MORAVIAN COLLEGE
Education Department

EDU 228 - SCIENCE IN THE ELEMENTARY SCHOOL
FALL 2009

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and by appointment.

Overview

A course designed to help prospective teachers interpret children's science experiences and guide their development of scientific concepts. The course involves a study of science content material, modern elementary science curricula, and techniques that are helpful in the teaching of science in the elementary school. *Prerequisite:* One course in science or permission of the instructor. QPA of 2.70.

Course Objectives

The student will be able to:

1. Appreciate the importance of science and of teaching science in elementary school.
2. Explain and apply the concepts and processes of earth, life, and physical science in elementary school curricula.
3. Apply teaching strategies that promote students' scientific inquiry, active involvement, and higher order thinking.
4. Demonstrate creating and teaching science lessons, including effective teaching methods, feedback, and appropriate resources/materials.

Required Texts

Victor, E., & Kellough, R. D. (2007). *Science K-8: An integrated approach* (10th ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Friedl, A. E., & Koontz, T. Y. (2005). *Teaching science to children: An inquiry approach* (6th ed.). Boston: McGraw Hill.

Resources

Blackboard

Important information about our class will be posted on our Blackboard site at http://blackboard.moravian.edu. The Discussion Forum will enable us to exchange ideas, insights, and resources about various topics throughout the semester. Information about logging in and using the site will be given in class.

Website

The Victor and Kellough text has a website at www.prenhall.com/victor. The site has annotated links for web resources pertaining to science in the elementary school.
The Friedl and Koontz text has a website at www.mhhe.com/friedkel16e. The site has chapter links and multiple-choice quizzes, and a glossary.

Assignments

Reading Assignments

Reading assignments will include chapters in the texts and materials on reserve in Reeves Library. As part of each reading assignment, consider these questions and be prepared to discuss them in class:

- What is my understanding of the science concepts and processes?
- What is my understanding of the science teaching methods?

Written Assignments

You will complete several kinds of written assignments. Written assignments may include use of outside texts and journals; these will serve to extend your understanding of teaching concepts and familiarize you with educational resources. All written work is to be prepared using a word processor. Papers should be double spaced with 1" margins. Grades on late assignments will be reduced for each day late. An assignment that is more than two weeks late will not be accepted.

Journal. You will keep a journal that reflects your growth as a science teacher. Each week you will make an entry about: a factor that influences your attitude about science, your understanding of a particular pedagogical concept, or your understanding of a particular science concept. Journal entries must be 1 page long (minimum), and are due on Mondays.

Piagetian Interview. You will interview an elementary school child to gain insight into his/her scientific thought processes. You will tape record and transcribe the interview. You will analyze your interview in light of cognitive learning theories. You will submit the tape, transcript, and analysis. Use a standard size recording tape.

Blackboard Discussion Forum. You will post three substantive questions/issues during the semester to the Discussion forum, and you will post substantive responses to three questions/issues posed by classmates. One purpose of the postings is to share resources. Somewhere within your posts, you must make reference to a website you consider of value, to a book you have used, and to a relevant journal article that you have employed. To receive full credit you must complete at least three posts by October 7 and six posts by November 25.

Exams, There will be a midterm exam and a final exam. Content will include science content and processes, and pedagogy concepts.

Teaching Assignments

Each teaching assignment teaches a scientific concept and explains a scientific process.

Micro-teaching, You will prepare lesson plans for and present two micro-teaching sessions to the class. This will give you an opportunity to implement the methods you are learning.

One lesson will be directed at K-4 grade students, and one at 5-6 grade students.

Each lesson will focus on one of the major areas of science (physical, life, earth). The second lesson will integrate another content area with science (e.g. mathematics, language arts, social studies, art, music).

Students must be actively involved in both lessons. One lesson must include a demonstration or experiment.

The lesson plan must include the objective of the lesson. The cognitive level of the lesson (according to Bloom's taxonomy) must be indicated. In addition, indicate the Pennsylvania science standard addressed; identify it by number and write it out in words. At least one lesson

should involve higher order thinking, at the application or analysis level, and may be constructivist in nature.

