

Lane College
Course Syllabus for Teaching Elementary Science
Traditional Classes
Spring 2012

Course Number: BIO 330

Credit Hours: 3

Instructor: Dr. Larry E. Thompson

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Prerequisite: BIO131, PHY131, and EDU230

Rationale: The Lane College graduate will be able to communicate and acquire information in a variety of modes, organizing, comprehending, and making practical use of a wide variety of materials while at the same time applying knowledge in differing contexts. The graduate will also be cognizant of and appreciate cultural, racial, and religious diversity.

General Studies Goal: To develop in students the knowledge to discuss all living organisms, including (a) their similarities and differences, interdependence and environment; and (b) their principles that govern chemical, physical and biological interactions. To provide students with concepts that allow them to explain the methods of scientific investigation and utilize inquiry-based learning techniques.

Instructional Goals:

The goals of the course are designed to enable the student to develop competencies to:

- 1) develop an awareness of how students learn science concepts in order to create instructional materials and opportunities for students that are developmentally appropriate (INTASC #1 & 2 Content Knowledge).
- 2) observe students' performance in order to adapt curricular materials and instruction to meet the diverse needs of students (INTASC 3 & 7 Student Learning).
- 3) explore instructional strategies that promote science learning in order to develop motivational activities that encourage critical thinking and active involvement in learning (INTASC #4 & 5 Diverse Learners).
- 4) gain exposure to the use of CDROM, multimedia, and online technology in teaching science (INTASC #6 Communication Skills).
- 5) investigate various assessment techniques related to science instruction and to create, administer, and evaluate a performance based assessment activity for students (INTASC #8 Planning Process).
- 6) acquire initial experience with the role of collaboration and community involvement play in supporting student learning in science (INTASC #9 Reflection and Professional Development).
- 7) gain some exposure to the science education professional literature (INTASC 10 Partnerships).

Course Description: A discussion of current developments in both process and content and examination of new curriculum materials and involvement in learning experiences appropriate for elementary grades. This course includes experiences in working with audio-visual materials in presenting basic science concepts.

Key Concepts in Reference to General Education Outcomes:

- 1) Usage/Mechanics: student in this course will be competent in the usage of punctuation (e.g., commas, colons, semi-colons, dashes, parentheses, apostrophes, and quotation, question, and exclamation marks).
- 2) Rhetorical Skills: the student will be competent in organization of ideas and relevance to writing style.
- 3) Strategy: students will develop writing skills with appropriate usage of supporting materials and effective choice of statements of theme and purpose.
- 4) Analysis of Elements of Arguments: students will be able to identify essential elements of an argument, including hypotheses, premises, and conclusions.
- 5) Evaluation of Arguments: students will be able to evaluate information on the basis of its consistency, relevance, and accuracy.
- 6) Extension of Arguments: students will acquire skills in using given premises to reach related conclusions and recognize the scope of application of arguments.

Overview of Content: This course presents an overview of teaching elementary and secondary science and how teachers use science to create a classroom environment that enables children to learn in an inquiry-based classroom.

Key Concepts of the Course - Major Topics:

- 1) The nature of science
- 2) How children learn science
- 3) Improving science learning for diverse learners
- 4) Planning for the inquiry-based classroom
- 5) Inquiry methods that help learners construct understanding
- 6) Use of questions to foster scientific inquiry
- 7) Developing and using authentic assessment
- 8) Integrating technology that enriches science learning
- 9) Planning for and integrating science and other disciplines
- 10) Designing and managing a safe inquiry-based science classroom
- 11) Materials and resources that promote inquiry-based science

General Outline of Course Content (Tentative):

