

Education 364Z: Curriculum and Instruction In Science
Moravian College
Fall, 2006

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(Select High School Option)

Office Hours: By appointment; before or after class

Course Meeting Time: Wednesday, 6:30-9:30 pm.

Course Objectives: Each student will ...

- Synthesize a personal rationale and philosophy for teaching science.
- Infuse inquiry and constructivist practices in their teaching.
- Demonstrate mastery and application of Pennsylvania Department of Education Academic Standards for
 - Science and Technology
 - Environment and Ecologyin order to prepare their future students for the upcoming S.T.E.E. P.S.S.A. assessment.
- Practice the activities of teaching: unit design, lesson planning, instruction, questioning, evaluating texts, assessing student learning, and reflection. Also,
- utilize, practice, and demonstrate varied, effective teaching methods in both the college and field experience settings.
- Reflect on their effectiveness as an educator.
- Incorporate technology into planning and in classroom instruction.
- Observe and evaluate current classroom practice and interact professionally with secondary students and fellow educators.
- Analyze and become familiar with resources (professional organizations and professional journals) for secondary science teachers.
- Demonstrate the essentials of laboratory safety and classroom management.

- Discuss and analyze current trends in science education.
- Research and employ science area-specific pedagogy.
- Prepare for the interview process.
- Prepare for student teaching and to become professional science educators.

Required Texts: Trowbridge, L.W., Bybee, R.W., Powell, J.C. *Teaching Secondary School Science, Eighth Edition*. 2004. Pearson/Merrill/Prentice Hall.

Kwan, T., Texley, J., Summers, S. *Investigating Safely: A Guide For High School Science Teachers*. 2004. NSTA Press.

Colburn, Alan. *Lingo Of Learning – 88 Educational Terms Every Science Teacher Should Know*. 2003. NSTA Press.

* Other readings will be required from handouts and journals.

Important Web Sites:

National Science Teachers Association: www.nsta.org

National Association of Biology Teachers: www.nabt.org

American Association of Physics Teachers: www.aapt.org

American Chemical Society: www.acs.org

Journal of Chemical Education: <http://jchemed.chem.wisc.edu/>

Pennsylvania Science Teachers Association: www.pascience.org

PA Department of Education: www.pde.state.pa.us (PA Standards)

Benchmarks for Scientific Literacy/Project 2061: www.project2061.org

National Science Education Standards:

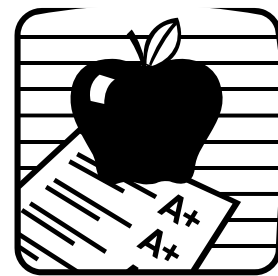
<http://search.nap.edu/readingroom/books/intronses/>

Attendance: The success of this class relies heavily on the full participation of all its members. A large part of this class depends greatly on your class discussions and presentations. Of course, illness and emergencies arise and are unavoidable. If you cannot attend class for a valid reason, please call me. You are responsible for finding out what you missed from the other class members. It is your responsibility to consult the course schedule for the due dates of assignments. Since class participation is dependent on your attendance, your grade may be affected by absences. More than two absences may jeopardize the passing of the course. The instructor reserves the right to determine the conditions upon which late work may be submitted and graded.

Academic Honesty Policy: Please refer to the Student Handbook for this college policy.

Grading: Your final grade is calculated as follows:

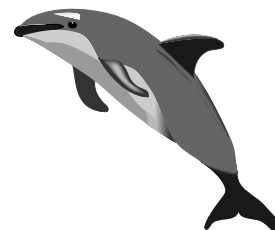
Lessons, Assignments & Quizzes: 40%
Portfolio & Unit Plan: 25%
Field Experience & Field Journal: 25%
Participation: 10%



* Please note: It is within the instructor's purview to apply qualitative judgment in determining grades for an assignment or for a course *

Students with Disabilities: If you need accommodations in this class, please contact the Learning Services Office as soon as possible to enhance the likelihood that such accommodations are implemented in a timely fashion.

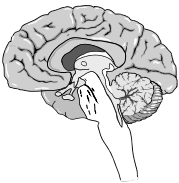
Work Requirement: Students should expect to work 3 or more hours per week outside of class and field experience.



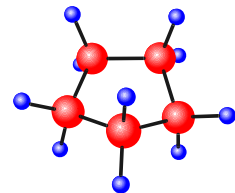
Disclaimer: This syllabus is subject to change

LESSONS

- **2 Micro-Lessons:** Present lessons that take about ten – fifteen minutes. A lesson plan must be written using the format found on page 17 (Activity 1–3.) One lesson must be a demonstration. A short self-critique, using the criteria on page 18 (Activity 1–3), will be due the following class meeting.
- **1 Laboratory/Activity Driven Lesson:** 20 – 30 minutes long. Lesson plan follows Moravian College format; turn in before you deliver the lesson. Self-critique due at the next class.
- **1 Internet-Assisted Lesson:** 20 – 30 minutes long. Lesson plan follows Moravian College format; turn in before you deliver the lesson. Self-critique due at the next class.
- **The “BIG” Lesson:** 40 –45 minutes long. Lesson plan follows Moravian College format; turn in before you deliver the lesson. Self-critique due at the next class.



