Description of Course:
A study of the natural world centers on cellular structure and the processes of life. First semester topics include: history of biology, cell structure and function, biochemical properties, ecology, taxonomy and evolution. Second semester topics include genetics, structure and function of organisms, and botany.

Prerequisites:
No prerequisite course requirements.

Goals:
Students will gain the:
1. Ability to identify the basic principles of inheritance and the role it plays in the natural selection and the orderly development of life.
2. Ability to classify matter and analyze basic chemical and physical reactions of energy.
3. Ability to recognize the basic cycles of an ecosystem and their effects on physical and chemical activity.
4. Ability to evaluate limitations in amount and use of energy and other natural resources and importance of conservation and recycling.
5. Ability to analyze using scientific knowledge, the role of the individual, local governments, and nations in preservation and conservation.
6. Ability to analyze the current practices of individuals and industries that may have long-term and global effects on Earth systems.
7. Ability to perform basic scientific experiments using proper techniques, instruments, and report skills and write a lab report using the scientific method.

Course Outline:
I. Orientation and introduction
   A. Familiarization with 1) Attendance, conduct, text features, and evaluation scheme.
   B. Nature and magnitude of topics in Biology
   C. Laboratory Skills Assessment

II. Summary of Scientific Concepts
   A. Scientific Fundamentals and Methods
   B. Anatomical & Physiological Terminology
   C. Selected Latin/Greek prefixes/suffixes

III. Chapter 1: The Science of Biology
   A. 1.1 What is Science
   B. 1.2 How Scientists Work
   C. 1.3 Studying Life
   D. 1.4 Tools and Procedures
   E. Lab 1: Using a Compound Microscope
   F. Chapter 1 Test

IV. Chapter 2: The Chemistry of Life
   A. 2.1 The Nature of Matter
   B. 2.2 Properties of Water
   C. 2.3 Carbon Compounds
   D. 2.4 Chemical Reactions and Enzymes
   E. Lab 2: Investigating the Effect of Temperature on Enzyme Activity
   F. Chapter 2 Test
V. Chapter 3: The Biosphere
   A. 3.1 What is Ecology?
   B. 3.2 Energy Flow
   C. 3.3 Cycles of Matter
   D. Lab 3: Identifying a Limited Nutrient
   E. Chapter 3 Test

VI. Chapter 4: Ecosystems and Communities
   A. 4.1 The Role of Climate
   B. 4.2 What shapes an Ecosystem?
   C. 4.3 Biomes
   D. 4.4 Aquatic Ecosystems
   E. Lab 4: Observing Succession
   F. Chapter 4 Test

VII. Chapter 5: Populations
   A. 5.1 How Populations Grow
   B. 5.2 Limits to Growth
   C. 5.3 Human Population Growth
   D. Lab 5: Investigating the Growth of a Population of Bacteria
   E. Chapter 5 Test

VIII. Chapter 6: Humans in the Biosphere
   A. 6.1 A Changing Landscape
   B. 6.2 Renewable and Nonrenewable Resources
   C. 6.3 Biodiversity
   D. 6.4 Charting a Course for the Future
   E. Lab 6: Observing the Effects of Acid Rain
   F. Chapter 6 Test

IX. Chapter 7: Cell Structure and Function
   A. 7.1 Life is Cellular
   B. 7.2 Eukaryotic Cell Structure
   C. 7.3 Cell Boundaries
   D. 7.4 The Diversity of Cellular Life
   E. Lab 7: Investigating Cell Structures and Processes
   F. Chapter 7 Test

X. Chapter 8: Photosynthesis
   A. 8.1 Energy and Life
   B. 8.2 Photosynthesis: An Overview
   C. 8.3 The Reactions of Photosynthesis
   D. Lab 8a: Investigating Photosynthesis
   E. Lab 8b: Paper Chromatography
   F. Chapter 8 Test

XI. Chapter 9: Cellular Respiration
   A. 9.1 Chemical Pathways
   B. 9.2 The Krebs Cycle and Electron Transport
   C. Lab 9: Investigating Fermentation by Making Kimchi
   D. Chapter 9 Test

XII. Chapter 10: Cell Growth and Division
A. 10.1 Cell Growth
B. 10.2 Cell Division
C. 10.3 Regulating the Cell Cycle
D. Lab 10: Modeling the Phases of the Cell Cycle
E. Chapter 10 Test

XIII. Science Fair
A. Required research paper
B. 50 bonus points for being selected to compete in science fair

XIV. Chapter 11: Introduction to Genetics
A. 11.1 The Work of Gregor Mendel
B. 11.2 Probability and Punnett Squares
C. 11.3 Exploring Mendelian Genetics
D. 11.4 Meiosis
E. 11.5 Linkage and Gene Maps
F. Lab 11: Modeling Meiosis
G. Chapter 11 Test

