

**Integrated Science II (Draft Syllabus-items in red refer to integration of the science and math)**  
**SC2106**  
**Spring 2008**

**Instructor:** Dr. Jessie Klein

**Office:** Henderson Hall-322,

**Phone:** 781-280-3862 If I am not available please leave a message on the voice mail.

**e mail:** kleinj@middlesex.mass.edu

**Office Hours:** Monday-Thursday 10:30-11:30 Students may also make an appointment to see me if they are not available during my scheduled office hours. Please feel free to stop by my office. I would be happy to discuss science with you or answer any questions about your progress at Middlesex.

**1. Catalogue Course Description:** The second course in a two-semester sequence intended for, but not limited to, students planning a career in elementary education. Topics will include cell structure and function, plant structure and processes, human body systems, biodiversity and the interaction of organisms with each other and their environment. Experiments will help students become skilled in, generating and testing hypotheses and gathering and analyzing data. This course meets the environmental issue core intensive. 3 hr lecture/2 hr lab

Prerequisites: Placement above or successful completion of EN 2103 and eligibility for MA 1104. High school or college science course within the last five years or permission of instructor. Recommendation: Concurrent enrollment in EN2122 or EN2131 if CPT reading placement test is between 68 and 75.

**2. Extended Course Description:** Integrated Science II has been designed to give future elementary school teachers a background in the biological sciences. The course is also appropriate for any student who is interested in obtaining a broad exposure to biology. The best way to learn science is to do science; therefore the course will emphasize active learning with limited lecture. **We will also be infusing math topics so you can see how science and math are related and we use math all the time.**

**3. Textbook and Supplies:**

Explore Life Postlethwait and Hopson 2003 Brooks/Cole

Laboratory exercises will be provided by the instructor. You will need a lb. deli container.

Notebook-I would suggest a ring binder for notes and the handouts.

Calculator

Goggles  
Pens or pencils of at least two colors

#### 4. Final Grade Determination-

Quizzes	50%
Reading Questions Homework	15%
Lab Reports	20%
Projects	15%

#### 5. Evaluation Methods:

**Quizzes**-Every two weeks there will be a quiz based on lecture material and text reading questions. If you have an emergency and have to miss a quiz, please call me. Once graded quizzes are returned, it is not possible to take a make-up.

**Reading Questions and Homework**-There will be weekly questions or homework activities based on assigned text readings. Spelling and grammar counts so leave time to visit the writing lab, if necessary.

**Lab Reports** -You will be doing experiments in the laboratory portion of the course. Some of these experiments will be completed in one class period and others will run for several weeks. At the conclusion of each experiment, you will be asked to write a lab report. It is acceptable to discuss lab reports with your lab partner, but the report should be written in your own words. Lab reports should be stapled or fastened with a paper clip and are due one week after the exercise is completed. Five points will be deducted for every day that the assignment is late.

**Projects**-During the semester there will be individual and group projects. In cases of group work, grades will be based on your individual contribution to the group and on a group report, poster or PowerPoint presentation. Five points will be deducted for every day that an assignment is late. Projects may include the study of biomes, designing a science activity appropriate for elementary school students.

**6. Academic Procedures and Support**-This is a science course. There will lots of new terms, concepts, and work. Students should spend at least two hours a week studying for every hour in class. So, for this course you should be spending at least **ten** hours a week working on Integrated Science outside of the classroom. **Do not wait for the night before a test to start studying-it will not work!** If you need help with the course material, please see me. This course syllabus should be used frequently during the semester. Please keep it for reference.

Academic Support Services has labs on the Bedford and Lowell campuses where students can get assistance with reading, writing, math, science and study skills.

The phone numbers are as follows:

	Bedford	City(Lowell)
Math	781-280-3707 HH 116	978-656-3768 Room 406
Reading	781-280-3727 AR 214	978-656-3364 Room 406
Writing	781-280-3727 AR 214	978-656-3365 Room 406
Science	781-280-3726 HH 202 By appointment	978-656-3369 Room 406

**7. Attendance-**You are expected to attend all classes. A lot of the course will be hands-on activities so it is important for you to be there. Do not depend on other people to take notes for you. It is not the same as being in class and hearing the information. If you are absent, it is your responsibility to get missed class notes and do assignments. Attendance will be taken in class and lab. For those students with perfect attendance in lecture and lab, two points will be added to the final grade. For students with only one absence, one point will be added to the final grade.

