

2014-2015  
KAP Biology  
Energy in Living Systems  
BIOLOGY115:  
Instructor: Mrs. Aykan-- Horizon Science Academy

Energy in Living Systems (BIOL 115) is a course designed to cover the study of life from the biochemical to the global levels, concentrating on the flow of energy and materials through systems. The course will introduce students to the process of scientific thinking as well as to the principles of biochemistry, cell biology, physiology and ecology. We will discuss current research methods and approaches to unanswered questions.

#### Text

Freeman S (2011). Biological Science. (4th Edition). Pearson/Cummings, New York, NY ISBN: 978-0-32-159820-2 or 3<sup>rd</sup> edition is fine

#### Goals & Objectives

- 1) Begin to develop a “big picture” understanding of how energy flows through biological systems
- 2) Begin to acquire some of the basic principles of biology that will provide the foundation for future courses
- 3) Develop critical thinking skills and apply those skills to scientific discussion
- 4) Develop an understanding of the scientific method focusing on hypothesis testing, experimental design, statistical analysis, and data interpretation

#### Exams

Exams will generally be a combination of short answer and multiple choice questions. You will be given exams at the end of each chapter.

If a student anticipates missing an exam, they should contact me as soon as possible and before the exam is administered. It is the student's responsibility to notify me. Make up exams will be given at my discretion and only with a substantiated excuse. Unless informed otherwise, if you miss any exam, you will receive a score of 0 for that exam.

During exams, you will not be permitted to use texts, notes, calculators, text messaging devices or any other source materials unless otherwise noted. Cell phones, laptops, iPods, or any other electrical devices are not permitted when tests are administered. Refer to the section on academic integrity below. In addition, PLEASE turn these devices off during class. Texting, web surfing, leaving class to answer a phone, and game playing during class is not only rude, but disruptive to the rest of the class. If for some reason there is an important need to use these devices during class, please let me know.

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Grade

The student's numerical grade will be transformed to a letter grade in accordance with the table below. In converting percentage grades to letter grades, any amounts less than 0.50 will be rounded down, and amounts equal to or greater than 0.50 will be rounded up. For example: 59.49 = F; and 59.50 = D. Grades may be adjusted on an individual basis under special circumstances.

Grading scale	
Grade	Percentage
A	90 – 100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

Grade composition	
Exams	60%
Participation	20%
Homework	20%

## Lecture Schedule

The following is a tentative schedule of reading assignments and a brief description of the subject to be discussed in each lecture. Students should come to class prepared to discuss the assigned readings unless informed otherwise. Updates will be included on the Moodle site.

Subject	Readings
Introduction to the class; What is Life?	
Tree of Life: Prokaryote Structure and Diversity	Ch. 1, 28.1-28.3, Bioskills 3 (in the back of text)
Energy	Ch. 2, 9.1
Chemical Bonds, Atoms, Water	Ch. 2, Bioskills 6
Amino Acids; Protein Structure and Function	Ch. 3
Enzymes and Catalysis	Ch. 3
Nucleic Acids and the RNA World	Ch. 4
Lipids and Membranes	Ch. 6
Cell Structure	Ch. 7
Cellular Transport	Ch. 7
Multicellularity; Cellular Specialization; Protist Diversity	Ch. 8.2, 29.3 pp. 603-612
Carbohydrates; ATP	Ch. 5
Overview of Energetics: Glycolysis	Ch. 9
Glycolysis; The Krebs Cycle	Ch. 9
Oxidative Phosphorylation	Ch. 9
Photosynthesis: The Light Reactions	Ch. 10
Photosynthesis: Calvin Cycle; C3 vs. C4 Plants	Ch. 10
October Break	
Plant Nutrition and Nitrogen Fixation	Ch 38
Plant Structure and Diversity	Ch. 30, 36.1

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Sugar and Water Transport in Plants	Ch. 37
Tissues and Organs; Structure and Function in Animals	Ch. 32.1, 41.2
Animal Diversity: protostomes	Ch. 32.3, 33.1, 33.2, 33.4
Animal Diversity: deuterostomes	Ch. 34.1-34.3, 34.5-34.6
Homeostasis and Physiological Ecology	Ch. 41.3-41.5
Salt and Water Balance in Animals	Ch. 42.1-42.3
Gas exchange	Ch. 44.3-44.5
Neurons and the Nervous System	Ch. 6.4, 45.1-45.3
Sensory Systems	Ch. 46.1-46.2, 46.5
Cellular Coordination: Signaling and Hormones	Ch. 8.2-8.3; 47.3, 47.4
Behavioral Ecology	Ch. 50, 51
Demography; Population Growth	Ch. 52.1; Bioskills 7
Limits to Populations, Population Dynamics	Ch. 52.2-52.4
Species Interactions; Community Structure	Ch. 53.1-53.2
Thanksgiving Break	
Community Dynamics	Ch. 53.3-53.4
Energy Flow in Ecosystems	Ch. 54.1

Global Biogeochemical Cycles	Ch. 54.2
Human Impacts on Global Ecosystems	Ch. 54.3
Biodiversity	Ch. 55.1-55.2
Human Impacts on Global Biodiversity: Extinction and Species Conservation	Ch. 55.3-55.4