ASSIGNMENTS



- **Textbook Activities:** Simple, reflective tasks from our required textbooks which are discussed in groups and by the entire class when we meet.

- **Personal Mission Statement & Philosophy:** In a previous course, you may have written a general philosophy statement on teaching. For this activity, you will concentrate specifically on science teaching and your specific discipline. Kids, invariably will ask you “Why is this stuff important?” Well, you will need to answer their question quickly and convincingly! So, prepare yourself now! Address questions like: What is your personal definition of science? Why do you want to teach science? Why is it important? Why is your discipline important? What are your goals in science teaching? Why do kids need to be scientifically literate? What will kids get out of your class? How will kids master the PA Standards? One page will be sufficed.

- **3 Journal Article Critiques:** After reading an article, write a brief reaction in which you address the following:
 - Why did you choose this article?
 - Why was the article written? For whom?
 - What information was valuable to you?
 - What will the students learn? Why is this important?
 - Are the strategies appropriate and effective?
 - What would you change?

Attach a copy of the article to the critique and be prepared to discuss it with the class that evening.

****Two articles must be from *The Science Teacher*. The other will be from journals in your science discipline. One critique must be of an article that does not involve a specific classroom activity.**

- **1 Cookbook Conversion Lab Activity:** Find a “cookbook” lab exercise and (as Emeril would say) “Kick it up a notch.” Transform this mundane lab into an exercise that models the constructivist model of learning. Or, some call it a discovery lab. Change those lame, low level questions to those that require kids to think at a higher level. Bam, now you’ve got a great lab!
- **1 Computer Interface Lab:** Write a lab that utilizes a computer sensor (or sensors) for analytical data collection. I will give you a list of the different sensors that are available. Data can be collected & analyzed on site or back in the lab using a computer, TI Graphing Calculator, or Palm Handheld.
- **3 Web Site Reviews:** Zip around the web looking for websites for teachers or students. **Pick three that knock your socks off** and write a brief two paragraph review of them. If applicable, indicate if the site may help students master one or more PA Standards. **Attach your review to a printout of the website’s “home” page (screen).**
- **1 Science Software Review:** Write a one–page review on any science software, like a CD tutorial, you can find. Your field experience mentor may have some to loan. Otherwise see me. If applicable, indicate if the software will help students master one or more PA Standards.
- **Textbook Review:** Use the rubric in your textbook and conclude with a 2–4–paragraph report written to a school district book selection committee describing the strengths and weaknesses of this text. Support your position. Make sure to address the PA Standards.

- **Research Paper –Content Specific Pedagogy:** Write a two–page paper on specific pedagogy that applies to your science discipline. For example, are their teaching strategies unique to biology, chemistry, or physics? What are they? What contemporary topics are “hot” in the teaching of your science discipline? You will need to research journals and pertinent websites in your content area. There are many associations devoted to the teaching of your discipline. You are also highly encouraged to network with these groups and other universities as well via e–mail.

PORTFOLIO

A good portfolio shows personal achievement and growth. Ideally, your portfolio should begin with your first field experience through your student teaching. This project is for you! When you want to land a job, you must sell yourself! Show and be proud of your hard work done at Moravian! Share it with those who are interviewing you for a position! Why not give them a videotape of your teaching talents! With this in mind, make this project your own creation. This should be a loose–leaf binder, which contains materials assigned throughout this semester (and from other courses, if you wish) that reflect your knowledge base, teaching skills & experience, personal philosophies, accomplishments, and reflections. Examples of student work are also encouraged. If you want to include any activities from the textbook, simply Xerox the page(s). Include any other additional items you think would indicate your competence as a teacher. After student teaching, you can add and modify your portfolio to reflect your new achievements. Then, carry this baby with you as you hunt for a job!

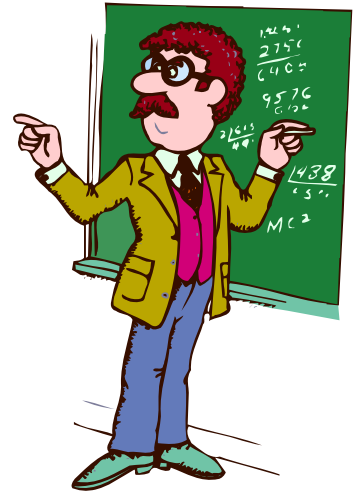
UNIT PLAN

- Your unit plan should include the following:
 - Title of Course
 - Level of Students
 - Name of the Unit
 - Objectives
 - Unit Rationale
 - Content Outline
 - Correlation to PA Standards
 - Materials Required
 - Methods of Formative Assessments Methods (Learning Strategies)
 - Overview of daily activities/Brief Daily Lesson Plans– may be in a calendar–like format
 - Unit Exam