**8. Teaching Procedures-**Most of the material in this course will be presented through limited lecture and hands-on activities. Active learning models how science should be taught at the elementary school level. Discussions are encouraged and you should not hesitate to ask questions in order to clarify information or add information that is relevant to the topic being discussed. In the laboratory, exercises will be explained and you will then perform the experiments either individually or in groups.

**9. Classroom Atmosphere-**Our classroom is a learning community. We are here to help each other learn whether it be science concepts or how to be a better instructor. As part of a community we should be respectful of each other and the room that is our home for five hours a week. I like my class to have a relaxed atmosphere but we have to set some standards for behavior. Disruptions in class are not fair to students who are here to learn.

- a. Please be on time for class. Frequent tardiness is unacceptable.
- b. Please refrain from talking with neighbors during lecture or interrupting during discussions. If you would like to say something raise your hand and you will be recognized.
- c. Be tolerant of questions from other students. We all have different learning styles. Some people assimilate material quickly; others take longer. We all learn from each other's questions.
- d. Sharpen pencils before class.

- e. Save trips to the trash for after class.
- f. Please turn-off or set on vibrate all electronic devices such as cellular phones and pagers before the beginning of class.
- g. Plagiarism: The following is a statement directly from the 2003-2005 MCC catalogue.  
“Adherence to ethical standards is obligatory. Cheating is a serious offense, whether it consists of taking credit for work done by another person, or doing work for which another person will receive credit. Taking and using the ideas or writings of another without clearing and fully crediting the source is plagiarism, a violation of the academic code, and if it is proven that a student, in any course which he or she is enrolled, has knowingly committed such a violation, suspension from the course and a failing grade in the course may result. Due process is accorded to students in the event of any alleged violation of college regulations.”

For this class cheating is considered to be copying from another student during a quiz or using written material during quiz that contains information pertinent to the quiz. Anyone who is caught cheating or committing plagiarism will receive a zero for that assignment and may also receive an F as the final course grade. Copying a fellow student’s lab report is also considered plagiarism. Copying off of the www or out of books without proper citation is also plagiarism.

**10. Instructional Objectives:** By the end of the semester students should be able to:

- Explain how biotic and abiotic factors cycle in an ecosystem
- Use a food web to distinguish between producers, consumers and decomposers
- Explain transfer of energy through trophic levels
- Identify the characteristics of the different biomes
- Analyze changes in ecosystems resulting from natural causes and human activity
- Classify organisms into kingdoms and domains based on their characteristics
- Discuss the significance of maintaining biodiversity
- Describe the characteristics and limiting factors of population growth
- Identify representatives of plant and animal phyla
- Determine if leaf size shows a normal distribution**
- Explain metamorphosis
- Identify and describe the parts of plant

- ❑ Describe the flowering plant life cycle
- ❑ Relate cell organelles to their functions
- ❑ Differentiate between prokaryotic and eukaryotic cells
- ❑ Distinguish between plant and animal cells
- ❑ **Discuss why surface area to volume ratios are important for determining cell size**
- ❑ Describe the role of enzymes and in cell function
- ❑ Explain how cell membranes act as a barrier(diffusion, osmosis, active transport)
- ❑ Identify reactants and products in photosynthesis
- ❑ Describe cellular respiration in terms of ATP production
- ❑ Explain how photosynthesis and respiration are interrelated through the carbon cycle
- ❑ Describe and compare mitosis and meiosis
- ❑ Describe the processes of replication, transcription and translation
- ❑ Explain the terms dominant, recessive, phenotype and genotype in regards to Mendelian genetics
- ❑ Use a Punnett Square to determine an organism's genotype
- ❑ **Determine the probability that traits will be inherited**
- ❑ Explain how the fossil record, comparative anatomy, and other evidence support the theory of evolution
- ❑ Illustrate how natural selection results in biodiversity
- ❑ Strengthen their critical thinking skills through hypothesis testing and analysis of experimental data

What is Life	1
Ecology	24, 25
Biodiversity	10-13
The Living Plant	21-23
Cells	2
Cells and Energy	3
Cell Cycle	4
Patterns of Inheritance	5
DNA	6,7
Dynamic Body	14-19
Evolution	9

## 12. Tentative Laboratory Topics

Science Topics	Math Topic
Characteristics of Life	
Scientific Method	
Know Your Trees	Normal Distribution
Ecology-Biodiversity	
Fast Plant Genetics	Probability
Microscope	
Cell	Area, Volume, Ratio
Osmosis	
Enzymes	
Photosynthesis/Respiration	
Genetics	Probability
Organ systems	
Evolution	

## 13. Tentative Quiz Dates

9/23, 10/7, 10/21, 11/4, 11/18, 12/2, Dec. 19 at 10:30