Lessons will be 10 minutes in length.

Follow the Moravian College lesson plan format. Write out the procedure in outline or bulleted form.

Learning Center. You will create a learning center that provides a science activity for students at any grade level. The content will focus on the major areas of science (physical, life, earth) not used for micro-teaching. The center should be complete with all materials and instructions and contain (minimum) three activities.

Note: There will be a sign-up sheet of topics within content areas for each teaching assignment.

You can expect to work 6-9 hours per week outside of class preparing for this class.
Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the Learning Services Office as soon as possible to enhance the likelihood that such accommodations are implemented in a timely fashion.

Attendance and Class Participation

Attendance in class is essential for your comprehension of the concepts covered. If you are absent, it is your responsibility to make up all work. Final grade will be reduced by 2% for each absence. Attendance is expected. If you are absent because of illness, you will be excused if you bring a note from the Health Center. If you are absent, you will be given an assignment to do to ensure that you have mastered the content that you missed.

Arrive on time and remain for the entire class session. Be prepared for each class session. During class, remain actively involved by paying attention, taking notes, and participating. By contributing to class discussions, and asking or answering questions, you ensure that you comprehend the material. Lateness or partial class attendance will count toward absence.

Participation will be graded on the relevance quality of responses, questions, and comments made during class sessions. Contributions that indicate grasp of textual material will be especially welcome. Participation on a regular basis is expected. Lack of participation will reduce your grade.

The Moravian College policy on academic honesty will be followed.
Be sure to cite the source(s) that you use in preparing your assignments.
Although you may discuss your work and study with classmates, the assignment you submit must be prepared entirely by you.

Grading

Each assignment will be graded based on specific criteria. You will receive the Criteria during the discussion of each assignment.

Journal	10%
Micro-teaching	20%
Learning Center	10%
Piagetian Interview	10%
Blackboard	10%
Midterm exam	15%
Final exam	15%
Participation	10%

A	=	93 - 100
A-	=	90 - 92
B+	=	87 - 89
B	=	83 - 86
B-	=	80 - 82
C+	=	77 - 79
C	=	73 - 76
C-	=	70 - 72
D+	=	67 - 69
D	=	63 - 66

D- = 60 - 62 F = below 60

Course Outline

I. Introduction
Concepts of effective teaching

II. The Nature of Science
Science as a process of inquiry
Scientific processes

III. Science Content
Physical Science
Life Science
Earth/Space Science
Environmental and Ethical Issues
NSTA and Pennsylvania Science Standards

IV. Science Pedagogy
Objectives, Standards, and Lesson Plans
Inquiry, Cooperative Learning, and Problem Based Learning
Constructivist approach
Questioning and feedback
Higher order thinking skills
Class management and safety
Assessing student performance by various means
Integrating the curriculum
Adapting to needs and individual differences of students
Problem posing, problem solving, peer persuasion

V. Resources
Curriculum projects
Models
Instructional technology - computer, Internet sites
Current events

Assignment Schedule

Week	Topic	Victor	Friedl	Assignment Due
8/31	Introduction	1,2		
9/7	Universe	2, 9	14 (thru p. 274)	no class 9/7 - Labor Day
9/14	Earth	10		
9/21	Universe and Earth		11(thru 215); 15 (274-end)	
9/28	Water, Weather, Climate	3, 11	12, 16	
10/5	Plants	12	18	
10/12	Animals	14	19	no class 10/12 - fall recess
10/19	Human Body	14	19	Semester exam 10/21
10/26	Microteaching 10/26 and 10/28			Microteaching 10/26 and 10/28
11/2	Matter and Energy	16	3,4	Piagetian interview11/5
11/9	Friction and Machines	17, 18	5	
11/16	Sound	19	8	Microteaching 11/16 and 11/18
11/23	Light	20	9	no class 11/26- Thanksgiving
11/30	Magnetism and Electricity	21	6	Learning Centers 12/2
12/7	Environment		17	Last class 12/9 (Summary)
12/14				12/15 – Exam (1:30)

Note: This schedule is tentative and may be modified if necessary.