Date	Lecture Topic	Chapter in text
1 st Class	Introduction and Orientation; Cover syllabus, expectations, and begin working on “critical”	

	skills (to be continued daily throughout the semester).	
2nd Class	What is the nature of science?	Chapter 1
3rd Class	What is the nature of science?	Chapter 1
Week 2 16 - 20 Jan.	MLK Birthday; How do children learn science?; (First Writing Assignment Due)	Chapter 2
Week 3 23 - 27 Jan.	How can you improve science learning for diverse learners?; (Hourly Exam 1; Second Writing Assignment Due)	Chapter 3
Week 4 30 Jan. - 03 Feb.	How do you plan for the inquiry-based classroom?	Chapter 4
Week 5 06 - 10 Feb.	What inquiry methods help learners to construct understanding?	Chapter 5
Week 6 13 - 17 Feb.	How can you use questions to foster scientific inquiry?	Chapter 6
Week 7 20 - 24 Feb.	How do you develop and use authentic assessment?; (Mid-terms (Hourly Exam 2); Third Writing Assignment Due)	Chapter 7
Week 8 27 Feb. - 02 Mar.	How do you integrate technology that enriches science learning?	Chapter 8
Week 9 05 - 09 Mar.	How do you plan for and integrate science and other disciplines?	Chapter 9
Week 10 12 - 16 Mar.	How can you design and manage a safe inquiry-based science classroom?; (Hourly Exam 3; Fourth Writing Assignment Due)	Chapter 10
Week 11 19 - 23 Mar.	Spring Break	
Week 12 26 - 30 Mar.	What materials and resources promote inquiry-based science?	Chapter 11
Week 13 02 - 06 Apr.	Presentations and review; Labs; Easter	
Week 14 09 - 13 Apr.	Presentations and review; (Fifth Writing Assignment Due) ; Labs	
Week 15 16 - 20 Apr.	Labs; Senior Exit Exams (19 & 20)	
Week 16 24 - 27 Apr.	FINAL EXAM (Hourly Exam 4); Date TBA	
* Material covered and dates of coverage are subject to change.		

Methods of Instruction: The instructor will use the following methods of instruction: lectures, internet search, cooperative group work, AV presentations, readings and discussions, library work, individual/group projects, and in-class exercises.

General Requirements (Academic Integrity and Classroom Behavior):

- 1) Students must complete the following:
 - a) Four hourly tests will be administered as noted on the syllabus.
 - b) Chapter quizzes (tentative depending on Chapters actually covered) will be administered on regular basis.
 - c) Outline for each chapter covered in class.
 - d) Writing assignments covering topics as discussed in class.
 - e) Daily reading assignments.
 - f) Student Understanding Form.
- 2) Students are expected to attend class regularly and punctually. No unexcused absences will be accepted. Excessive absences will be reported to the Vice President of Academic Affairs.
- 3) All students must adhere to the formal dress code of Lane College. No head gear. Please no caps, hats, or rags.
- 4) Students are expected to read relevant portions of the textbook in preparation for lectures.
- 5) No food, drinks, or loud gum-chewing allowed in class.
- 6) No smoking or tobacco use is allowed inside the building.
- 7) **Cell phones** and electronic devices must be turned off in the classroom. In the event that you leave the classroom to answer a call, you will not be allowed to return. If the cell phone policy is violated, the instructor reserves the right to confiscate the phone and turn it over to the Vice President of Academic Affairs. The student must contact the Vice President of Academic Affairs to retrieve the phone.
- 8) No weapons, alcohol, or drugs are allowed campus-wide. This includes the classroom.
- 9) Cheating on exams, quizzes, copying another person's work, or plagiarizing are strictly forbidden.
- 10) Disruptive behavior will not be tolerated. Do not disrespect your colleagues or myself by disrupting class. If you disrupt the class, you will be asked to leave.
- 11) Students are expected to form and make use of study groups so as to minimally study one hour outside of class for every hour in class.
- 12) Any student receiving a grade of a "D" or lower on any quiz, test, or homework assignment will be required to attend study assistance sessions and to produce evidence of such attendance upon request of the instructor.

Expected Outcomes: By the completion of this course, students will understand the National and Tennessee Science Education Standards by stating, explaining, and demonstrating what all K-12 students should know and be able to do in an elementary and secondary science classroom

as indicated by their ability to:

- 1) recognize student's misconceptions about science and plan activities to address them.
- 2) utilize resources that promote the use of technology in the classroom to enhance science learning.
- 3) encourage students to recognize and develop their interests, talents, and abilities in scientific endeavors.
- 4) recognize that science has relevance for students in their everyday life.
- 5) evaluate safety rules and procedures on planning how to teach science lessons.
- 6) demonstrate science concepts through a project-based approach.
- 7) identify practical exercises that work in the science classroom.
- 8) identify rules and procedures for maintaining appropriate student behavior in the science classroom.
- 9) demonstrate the use of computers in the science classroom.

