

Biology 3300 – Survey of Basic Sciences



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Office hours: Mon-Thur 10 AM – noon. Other times by appointment.

Required Texts: Tolman, Marvin N. 2002. *Discovering Elementary Science: Methods, Content and Problem-Solving Activities*, 3rd Ed. Allyn & Bacon, Boston, MA 560 pp.
Wikibooks.org Look for [Science: An Elementary Teacher's Guide](#)

Student Learning Outcomes: There are six broad goals for this course. Basic Survey of Sciences students will:

- Review and practice teaching theories and methodologies of elementary instruction as they pertain to elementary science.
- Demonstrate understanding of basic Physics principles such as matter, energy, light, sound, electricity and magnetism after discussions of such topics.
- Demonstrate understanding of Earth Science subjects such as weather, seasons, climate, and plate tectonics after discussions of such topics.
- Comprehend basic categorization and organization of animal, plant, and other life, after discussions of such topics.
- Comprehend basic organization and functioning of the human body, after discussions of such topics.
- Understand and be able to carry out a wide variety of demonstrations and experiments suitable for elementary students.

Attendance and Participation:

Class will be a time of discussion, demonstration, and collaborative learning. I will provide links to some instructional videos on the various topics, plus you have your book and other resources, so come to class having already studied the topic of the day, thus leaving more time for demonstrations, question/answer, and collaborative learning. I will communicate by sending out announcements over Blackboard, so please check regularly (notices of announcements will be sent to your school email account).

This class has not changed for many years, but this semester we will work together to make some big changes, including writing a new textbook that you can later use as a teacher. You will still have exams based on lectures, notes, textbook and assigned web page readings, but we will be shifting the focus away from exams to more comprehensive methods of assessment.

Semester Overview (exact dates and topics subject to change)

Date	Topic(s)
Aug. 22	Ch 1: History and Goals
Aug. 24	Ch 2: Principles of Learning
Aug. 29	Ch 3: Problem Solving and Research
Aug. 31	Ch 4: Questioning
Sept. 5	<i>Labor Day Holiday—No Classes</i>
Sept. 7	EXAM I – Chapters 1 – 4
Sept. 12	Ch 13: Energy and the Nature of Matter
Sept. 14	Ch 14: Heat
Sept. 19	Ch 15: Light and Electromagnetic Waves
Sept. 21	Review Chapters 13-15 for Test II Prep
Sept. 26	Exam II – Chapters 13 – 15
Sept. 28	Ch 16: Sound
Oct. 3	Ch 17: Electricity and Magnetism
Oct. 5	Ch 18: Machines
Oct. 10	Review Chapters 16-18 for Test III Prep
Oct. 12	Exam II – Chapters 16 – 18
Oct. 17	Ch 9: The
Oct. 19	Ch 19: The
Oct. 24	Ch 20: The Cytoskeleton and Cell Movement
Oct. 26	Review Chapters 9, 19, 20 for Test IV Prep
Oct. 31	Exam IV – Chapters 9, 19, 20
Nov. 2	Ch 10: Animals
Nov. 7	Ch 11: Plants
Nov. 9	Ch 12: The Human Body
Nov. 14	Review Chapters 10-12 for Test V Prep
Nov. 16	Exam V – Chapters 10-12
Nov. 21	Comprehensive Review & Book Editing
Nov. 23	<i>Thanksgiving Holidays – No Classes</i>
Nov. 28	Comprehensive Review & Book Editing
Nov. 30	Comprehensive Review & Book Editing
Dec. 7 (Wed)	Comprehensive Final 2:00-5:00 PM

Tentative Lecture Schedule

(Note: exact dates are subject to change; be sure to keep abreast of changes).

For summer the course is greatly compressed. What normally takes 3 weeks will be done in 1.

UNIT 1—THEORY & METHODOLOGY

In this section the following Science Generalist Standards will be addressed:

The science teacher:

- Standard I:** manages classroom, field & laboratory activities to ensure the safety of all students & the ethical care & treatment of organisms & specimens
- Standard III:** knows & understands the process of scientific inquiry & its role in science instruction
- Standard IV:** has theoretical & practical knowledge about teaching science & about how students learn science
- Standard V:** knows the varied & appropriate assessments & assessment practices to monitor science learning

Introduction, Syllabus, Principles of Learning	Chapter 1 & 2
Problem Solving & Research	Chapter 3
Questioning	Chapter 4

Exam 1 (Chapters 1-4) Wednesday September 7, at the computer lab of your campus

UNIT 2—CONTENT & PROBLEM SOLVING

SECTION 1 – PHYSICAL SCIENCES

In this section the following Science Generalist Standards will be addressed:

The science teacher knows & understands:

- Standard VI:** the history & nature of science
- Standard VII:** how science affects the daily lives of students & how science interacts with & influences personal & societal decisions
- Standard VIII:** the science content appropriate to teach the statewide curriculum skills (TEKS) in physical sciences
- Standard XI:** the unifying concepts & processes that are common to all sciences

Energy & Matter	Chapter 13
Heat	Chapters 14
Light & Electromagnetic spectrum	Chapter 15

Exam 2 (Chapters 13, 14 & 15) Monday, September 26, at the computer lab of your campus

