

Washtenaw Community College Comprehensive Report

BIO 101 Concepts of Biology

Effective Term: Fall 2013

Course Cover

Division: Math, Science and Health

Department: Life Sciences

Discipline: Biology

Course Number: 101

Org Number: 12100

Full Course Title: Concepts of Biology

Transcript Title: Concepts of Biology

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Course description

Rationale: Revise course description to differentiate it from BIO 161 & 162.

Proposed Start Semester: Fall 2013

Course Description: Basic principles and concepts of biology are surveyed in lecture and laboratory. Emphasis is placed on biological processes as well as practical applications including (but not limited to) major units on chemistry, cells, genetics, cellular energy, kingdoms, reproduction, ecology, evolution and laboratory skills. This course serves as an introduction to biology for non-science students and may be used as a prerequisite for other biology courses.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 Student: 45

Lab: Instructor: 45 Student: 45

Clinical: Instructor: 0 Student: 0

Total Contact Hours: Instructor: 90 Student: 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Prerequisite

Academic Reading and Writing Levels of 6

General Education

MACRAO

MACRAO Science & Math

MACRAO Lab Science Course

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

Assessment 1

Assessment Tool: Five core questions per test will be used throughout all sections and an item analyses will be done on these questions for objectives 1-54.

Assessment Date: Winter 2014

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: 50-100% (randomly selected)

How the assessment will be scored: item analysis of selected unit test questions.

Standard of success to be used for this assessment: 75% of answers are correct for each outcome.

Who will score and analyze the data: department faculty.

2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.

Assessment 1

Assessment Tool: Five core questions per test will be used throughout all sections and an item analyses will be done on these questions for objectives 1-54.

Assessment Date: Winter 2014

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: 50-100% (randomly selected)

How the assessment will be scored: item analysis of selected unit test questions.

Standard of success to be used for this assessment: 75% of answers correct for each outcome.

Who will score and analyze the data: department faculty.

3. Recognize proper use of laboratory equipment.

Assessment 1

Assessment Tool: Lab exam questions.

Assessment Date: Winter 2014

Assessment Cycle: Every Three Years

Course section(s)/other population: all

Number students to be assessed: 50-100% (randomly selected)

How the assessment will be scored: item analysis of selected questions.

Standard of success to be used for this assessment: 75% of questions correct.

Who will score and analyze the data: department faculty.

Course Objectives

1. Identify each of the characteristics that distinguish living from non-living things.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
2. Identify the function of the scientific method; each of the steps of the scientific method and the reason for doing a control experiment.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
3. Recognize the structure of an atom and the characteristics and functions of each part.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
4. Recognize the definitions of terms that relate to atoms.

Matched Outcomes

5. Identify the six most significant biological elements, their chemical symbols and atomic numbers.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
6. Identify the characteristics of ionic and covalent bonding and where they occur.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
7. Recognize the differences between molecular (chemical) and structural formulas and how they are written.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.
8. Recognize the characteristics and structure of water and how they relate to polarity and hydrogen bonds.

Matched Outcomes

9. Identify the process of ionization and how it relates to pH measurement and the difference between acids and bases.

Matched Outcomes

10. Identify the chemical formulas of common functional groups and the molecules that contain them.

Matched Outcomes

2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.
11. Recognize the processes of dehydration synthesis (condensation) and hydrolysis.

Matched Outcomes

2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.
12. Identify the functions and structures of the different types of carbohydrates, lipids, proteins and nucleic acids.

Matched Outcomes

2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.
13. Recognize the four levels of protein structure and how this affects function.

Matched Outcomes

2. Identify basic processes, theories and principles of chemistry, cells, genetics and cellular energy.
14. Identify the three components of the cell theory.

Matched Outcomes

1. Recognize basic concepts relating to: characteristics of living things, chemistry, cells and cellular energy, genetics, human reproduction, kingdoms, ecology and evolution.

15. Identify the differences and similarities between prokaryotic and eukaryotic cells and between plant and animal cells.
Matched Outcomes
16. Recognize the structures and their functions of prokaryotic and eukaryotic cells.
Matched Outcomes
17. Identify the structures and functions of the cell (plasma) membrane.
Matched Outcomes
18. Identify the methods and mechanisms of all types of movement of materials in or out of cells.
Matched Outcomes
19. Identify each stage of the cell cycle and recognize all of the processes and functions of each stage.
Matched Outcomes
20. Identify the processes and functions of meiosis I and meiosis II.
Matched Outcomes
21. Identify the differences between the overall processes of mitosis and meiosis.
Matched Outcomes
22. Identify the basic structure of chromosomes and all the steps in the process of DNA synthesis.
Matched Outcomes
23. Recognize the definitions of the following terms: homologous chromosomes, haploid ($1n$), diploid ($2n$), alleles, crossing over, genetic recombination, independent assortment, spermatogenesis, oogenesis, zygote, somatic cells, gametes, sexual and asexual reproduction.
Matched Outcomes
24. Recognize the definitions of the following terms: gene, locus, dominant, recessive, genotype, phenotype, heterozygous, homozygous, incomplete dominance, codominance, epistasis, pleiotropy, and polygenic traits.
Matched Outcomes
25. Recognize Punnett squares for monohybrid or dihybrid crosses of complete dominance, incomplete dominance or codominance.
Matched Outcomes
26. Identify the differences between sex chromosomes and autosomes; the genetic determination of gender in humans and the genotypes of normal human females and males.
Matched Outcomes
27. Identify sex-linked diseases and other selected genetic diseases and Punnett squares regarding sex-linked characteristics.
Matched Outcomes
28. Identify the following chromosomal aberrations: deletions, duplications, inversions, translocations, nondisjunctions leading to polyploidy and Down's syndrome.
Matched Outcomes
29. Identify all of the components and the steps involved in the process of protein synthesis.
Matched Outcomes
30. Recognize the definitions of the following terms: energy, work, kinetic energy, potential energy, metabolism, oxidation and reduction.
Matched Outcomes
31. Identify the first and second Laws of Thermodynamics.
Matched Outcomes
32. Identify the structure, characteristics and functions of protein enzymes.
Matched Outcomes
33. Identify all of the components, processes and end products of photosynthesis, and why photosynthesis is important for life on earth.
Matched Outcomes
34. Identify all of the components, processes and end products of anaerobic (fermentation) and aerobic (cellular) respiration.
Matched Outcomes