Grading:

- 1) Up to 10 Chapter quizzes will be administered.
- 2) Four hourly exams will also be given. Tests will be predominantly composed of multiple choice, true/false, short essay, and/or short answer questions. Missed exams or tests may be made up with a legitimate, excused absence.
- 3) Five writing assignments are required for this course. The topics will be discussed in class, while the due dates are noted on the preceding syllabus. **DO NOT PLAGIARIZE!!!** If you plagiarize, you will get a zero for the assignment. It is expected that writing assignments will be computer generated, with proper spelling, punctuation, grammar, sentence structure, and organization (CAAP). Writing assignments will also be checked for the inclusion of the standards of critical thinking: clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness. The font used will be 12 pt. Margins, top, bottom, and sides, should be one inch wide. Sentences will be complete and double-spaced, and the entire paper should be long enough to adequately cover the subject.
- 4) Class attendance and participation are required. You will receive a total of 100 points if you attend class regularly and participate in class activities. Points will be deducted for failure to attend and/or participate in class.
- 5) Electronic Portfolio – Students will develop and submit an electronic portfolio consisting of 15 science activities in the following categories: heat, magnetism, seeds, plants, and soil,

animals, moon and solar system, light, sound, machines, electricity, air, earth science, and water. You should submit one activity for each category. All activities must be hands-on activities. You should submit activity sheets with the activity. PowerPoint is an excellent inexpensive multimedia format.

- 6) Students will develop and present a 20-25 minute science lesson on different topics in the electronic portfolio. The professor should receive a copy of the lesson prior to presentation. The lesson must include the class in hands-on activities. Give a copy of your lesson plan to each class member. Your own understanding of scientific concepts should be evident in your lesson plans.
- 7) Concept Mapping Activity – Because science is a conceptual subject, it is important for learners to have tools for developing concepts. Concept mapping is a valuable tool in determining a student's current cognitive status, and for helping students' concepts to mature. Create a concept map that illustrates a concept taught at the elementary or secondary level in science. You will work with model concept maps in class and in your text.
- 8) Course Portfolio – Your course portfolio is a reflective tool that integrates and describes your experiences with course activities in and out of class. Keep a regular log describing your reactions, analysis, self-evaluation, and wonder about science and teaching. You should record responses to class activities as soon as possible after class. The length of portfolio entries will vary. Also include summary statements that unify themes in your portfolio.

Grades will not be curved. It is theoretically possible for everyone to make an “A” in this class. The final grade for the course will be computed using the following distribution:

10 chapter quizzes	@ 10 points each	= 100 points (9.5 % final grade)
4 exams	@ 100 points each	= 400 points (38 % final grade)
5 writing assignments	@ 10 points each	= 50 points (4.8 % final grade)
Electronic portfolio (15 science activities)	@ 10 points	= 150 points (14.3 % final grade)
Presentation	@ 100 points	= 100 points (9.5 % final grade)
Concept map	@ 50 points	= 50 points (4.8 % final grade)
Course portfolio	@ 100 points	= 100 points (9.5 % final grade)
Class attendance/participation	@ 100 points	= 100 points (9.5 % final grade)
		Total available points = 1050 points

Course grades will be assigned as follows:

- A = 90 - 100% = 945 - 1050 total points
- B = 80 - 89% = 840 - 944 total points
- C = 70 - 79% = 735 - 839 total points
- D = 60 - 69% = 630 - 734 total points
- F ≤ 59% ≤ 629 total points

Bonus points will also be available for those attending academically and/or culturally oriented functions promoted by Lane College throughout the semester.

