

**Instructor:** Dr. Sara Fenske **Courses:** Honors Life Science

**Academic Year:** 2008-2009

**Course Philosophy:** This course is an introduction to biology: the study of life. In Life Science you will be introduced to how organisms (such as ourselves) grow and live. You will also be introduced to the variety of life that we find on our planet. The success of this course depends on your enthusiasm, hard work, and participation.

**Course Requirements:** 1) Life Science by Glencoe Science

- 2) Binder for Handouts and paper for notes
- 3) Pencil or Pen (blue or black)
- 4) All handouts
- 5) Access to the Internet

**Grading Procedure:** Grades are based on a combination of two Major Exams (at least 100 points each), Tests and Quizzes (at least 25 points each), and Writing Assignments (including lab reports) (25-100 points).

**Grading Scale:** As stated in the Student Handbook, letter grades are determined based on the following scale:

A- to A+: 90-100 D- to D+: 60-69  
B- to B+: 80-89 F: 0-59  
C- to C+: 70-79

**Homework/ Classwork Policies:**

1. Problem sets, research papers, and reading assignments must be completed by the assigned date. Any long-term projects should be worked on daily so that the task is completed on time and will earn the best grade.
2. Two major exams will be given in the first trimester and third trimester. Both exams are cumulative. Quizzes will be given every week to two weeks. At least one test will be given per trimester in addition to the major exam and quizzes. Pop quizzes may be given at any time.
3. All assignments should be turned in on the due date during the class period. The maximum score for any late assignments will decrease by 10% for every day late until the grade reaches a maximum score of 50%. Any work not turned in will receive a 0.
4. All work must be legibly written or typed, and grammatically correct.
5. Keep all handouts, homework, returned homework and exams in a binder.
6. Ask questions about any instructions that are not clear.

**Classroom Policies:**

1. Daily, *prepared* attendance is mandatory. The school's attendance policy will be strictly enforced.
2. You are solely responsible for any material covered or announcements made during your absence.
3. You are expected to treat everyone with respect at all times.
4. Cheating or plagiarism will result in a 0 grade for that assessment.
5. During all labs, safety comes first!
6. Finally, you are expected to ask questions about any material that is not clear. Do not worry about a question being too simple. If you don't understand, chances are others don't also (Yes, this is really true).

Because this is the honors section of life science, the following topics will be covered in greater depth, and assessments will require some deeper thought.

**Tentative Schedule:**

Week	Topics	Chapters
1	What is Science? The Scientific Method	Ch. 1
2	Biology and Biological Methods	Ch. 1
3	Cell Structure	Ch. 2
4	Cell Structure & Viruses	Ch. 2
5	Cell Processes: Chemistry of Life, Moving Cellular Materials	Ch. 3
6	Cell Processes: Photosynthesis and Respiration	Ch. 3
7	Cell Reproduction: Cell Division and Mitosis	Ch. 4
8	Cell Reproduction: Sexual Reproduction and Meiosis	Ch. 4
9	Heredity: DNA and Genetics	Ch. 5
10	Heredity: Beyond Mendel and Advances in Genetics	Ch. 5

11	Adaptation and Natural Selection	Ch. 6
12	Review / Exam Week	
13	Bacteria	Ch. 7
	0. Thanksgiving Break	
14	0. Protists and Fungi	Ch. 8
15	0. Plant Diversity	Ch. 9
16	0. Plant Reproduction	Ch. 10
	Christmas Break	
17	Plant Processes	Ch. 11
18	Introduction to Animals	Ch. 12
19	Mollusks, Worms, Arthropods, and Echinoderms	Ch. 13
20	Fish, Amphibians, and Reptiles	Ch. 14
21	Birds and Mammals	Ch. 15
22	Animal Behavior	Ch. 16
23	The Human Body: Structure and Movement	Ch. 17
24	Nutrients and Digestion	Ch. 18
25	Circulation	Ch. 19
26	Respiration and Excretion	Ch. 20
27	Control and Coordination	Ch. 21
	Spring Break	

28	Regulation and Reproduction	Ch. 22
29	Immunity and Disease	Ch. 23
30	Ecology: Interactions of Life	Ch. 24
31	The Nonliving Environment	Ch. 25
32	Ecosystems	Ch. 26
33	Conserving Resources	Ch. 27
34	Review for Final Exam	
35	Final Exam Week	

## **Life Science and Honors Life Science Outline:**

- I. What is Science?
  - i. The Scientific Method
- II. Overview of Biology & Biology Methods
  - i. Model Organisms
    1. Genetics
    2. Biochemistry
  - ii. Classification
  - iii. Ecology
- III. Cells: Single Cell, Animal, and Plant
  - i. Cell Structure
    1. Organelles
    2. Lipid Membrane
  - ii. Viewing Cells
  - iii. Viruses
- IV. Cell Processes
  - i. The Chemistry of Life
    1. Elements, Atoms, and Molecules
    2. Mixtures
    3. Organic Compounds
    4. Characteristics of Water
  - ii. Moving Cellular Materials
    1. Passive Transport and Osmosis
    2. Active Transport
    3. Endocytosis and Exocytosis
  - iii. Energy of Life
    1. Photosynthesis
    2. Respiration
- V. Cell Reproduction
  - i. Cell Division and Mitosis
  - ii. Sexual Reproduction and Meiosis
  - iii. DNA
- VI. Heredity
  - i. Genetics
    1. Inheriting Traits