35. Recognize the sequence of taxons in classifying organisms, the binomial system of nomenclature, the names of the three domains and the five kingdoms, and the classification of humans.
Matched Outcomes
36. Recognize the structures, functions and reproduction of viruses and the characteristics of bacteriophages, retroviruses, viroids and prions.
Matched Outcomes
37. Identify the different kinds of Protists, their characteristics, functions, negative and positive effects.
Matched Outcomes
38. Identify the different types of Fungi and their characteristics.
Matched Outcomes
39. Identify the major groups of the plant kingdom and their characteristics and the description of the phrase "alteration of generations."
Matched Outcomes
40. Recognize the life cycles of the mosses, ferns, gymnosperms and the terms gametophyte and sporophyte.
Matched Outcomes
41. Recognize the structures of plants and their functions.
Matched Outcomes
42. Identify the following: structures and functions of a flower, the process of double fertilization, the process of pollination, seed dispersal, plant hormones, seed and fruit development.
Matched Outcomes
43. Recognize the characteristics of animals, the main types of body symmetry, the types of digestive systems, the types of body support systems, and the terms cephalization, coelom formation and segmentation.
Matched Outcomes
44. Identify the members and features of the following animal phyla: Porifera, Cnidaria, Platyhelminthes, Nematoda, Rotifera, Mollusca, Annelida, Arthropoda, Echinodermata, and Chordata (including the Chordate classes and the orders of the class Mammalia).
Matched Outcomes
45. Identify the structures and functions of both the human male and the human female reproductive systems including the functions of hormones on each system.
Matched Outcomes
46. Recognize the process of fertilization in humans including the formation of egg and sperm.
Matched Outcomes
47. Identify the stages of development of a human embryo and the different germ layers that result from gastrulation and what each will eventually become.
Matched Outcomes
48. Recognize the causes and characteristics of the various STD's.
Matched Outcomes
49. Recognize the definitions of the following terms: biosphere, lithosphere, hydrosphere, atmosphere, ecosystem, biotic, abiotic, trophic levels, food web, primary producers, autotrophs, primary consumers, heterotrophs, secondary consumers, tertiary consumers, decomposers, detritivores, community, population, habitat, and niche.
Matched Outcomes
50. Identify examples of predator adaptations, plant defenses, animal defenses, warning coloration, camouflage, Batesian mimicry and Mullerian mimicry.
Matched Outcomes
51. Identify the different types of species interactions, including competition, predator-prey, and symbiosis (commensalism, mutualism, parasitism).
Matched Outcomes
52. Recognize the two main observations that led Darwin to the concept of natural selection.
Matched Outcomes
53. Identify the processes involved in the study of microevolution and the biological species concept.

Matched Outcomes

54. Recognize the importance of the Theory of Evolution in the study of biology and the different techniques that scientists use to provide evidence that evolution occurs.

Matched Outcomes

55. Identify each part and its function for the dissection microscope and the compound light microscope.

Matched Outcomes

3. Recognize proper use of laboratory equipment.

56. Demonstrate proper usage of both microscopes to locate specific organisms on slides.

Matched Outcomes

3. Recognize proper use of laboratory equipment.

57. Demonstrate the correct technique in handling prepared slides and in making wet-mount slides of living organisms and in using the compound light microscope to measure objects being observed.

Matched Outcomes

3. Recognize proper use of laboratory equipment.

58. Demonstrate the proper care of the microscopes.

Matched Outcomes

3. Recognize proper use of laboratory equipment.

59. Perform the steps of the scientific method in the Scientific Method Lab.

Matched Outcomes

3. Recognize proper use of laboratory equipment.

New Resources for Course

Course Textbooks/Resources

Textbooks

Johnson, G., Losos, J.. *Living World*, 6 ed. McGraw Hill, 2010

Manuals

Strayer, R.. Concepts of Biology Lab Manual, Hayden McNeil, 09-10-2010

Periodicals

Software

Equipment/Facilities

Reviewer

Action

Date

Faculty Preparer:

Anne Heise

Faculty Preparer

Mar 21, 2013

Department Chair/Area Director:

Anne Heise

Recommend Approval

Mar 21, 2013

Dean:

Martha Showalter

Recommend Approval

Mar 22, 2013

Vice President for Instruction:

Bill Abernethy

Approve

Apr 11, 2013