



HIGH SCHOOL BIOLOGY LABS

Fridays, August 28-December 18 (Fall 2020) – 12 labs

No class September 4, 25, October 2, 16, November 13, 27, December 4

Fridays, January 22-May 21 (Spring 2020) – 10 labs

No class January 29, February 5, 12, 19, March 5, 12, 19, April 9

9:30am-11:00am

Ages 14+

In our High School Biology Labs, students investigate the fundamentals of life from cells and biological processes, to invertebrate and vertebrate anatomy. Students learn laboratory techniques and perform hands-on science experiments, including dissections, commonly required in many high school biology curricula. A brief review of relevant material starts each lab, followed by a lab period which includes lab preparation, experimentation and clean-up. Students work semi-independently to conduct each lab, and have the option to complete reports for each investigation (to be evaluated by the parent). All lab costs are included in registration fees.

Location: STEM Lab (suite 21)

\$275/fall semester OR \$25/lab

\$225/semester OR \$25/lab (\$50/Fetal Pig Dissection - 2 weeks)

10% off sibling discount available

LAB SCHEDULE:

SCIENTIFIC METHOD AND METRIC SYSTEM - Friday, September 18

We review the scientific method how to properly use scientific tools to measure mass, volume, distance, and temperature using the metric system.

CELL STRUCTURE AND FUNCTION - Friday, September 25

In this lab, we review microscopy techniques and biological illustration as we examine animal and plant cells under microscope to describe their structural differences and organelle distribution and function.

DIFFUSION AND OSMOSIS - Friday, October 2

We conduct experiments with chicken eggs and plant cells to evaluate the processes of diffusion and osmosis, and the importance of passive transport to cell structure and function.

BLOOD TYPING - Friday, October 9

Students study blood types and how blood is characterized, learn how antibodies are used to determine blood antigens, and conduct a blood type analysis on synthetic blood.

PHOTOSYNTHESIS - Friday, October 23

We study chemistry and biology of photosynthesis as we examine variables that alter the rate of the photosynthetic reaction, and review where this process occurs within plants.

ENZYME LAB - Friday, October 30

Students experiment with reaction rates as we learn about the enzyme, catalase, its function within cells and its interaction with hydrogen peroxide.

STRUCTURE AND FUNCTION OF DNA - Friday, November 6

We review the basics of DNA, including its structure and function, create a model of a DNA strand and extract DNA from an octoploid organism following a scientific protocol.

MITOSIS AND MEIOSIS LAB - Friday, November 13

In lab today, we model the processes of mitosis and meiosis to study how DNA replication is incorporated into the cell cycle, and visualize each stage of mitosis in cells using microscopy.

HEREDITY - Friday, November 20

Students use a Punnett square card game to investigate how alleles are inherited and to study the behavior of dominant and recessive genes.

GENOTYPES AND PHENOTYPES - Friday, December 4

This week, students investigate genotypes and phenotypes to learn how genetics influences physical traits, and how natural selection acts on phenotypes of individuals.

EVOLUTION LAB - Friday, December 11

We investigate factors that influence the frequency of alleles in a population, and how populations evolve to become distinct species.

BACTERIAL INVESTIGATIONS - Friday, December 18

We study microbes in this lab as we classify bacteria by cell and colony characteristics, learn protocols for bacterial culturing and Gram staining, and design a proper microbial experiment.

MICROSCOPIC ORGANISMS - Friday, January 22

Students study the diversity of aquatic microorganisms as they conduct a microscopic survey of pond water samples for protists, microalgae and microinvertebrates.

FUNGI - Friday, February 26

We examine the anatomy, biology and ecology of mushrooms, molds and other fungi and discuss their important role in our ecosystem.

PLANT ANATOMY - Friday, March 26

Our attention turns to botany this week as we study the anatomical features of leaves, flowers and seeds, classification of fruits, and plant adaptations that increase pollination and dispersal.

CLAM AND SQUID DISSECTIONS - Friday, April 2

We examine the internal and external anatomy of a two diverse members of the phylum Mollusca to determine how these features enable their survival in their environments.

WORM DISSECTIONS - Friday, April 16

Explore the anatomy of two groups of worms, segmented worms and roundworms, as we dissect representatives of each.

COW EYE DISSECTION - Friday, April 23

Learn about vision and the anatomy of the eye as we investigate the external and internal anatomy of a preserved cow eye.

FISH DISSECTION - Friday, April 30

Students study the anatomy and physiology of bony fish and learn about adaptations allowing these vertebrates to live underwater.

FROG DISSECTION - Friday, May 7

Students investigate the external and internal anatomy of a vertebrate, the grass frog, *Rana forreri*. Focus will be on proper dissection technique, as well as specific body systems and anatomical functions.

FETAL PIG DISSECTION (two weeks) - Friday, May 14 and May 21

We study mammalian organ systems as we investigate the external and internal anatomy of a fetal pig. Using proper dissection techniques, students perform the dissection over a two-week period.