

# Concepts of Biology

Bio 101



Fall, 2009

This course provides a brief overview of the field of biology. It is designed primarily for students who are not majoring in the sciences and fulfills the Scientific Discovery Intellectual Perspectives requirement. Scientific knowledge is attained through curiosity and a desire to explore. During the semester, we will explore ways of observing and thinking about fundamental biological topics (cells, genetics, evolution, ecology, etc.) using a combination of lectures, laboratory exercises, and assignments. Various resources in lecture and the laboratory will be used to reinforce important biological concepts, enhance the learning experience, develop practical abilities, and to improve critical thinking skills.

**INSTRUCTOR** Dr. Ann Throckmorton, Professor of Biology

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Office hours: 10:30-11:30 Monday, Friday

9:20-10:50 Tuesday

*or by appointment*

**LECTURE** 11:00-12:30, Tuesday/Thursday 150 Hoyt Science Center

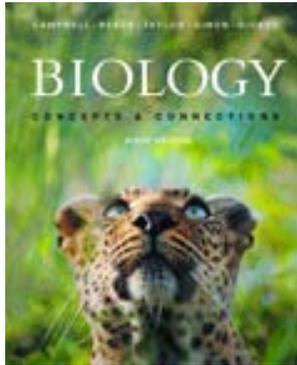
Attendance in lecture is expected, and 5% of your grade in the class is based on attendance and participation. Attendance also affects your grade indirectly, through your grades on exams and labs. Because of this, you should make an effort to be present at all class sessions. If you know ahead of time that you will miss class, let me know so we can make arrangements for you to attend another lecture section. Absence may be excused for personal emergencies or health-related problems. If you miss class, it is your responsibility to contact me and to obtain notes, information, and assignments that were given during your absence.

LABORATORY 2:00-5:00 Thursday

315 Hoyt Science Center

Attendance in laboratory is required. You must notify me ahead of time if you know that you cannot be in lab so we can make arrangements for you to attend another lab section. Any missed group work must be made up independently and will be graded on an individual basis.

**REQUIRED  
MATERIALS**



**Textbook:** *Biology: Concepts and Connections*, 6<sup>th</sup> edition (© 2009), by Campbell, Reece, Taylor, Simon, and Dickey. Benjamin Cummings Publisher

**Lab book:** There is no lab manual for this course and you will not need a blank lab book. All lab exercises will be saved on the course r-drive; you are responsible for printing them to bring to lab each week.

**PURPOSE OF THIS COURSE**

1. To teach fundamental concepts of biology through the presentation of conceptual knowledge coupled with investigative laboratory experiences.
2. To give insight into the complex nature of biological relationships at the molecular, cellular, organismal, population, and ecosystem level.
3. To investigate the factors that determine the function, behavior, distribution, and abundance of living things. To discover general principles that shape the living world.
4. To demonstrate how the scientific method works, how it is used to attain scientific knowledge, and what its abilities and limitations are.
5. To present some of the methods used in the biology laboratory and to show how they are used to develop, test, and investigate theories. This includes:
  - a. development of a familiarity with the types of information used by biologists;
  - b. the use of experimental methods of observation and measurement.
  - c. collection and analysis of data using appropriate techniques; and
  - d. development of conclusions based on data analysis.
6. To give an awareness of the many ways that biology affects humans and how, in turn, humans affect the world around them, both positively and negatively. To help students become better citizens and teachers of science by increasing their ability to make informed decisions regarding current and future scientific discoveries.

## METHODS OF INSTRUCTION

1. **Lectures and discussion:** These will follow the schedule printed below. I expect you to attend class, pay attention, and participate actively in discussions by answering questions, asking questions, and making comments. Always bring your textbook to lecture.
2. **Reading:** The textbook provides a good general introduction to the field of biology at a level appropriate to non-majors. Most of the topics that we will approach in the class are covered by the book. Thus, it will serve to augment lecture and to provide material for discussion. Being prepared is a key to success in this course. Assigned reading should be completed before coming to class or lab. Take notes on your reading and keep track of any questions that arise for later clarification in class or during office hours.
3. **Laboratories and pre-lab quizzes:** Labs are a very important part of this course. The laboratory exercises will parallel what we are discussing in lecture, to increase your understanding of certain topics and to give you a different perspective on them. Lab exercises will also teach you new concepts and important skills. You should read lab handouts prior to each lab to prepare you for a short pre-lab quiz, designed to test your understanding of the most important concepts to be covered in lab and the techniques to be used. For most lab activities, you will fill out laboratory worksheets to be handed in and graded.
4. **Exams:** Periodic lecture exams will allow you to assess your progress in learning the information presented in the class. There will be four exams in this course. Each will be over material contained in four to six chapters. The final exam will not be cumulative. You should expect multiple choice, short answer, and essay questions on the exams; matching, true/false, and fill-in-the-blank questions may occasionally appear.
5. **Seminars:** Throughout the semester, you will have the opportunity to attend numerous seminars given by Westminster biology faculty or off-campus professionals in the field of biology. You are required to attend two of those seminars. After each seminar, you will submit a one to two page summary of the talk, ending in a paragraph in which you describe your personal reaction to the topic or presentation.
6. **Additional resources:** Take advantage of your resources. Feel free to drop by my office or e-mail me any time you have questions or concerns. If you want, we may have weekly study sessions to answer questions and go over lecture and lab material. I will also post study aids on the r-drive, including outlines and objectives for each chapter. Your fellow students are another potential resource. Some students find studying in groups to be an effective learning strategy. You may also take advantage of a free tutoring service provided by upper-class biology majors in Beta Beta Beta, Westminster's biology honorary society.

