Teaching Science in Secondary Schools
Spring 2013
[redacted]
Mondays 5:45 – 8:45 pm

[redacted]

EDUC3640

COURSE DESCRIPTION

This section of your Secondary Methods course is designed to teach and give practice to various strategies specific to a high school science lab class. Students will learn to brainstorm laboratory activities, conflict resolution through theoretical science scenarios, where to find sources for various laboratory investigations., as well as give practice to specific high school labs.

RESOURCES

- Skyview High School Lab Rooms
- Selected articles
- Various web-sites
- NNU Curriculum Library

Required Materials

1 to 1 ½ inch three ring binder with 4 sections labeled: Science Scenario's, Activity Brainstorming, Crimbchin's Experiments, and Shared Experiments

INSTRUCTIONAL STRATEGIES

Many of the instructional strategies used in this class may be adapted for teaching any grade level. They were selected to meet the needs of diverse learners, to promote active student involvement, and to encourage students to construct meaning in a variety of ways. Included in these strategies would be cooperative learning, various discussion structures, technology, observation, performing actual lab activities, and research.

University Outcomes

This course encourages growth and development toward the University Outcomes in the following ways:

Transformation—We believe education fosters transformation. NNU engages and affects all domains of life—intellectual, social, physical and spiritual—thereby advancing the transformation of the individual, the church and the world.

Truth—We believe education pursues truth. NNU explores knowledge, the wonder of God's creative activity, the story of human civilization and the achievements in the arts, sciences and professions. Ultimately, we believe Jesus is the truth incarnate; therefore, we pursue Christ.

Community—We believe education flourishes in community. NNU provides a learning and faith community that teaches, challenges and encourages each other through intellectual and spiritual practices. Within covenantal relationships we express our love for God and others.

Service—We believe education cultivates service. NNU teaches the importance of a life of servanthood as modeled by Jesus Christ. We learn to lead by giving of ourselves to God and humankind.

CONCEPTUAL KNOWLEDGE BASE AND FRAMEWORK FOR TEACHING

All effective programs should be driven by a conceptual framework that is supported be a knowledge base of research and practice. The Critical Social Model drives NNU's teacher preparation programs. The various components of this model are:

1. **Citizenship/Democratic Society** – Graduates of education programs will promote democratic values, facilitate equal voice and equal access for all students and parents, examine and challenge social inequities in schools and communities, and formulate responses to local and global issues in education.

2. **Liberal Arts/Continuing Learning** - Graduates of education programs will value learning, evidence breadth of knowledge, and demonstrate an inquiry-based habit of mind. They will be effective communicators who question educational assumptions and use educational research to stimulate reflection and inform classroom practice.

3. **Professional Knowledge and Skills** – Through a learner-centered approach, graduates of education programs will apply theories, strategies, and research in teaching and learning to challenge, interest, accommodate, and assess a diverse student population. They will relate to students and families in a manner that stimulates learning and creates a positive, productive environment. They will use reflection to improve teaching and learning.

The Mission of Northwest Nazarene University is the transformation of the whole person. Centered in Jesus Christ, the NNU education instills habits of heart, soul, mind and strength to enable each student to become God's creative and redemptive agent in the world.

4. **Role of Schooling** - Graduates of education programs will demonstrate understanding of the historical and philosophical purposes of schools and a range of legal and societal influences. They will use their knowledge to make decisions about their teaching and work to improve school conditions and educational opportunities for all.

COURSE GOALS

- Students will develop engaging processing activities for material covered
- Students will learn the art of appropriate and educational demonstrations
- Students will become competent in the laboratory
- Students will develop the habit of reflection as a regular part of their teaching

LEARNING OBJECTIVES

- Students will demonstrate the ability to practice conflict resolution in a science setting (Science Scenarios)
- Students will be able to demonstrate the ability to create engaging anticipatory sets unique to each lesson (Activity Brainstorming)
- Students will be able to practice specific labs and then evaluate each one in order to see how they would accommodate each lab for a particular class (Crimbchin's Experiments and Lab Review Questions)
- Students will be able to use the internet to find appropriate subject based labs (Internet Labs)
- Students will be able to observe other teachers in areas they may be concerned with (Observation Days)
- Students will be able to create their own 50 minute lesson and lab (Lessons)
- Students will be able to reflect upon the course and its benefits (Reflection Paper)

PROFESSIONALISM

This is a vital factor for success in teaching. It will be evaluated in the checkpoint process. You will want to show your professionalism in this class by:

- Turning in assignments on due dates.
- Attending class.
- Class participation.
- Field experience as scheduled. (If you must miss your appointed time you must call the school well in advance so your teacher will know not to plan for you)
- Dressing appropriately for field experience work.
- Quality work on assignments. (Not first draft!)

Note #1 – Late assignments will receive a 50% reduction in grade unless arrangements have been made with the professor ahead of time (with a compelling reason to be late!). If you know you are going to miss class, have someone turn your assignment in for you.

Note #2 – Students who need to improve their writing are encouraged to use the services of the Academic Resource Center.

ASSIGNMENTS

1. Subject Based Internet Labs

   In order to help give you a starting arsenal of labs you will bring any **secondary level lab** you find on the internet for the given subject areas. Please also **include the website** you located the lab on as you will find some labs are random singles and others belong to more detailed lab/activity banks that may be useful to you later. Please bring **3 copies** of the lab. Below are the subject areas I would like for each class:

   March11 – Physical Science
   March 18 – Physical Science
   April 1 – Biology
   April 8 – Biology
   April 15 – Chemistry
   April 22 – Earth Science/Environmental Studies
   April 29 – Anatomy & Physiology or Zoology

2. 3 Teacher Observations

   I have luckily been doing this long enough that I have a range of colleagues all with different personalities, teaching styles and methodologies they use. We will discuss during class specific areas you are more concerned with for yourself in the classroom and we will set up observation times with teachers I feel excel in these areas so you can see how other teachers perform these tasks. Upon completion of an observation day please turn in the following: a copy of any labs or activities that were done, a paragraph regarding the things that teacher did well and you would consider using, and a final paragraph regarding the things you would see yourself doing differently.

