EASTERN ARIZONA COLLEGE
General Biology I
Course Design
2013-2014

Course Information
Division: Science
Course Number: BIO 181 (SUN# BIO 1181)
Title: General Biology I
Credits: 4
Developed by: David J. Henson
Lecture/Lab Ratio: 3 Lecture/3 Lab
Transfer Status

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Activity Course: No
CIP Code: 26.0100
Assessment Mode: Pre/Post Test (50 Questions/100 Points)
Semester Taught: Fall
GE Category: Lab Science
Separate Lab: Yes
Awareness Course: No
Intensive Writing Course: No

Prerequisites
ENG 091 with a grade of “C” or higher or reading placement test score as established by District policy

Description
Designed for Biology majors. Principles of structure and function of living things at molecular, cellular, and organismic levels of organization. One year of high school chemistry or one semester of college level chemistry recommended.

Supplies
None
Competencies and Performance Standards

1. Identify characteristics of living organisms

   Learning objectives
   What you will learn as you master the competency:
   a. Identify the molecular constituents of living organisms
   b. Describe the role of energy in the process called life
   c. Define terms which are used to characterize the living process
   d. Identify contributions to the diversity of life

   Performance Standards
   You will demonstrate your competence:
   o through class discussion
   o on an objective test
   Your performance will be successful when:
   o learner lists some of the major molecular constituents found in living organisms
   o learner is able to describe the role energy plays in the process of life
   o learner is able to describe the role energy plays in the process of life
   o learner identifies contributions to the diversity of life

2. Identify some basic chemical principles

   Learning objectives
   What you will learn as you master the competency:
   a. Identify the organization and characteristics of matter
   b. Identify the structure of atoms
   c. Identify the nature of chemical bonds
   d. Identify the properties of water
   e. Identify the properties of pH, acids, bases, salts and buffers

   Performance Standards
   You will demonstrate your competence:
   o through class discussion
   o on an objective test
   Your performance will be successful when:
   o learner identifies the organization and characteristics of matter
   o learner identifies the structure of atoms
   o learner identifies the nature of chemical bonds
   o learner identifies the properties of water
   o learner identifies the properties of pH, acids, bases, salts and buffers

3. Identify characteristics of biological compounds

   Learning objectives
   What you will learn as you master the competency:
   a. Identify properties of organic compounds
b. Identify some carbohydrates and their properties
c. Identify some lipids and their properties
d. Identify some proteins and their properties
e. Identify some nucleotides and their properties

**Performance Standards**

You will demonstrate your competence:

- through class discussion
- on an objective test

Your performance will be successful when:

- learner identifies properties of organic compounds
- learner identifies some carbohydrates and their properties
- learner identifies some lipids and their properties
- learner identifies some proteins and their properties
- learner identifies some nucleotides

4. **Identify cell structure and function**

**Learning objectives**

What you will learn as you master the competency:

a. Identify basic aspects of cell structure and function
b. Identify features of eukaryotic cells
c. Identify features of the nucleus
d. Identify features of the cytomembrane system
e. Identify features of the cytoskeleton system
f. Identify features of the specialized plant organelles
g. Identify features of cell walls and cell junctions
h. Identify features of prokaryotic cells

**Performance Standards**

Your performance will be successful when:

- through class discussion
- on an objective test
- on a lab practical

Criteria - Performance will be satisfactory when:

- learner identifies basic aspects of cell structure and function
- learner identifies features of eukaryotic cells
- learner identifies features of the nucleus, cytomembrane system, cytoskeletal system
- learner identifies features of specialized plant organelles, cell walls and cell junctions
- learner identifies features of prokaryotic cells
5. Identify cell membrane structure and function

Learning objectives
What you will learn as you master the competency:
a. Identify protein and lipid features of the cell membrane
b. Describe principles of diffusion
c. Describe principles of diffusion across cell membranes (osmosis)
d. Describe principles of active transport

Performance Standards
You will demonstrate your competence:

- through class discussion
- on an objective test
- on a lab practical

Your performance will be successful when:

- learner identifies protein and lipid features of the cell membrane
- learner describes principles of diffusion
- learner describes principles of diffusion across cell membranes (osmosis)
- learner describes principles of active transport

6. Identify principles of cell division

Learning objectives
What you will learn as you master the competency:
a. Identify types of cell division
b. List stages and features of mitosis
c. List stages and features of meiosis
d. List stages and features of gamete formation

Performance Standards
You will demonstrate your competence:

- through class discussion
- on an objective test
- on a lab practical

Your performance will be successful when:

- learner identifies types of cell division
- learner lists stages and features of mitosis
- learner lists stages and features of meiosis
- learner lists stages and features of gamete formation

7. Identify ground rules of metabolism

Learning objectives
What you will learn as you master the competency:
a. Identify general features of energy
b. Identify some major energy related molecules in cells
c. Identify features of major energy related molecules in cells

d. Identify some features of photosynthesis

**Performance Standards**

*You will demonstrate your competence:*

- through class discussion
- on an objective test
- on a lab practical

*Your performance will be successful when:*

- learner identifies general features of energy
- learner identifies some major energy related molecules in cells
- learner identifies features of major energy related molecules in cells
- learner identifies features of photosynthesis

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8. **Identify mechanisms of energy releasing pathways**

**Learning objectives**

*What you will learn as you master the competency:*

a. Compare aerobic and anaerobic pathways
b. Identify features of glycolysis, Kreb's cycle and electron transport phosphorylation
c. Describe processes of acquiring energy from fats and lipids

**Performance Standards**

*You will demonstrate your competence:*

- through class discussion
- on a laboratory practical
- on an objective test

*Your performance will be successful when:*

- learner compares aerobic and anaerobic pathways
- learner identifies features of glycolysis, Kreb's cycle and electron transport phosphorylation
- learner describes processes of acquiring energy from fats and lipids

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9. **Identify basic tenets of inheritance and genetics**

**Learning objectives**

*What you will learn as you master the competency:*

a. Identify Mendelian principles and theories of segregation and independent assortment
b. Identify examples of non-Mendelian genetics
c. Describe features of chromosomes and chromosomal inheritance
d. Describe patterns of autosomal and sex-linked inheritance
e. Describe changes in chromosomal number and structure and their effects

**Performance Standards**

*You will demonstrate your competence:*

- through class discussion
- on an objective test
on a laboratory practical

Your performance will be successful when:

- learner identifies Mendelian principles and theories of segregation and independent assortment
- learner identifies examples of non-Mendelian genetics
- learner describes features of chromosomes and chromosomal inheritance
- learner describes patterns of autosomal and sex-linked inheritance
- learner describes changes in chromosomal number and structure and their effects

10. Identify DNA structure and functions

Learning objectives

What you will learn as you master the competency:

a. Identify historical events leading to discovery of DNA structure and function
b. Identify DNA structure
c. Identify DNA replication and repair
d. Identify DNA transcription and translation
e. Identify types and effects of DNA mutation
f. Identify prokaryotic gene controls
g. Identify eukaryotic gene controls
h. Identify chromosomal gene control
i. Identify examples of natural DNA, recombination and genetic engineering

Performance Standards

You will demonstrate your competence:

- through class discussion
- on an objective test
- on a laboratory practical

Your performance will be successful when:

- learner identifies DNA structure and functions

Types of Instruction

Classroom Presentation
On Campus Laboratory and clinicals

Grading Information

Grading Rationale

Laboratory Work - 30%
Lecture Tests - 50%
Post Test - 10%
**Grading Scale**

A  90-100%
B  80-89%
C  70-79%
D  60-69%
F  Below 59%