathogens

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, Discussion-Based Assessments, discussions, and projects. Students are expected to maintain regular contact with teachers; the minimum requirement is monthly. When teachers, students, and parents work together, students are successful.