## GRADING

Grades will be based on exams, pre-lab quizzes, lab worksheets, attendance and participation, and seminar summaries, weighted as follows:

Exams (four)	= 50% of your final grade
Pre-lab quizzes	= 10% of your final grade
Lab worksheets	= 30% of your final grade
Attendance and participation	= 5% of your final grade
Seminars	= 5% of your final grade

Your final grade in the course will be based on the following scale:

Above 93%: A	87%-90%: B+	77%-80%: C+	67%-70%: D+	below 60%: F
90%-93%: A-	83%-87%: B	73%-77%: C	63%-67%: D	
	80%-83%: B-	70%-73%: C-	60%-63%: D-	

## POLICY ON EXAMS AND ASSIGNMENTS

All assignments must be turned in by 5:00 p.m. on the day that they are due unless you are absent the day that the assignment was due and had a valid excuse. Valid excuses include such things as serious illness or injury and personal and family emergencies. Points will be subtracted from assignments turned in late. Occasionally, assignments may be due in class but I will let you know ahead of time if this happens.

You may turn in assignments in three ways:

1. hard copy: the least desirable method. Hand the paper to me, slide it under my office door, or give it to someone to deliver. *Do not use campus mail.*
2. in the Assignments folder on the course r-drive: if you save a file to the r-drive, the name of the file must contain your name and some indication of what it contains (*e.g.*, the name of the file could be "Smith, Assignment 5"). If you try to save directly to the r-drive, the network will only write a blank temporary file and you will lose all of your work. You must first save the file to another drive, then save it to the r-drive. Once you have saved something to the Assignments folder you will be unable to retrieve it, open it, or delete it.
3. as an e-mail attachment: Again, the name of the file must contain your name and some indication of what it contains. You can find out if I have received your messages by looking in the Sent Items folder in your mailbox.

## ACADEMIC INTEGRITY

Academic integrity is central to the purpose and pursuit of any academic community. In this class, I expect you to adhere to the principles of academic integrity stated in the Westminster College handbook and to maintain the highest standards of academic honesty, in keeping with the philosophy and purposes of the College.

“Academic dishonesty is a profound violation of this expected code of behavior. It can take several forms, including, but not limited to, plagiarism, cheating, purposely altering the work of another (without that person’s permission), misrepresentation of attendance in class or at a College event, misrepresentation of work, facts or experimental results, unauthorized use of or intentional intrusion into another's computer files and/or programs, intentional damage to a computer system, unauthorized use of library materials and privileges, or engaging in any activity which attempts to alter or harm another’s academic standing.”

You must always guard against potential plagiarism. Plagiarism includes copying information from others in the class, extensive quoting, paraphrasing, or copying from any other source (books, articles, websites, other students’ work, or class material), incorrect or inadequate citation of quotes, data, ideas, or images, and directly copying experiments or research projects that have been developed by another student or published by another researcher. I encourage you to work together and discuss your assignments with other students, but all material that you turn in must be your own work.

Quotes, data, graphs, photographs, or ideas taken from another source must be cited correctly. If you have any doubts about whether you need to cite a source, you must ask. All electronic assignments that you turn in will be submitted to Turnitin.com, an on-line plagiarism detection and prevention tool. In accordance with College policy, if there is plagiarism in one of your assignments, you will receive a score of zero for that assignment and a written report will be sent to the Dean of Academic Affairs. More than one incident of plagiarism in the course may result in your being awarded an F.

