Instructor: Connie B. Shook  
Room 907  
7:00 a.m. – 4:00 p.m. (let me know if you will arrive after 3:30)  
Email: shookc@oths.k12.il.us  
Home email: shookc@oths.k12.il.us  
School phone: 632-3507  
Home phone: 539-3878

Text:  
Biology, 7th Edition by Campbell & Reece, 2005

Course Objectives: Upon completion of BIOL 104, a student should have developed
1) Knowledge of the basic principles of biology relating to the origin and definition of life, the chemical composition of cells, cellular structure and organization, cellular metabolism, the basis of heredity, fundamentals of ecology and evolution, and plant and animal form and function.
2) Understanding of the process of scientific inquiry in the biological sciences and the ability to apply critical thinking skills to solve biological problems.
3) A foundation in the skills or oral and written scientific communication and the ability to express scientific ideas and concepts clearly.
4) An ability to work constructively with others toward shared goals.
5) An understanding of ethics in regard to scientific research and communication.
6) Experience in utilizing current laboratory techniques.

Grading and Assessment

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>100-97%</td>
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<tr>
<td>A</td>
<td>96-93%</td>
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<tr>
<td>A-</td>
<td>92-90%</td>
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<tr>
<td>B+</td>
<td>89-87%</td>
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<td>B</td>
<td>86-83%</td>
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<tr>
<td>B-</td>
<td>82-80%</td>
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<tr>
<td>C+</td>
<td>79-77%</td>
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<tr>
<td>C</td>
<td>76-73%</td>
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<tr>
<td>C-</td>
<td>72-70%</td>
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<tr>
<td>D+</td>
<td>69-67%</td>
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<tr>
<td>D</td>
<td>66-63%</td>
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<tr>
<td>D-</td>
<td>62-60%</td>
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Semester grades are calculated using 80% of the average from above and 20% Cumulative Final Exam.

*St. Louis University grading does NOT include D+ or D-; D = 69-60%

Class participation is required of every student and is an important part of your grade. Taking part in class discussions and asking questions are necessary for your growth in this course. Your class participation grade will be based on the following: your asking and answering of relevant questions in class, your appropriate participation in class discussions and labs, your punctuality, your classroom conduct and attitude, as well as your adherence to class guidelines.

Important Points
- All work is due at the beginning of the hour. Late work is assessed a penalty of 20% reduction in score. This reduction increases if the assignment becomes more than 2 days late.
- Tests that are missed due to an excused absence are the student’s responsibility. Makeup work must be completed promptly either before or after school.
- Missed labs can rarely be made up with the same opportunity for laboratory experimentation. Because lab is an important component of the course, it is expected that students will avoid missing scheduled lab dates if at all possible. An absence during more than one college lab during a semester will be discussed with the instructor and may jeopardize St. Louis University credit for the course.
- Extra credit is available for a maximum of 12.5 points per quarter (25 points per semester, written work grade category).
- Additional help is available from the instructor for any student upon request. Please seek help promptly so problems may be resolved quickly.

Academic Integrity Statement
This class holds the same standards of academic integrity as other classes at St. Louis University. Complete, specific college guidelines are available at [http://academicintegrity.slu.edu/](http://academicintegrity.slu.edu/).
**Expectations**
This is an entry level college biology course taught in a high school. All students, whether they enroll in St. Louis University for credit or not, are expected to successfully complete the same course work for their O'Fallon Township High School grade. The purpose of this course is to prepare the talented high school student for the advanced college biology course and lab work.

<table>
<thead>
<tr>
<th>Major Units</th>
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<tbody>
<tr>
<td>1. Biological Themes</td>
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<tr>
<td>2. Ecology</td>
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<tr>
<td>3. The Chemistry of Life</td>
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<tr>
<td>4. Cellular Biology</td>
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<tr>
<td>5. Genetics</td>
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<tr>
<td>6. Animal Form and Function (integrated throughout)</td>
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**First Semester**

**Unit 1 Biological Themes**
Chapter 1 Exploring Life (pg 2)
Topics: Biological Themes
Scientific Methods

Chapter 22 Descent with Modification: A Darwinian View of Life (pg 438)
Topics: Darwin

Chapter 23 The Evolution of Populations (pg 454)
Topics: Populations
Hardy-Weinberg Theorem
Microevolution
Mutations
Natural Selection
Artificial Selection

Labs/Activities: Teddy Graham Evolution (1 day)
Modeling Microevolution (1 day)

Chapter 40 Basic Principles of Animal Form and Function (pg 820)
Topics: Impacts of the Physical Environment
Animal regulation & homeostasis

Labs/Activities: Black Worm Testing (2 days)

*Test: Introduction, Evolution, Animal Principles*

**Unit 2 Ecology**
Chapter 50 An Introduction to Ecology and the Biosphere (pg 1808)
Topics: Distribution of Species
Abiotic and Biotic Factors
Biomes