To make an "A" in Biology 330: Everyone is beginning this class on a level playing field . . . everyone has an "A" to start. In order to keep your "A" you need to prepare prior to class by reading the material to be covered in class, come to class, be attentive, take notes, and ask questions. To keep your "A" you must score between 90 - 100% on all quizzes and exams.

Required Textbooks: All students are required to purchase the following text book from Lane College Bookstore:

Martin, Ralph, Colleen Sexton, Teresa Franklin, Jack Gerlovich, and Dennis McElroy. 2009. Teaching Science for all Children. 5th edition. Pearson Allyn and Bacon. 531 p.p.

Websites of Possible Interest

National Science Education Standards – www.nap.edu/readingroom/books/intronse
Science for All Children – www.nap.edu/readingroom/enter2.gci?0309052971.html
Introducing the National Science Education Standards – www.nap.edu/readingroom/books/intronses
National Science Teachers Association – <http://www.nsta.org>
American Association for the Advancement of Science (AAAS) – <http://www.aaas.org>
Ask ERIC Lesson Plans <http://ericir.syr.edu/Virtual/Lessons>
Ask the Experts at Scientific American <http://www.sciam.com/askexpert/index.html>
Assessing the Whole Child, CRESST <http://www.cse.ucla.edu/CRESST/pages/products.htm>
Beakman's World <http://www.beakman.com>
Eisenhower National Clearinghouse, for K-12 math and science <http://www.enc.org>
ERIC Clearinghouse for Science, Math, and Environmental Education, <http://www.ericse.org/>
Mad Scientist Network <http://www.madsci.org>
NASA Observatorium for Earth and Space <http://www.observe.ivv.nasa.gov/nasa/core.shtml>
NASA Spacelink <http://spacelink.nasa.gov/index.html>
Newton's Apple <http://www.pbs.org/ktca/newtons>
Science Questions and Answers <http://www.last-word.com>
Science Technology Daily Review <http://SciTech.com>
Science Toys <http://scitoys.com/net4kids.html>
Sunshine State Standards <http://www.firn.edu/doe/menu/sss.htm>
US Geological Survey education site <http://www.usgs.gov/education>
Volcano World <http://volcano.und.nodak.edu>
Weather Classroom <http://www.weather.com/education>
Yucky Page <http://www.yucky.com>

**Lane College
Student Understandings Form
Spring 2012**

BIO330, Teaching Elementary Science

- 1) I understand the rationale for my taking Teaching Elementary Science, BIO 330. _____
- 2) I have read and understand the syllabus and general requirements, including topics (chapters) to be covered, topics and due dates for all written assignments, and dates for all quizzes and exams (excluding the final exam; TBA). _____
- 3) I understand that I am expected to attend class regularly and punctually, and that no unexcused absences will be accepted. _____
- 4) I understand that excessive absences will be reported to the Vice President of Academic Affairs. _____
- 5) I understand that I must adhere to the formal dress code of Lane College, and that no head gear (caps, hats, or rags) will be allowed. _____
- 6) I understand that I am expected to read relevant portions of the textbook in preparation for lectures. _____
- 7) I understand that no food, drinks, or loud gum-chewing are allowed in class. _____
- 8) I understand that no smoking or tobacco use is allowed inside the building. _____
- 9) I understand that cell phones and all other electronic equipment must be turned off in the classroom, and if this policy is violated, you will either be asked to leave, or the instructor reserves the right to confiscate the phone and turn it over to the Vice President of Academic Affairs where it may be retrieved. _____
- 10) I understand that no weapons, alcohol, or drugs are allowed campus-wide, including the classroom. _____
- 11) I understand that cheating on exams, quizzes, copying another persons work, or plagiarizing are strictly forbidden and are grounds for receiving a zero. _____
- 12) I understand that disruptive behavior will not be tolerated, and if I do disrupt the class, I will be asked to leave. _____
- 13) I understand that I am responsible for mastery of the vocabulary words found appended to the syllabus, and that I will be tested using both written and oral means for definition comprehension. _____
- 14) I have read and understand the schedule of available times of office hours for my professor. _____

Date: _____

Name (print): _____

Email: _____

Signature: _____

Phone: _____