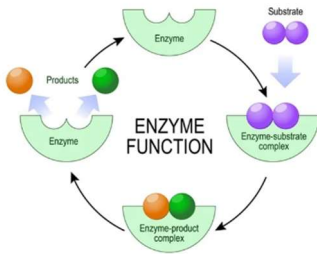


Exploring the Wonders of Biology Class

Course Description:

Dive into the fascinating world of biology with our dynamic 12-week course, "Exploring the Wonders of Biology," designed for curious middle and high school students. This engaging, lab-heavy program meets twice a week (**Wednesday and Friday**) for two-hour sessions, offering a unique blend of lectures, hands-on laboratory experiments, and field experiences. Tailored to spark curiosity and deepen understanding, our course covers a wide range of topics from the foundational principles of biology to the complex interactions within ecosystems.



Start Date: April 10, 2024

Class Times:

9AM-11AM | 11AM-1PM | 1AM-3PM

Cost: \$229 Per Student



Location: The Learning Space- Halfmoon | 177 route 236, Halfmoon

Email us at director@upstatealgaelaboratory.org to enroll

Key Features:

- **Comprehensive Curriculum:** From the microscopic structure of cells to the vast biodiversity of ecosystems, students will explore key biological concepts, including the chemistry of life, cell processes, genetics, enzymes and biochemical reactions, hormones, and biodiversity.
- **Hands-On Learning:** Each week, students will participate in interactive labs, such as DNA extraction, enzyme activity studies, and chemical reactions, to apply what they've learned and cultivate scientific skills.
- **Field Trip Adventure:** Highlighting our course is a memorable field trip where students will conduct a real-world biodiversity study, applying their knowledge and skills to understand and appreciate the complexity of life and the importance of conservation.
- **Engaging Lectures:** The first day of each week focuses on immersive lectures that introduce exciting biological concepts and prepare students for their lab activities and field experiences.
- **Innovative Lab Sessions:** The second day combines further discussion with hands-on lab work, reinforcing concepts through practical application and exploration.

Learning Objectives:

- Grasp fundamental biological principles and their real-world applications.
- Develop critical thinking and problem-solving skills through scientific inquiry and experimentation.
- Gain practical laboratory skills and experience in data collection and analysis.
- Understand the importance of biodiversity.
- Foster a deep appreciation for the living world.

Course Outline/Curriculum

Week 1: Introduction to Biology and Scientific Method

- Day 1 (Lecture): Nature of science, scientific inquiry, scientific method, overview of biology.
- Day 2 (Lecture + Lab): "Observation Skills" lab, practicing making and recording observations.

Week 2: The Chemistry of Life

- Day 1 (Lecture): Significance of carbon, lipids, proteins, nucleic acids, amino acids, biochemical, and chemical properties and reactions.
- Day 2 (Lecture + Lab): Labs on pH measurement, understanding polar vs. non-polar molecules, and observing osmosis in different solutions.

Week 3: Cells and Cell Processes

- Day 1 (Lecture): Cell theory, structure and function of cells, prokaryotic vs. eukaryotic cells.
- Day 2 (Lecture + Lab): "Onion Cell Lab" to observe cell structures under a microscope.

Week 4: Genetics

- Day 1 (Lecture): Basics of genetics, Mendelian genetics, introduction to Punnett squares.
- Day 2 (Lecture + Lab): "Extracting DNA" lab, simple DNA extraction from fruits or vegetables.

Week 5: Enzymes and Biochemical Reactions

- Day 1 (Lecture): Introduction to enzymes, their roles in biochemical reactions.
- Day 2 (Lecture + Lab): Investigating enzyme activity and factors affecting enzyme activity, such as temperature and pH.

Week 6: Hormones

- Day 1 (Lecture): Introduction to hormones and how they regulate cell functions.
- Day 2 (Lecture + Lab): Applying hormones to algal and plant samples and observing growth effects over a week.

Week 7: Photosynthesis and Cellular Respiration

- Day 1 (Lecture): Understanding the processes of photosynthesis and cellular respiration, their significance in the energy cycles of living organisms.
- Day 2 (Lecture + Lab): "Leaf Disk Assay" and algae beads experiment to study photosynthesis rates under different light conditions.

Week 8: Ecology and Ecosystems

- Day 1 (Lecture): Basics of ecology, types of ecosystems, and the roles of organisms within ecosystems.
- Day 2 (Lecture + Lab): Constructing and analyzing food webs, observing interactions in a simulated ecosystem.

Week 9: Microbe Biology and Physiology

- Day 1 (Lecture): Week 9: Overview of microbial life, including bacteria, viruses, fungi, and protozoa.
- Day 2 (Lecture + Lab): Microbial Culturing and Observation.

Week 10: Plant Biology and Physiology

- Day 1 (Lecture): Structure and function of plant systems, plant life cycles, and reproduction.
- Day 2 (Lecture + Lab): "Plant Nutrient Transportation" experiment, measuring nutrient movement.

Week 11: Animal Physiology and Adaptations

- Day 1 (Lecture): Comparative physiology of animals, focusing on adaptations to their environments.
- Day 2 (Lecture + Lab): Dissection or virtual simulation to study the anatomy and physiology of a selected animal.

Week 12: Biodiversity and Conservation

- Day 1 (Lecture): Introduction to Biodiversity
- Day 2 (Field Trip): Conducting a Biodiversity Study