3. Two 50 minute lesson/labs taught

   You will prepare and teach two 50 minute lesson and labs to one of Crimbchin's classes. Your first lesson will be done for some time between April 1st and April 10th and be on some aspect of the cardiovascular system and your second lesson will be planned for some time between April 15th to April 24th and be on some aspect of the nervous system. You will be required to turn in lesson plans to me the day of the lesson that includes:

   1. Objective – what do you want your students to be able to do at the end of the lesson?

   2. Anticipatory Set – how will you get their attention for the day's lesson?

3. Lecture Notes – what information will they need to know prior to the lab?

4. Lab Activity

5. Reinforcement – how will you bring the lesson together upon completion of the lab?

6. Assessment – how will you determine if students learned what you intended?

4. Course Reflection Paper
On the last day of class please turn in a one page reflection paper on this course. Please include what aspects you found to be the most beneficial to your future science teaching career, and what aspects you felt may not have been as helpful. Do you have suggestions of things that you would have liked to have done? Was the workload too little, adequate, or too much? What else would you like to share with me?

GRADING

In class participation	30 points
Subject based internet labs	10 points
Observations and refelections	30 points
Lessons	30 points
Reflection Paper	20 points
Total Points Possible	**150 points**

GRADING SCALE

94 – 100% = A	78 – 79% = C+	60 – 63% = D-
90 – 93% = A-	74 – 77% = C	Below 60% = F
88 – 89% = B+	70 – 73% = C-	
84 – 87% = B	68 – 69% = D+	
80 – 83% = B-	64 – 67% = D	

COMPLIANCE WITH ADA
Students who qualify for and desire accommodations in this course due to a disability, as defined by the Americans with Disabilities Act of 1990, and the ADA Amendments Act of 2008, must follow the NNU Disability Services Policies and Procedures as put forth by the office of Academic Advising. Any student may review a copy of these policies and procedures on the NNU website at: www.nnu.edu/academics/academic-advising/disability-services/policies-procedures/. Call 208-467-8463 or email (disabilityservices@nnu.edu) for further information.

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ACADEMIC INTEGRITY
Northwest Nazarene University seeks to establish academic integrity within the university community. NNU has identified unacceptable practices including, but not limited to:

1. Cheating in its various forms, whether copying another student's work, allowing your own to be copied, using unauthorized aids on an examination, having someone else take an exam for you (in-class or take-home), submitting as your own another person's work, rescheduling an exam relying on a false excuse;
2. Plagiarizing, i.e. presenting as your own the words or ideas of another person, including inadequate documentation of sources (electronic, Internet, or print) and excessive dependence on the language of sources even when documented, relying on a similar order of sentences while altering a few words or word order;
3. Submitting the same work for more than one course or assignment without prior written approval from the professor;
4. Using copyrighted material without appropriate citation or copying software or media files (such as music, movies, etc.) without permission;
5. Signing a roll sheet for another student who is not in class;
6. Fabricating data: This includes falsifying or manipulating data to achieve desired results, reporting results for experiments not done (dry labbing), or falsifying citations in research reports;
7. Denying other students access to academic information whether in the classroom, library (by hiding books, for example), or computer lab;
8. Destroying, altering, or tampering with another student's work to impede academic progress;
9. Stealing problem solutions from a professor or computer file;
10. Falsely reporting completion of reading assignments.

Students who either witness or have knowledge of violations are responsible for informing the instructor or appropriate University personnel. At the instructor's discretion, depending on the nature of the offense, the student's grade or ability to earn credit for the course may be affected. All students who violate the principles of academic integrity will be reported to the appropriate academic school and the Vice President for Academic Affairs. Violations may also lead to further disciplinary action.

Course Meeting Times

Day and Date	Topics	Requirements/Assignments
Monday March 4	Introductions Responsibilities - Syllabus Bubble Gum Lab Measuring Lab	Physical Science Internet Lab (Observation)
Monday March 11	Science Scenario Observation reporting Review Internet Lab Flinker Lab Calculating Speed Lab	Physical Science Internet Lab (Observation)
Monday March 18	Science Scenario Observation reporting Review Internet Lab Gravity Lab Stairmaster Lab	Biology Internet Lab (Observation)
Monday March 25	No Class Spring Break	
Monday April 1	Science Scenario Observation reporting Review Internet Lab Create A Baby Lab DNA Extraction Lab	Biology Internet Lab (Observation) (Lesson)
Monday April 8	Science Scenario Observation reporting Review Internet Lab (Review Teaching Experience) Cellular Respiration Lab Fish Sticks Lab	Chemistry Internet Lab (Observation) (Lesson)
Monday April 15	Science Scenario Observation reporting Review Internet Lab (Review Teaching Experience) Baggy Lab Endothermic/Exothermic Lab	Environmental/Earth Science Internet Lab (Observation) (Lesson)
Monday April 22	Science Scenario Observation reporting Review Internet Lab (Review Teaching Experience) Owl Pellots Lab Wilson Pond Lab	Zoology/Anatomy Internet Lab Course Reflection Paper (Observation) (Lesson)
Monday April 29	Science Scenario Observation Reporting Review Internet Lab (Review Teaching Experience) Review Course Reflection Somatic Senses Lab Cow Eye Dissection	