

# Syllabus

## Biology B

### Course Overview

Biology is a science dedicated to studying all forms of life on Earth. You are probably familiar with a number of plants and animals, but do you know what makes them different from each other? This course will show you how scientists categorize various types of life, as well as the structure of plants and animals. You will also learn about how ecosystems support different life forms, and how the systems change to cater to the life forms that live within them.

### Course Goals

- By the end of this course, you will be able to do the following:
- Explain how life forms are classified by scientists.
- Differentiate between the various kingdoms.
- Identify the basic structures of plants.
- Describe the functions of systems within plants.
- Identify the basic systems within animals.
- Describe the functions of systems within animals.
- Explain how ecosystems interact with and support a variety of species.

## Math and Science Skills

Successful completion of Algebra 1 provides the mathematical skills you'll need for Biology B.

Successful completion of Biology A (or its equivalent) is required for Biology B. This includes an understanding of cellular structures and functions.

You should also have a good working understanding of inquiry science methods, including:

- Experimental design, including the importance of experimental controls.
- Basic data analysis skills, including the ability to interpret mathematical patterns from data tables and graphs.
- The ability to use experimental results and/or real data sets to propose general rules.

## General Skills

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Understand the basics of spreadsheet software, such as Microsoft Excel or Google Spreadsheets, but having prior computing experience is not necessary.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

*For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.*

## Credit Value

Biology B is a 0.5-credit course.

## Course Materials

- Notebook
- Computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft Excel or equivalent

# Course Pacing Guide

This course description and pacing guide is intended to help you keep on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

## Unit 1: Diversity of Life Part I

### Summary

This unit explores how scientists classify different life forms in order to understand them better. It begins with the concept of the tree of life and explains how our modern system of taxonomy is hierarchical in nature and how this taxonomy reflects evolutionary relationships. The units then goes on to explore the biology, diversity, evolution, and importance of domains and kingdoms, including prokaryotes, protozoa, algae, and fungi.

Day	Activity/Objective	Type
1 day: 1	<b>Syllabus and Plato Student Orientation</b> <i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
1 day: 2	<b>The Tree of Life</b> <i>Explain how our modern system of taxonomy is hierarchical in nature.</i>	Tutorial
1 day: 3	<b>Phylogeny and Evolution</b> <i>Describe how taxonomy reflects evolutionary relationships.</i>	Exploration
2 days: 4-5	<b>Prokaryotes</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the prokaryotes.</i>	Tutorial
2 days: 6-7	<b>Protozoa</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the protozoa within kingdom Protista.</i>	Tutorial
2 days: 8-9	<b>Algae</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the major algae types within kingdom</i>	Tutorial

	<i>Protista.</i>	
2 days: 10-11	<b>Fungi</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the Fungi.</i>	Tutorial
2 days: 12-13	<b>Unit Activity and Discussion—Unit 1</b>	Unit Activity Discussion
1 day: 14	<b>Posttest—Unit 1</b>	Assessment

## Unit 2: Diversity of Life, Part 2

### Summary

This unit continues with the remaining two kingdoms, Plantae and Animalia, and explores the major types of plants and animals. It begins by covering the biology, diversity, evolution, and importance of vascular plants and of nonvascular plants like mosses and other bryophytes. The unit then moves on to the kingdom Animalia, explaining the phylogenetic tree of animal kingdom evolution and the characteristics used to classify animals. The unit lists the nine major phyla of the animal kingdom called porifera, cnideria, platyhelminthes, nematoda, molluska, annelida, arthropoda, echinodermata, and chordata. This unit then explores the biology, diversity, evolution, and importance of these phyla under three headings: lower invertebrates, higher invertebrates, and chordata.

Day	Activity / Objective	Type
1 day: 15	<b>Moss and Other Bryophytes</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the non-vascular plants.</i>	Tutorial
2 days: 16-17	<b>Vascular Plants</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the vascular plants.</i>	Tutorial
2 days: 18-19	<b>Lower Invertebrate Animals</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the lower invertebrates.</i>	Tutorial
2 days: 20-21	<b>Higher Invertebrate Animals</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the higher invertebrates.</i>	Tutorial
1 day: 22	<b>Chordates</b> <i>Demonstrate knowledge of the biology, diversity, evolution, and importance of the chordates.</i>	Tutorial
2 days: 23-24	<b>Unit Activity and Discussion—Unit 2</b>	Unit Activity Discussion
1 day: 25	<b>Posttest—Unit 2</b>	Assessment

## Unit 3: Plant Structure and function

### Summary

After covering the classification of various life forms on Earth in the previous units, the next few units go deeper to explore the structure and functions of the two major kingdoms: Plantae and Animalia. This unit covers the structure and functions of angiosperms, or flowering plants, which are the most diverse plant group. It begins with the organization of an angiosperm into seven major plant tissues, such as collenchyma, sclerenchyma, parenchyma, xylem, phloem, meristems, and epidermis. It then delves deeper into the structure and function of the four major organs: leaves, stems, roots, and flowers. This unit also explores how plants absorb and transport materials necessary for their metabolism and how they reproduce using sexual and asexual methods. This unit ends by describing how plants respond to their environment due to their hormones and other behavior.