Chapter 52 Population Ecology (pg 1136)
Topics: Characteristics of Populations
Demography
Population Growth
Carrying Capacity

Chapter 53 Community Ecology (pg 1159)
Topics: Community Interactions
Biogeography

Chapter 54 Ecosystems (pg 1184)
Topics: Energy Flow
Nutrient Cycling

Labs/Activities: Energy in Ecosystems (2 days)

Chapter 55 Conservation Biology and Restoration Ecology (pg 1209)
Topics: Human Impact
Population
Sustainable Development

Labs/Activities: Excerpts from, "A Sand County Almanac" by Aldo Leopold

*Test: Ecology & Conservation*
**Unit 3 The Chemistry of Life**
Chapter 3  Water and the Fitness of the Environment (pg 47)
Topics: Properties of Water
Solutions
pH
Acid Precipitation

Chapter 4  Carbon and the Molecular Diversity of Life (pg 58)
Topics: Hydrocarbons
Functional Groups

Chapter 5 The Structure and Function of Macromolecules (pg 68)
Topics: Polymers
Carbohydrates, Lipids, Proteins, Nucleic Acids
Labs/Activities: Protein Folding Models (1 day)

*Test: Biochemistry

**Unit 4 Cellular Biology**
Chapter 6 A tour of the Cell (94)
Review structures learned in Biology 1
Additional Cellular Structures

Chapter 7 Membrane Structure and Function (pg 124)
Topics: Membrane Structure
Passive Transport
Transport Proteins
Active Transport
Exocytosis and Endocytosis
Labs/Activities: Diffusion and Osmosis (2 days)

Chapter 44 Osmoregulation and Excretion (922)
Osmoregulation balances in fish
Animal Excretion
*Test: Cell Structures, Animal Excretion

Chapter 8 An Introduction to Metabolism (pg 141)
Topics: Metabolic Pathways
Energy
ATP
Enzymes
Labs/Activities: Properties of Enzymes (2 days)

Chapter 9 Cellular Respiration: Harvesting Chemical Energy (pg 160)
Topics: Glycolysis
Krebs Cycle
Electron Transport Chain
Anaerobic Respiration
Labs/Activities: Fermentation (1 day)
Respiration (1 day)

*Test: Metabolism, Enzymes, Cell Respiration

Projects
2 Scientific Journal article summaries on topics studied

**Second Semester**

Chapter 10 Photosynthesis (pg 181)
Topics: Chloroplasts
Light Reactions
Calvin Cycle
C4 and CAM
Labs/Activities: Photosynthesis (3 days)

Chapter 11 Cell Communication (pg 201)
Topics: Signal Reception
Transduction
Response

Chapter 41 Animal Nutrition (pg 844)
Topics: Homeostasis of glucose & fat

Chapter 42 Circulation and Gas Exchange (pg 884)
Topics: Hearts, gills, lungs, hemoglobin

*Test: Photosynthesis, Cell Communication, Animal Nutrition, Circulation & Gas Exchange
### Unit 5 Genetics (Mendelian and Molecular)

#### Chapter 12 The Cell Cycle (pg 218)
**Topics:**
- Review Phases of Mitosis
- Control of Cell Division
- Cancer

#### Chapter 13 Meiosis and Sexual Life Cycles (pg 238)
**Topics:**
- Phases of Meiosis
- Sources of Genetic Variation

*Test: Mitosis, Meiosis*

#### Chapter 14 Mendel and the Gene Idea (pg 251)
**Topics:**
- Mendelian Genetics Problems

Labs/Activities: Genetics Problem Solving

#### Chapter 15 The Chromosomal Basis of Inheritance (pg 274)
**Topics:**
- Linked Genes
- Aneuploidy

*Test: Genetics*

#### Chapter 16 The Molecular Basis of Inheritance (pg 293)
**Topics:**
- DNA Structure
- Replication

#### Chapter 17 From Gene to Protein (pg 309)
**Topics:**
- RNA Structure
- Transcription
- Translation

Labs/Activities: β-Globin Gene (1 day)

*Test: DNA, RNA, and Protein Synthesis*

#### Chapter 18 The Genetics of Viruses and Bacteria (pg 334)
**Topics:**
- Lytic and Lysogenic Cycles
- Transposition
- Transformation, Transduction, Conjugation

Labs/Activities: Transformation Lab (3 days)

#### Chapter 19 Eukaryotic Genomes: Organization, Regulation, and Evolution (pg 359)
**Topics:**
- DNA Packing

#### Chapter 21 The Genetic Basis of Development (pg 411)
**Topics:**
- Embryonic Development
- Differential Gene Expression
- Pattern Formation

*Test: Modern Genetics*

### Unit 6 Animal Form and Function

Labs/Activities: Cat Dissection (10 days)

### Projects

2 Scientific Journal article summaries on topics studied