

Introduction to Biology Lab

Course Text/Materials

Custom Lab Kit from eScienceLabs.com (please register at eScienceLabs, login, and use the "Have a Code" button) which is \$81.61; please enter this code [kit1585] to ensure that you purchase the correct Lab.

Course Description

This lab-only course is designed as a standalone addition to the Introduction to Biology course. Students will complete at home laboratory experiments, track and record results and take lab-based assessments to meet the lab requirement. The labs are provided by eScience Labs, a leading provider of at home lab kits and supplemental online materials. This course will give the student a solid foundation for further study into laboratory sciences.

Course Objectives

After completing this course, students will:

- Learn how to work safely in the laboratory
- Understand how to make testable observations and hypotheses
- Explore key concepts in biology
- Clearly define and relate all aspects of the cell cycle
- Understand and describe each structure of the cell and their roles
- Explore photosynthesis
- Understand Mendelian genetics
- Discuss heredity and mutation
- Have an understanding of the Ecology of organisms
- Understand mutation.

Course Prerequisites

There are no prerequisites to take Introduction to Biology Lab, though we highly recommend previous or concurrent enrollment in Introduction to Biology (BIO101).

Important Terms

In this course, different terms are used to designate tasks:

- **Tutoring:** memberships include online tutoring for students to access with any content/subject related questions in the place of faculty. If your tutor is not able to answer your questions please contact a student advisor.
- **Labs:** These are experiments at home that you will complete and be assessed on through online exercises.
- **Lab Quiz:** A graded online test.

Course Evaluation Criteria

Your score provides a percentage score and letter grade for each course. A passing percentage is **70%** or higher.

There are a total of 1000 points in the course:

Lab	Assessments	Points
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	Upload Lab Kit Photos	40
1	Lab: Introduction to Science	85
1	Lab Exam: Introduction to Science	35
2	Lab: Cell Structure and Function	85
2	Lab Exam: Cell Structure and Function	35
3	Lab: Ecology of Organisms	85
3	Lab Exam: Ecology of Organisms	35
4	Lab: Energy and Photosynthesis	85
4	Lab Exam: Energy and Photosynthesis	35
5	Lab: Mitosis	85
5	Lab Exam: Mitosis	35
6	Lab: DNA and RNA	85
6	Lab Exam: DNA and RNA	35
7	Lab: Mendelian Genetics	85
7	Lab Exam: Mendelian Genetics	35
8	Lab: Population Genetics	85
8	Lab exam: Population Genetics	35
Total		1000

Course Topics and Objectives

Lab	Title	Objectives
1	Lab: Introduction to Science	<ul style="list-style-type: none"> Apply the scientific method, including making observations, developing hypotheses, identifying variables and controls, collecting and analyzing data, and drawing conclusions Use calculations and measurements to connect percent error, significant figures, conversions, accuracy and precision to scientific reasoning Summarize how to write and format a lab report
2	Lab: Cell Structure & Function	<ul style="list-style-type: none"> Apply Cell Theory Compare and contrast the structure and function of prokaryotic and eukaryotic cells Identify eukaryotes and prokaryotes based on their cellular structure
3	Lab: Ecology of Organisms	<ul style="list-style-type: none"> Define ecology as interactions amongst organisms and their environment Analyze the effects of abiotic and biotic factors in an ecosystem Assess how generalists and specialists define their habitat tolerance

4	Lab: Energy and Photosynthesis	<ul style="list-style-type: none"> • Identify the four principles of a chloroplast: thylakoids, grana, lamella, and stroma • Use photosynthesis to explain how the sun affects all organisms • Compare and contrast the light-dependent and light-independent reactions that occur during photosynthesis
5	Lab: Mitosis	<ul style="list-style-type: none"> • Relate DNA to genes, alleles and chromosomes • Identify chromosomal structures during the various stages of the cell cycle including chromatin, sister chromatids, homologous chromosomes, and centromeres • Compare and contrast animal and plant mitosis • Apply the concept of ploidy to the human species • Explain the role of parent and daughter cells in cell cycle division
6	Lab: DNA and RNA	<ul style="list-style-type: none"> • Compare and contrast the structure and function of DNA and RNA • Connect nucleotides, amino acids and proteins to the central dogma of the genetic code • Explain and perform a DNA extraction
7	Lab: Mendelian Genetics	<ul style="list-style-type: none"> • Explain how Mendel's work formed the foundation of modern genetics including the law of segregation and the law of independent assortment • Relate genes to homozygous, heterozygous, dominant alleles, recessive alleles, genotype and phenotype • Use monohybrid and dihybrid crosses to analyze patterns of inheritance including dominance, incomplete dominance and co-dominance
8	Lab: Population Genetics	<ul style="list-style-type: none"> • Explain how genetic drift, the founder effect, mutations and natural selection affect a population's gene pool • Use the Hardy-Weinberg equation to calculate gene frequencies within a population • Analyze the effects of stochastic events on genetic variation and frequency in the gene pool