## TENTATIVE LECTURE SCHEDULE

<b>Date</b>	<b>Lecture topic</b>	<b>Reading</b>
September 1	Introduction to the course Chapter 1: The process of biology	section 1.1-1.6 (pp. 1-9)
September 3	Chapter 1: Biology and everyday life Chapter 2: The chemical basis of life	section 1.9-1.10 (p. 12) section 2.1-2.10 (pp. 17-24)
September 8	Chapter 2: The chemical basis of life Chapter 3: The molecules of cells	section 2.11-2.18 (pp. 25-29) section 3.1, 3.3, 3.17 (pp. 33-34, 36, 47)
September 10	Chapter 3: The molecules of cells	section 3.8, 3.11-3.12, 3.16 (pp. 40, 42-43, 46-47)
September 15	Chapter 4: Tour of the cell	section 4.3-4.8, 4.13-4.17, 4.22-4.23 (pp. 55-59, 63-65, 68-69)
September 17	Chapter 5: The working cell	section 5.1, 5.3-5.6, 5.8-5.9 (pp. 73-74, 75-77, 78-79)
<b>September 22</b>	<b>Exam #1</b>	
September 24	Chapter 5: The working cell Chapter 6: How cells harvest chemical energy	section 5.10-5.13 (pp. 80-83) section 6.1-6.6, 6.13-6.16 (pp. 89-93, 101-103)
September 29	Chapter 7: Photosynthesis	section 7.1, 7.5-7.6, 7.11, 7.13 (pp. 107-108, 111-112, 117, 119)
October 1	Chapter 8: Cellular basis of reproduction and inheritance	section 8.1-8.8, 8.10-8.15, 8.17, 8.19-8.24 (pp. 125-133, 135-140, 142, 144-147, 148)
October 6	Chapter 9: Patterns of inheritance	section 9.1-9.6 (pp. 153-159)
October 8	Chapter 9: Patterns of inheritance	section 9.9, 9.11-9.15, 9.20-9.23 (pp. 162-163, 166-170, 174-177)
October 13	Chapter 10: Molecular biology of the gene	section 10.2-10.4, 10.6-10.8, 10.10, 10.15-10.16, 10.17-10.21 (pp. 184-188, 190-192, 194, 198-199, 200-203)
<b>October 15</b>	<b>Exam #2</b>	
<b>October 17 through 20</b>	<b>Mid-semester break</b>	

<b>Date</b>	<b>Lecture topic</b>	<b>Reading</b>
October 22	Chapter 13: How populations evolve	section 13.1-13.8 (pp. 255-265)
October 27	Chapter 13: How populations evolve	section 13.11-13.15, 13.17 (pp. 268-272, 273)
October 29	Chapter 14: The origin of species	section 14.1-14.2, 14.4, 14.10-14.11 (pp. 277-279, 282, 288-289)
November 3	Chapter 15: Tracing evolutionary history	section 15.1-15.6, 15.9-15.10, 15.13-15.15 (pp. 293-298, 302-304, 307-309)
November 5	Chapter 16: Prokaryotes and protists	section 16.1-16.6, 16.8-16.11, 16.20-16.21 (pp. 318-325, 327-330, 336-337)
November 10	Chapter 17: Plants and fungi	section 17.1-17.3, 17.10-17.14, 17.18-17.21 (pp. 341-346, 352-355, 359-361)
November 12	Chapter 18: Evolution of invertebrate diversity	section 18.1-18.4, 18.11-18.12, 18.14-18.15 (pp. 365-369, 378-381, 383-384)
November 17	Chapter 19: Evolution of vertebrate diversity	section 19.1-19.3, 19.5-19.11 (pp. 388-393, 396-403)
<b>November 19</b>	<b>Exam #3</b>	
November 24	Chapter 34: The biosphere	section 34.1-34.4, 34.6-34.17 (pp. 680-685, 688-697)
<b>November 25-</b>	<b>Thanksgiving break</b>	
December 1	Chapter 36: Population ecology	section 36.1-36.7, 36.9, 36.11 (pp. 724-733, 734-735, 736-737)
December 3	Chapter 37: Communities and ecosystems	section 37.1-37.9, 37.12-37.18, 37.22 (pp. 741-747, 750-755, 758)
December 8	Chapter 38: Conservation biology	section 38.1-38.11 (pp. 763-774)
December 10	Chapter 38: Conservation biology	section 38.15 (p. 779)
<b>December 15</b>	<b>Reading Day</b>	
<b>December 16, 11:30-2:00</b>	<b>Exam #4</b>	

TENTATIVE LABORATORY SCHEDULE

Date	Laboratory topic	Reading
September 3	No lab this week	
September 10	Lab 1: Scientific methodology	section 1.7-1.8 (pp. 9-11)
September 17	Lab 2: Microscopes and cells	section 4.1-4.2 (pp. 51-54)
September 24	Lab 2 continued: Microscopes and	
October 1	Lab 3: Enzyme kinetics	section 5.14-5.16 (pp. 84-85)
October 8	Lab 4: Mitosis and DNA	section 8.6-8.7, 8.11 (pp. 130-132, 136)
October 15	Lab 5: Corn genetics	section 9.5 (pp. 158-159)
October 22	No lab this week	
October 29	Lab 6: Natural selection	section 13.2, 13.11-13.13 (pp. 258, 268-270)
November 5	Lab 7: Phylogeny	section 15.14, 15.16 (pp. 308-311)
November 12	Lab 8: Fossils	section 15.5-15.6 (p. 298)
November 19	Lab 9: Effect of the environment on organisms	section 32.4 (p. 647)
November 26	No lab this week	
December 3	Lab 10: Population ecology	section 36.4-36.6 (pp. 728-731)
December 10	Lab 11: Composting (meets at the Field Station)	