- 2. Mendelian Genetics
  - ii. Variations on Mendel's Laws
    - 1. Incomplete Dominance
    - 2. Multiple Alleles
    - 3. Polygenic Inheritance
    - 4. Human Genes and Mutations
    - 5. Sex Determination and Sex-Linked Disorders
  - iii. Advances in Genetics
    - 1. Genetic Engineering
    - 2. Human Genome Project
- VII. Adaptation and Natural Selection
  - i. Models of Evolution
  - ii. Natural Selection
  - iii. Variation and Adaptation
  - iv. Clues about Evolution
    - 1. Fossils
    - 2. Other Evidence of Evolution
  - v. Evolution of Primates
  - vi. Control of Gene Expression
    - 1. Effects of Gene Regulation
    - 2. Transcriptional Control
    - 3. RNA processing
    - 4. Translational Control
  - vii. Cloning of Plants and Animals
  - viii. Genetic Basis of Cancer
- VIII. Bacteria
  - i. Characteristics
  - ii. Eubacteria
  - iii. Archaeobacteria
  - iv. Beneficial Bacteria
  - v. Harmful Bacteria
- IX. Protists and Fungi
  - i. Protists
    - 1. Protist Reproduction
    - 2. Evolution of Protists

3. Plant-like Protists (Algae)
    4. Animal-like Protists (Protozoans)
    5. Fungus-like Protists
  - ii. Fungi
    1. Characteristics of Fungi
    2. Kinds of Fungi
    3. Importance of Fungi
- X. Plant Diversity
  - i. Plant Characteristics
  - ii. Plant Cells
  - iii. Origin and Evolution of Plants
  - iv. Adaptation to Land
  - v. Classification of Plants
  - vi. Seedless Plants
  - vii. Seed Plants
- XI. Plant Reproduction
  - i. Types of Reproduction
  - ii. Plant Life Cycle
  - iii. Seedless Reproduction
  - iv. Seed Reproduction
- XII. Plant Processes
  - i. Photosynthesis and Respiration
  - ii. Plant Responses
- XIII. Introduction to Animals
  - i. Animal Characteristics
  - ii. Sponges and Cnidarians
  - iii. Flatworms and Roundworms
- XIV. Mollusks, Worms, Arthropods, and Echinoderms
  - i. Mollusks
    1. Characteristics of Mollusks
    2. Classification of Mollusks
  - ii. Segmented Worms
    1. Characteristics of Segmented Worms
    2. Earthworm Body System
  - iii. Arthropods

1. Characteristics of Arthropods
    2. Insects
    3. Crustaceans
  - iv. Echinoderms
    1. Characteristics of Echinoderm
- XV. Fish, Amphibians, and Reptiles
  - i. Chordates and Vertebrates
  - ii. Fish
    1. Characteristics of Fish
  - iii. Amphibians
    1. Characteristics of Amphibians
    2. Salamanders
    3. Importance of Amphibians
  - iv. Reptiles
    1. Reptile Characteristics
    2. Importance of Reptiles
- XVI. Birds and Mammals
  - i. Birds
    1. Bird Characteristics
    2. Body Systems
    3. Importance of Birds
  - ii. Mammals
    1. Characteristics of Mammals
    2. Body Systems
    3. Types of Mammals
- XVII. Animal Behavior
  - i. Types of Behavior
    1. Innate Behavior
    2. Learned Behavior
    3. Imprinting
    4. Trial and Error
  - ii. Social Behavior
    1. Animal Societies
    2. Territorial Behavior
    3. Sound Communication

#### 4. Migration

### XVIII. Human Body Systems

#### i. Structure and Movement

1. Skeletal System
2. Muscular System
3. The Skin

#### ii. Nutrients and Digestion

##### 1. Nutrition

1. Calorie Needs
2. Energy Sources
3. Vitamins

##### 2. Digestive System

#### iii. Circulation

1. Heart
2. Blood Vessels
3. Blood Pressure
4. Blood
5. Lymphatic System

#### iv. Respiration and Excretion

##### 1. Respiratory System

1. Functions of the Respiratory System
2. Lungs
3. Diseases and Disorders of the Respiratory System

##### 2. Excretory System

1. Urinary System
2. Urine
3. Urinary Disease and Disorders

#### v. Control and Coordination

1. Nervous System
2. The Senses
  1. Hearing and Taste
  2. Understanding the Eye

#### vi. Regulation and Reproduction

1. Endocrine System

- 2. Reproductive
    - 3. Human Life Stages
  - vii. Immunity and Disease
    - 1. Immune System
      - 1. Active Immunity
      - 2. Passive Immunity
    - 2. Infectious Diseases
    - 3. Noninfectious Diseases
- XIX. Ecology: Interactions of Life
  - i. Understanding Ecosystems
  - ii. Populations
    - 1. Population Size
    - 2. Carrying Capacity
  - iii. Interactions within Communities
- XX. The Nonliving Environment
  - i. Abiotic Factors
  - ii. Cycles in Nature
    - 1. Natural Recycling
    - 2. Water Cycle
    - 3. Nitrogen Cycle
    - 4. Carbon Cycle
  - iii. Energy Flow
    - 1. Food Chains
    - 2. Food Webs
- XXI. Ecosystems
  - i. Defining Ecosystems
  - ii. Tundra
  - iii. Desert
  - iv. Aquatic Ecosystems
- XXII. Conserving Resources
  - i. Resources
    - 1. Renewable Resources
    - 2. Nonrenewable Resources
  - ii. Pollution
    - 1. Acid Precipitation

2. Greenhouse Effect
  3. Soil Loss
  4. Soil Pollution – Solid Wastes
- iii. The Three Rs of Conservation
1. Recycle
  2. Reduce
  3. Reuse