Field Experience Journal

- **2 Weekly Entries:** These are e–mailed to me weekly during your field experience.
 - I’m interested in your observations and reflective thoughts.
 - Some of your narratives should begin to sound like the cases we are discussing in class from the text. In fact, we will be discussing your cases together as a class. Following are some questions to help guide you through commenting on significant classroom events:

- ✓ What is the context of the event?
- ✓ What actions were taken first?
- ✓ Who took the action?
- ✓ Why was it taken?
- ✓ What is the class atmosphere like?
- ✓ How did the action make you feel?
- ✓ What question(s) have arisen?
- ✓ What would you do? Why?



- **Please be discreet and use pseudonyms.**
- I would also like you to observe one student throughout your experience and make comments on him/her. **Again, please be discreet and do not use their actual name in your writings.**
- **Journal Conclusion:**
 - Write a one-page critique of the written curriculum for the course you are observing. Reflect on the PA Standards.
 - Finally, conclude with a 2-3-paragraph description of what you learned about teaching and students from your experience.



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Please note: topics may change with advanced notice.

* We will make a concerted effort to discuss readings each class. Please be ready to converse about the topics covered in the text.

8/30 – Course Overview & Introduction

- ✓ Meeting at 6:30 w/ Mrs. Modjadidi and Dr. Mayer in Prosser
- ✓ Class Overview

9/6 - Science Teaching Introduction Pt 1

TSSS Text Assignment For This Week: Chapters 1 (Text Activities 1-1 → 1-3 and 1-5)

Due Tonight:

- ✓ Journal Critique #1
- ✓ Micro-Lesson #1 w/ Lesson Plan (Use TSSS page17)

9/13 - Science Teaching Introduction Pt 2 & A Little History

TSSS Text Assignment For This Week: Chapters 2-4 (Activities 2-1 → 2-3 and 5-1)

Due Tonight:

- ✓ Personal Mission Statement & Philosophy
- ✓ Micro-Lesson #2 w/ Lesson Plan (Use TSSS page17)
- ✓ Critique of Micro-Lesson #1 (Use page 18 in TSSS)

9/20- Goals & Objectives

TSSS Text Assignment For This Week: Chapters 5 & 6

Due Tonight:

- ✓ Journal Critique # 2
- ✓ Web Site Review #1
- ✓ Critique of Micro-Lesson #2 (Use page 18 in TSSS)

9/27 - Curricula

TSSS Text Assignment For This Week: Chapters 7 - 10

Due Tonight:

- ✓ Journal Critique # 3
- ✓ Web Site Review # 2

10/4 - Inquiry & Questioning

TSSS Text Assignment For This Week: Chapters 11 & 12

Due Tonight:

- ✓ **Lab/Activity Lesson w/ M.C. Lesson Plan**

10/11 - Safety & Management

TSSS Text Assignment For This Week: Chapter 14 & 22

Due Tonight:

- ✓ **Web Site Review #3**
- ✓ **Critique of Lab/Activity Lesson**

10/18 - Planning

TSSS Text Assignment For This Week: Chapter 16

Due Tonight:

- ✓ **Text Book Review**

10/25 - The Kids We Teach

TSSS Text Assignment For This Week: Chapter 19 - 21

Due Tonight:

- ✓ **Internet Assisted Lesson w/ M.C. Lesson Plan**

11/1 - Strategies and Rationale

TSSS Text Assignment For This Week: Chapters 13, 15, & 18

Due Tonight:

- ✓ **Software Review**
- ✓ **Critique of Internet Lesson**
- ✓ **UNIT PLAN (Rough Draft)**

11/8 - Professional Development

TSSS Text Assignment For This Week: Chapter 23

Due Tonight:

- ✓ “Cookbook” Conversion Lab
- ✓ UNIT PLAN (First Draft)

11/15 - Assessment

TSSS Text Assignment For This Week: Chapter 17

Due Tonight:

- ✓ UNIT PLAN (Final Draft)
- ✓ Computer Interface Lab

11/23 NO CLASS: Happy Thanksgiving!

11/29- Professional Development

TSSS Text Assignment For This Week: Chapter 24

Due Tonight:

- ✓ FIELD EXPERIENCE JOURNAL WITH CONCLUSION
- ✓ PORTFOLIO
- ✓ “BIG” Lesson (3 Presented) w/ M.C. Lesson Plan

12/6 - Closure

Due Tonight:

- ✓ “BIG” Lessons Continued (4 Presented) w/ M.C. Lesson Plan
- ✓ Course Evaluation

Due by 12/11:

- ✓ Critique of “BIG” Lesson (E-mailed To Me)

Have a wonderful winter break; Happy Holidays!