Sound	Chapter 16
Electricity and Magnetism	Chapter 17
Machines	Chapter 18

Exam 3 (Chapters 16, 17, & 18) Wednesday, October 12, at the computer lab of your campus

SECTION 2 – EARTH & SPACE SCIENCE

In this section the following Science Generalist Standards will be addressed:

The science teacher knows & understands:

- Standard II:** the correct use of tools, materials, equipment & technologies
- Standard VI:** the history & nature of science
- Standard VII:** how science affects the daily lives of students & how science interacts with & influences personal & societal decisions
- Standard X:** the science content appropriate to teach the statewide curriculum skills (TEKS) in Earth & space science
- Standard XI:** the unifying concepts & processes that are common to all sciences

The Environment	Chapter 9
Weather, Seasons & Climate	Chapter 19
The Earth	Chapter 20

Exam 4 (Chapters 9, 19, 20) Monday, October 31, at the computer lab of your campus

SECTION 3-LIFE SCIENCES

In this section the following Science Generalist Standards will be addressed:

The science teacher knows & understands:

- Standard VI:** the history & nature of science
- Standard VII:** how science affects the daily lives of students & how science interacts with & influences personal & societal decisions
- Standard IX:** the science content appropriate to teach the statewide curriculum skills (TEKS) in life science
- Standard XI:** the unifying concepts & processes that are common to all sciences

Animals	Chapter 10
Plants.	Chapter 11
The Human Body	Chapter 12

Exam 5 (Chapters 9, 19, 20) Wednesday, November 16, at the computer lab of your campus

Comprehensive Final Exam Wednesday, December 7, 2:00-5:00 PM at the computer lab of your campus

Grade assessment:

There will be **5 lecture** examinations, each worth 100 points, plus a comprehensive final worth 150 points. Additionally, you must contribute to the writing of 10 chapters of a new online textbook for 200 points (20 points per chapter).

Writing and Editing the New Textbook:

In addition to the taking tests, you will be earn points by improving this class for the benefit of future students. You will be writing and editing a wikibook, which will become the new textbook in Jan 2017. I would like at least one *meaningful* contribution on ten different chapters. These efforts will count as 20 points per chapter, or 200 points total (25% of your final grade). Each week we will decide who will be working on which chapters. Basic instructions will be given in class, and these instructions will be improved as we make progress.

Therefore, there are a total of 800 possible points during this course:

5 regular semester exams	500
Final exam	100
Wikibook writing	200
<u>Total</u>	<u>800</u>

Your final grade in this course will be determined by the cumulative number of points you earn. Your final grade will be determined by the following scale:

<u>Percent</u>	<u>Letter Grade</u>
90 – 100%	A
80 – 89.9%	B
70 – 79.9%	C
60 – 69.9%	D
< 60%	F

Exam questions will be drawn from information presented in lecture, information from your textbook, and through additional assigned websites and readings (see Assignments section of Blackboard). Exam questions will be multiple choice questions. No notes, books, cell phones, or other materials will be allowed during the exam. I will provide an English dictionary for your use if necessary. If you are an ESL student, please contact me to make arrangements for use of foreign language dictionaries and translators.

Study Tips:

Everyone has their own unique way of learning. How you study may have a larger impact on your learning than how much you study. If you use all the resources available to you and take an active role in the learning process you will likely do much better.

Some specific tips are:

- Spend 15 – 20 minutes to skim through each reading assignment before class.
- Review the lecture notes and read the assigned reading
- Try to draw diagrams from lecture and the book from memory
- Make flash cards or important concepts and terms
- Call up a friend and try to explain what you have learned in class
- ASK QUESTIONS! You are not in this class alone, if you don't understand something, more than likely your classmates also don't understand.
- Watch the video lectures I will provide and give me feedback whenever you are confused.

Americans with Disabilities Act (ADA):

Sul Ross State University is committed to equal access in compliance with the Americans with Disabilities Act of 1973. It is the student's responsibility to initiate a request for accessibility services. Students seeking accessibility services must contact Mary Schwartz, M. Ed., L.P.C., in Counseling and Accessibility Services, Ferguson Hall, Room 112. The mailing address is P.O. Box C-122, Sul Ross State University, Alpine, Texas 79832. Telephone: 432-837-8691. E-mail: mschwartz@sulross.edu

Academic Honesty:

Cheating will not be tolerated. The University expects all students to engage in all academic pursuits in a manner that is above reproach and to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. "Cheating" includes, but is not limited to:

- Copying from another student's test paper, a laboratory report, other report, or computer files, data listings, and/or programs.
- Using, during a test, materials not authorized by the person giving the test.
- Collaborating, without authorization, with another person during an examination or in preparing academic work.
- Knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of an unadministered test.
- Substituting for another student; permitting any other person; or otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit.
- Bribing another person to obtain an unadministered test or information about an unadministered test.
- Purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm. This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist.

Plagiarism will not be tolerated. "Plagiarism" means the appropriation and the unacknowledged incorporation of another's work or idea into one's own work offered for credit. This includes verbatim written answers by colleagues with whom you might discuss laboratory exercises. Plagiarism also includes copying information from internet resources. To avoid plagiarism, make sure you always use your own words to construct your written answers.