

Course Description:

This biology course covers the basics of biochemistry and how it relates to life. You will discover how cells divide and reproduce. You will also explore how living things produce and use energy through metabolism and photosynthesis.

Course Objectives:

- Apply basic biochemistry to analyze the impact of healthy and unhealthy foods.
- Apply scientific processes to conduct an investigation.
- Compare the processes and genetic outcomes of sexual and asexual reproduction.
- Explain how tissues, organs, and organ systems develop from individual cells and support one another.
- Explain the processes and significance of photosynthesis and respiration.
- Use an understanding of genetics to discuss the implications of different diagnosis and treatment methods for genetic disorders.
- Use logical thinking to identify relationships and draw conclusions.

Required Materials:

In course.

Course Overview:

Unit 1: Biochemistry

- Direct Instruction
 - Atoms and All About Them
 - Atoms in Living Organisms
 - Molecules
 - Ions
 - Water and its Unique Properties
 - Acids, Bases, and pH
 - Introduction to Biological Molecules
 - Carbohydrates and Fats
 - Proteins and Nucleic Acids
- Interactive: Name That Element
- Interactive: Chemical Formulas
- Checkpoints 1-5
- Unit 1 Exam

Unit 2: Cells

- Direct Instruction
 - Cell Size
 - Hierarchy of Organization
 - Feedback and Homeostasis
 - Homeostasis in the Human Body
 - Prokaryotes and Eukaryotes
 - Unicellular and Multicellular Organisms

- Prokaryotic Cell Structure
- Eukaryotic Cell Structure
- Theory of Endosymbiosis
- Checkpoints 6-9
- Unit 2 Exam

Unit 3: Membranes

- Direct Instruction
- Fluid Mosaic Model
- Types of Membrane Proteins
- Diffusion
- Passive Transport
- Active Transport
- Sodium-Potassium Pump
- Endocytosis and Exocytosis
- Discussion Board
- Checkpoints 11-13
- Unit 3 Exam

Unit 4: Cell Division and Reproduction

- Direct Instruction
- The Cell Cycle
- Regulating the Cell Cycle
- Basic Chromosome Structure
- Chromosome Number
- Prokaryotic Cell Division
- Mitosis
- Sexual vs. Asexual Reproduction
- Reduction Division
- Stages of Meiosis
- Crossing-Over
- Nondisjunction and Chromosomal Abnormalities
- Human Reproduction
- Checkpoints 16-20
- Unit 4 Exam

Unit 5: Energy and Metabolism

- Direct Instruction
- ATP Structure and Function
- Enzymes
- Eating, Breathing, and Cellular Energy
- Overview of Respiration
- Glycolysis
- Citric Acid Cycle
- Electron Transport Chain
- Fermentation
- Checkpoints 22-25
- Unit 5 Exam

Unit 6: Photosynthesis

- Direct Instruction
- Photosynthetic Organisms
- Leaf and Chloroplast Structure
- Photosystems I and II
- Calvin Cycle
- Comparing Photosynthesis with Respiration
- Checkpoints 27-28
- Unit 6 Review
- Unit 6 Exam
- Units 1-5 Review
- Final Exam