

## **HIGH SCHOOL BIOLOGY LABS**

Wednesdays, September 10-December 10 (no class Oct 15, Nov 26; 12 weeks)

9:30am-11:00am

Ages 14+

In our High School Biology Labs, students investigate the fundamentals of life from cells and biological processes (fall semester) to invertebrate and vertebrate anatomy (spring semester). Students learn laboratory techniques and perform hands-on science experiments 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.

Instructor: Ashley Blocker, BS

Location: STEM Lab (suite 21)

Course fee: \$275 OR \$25/lab

10% sibling discount

Register for full semester or individual labs.

### **LAB SCHEDULE:**

#### **SCIENTIFIC METHOD AND METRIC SYSTEM - Wednesday, September 10**

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

#### **CELL STRUCTURE AND FUNCTION - Wednesday, September 17**

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 - Wednesday, September 24**

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 - Wednesday, October 1**

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** - Wednesday, October 8

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** - Wednesday, October 22

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** - Wednesday, October 29

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** - Wednesday, November 5

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** - Wednesday, November 12

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** - Wednesday, November 19

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** - Wednesday, December 3

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

### **BACTERIAL INVESTIGATIONS** - Wednesday, December 10

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.