Day	Activity / Objective	Type
2 days: 26-27	<b>Angiosperms</b> <i>Describe the organization of an angiosperm.</i>	Exploration
2 days: 28-29	<b>Leaves</b> <i>Describe the structure and function of leaves.</i>	Tutorial
2 days: 30-31	<b>Stems</b> <i>Describe the structure and function of stems.</i>	Tutorial
1 day: 32	<b>Growth in Stems</b> <i>Describe the process of primary and secondary growth in stems.</i>	Tutorial
1 day: 33	<b>Roots</b> <i>Describe the structure and functions of roots.</i>	Tutorial
2 days: 34-35	<b>Transportation in Plants</b> <i>Describe how materials necessary for plant metabolism are absorbed and transported by plants.</i>	Tutorial
2 days: 36-37	<b>Plant Reproduction</b> <i>Describe sexual and asexual methods of plant reproduction.</i>	Exploration

2 days: 38-39	<b>Plants in Their Environment</b> <i>Describe hormonal and other behavioral responses of plants to their environment.</i>	Exploration
2 days: 40-41	<b>Unit Activity and Discussion—Unit 3</b>	Unit Activity Discussion
1 day: 42	<b>Posttest—Unit 3</b>	Assessment

## Unit 4: Animal Structure and Function, Part 1

### Summary

This unit covers the structure and functions of animals, focusing on mammals. It begins with how an animal body is organized in a cell-tissue-organ-organ-system-organism order, and the four basic tissue groups, such as epithelial, connective, muscular, and nervous. It also explores how homeostasis is maintained in animal bodies by the coordination and synchronization of various organ systems. This unit also lists the important organ systems of animal bodies and then covers the structures and functions of the digestive system, circulatory and respiratory systems, immune system, and excretory system.

Day	Activity / Objective	Type
1 day: 43	<b>Animal Bodies</b> <i>Describe the levels of animal body organization as represented by a mammal.</i>	Exploration
2 days: 44-45	<b>The Digestive System</b> <i>Describe the structures and functions of the digestive system in a mammal.</i>	Tutorial
2 days: 46-47	<b>Circulatory and Respiratory Systems</b> <i>Describe the structures and functions of the circulatory and respiratory systems in a mammal.</i>	Tutorial
2 days: 48-49	<b>The Immune System</b> <i>Describe the structures and functions of the immune system in a mammal.</i>	Tutorial
2 days: 50-51	<b>The Excretory System</b> <i>Describe the structures and functions of the excretory system in a mammal.</i>	Tutorial
2 days: 52-53	<b>Unit Activity and Discussion—Unit 4</b>	Unit Activity Discussion
1 day: 25	<b>Posttest—Unit 4</b>	Assessment

## Unit 5: Animal Structure and Function, Part 2

### Summary

This unit covers the structures and functions of the remaining organ systems, including the endocrine system, nervous system, skeletal and muscular systems, and reproductive system. It also describes the stages that occur during animal development and ends with exploring the regulations that controls these stages.

Day	Activity / Objective	Type
3 days: 55-57	<b>The Endocrine System</b> <i>Describe the structures and functions of the endocrine system in a mammal.</i>	Tutorial
3 days: 58-60	<b>The Nervous System</b> <i>Describe the structures and functions of the nervous system in a mammal.</i>	Tutorial
3 days: 61-63	<b>The Skeletal and Muscular Systems</b> <i>Describe the structures and functions of the skeletal and muscular systems in a mammal.</i>	Tutorial
2 days: 64-65	<b>Animal Reproduction</b> <i>Describe the structures and functions of the reproductive system in a mammal.</i>	Tutorial
2 days: 66-67	<b>Stages of Development</b> <i>Describe the stages occurring during animal development.</i>	Exploration
2 days: 68-69	<b>Unit Activity and Discussion—Unit 5</b>	Unit Activity Discussion
1 day: 70	<b>Posttest—Unit 5</b>	Assessment

## Unit 6: Ecology

### Summary

This unit deals with all the previously covered concepts on ecology and presents a high level view of how living things interact. This unit begins by exploring how energy flows through an ecosystem by way of food chains and webs, and how these systems can be used to show trophic relationships in ecosystems. This unit then goes on to explain ecosystem productivity and important cycles of an ecosystem, such as the carbon cycle, nitrogen cycle, phosphate cycle, and water cycle. This unit also describes how population numbers and distribution are kept in balance in nature and explains how factors such as symbiosis, predation, and competition determine community structure in ecosystems. The unit then explores ecological succession and the major global ecological issues and crises facing humanity today. The unit ends by exploring how an animal's behavior pattern affects its adaptability in nature. Behavior patterns include instincts and other innate behavior, as well as learned behavior such as habituation, imprinting, conditioning, and reasoning.

Day	Activity / Objective	Type
2 days: 71-72	<b>Energy in an Ecosystem</b> <i>Describe how energy flows through an ecosystem.</i>	Tutorial
2 days: 73-74	<b>Cycles of an Ecosystem</b> <i>Describe the major biogeochemical cycles of an ecosystem.</i>	Tutorial
2 days: 75-76	<b>Balance in Nature</b> <i>Describe how population numbers and distribution are kept balanced.</i>	Exploration
2 days: 77-78	<b>Community Structure</b> <i>Discuss factors that determine community structure in ecosystems.</i>	Tutorial
3 days: 79-81	<b>Ecological Succession</b> <i>Describe how ecological succession can change environments and lead to the formation of new biomes.</i>	Tutorial
2 days: 82-83	<b>Ecological Issues and Crises</b> <i>Discuss the major global ecological issues facing humanity today.</i>	Exploration

2 days: 84-85	<b>Adaptability in Nature</b> <i>Explain how animals' behavior patterns effects adaptability in nature.</i>	Exploration
2 days: 86-87	<b>Unit Activity and Discussion—Unit 6</b>	Unit Activity Discussion
1 day: 88	<b>Posttest—Unit 6</b>	Assessment
1 day: 89	<b>Semester Review</b>	
1 day: 90	<b>End-of-Semester Test</b>	Assessment