

# Academic Biology Syllabus

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Prep./Conference Period: TBA

Course Description Per Course Catalogue: Academic Biology I is a laboratory course designed to teach the basic scientific facts and terminology related to the field of Biology, with an emphasis on developing skills in the use of basic laboratory techniques and laboratory apparatus. Labs will utilize inquiry methods. The areas of concentration are cellular biology, microbiology, protists, genetics, taxonomy, plant studies, and comparative invertebrate and vertebrate animal anatomy along with an introduction to evolution. Notebooks and other projects may be required for the completion of this course.

## Biology:

This biology course involves the scientific study of living organisms. The course considers the interactions among the vast number of organisms that inhabit planet Earth. It presents the basic form and function of these organisms, from cells to organ systems, from simple unicellular organisms to complex humans. It delves into interactions between organisms, and between an organism and its environment. It also looks into biotechnology, how it is used in today's society.

This is an interactive, highly hands-on course in biology. Students are exposed to what it means to be living from the cellular level right through to complex forms with an emphasis on the interconnectedness of all organism and their environment. Through out the study, students are encouraged to apply critical thinking, ask questions, and explore the nature of science.

There will also be readings periodically based upon biological topics which we are covering or that appear in the news.

The course is built upon the following themes:

- Nature of Science (science as a process)
- Unity with Diversity
- Systems and interactions
- Evolution
- Science, technology, and society

## Materials:

1. Textbook – must be signed and covered. This will be provided by the end of week two or upon completion of major schedule changes.)
2. Writing utensil – you must supply your own pen or pencil daily. Pencils must be used for microscope drawings.
3. 3-Ring Binder –this should be at least a 1 inch binder; bring daily for notes, handouts, and sketches. (This serves as your notebook for the course.)
4. Science fee – must be paid A.S.A.P. once they have been adopted. In the past this has been \$15.
5. Metric ruler
6. A thumb drive – for storing computer generated information.
7. Calculator – a simple one to add, subtract, multiply, and divide.
8. Paper- Loose leaf (Some printer paper will be used as well, but not enough to require purchasing a ream.)
9. You – you are required to attend class on a regular basis.

## Grading:

1. Grading scale: A=93-100%  
B= 84-92%  
C= 74-83%  
D= 65-73%  
F= 0-64%
2. Grades will be given for tests, quizzes, homework, labs, student response system lecture questions, presentations, projects, article reviews, journals etc.
  - a. Each week there is a set of multiple choice review questions, which are completed and graded on-line with immediate feedback.
3. There will be only a few extra credit opportunities a year. Generally once per grade period.
4. Point deductions will be made for lab violations / horseplay.

## Extra Help:

I encourage you get extra help when you need it. I am usually available after school, but check with me to make sure I don't have a meeting or other appointment.

## Topics

### Semester 1

Intro- To Biology (What is Biology, What is science)

How scientists/biologists work

Graphing

Data Tables

Data Collection and Analysis

Microscopes

Microscope Drawings

Basic Biological Drawings

Sampling Methods

Dissections

Directional Terminology

Pressings/Mountings

Ecology

Sampling

Food chains/food webs

Trophic levels

Classification of organisms by feeding types

Classification

History/People

Domains

Kingdoms

Scientific names

Cladistics

Plants

Divisions

Gymnosperms

Angiosperms

Monocots/Dicots

Reproduction

Grow

Roots/Stems/Leaves- Structures and functions

Plant Clones

Dissections

Collection

Cells

Structures and functions of structures

Osmosis/Diffusion

Active transport

Cell Cycle

Phases and periods

Mitosis

Meiosis

Cancer

### Semester 2:

Genetics

Classical

Mendel

Punnett and Punnett Squares

Dominance and recessiveness

Sex Linked Traits

Incomplete Dominance

Co-dominance

Multiple Alleles

Modern/Applied

Karyotypes

Genetic Diseases

Pedigrees

Symbolization

Determining Genotypes

DNA Analysis

DNA History

DNA structure and Mutations

DNA sequencing

DNA Extraction

DNA Electrophoresis- run gels

RFLP & PCR

DNA fingerprint/Profiles

(History and Readings)

Genetic Engineering- Process and ethics

Cloning – Process, development, ethics

Protists

Phyla

Importance/Uses

Animalia

Phyla and classes

Focus on

Porifera

Cnidaria

Nemotoda

Platyhelminthes- regeneration

Annelida

Echinodermata

Mollusca – dependant upon time

Arthropoda – dependant upon time

Amphibia

Dissections

Comparative anatomy

Structure and Function

Evolution

History/People

Change over time

Law of Uses and Disuse

Law of Acquired Characteristics

Survival of the Fit