XV. Chapter 12: DNA and RNA
A. 12.1 DNA
B. 12.2 Chromosomes and DNA Replication
C. 12.3 RNA and Protein Synthesis
D. 12.4 Mutations
E. 12.5 Gene Regulation
F. Lab 12: Modeling DNA Replication
G. Chapter 12 Test

XVI. Chapter 13: Genetic Engineering
A. 13.1 Changing the Living World
B. 13.2 Manipulating DNA
C. 13.3 Cell Transformation
D. 13.4 Applications of Genetic Engineering
E. Lab 13: Investigating the Effects of Radiation on Seeds
F. Chapter 13 Test

XVII. Chapter 14: The Human Genome
A. 14.1 Human Heredity
B. 14.2 Human Chromosomes
C. 14.3 Human Molecular Genetics
D. Lab 14: Modeling DNA Probes
E. Chapter 14 Test

XVIII. Chapter 15: Darwin’s Theory of Evolution
A. 15.1 The Puzzle of Life’s Diversity
B. 15.2 Ideas That Shaped Darwin’s Thinking
C. 15.3 Darwin Presents His Case
D. Lab 15: Modeling Adaptation
E. Chapter 15 Test

XIX. Chapter 16: Evolution of Populations
A. 16.1 Genes and Variation
B. 23.2 Roots  
C. 23.3 Stems  
D. 23.4 Leaves  
E. 23.5 Transport in Plants  
F. Lab 23: Identifying the Growth Zones in a Plant  
G. Chapter 23 Test  

XXVII. Reproduction of Seed Plants  
A. 24.1 Reproduction With Cones and Flowers  
B. 24.2 Seed Development and Germination  
C. 24.3 Plant Propagation and Agriculture  
D. Lab 24: Investigating Pollen Tube Growth  
E. Chapter 24 Test  

XXVIII. Plant Responses and Adaptations  
A. 25.1 Hormones and Plant Growth  
B. 25.2 Plant Responses  
C. 25.3 Plant Adaptations  
D. Lab 25: Using Hormones to Control Plant Development  
E. Chapter 25 Test  

XXIX. Sponges and Cnidarians  
A. 26.1 Introduction to the Animal Kingdom  
B. 26.2 Sponges  
C. 26.3 Cnidarians  
D. Lab 26: Investigating the Responses of Hydras to External Stimuli  
E. Chapter 26 Test  

XXX. Worms and Mollusks  
A. 27.1 Flatworms  
B. 27.2 Roundworms  
C. 27.3 Annelids  
D. 27.4 Mollusks  
E. Lab 27: Investigating Land Snails  
F. Chapter 27 Test  

XXXI. Arthropods and Echinoderms  
A. 28.1 Introduction to the Arthropods  
B. 28.2 Groups of Arthropods  
C. 28.3 Insects  
D. 28.4 Echinoderms  
E. Lab 28: Observing Ant Behavior  
F. Chapter 28 Test  

XXXII. Comparing Invertebrates  
A. 29.1 Invertebrate Evolution  
B. 29.2 Form and Function in Invertebrates  
C. Lab 29: Investigating Invertebrate Responses to External Stimuli  
D. Chapter 29 Test  

XXXIII. Non-vertebrate Chordates, Fishes, and Amphibians  
A. 30.1 The Chordates  
B. 30.2 Fishes
C. 30.3 Amphibians
D. Lab 30: Investigating Homeostasis in Fishes and Amphibians
E. Chapter 30 Test

XXXIV. Reptiles
A. 31.1 Reptiles
B. 31.2 Birds
C. Lab 31: Examining Bird Bones
D. Chapter 31 Test

XXXV. Mammals
A. 32.1 Introduction to the Mammals
B. 32.2 Diversity of Mammals
C. 32.3 Primates and Human Origins
D. Lab 32: Using Fibers as Forensic Evidence
E. Chapter 32 Test

XXXVI. Comparing Chordates
A. 33.1 Chordate Evolution
B. 33.2 Controlling Body Temperature
C. 33.3 Form and Function in Chordates
D. Lab 33: Comparing Chordate Family Trees
E. Chapter 33 Test

XXXVII. Animal Behavior
A. 34.1 Elements of Behavior
B. 34.2 Patterns of Behavior
C. 34.3 Observing Behavior in Fish
D. Chapter 34 Test

Course requirements:
Students must be familiar with and abide by the school handbook rules for student conduct and the lab procedures and safety rules.
Some reading materials will be provided only during class and students must make the most of their time by taking notes from those materials. Other materials are available in the library and students are expected to glean information from those materials in an organized fashion. The student’s Biology notebook, textbook, and other necessary materials are student’s responsibility and must accompany the student to class each session.

Methods of Evaluation:

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<tr>
<th>Every Grading Period</th>
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<tbody>
<tr>
<td>Chapter and Unit Tests</td>
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<tr>
<td>Lab Participation and Reports</td>
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<td>Class Participation, Notebook, &amp; Science Fair</td>
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<td>Semester Exams</td>
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Lecture, readings, discussion, audiovisuals, supervised lab investigations.

Required Text: