

Loyola University Chicago  
School of Education

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CIEP M64-001 - Secondary Methods: Science  
Spring 2011  
Mondays, 4:00-6:30 p.m., Cudahy Science 314 (Lake Shore Campus)

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### COURSE DESCRIPTION

This course encompasses the current content-specific methods and approaches used in teaching science in the secondary and middle school. Content knowledge, a working familiarity with commonly-cited sources of research literature including research synthesis efforts such as the *How People Learn*, lab demonstrations, materials and methods, integrative technology, and audiovisual applications are utilized by candidates in a hands-on and minds-on approach. Specific strategies are researched and demonstrated that deal with the complex issues of today's secondary student. This class promotes the integration of an Inquiry Based Instructional Model that aligns with state and national standards for science education. Students will address the issues of equity in education and integrate responsive strategies in the classroom so that understanding science is made accessible to all learners. Candidates will have opportunities to plan instruction, develop a laboratory safety analysis, design assessment opportunities, create ancillary support materials and analyze their instruction through peer evaluation.

### OBJECTIVES AND COMPETENCIES

*The major goals of the course are to help candidates:*

- Create, conduct, and evaluate science lessons at the secondary level (CASB 4E, 6E)
- Create learning activities and the necessary strategies for their implementation (IPTS 1, 4)
- Consider and demonstrate methodologies that assist *all* students in developing inquiry into various areas of science (CSST 1F; CASB 1H, 3H, 4H, 5J, 6H, 6I; IPTS 3, 6)
- Develop strategies for ensuring laboratory safety (CASB 1H, 2J, 4H, 5J, 6I)
- Understand and use formal and informal assessment to support student learning (IPTS 8)
- Examine and research disciplinary strategies for students (IPTS 2, 5, 7)
- Understand the uses of technology in science education and integrate appropriate technologies into curricular goals and lesson planning (CSST 2A, 2B, 5I; CASB 2H, 2J, 5I; IPTS 4H, 4R)
- Examine and develop a vision for their own instruction in science (CSST 9E, 9G; IPTS 10)

- Commit to becoming life-long learners in their field by incorporating the key components of a reflective practitioner's journal as part of their planning resources. (CSST 9F)

CSST=Core Standards for All Science Teachers; CASB=Content Area Standards for Biology  
IPTS=Illinois Professional Teaching Standards (see Appendix I)

This course is aligned to the Loyola University of Chicago – School of Education – Conceptual Framework (CF) standards:

- a. CF 1: Candidates demonstrate an understanding of a current body of literature and are able to critically evaluate new practices and research in their field.
- b. CF4: Candidates demonstrate skills that will enable them to work effectively with diverse clients.
- c. CF 5: Candidates demonstrate technological knowledge and skills that enhance education.

## CONCEPTUAL FRAMEWORK

- This course embodies the conceptual framework – *Professionalism in Service of Social Justice* – of the School of Education (SOE) at Loyola University Chicago. The four components of the SOE's conceptual framework are *service, skills, knowledge, and ethics*. As teachers we must instill behaviors within our classroom that exhibit a common concern for each other. Students need to realize that their classmates have individual needs and learn in a variety of styles. Each student has a right to a learning environment that is free from ridicule, prejudice, physical harm, vulgar language and sarcasm. It is within this framework that teaching and service go hand and hand. As a teacher I must address this compelling question: How does my action serve others? Teaching is an ethical act and science teaching is no exception. We will explore what it means to be an ethical teacher in the context of science and learning and teaching. These efforts will lay the framework for becoming a community of practitioners who are committed to serving youth, their families, and our communities.

## COURSE TEXTBOOKS

1. *The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> (2009) edition  
ISBN 978-0-87355-244-8
2. *Teaching Reading in Science*, Barton and Jordan 2<sup>nd</sup> edition  
ISBN-10:1-893476-03-0, ISBN-13: 978-1-893476-03-5
3. *Inquiry and the National Science Education Standards*, National Research Council, October, 2008 ISBN 0-309-06476-7
4. Mendler, A. (2000). *Motivating Students Who Don't Care: Successful Techniques for Educators*. Bloomington, IN: Solution Tree (formerly National Education Service)  
ISBN 1-979639-81-5
5. Carr, Sexton, Luginoff (2000). *Making Science Accessible to English Learners*  
San Francisco, CA: WestEd ISBN 978-0-914409-40-3

*Optional Text-Professional Library*

6. National Research Council (2000). *How People Learn: Brain, Mind, Experience and School*. Committee on Developments in the Science of Learning and Committee on Learning Research and Educational Practice, J.D. Bransford et al., Editors. Division of Behavioral and Social Sciences in Education. Washington DC: The National Academies Press. ISBN 0-309-0036-8

Useful On-Line Resources

Download a copy of the Illinois Learning Standards for Science:

<http://www.isbe.state.il.us/ils/science/standards.htm>

NRC (2006). *America's lab report: Investigations in high school science*. Washington, DC: National Academies Press. Available online at:

[http://books.nap.edu/catalog.php?record\\_id=11311#toc](http://books.nap.edu/catalog.php?record_id=11311#toc)

NRC (2000) *How People Learn: Brain, Mind, Experience and School*

National Academies Press. <http://www.nap.edu>

AAAS (1993). *Benchmarks for science literacy*. New York: Oxford University Press. Can be viewed on line at:

<http://www.project2061.org/publications/bsl/online/index.php?home=true>

NRC (1996). *National Science Education Standards*. Washington, DC: National Academy Press.

Available online at [http://www.nap.edu/openbook.php?record\\_id=4962](http://www.nap.edu/openbook.php?record_id=4962)

Information on IL Science Assessment:

<http://www.isbe.state.il.us/ils/science/standards.htm>

<http://www.isbe.state.il.us/assessment/IAFIndex.htm>

NRC (2000). *Inquiry and the National Science Education Standards*. Washington, DC: National

Academies Press. Available online at <http://www.nap.edu/openbook.php?isbn=0309064767>

COURSE POLICIES

ASSESSMENT OPPORTUNITIES

Grades are based on total points earned. “R” (revise) grades on any assignment can be resubmitted for another grading review. “R” grades do not imply a higher score. “I” (incomplete) grades require a one on one conference with the instructor to determine the next step in resolving the “I”.

<i>Point Range</i>	<i>Percentage</i>	<i>Grade Equivalent</i>
320-307	100-96	A
306-298	95-93	A-
297-291	92-91	B+
290-282	90-88	B
281-272	87-85	B-
271-266	84-83	C+
265-256	82-80	C
255-250	79-78	C-
249-240	77-76	D+
239-230	74-72	D
229-221	71-69	D-
220 and below		Not passing

COURSE ASSIGNMENTS AND PROJECTS\*

PRODUCT DESCRIPTORS: CATEGORY 1, 2 and 3

**Category 1: 40 points**

*Category 1 represents:*

- A. A variety of teaching materials that will assist you in the development of supplemental resources for your thematic unit.
- B. Management devices that can be applied to the day to day classroom management procedures that you will establish in your classes.

Each of the four (4) submissions is assigned a point value of 10. As you develop these materials, you will need to attach an explanation of its application for your use. This should be a one page typed descriptive narrative as to your intended integration of the material.

**Category 2: 60 points**

*Category 2 represents:*

The main focus of Category 2 is on the development of specific materials or strategies that will be added to your thematic unit or classroom management protocols. You are not limited to the listed choices.

This category will require you to integrate supplemental materials into your unit. For example, you may develop questions to ask students that pertain to a Category 1 recent news article, or you may develop a quiz or test question bank about your theme. A grading rubric for a lab you are intending to use would also be an example of a Category 2 element.

After each of the three (3) Category 2 products are developed, you should attach a one page typed description explaining their application to your unit. Each submission has a point value of 20.

**Category 3: 220 points**

*Category 3 represents:*

- A. A Thematic Unit containing lesson designs for:
- An Introductory Lesson which has an assigned value of 20 points.
  - A Lab Demonstration which has an assigned value 20 points.
  - A Lab or relevant Activity which has an assigned value 30 points.
  - A Lecture/Activity has which an assigned value of 30 points.

***Three of the above will be actually taught to our class.***

B. An assessment of your classroom observations that focus on community building, management and content expertise. This assignment has a value of 50 points.

C. Additionally, the 4<sup>th</sup> lesson that was not presented in class will be analyzed using the Lesson Study Rubric below. This analysis will be submitted using *LiveText*. A print version will be placed into your archive notebook. The point value assigned to this assignment is 100.

LESSON STUDY RUBRIC

(NSTA:5a,5d,5e,6a,6b,9a,9b,9c;  
 IL: 16A,16D,16H;  
 IPT: 3A,3B,3C,3D,3E,4E,4H,5D)

	Target	Acceptable	Unacceptable
<p><b>Target Grade/ Subject</b></p> <p>Identify the target grade and describe the target population and the relevance of the lesson for this population. This should be a full paragraph that describes the population’s likes, dislikes, their developmental stage, etc.</p> <p>(10 pts)</p>	<p>The unique attributes of your target population are very clear <u>and</u> the appropriateness of the lesson (for this group) is obvious.</p> <p>(10-9 pts)</p>	<p>Description of target population is general <u>and</u> the appropriateness of the lesson (for this group) is clear.</p> <p>(8-6 pts)</p>	<p>Description of target population is vague and/or, the appropriateness of the lesson (for this group) is not convincing.</p> <p>(5-0 pts)</p>
<p><b>Objective(s)</b></p> <p>Describe the specific behavior that the students will perform, the conditions under which it will be performed, and the criteria for assessing mastery.</p> <p>Connections to both local (Illinois) and national (National Science Education Standards) standards are included</p> <p>(10 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>6a. Understand the curricular recommendations of the National Science Education Standards, and can identify, access, and/or create resources and activities for science education that are consistent with the standards.</p> <p>6b. Plan and implement internally consistent units of study that address the diverse goals of the National Science Education Standards and the needs and abilities of students.</p>	<p>Behavior, criteria, and conditions are clearly communicated and clearly <u>and</u> concisely written.</p> <p>Connections to both local and national standards are included</p> <p>(10-9 pts)</p>	<p>Two of the three (behavior, criteria, and/or conditions) are apparent.</p> <p>Connections to either the local or the national standards are included</p> <p>(8-6 pts)</p>	<p>Behavior, criteria, and/or conditions are unclear or missing.</p> <p>Connections to local and national standards are not included</p> <p>(5-0 pts)</p>

<p><u>Relevant IL Standards:</u>          16A. understands the alignment of student learning standards, instructional strategies, and local curriculum in the development of assessment tools and strategies.          16D. understands the importance and impact of state and local assessment policies.</p>			
<p><b><u>Materials and Safety</u></b></p> <p>Include all materials (and explanations if necessary) including electronic files that are needed for lesson. A safety plan or safety precautions are taken care of</p> <p>(10 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>9a. Understand the legal and ethical responsibilities of science teachers for the welfare of their students, the proper treatment of animals, and the maintenance and disposal of materials.</p> <p>9b. Know and practice safe and proper techniques for the preparation, storage, dispensing, supervision, and disposal of all materials used in science instruction.</p> <p>9c. Know and follow emergency procedures, maintain safety equipment, and ensure safety procedures appropriate for the activities and the abilities of students.</p>	<p>Materials are provided and explained. A detailed safety plan is enclosed</p> <p>(10-9 pts)</p>	<p>All materials are included but how they are to be used is a bit unclear. Some safety guidelines are provided</p> <p>(8-6 pts)</p>	<p>All materials are not included and/or are poorly organized. No safety guidelines are provided</p> <p>(5-0 pts)</p>

<p><b><u>Lesson Description</u></b></p> <p>Describe how the lesson will work. All segments of the lesson with the estimated time of each are included and there is consistency among different segments. You will describe the lesson so that another teacher could understand it and implement it without your presence. (Note - use a bulleted or numbered list to clearly organize the procedures to follow.)</p> <p>You will also (a) include all your planned questions in the lesson, (b) specify what you will do with student responses and (c) consider of what you will do if desired response is not received</p> <p>(20 pts)</p>	<p>Description is sufficiently clear to enable a third party to try the lesson out. Description is clear yet economically written.</p> <p>All the required elements are explicitly and clearly covered</p> <p>(20-18 pts)</p>	<p>Description is fairly clear. It may be a bit wordy and/or repetitive.</p> <p>Two or more required components are present and explicitly covered.</p> <p>(17-14 pts)</p>	<p>Description is unclear and difficult to follow.</p> <p>Less than two components of the lesson plan are present.</p> <p>(13-0 pts)</p>
<p><b><u>Evaluation Procedure</u></b></p> <p>Describe the assessment measure for determining whether the lesson's objective(s) were met.</p> <p>(20 pts)</p> <p><u>Relevant IL Standards:</u> 16H. plans and conducts assessment to evaluate student understanding using a variety of tools and strategies.</p>	<p>The behavior assessed exactly matches the behavior described in the objective and description of the lesson.</p> <p>(20-18 pts)</p>	<p>The behavior assessed closely resembles the behavior described in the objective and description of the lesson.</p> <p>(17-14 pts)</p>	<p>The behavior assessed is inconsistent with the behavior described in the objective and description of the lesson.</p> <p>(13-0 pts)</p>
<p><b><u>Technology Support?</u></b></p> <p>Does technology SUPPORT instructional activity? Technology should not BE the lesson. Do not teach students how to use a word processor for example. Use technology as a tool. Is the use of technology transparent?</p>	<p>The technology supports the instructional objective in a meaningful way. It enhances it and possibly facilitates additional beneficial outcomes not directly measured.</p> <p>(10-9 pts)</p>	<p>The technology does support the lesson but may "get in the way" somewhat, e.g., when students need to "learn" to use the software as a separate endeavor.</p> <p>(8-6 pts)</p>	<p>Technology tends to be the focus of the lesson. Technology intrudes into the lesson or becomes the activity itself, e.g., teaching students how to use a spreadsheet.</p> <p>(5-0 pts)</p>

<p>Students should learn how to use the application without being aware of it. It is a means to an end, not an end in and of itself.</p> <p>(10 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>5d. Successfully use technological tools, including but not limited to computer technology, to access resources, collect and process data, and facilitate the learning of science.</p> <p><u>Relevant IPT Standards:</u></p> <p>4E. Understands how to integrate technology into classroom instruction</p> <p>4H. Understands the uses of technology to address student needs.</p>			
<p><b><u>Motivating Lesson?</u></b></p> <p>Is the lesson/activity intrinsically motivating? Does it build upon students' prior beliefs, knowledge, experiences, and interests? The activity must engage and motivate. Ask yourself the question "Why will students care?"</p> <p>(10 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>5e. Understand and build effectively upon the prior beliefs, knowledge, experiences, and interests of students.</p> <p><u>Relevant IPT Standards:</u></p> <p>5D. Understands factors that influence motivation and engagement and how to help students become self-motivated.</p>	<p>Activity is interesting and engaging for the target population. It builds upon students' prior beliefs and experiences. It is fun, even goofy enough to motivate students to do whatever it takes to accomplish it and would want to do it again.</p> <p>(10-9 pts)</p>	<p>Activity is reasonably different from students' normal classroom activities. It builds upon students' prior beliefs and experiences. Students are motivated to try the activity.</p> <p>(8-6 pts)</p>	<p>The activity is dry and boring. The activity does not build upon students' prior knowledge and experiences.</p> <p>(5-0 pts)</p>

<p><b><u>Accommodations</u></b></p> <p>Lesson includes accommodations designed to achieve maximum congruity with the learning styles, abilities, and cultural factors of students. (10 pts)</p> <p><u>Relevant NSTA Standards:</u></p> <p>5a. Vary their teaching actions, strategies, and methods to promote the development of multiple student skills and levels of understanding.</p> <p>5b. Successfully promote the learning of science by students with different abilities, needs, interests, and backgrounds.</p> <p><u>Relevant IPT Standards:</u></p> <p>3A. Understands the areas of exceptionality in learning as defined in the Individuals with Disabilities Act (IDEA) and the Illinois Administrative Code.</p> <p>3B. Understands the process of second language acquisition and strategies to support the learning of students whose first language is not English.</p> <p>3C. Understands how students' learning is influenced by individual experiences, talents, and prior learning, as well as language, culture, family, and community values.</p> <p>3D. Understands and identifies differences in approaches to learning and performance, including different learning styles, multiple intelligences, and performance modes.</p> <p>3E. Understands cultural and community diversity through a well-grounded framework and understands how to learn about and incorporate students' experiences, cultures, and community resources into</p>	<p>Lesson includes several accommodations to address different learning styles, abilities, and cultural factors of students. (10-9 pts)</p>	<p>Lesson includes few accommodations to address different learning styles, abilities, and cultural factors of students. (8-6 pts)</p>	<p>Lesson does not include any accommodations to address different learning styles, abilities, and cultural factors of students. (5-0 pts)</p>
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instruction.			
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## Score Buffer Up to 9pts

### How People Learn (HPL)

*First 4 chapters (pps. 1-114)*

#### Reflection and discussion questions for CIEPM 64 candidates.

1. Pick one of the key research findings described in HPL. How is this finding relevant to your current work? How does it relate to something you do really well? How does it help you reflect on something you could improve upon in your work? 3pts.
2. In what areas of work or leisure are you an ‘artisan’ and what areas a ‘virtuoso’? In an area where you might want to move from artisan to virtuoso, describe how the ideas highlighted in HPL might help you think about how you would plot such an improvement? 3pts.
3. A major goal of CIEPM 64 is that teachers transfer learning from our course into their classroom practice of teaching. How might you facilitate that transfer? Consider the ideas about transfer and learning described in HPL. Which describe some things you currently do and which ideas might you draw on in new ways to foster transfer of learning by teachers? 3pts.

#### EXPECTATIONS

##### 1. Academic Honesty

Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. Academic dishonesty is one of several possible reasons why a student may be dismissed from the Graduate School of Education. For specific policies and procedures see:

[http://www.luc.edu/education/pdfs/academics\\_policies\\_grad.pdf](http://www.luc.edu/education/pdfs/academics_policies_grad.pdf)

The same standards apply to undergraduate education. For specific policies and procedures see:

[http://www.luc.edu/academics/catalog/undergrad/reg\\_academicintegrity.shtml](http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml)

##### 2. Accessibility

Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks

of the semester or term. The University policy on accommodations and participation in courses is available at: <http://www.luc.edu/sswd>

### 3. Harassment (Bias Reporting)

It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias.

In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: <http://webapps.luc.edu/biasreporting/>

### 4. Diversity/Social Justice

It is my intention to facilitate this course in ways that acknowledge and respect all aspects of diversity. This includes respect for ideas and practices related to gender, sexuality, disability, religion, age, socio-economic status, race, ethnicity, and culture. Not only must we have respect for each other relative to diversity but we must also examine how issues of diversity interact with science learning and teaching in secondary science classrooms. We will continuously discuss what it means to teach science in culturally responsive ways.

### 5. Classroom Community

Our work together relies on honest, open, and respectful dialogue so that all participants feel free to express their views. During the first session our class will jointly develop a set of class norms that will serve as the first step in becoming a Professional Learning Community. Listed below are examples of issues that may be included in a norm statement:

- a. *There is no such thing as a stupid question.* Please ask any and all questions that you have and remember that by asking your questions, you are allowing us to learn as a community because you are helping to make ideas visible.
- b. *Be respectful of others' ideas and experiences* even if they are different from your own. We do not have to agree but we do owe it to each other to listen to and consider each other's points of view. On a related note, please *respect confidentiality* both in the class and outside of it.
- c. *Listen to others* by trying not to interrupt until whoever is talking finishes and by trying not to pass judgment until you have heard and considered what others have said. Do not assume that silences are unproductive. Give others time to think, consider, and formulate ideas.
- d. *Monitor your participation.* If you are outgoing and tend to dominate conversation, use this course to practice allowing others a space to participate. If you are less outgoing and tend to

let others do the talking, use this course as an opportunity to practice speaking up. It is always helpful to ask others what they think in any given situation.

e. *Please either turn cell phones off or to vibrate* before each class session out of respect for our community. On a related note, *use laptops appropriately* (e.g., note taking, presentations) Please *turn off all MP3 players*.

c. *Listen to others* by trying not to interrupt until whoever is talking finishes and by trying not to pass judgment until you have heard and considered what others have said. Do not assume that silences are unproductive. Give others time to think, consider, and formulate ideas.

d. *Monitor your participation*. If you are outgoing and tend to dominate conversation, use this course to practice allowing others a space to participate. If you are less outgoing and tend to let others do the talking, use this course as an opportunity to practice speaking up. It is always helpful to ask others what they think in any given situation.

## **6. Attendance, Participation, and Communication**

Regular, on-time attendance and thoughtful participation during class discussions and other activities are essential not only to your individual performance but also to the success of the course. Collaboration in every phase of the course is absolutely necessary if we are to form learning and teaching community. We all share responsibility for the learning and teaching in this course and beyond. If you know that you have to miss a class session, please notify me *prior* to your absence. Absences will negatively impact your grade. A **7% deduction** will be assessed for each unexplained absence.

## **7. Late Work and Extension Requests**

All assignments are due on the dates listed in the syllabus. Please talk with me in person or contact me via email or phone to discuss assignment extensions. All assignments due after an excused absence will follow the x+1 rule (number of authorized absences plus one additional session).

## **8. Format for Assignments**

Unless otherwise noted, all assignments must be typed and use 12 point Times New Roman font. As with all assignments, spelling and grammar reflect upon the care and professionalism of the author. If referencing course or other textual materials, please follow American Psychological Association style guidelines (APA – 6<sup>th</sup> edition). You can access the APA style manual through Loyola University Chicago's libraries or online at <http://www.apastyle.org>.

## **9. Technology**

It is important that we spend time thinking about how to integrate technology into science learning and teaching. Various forms of technology are crucial to many aspects of scientific work (e.g. probe ware and CBL) and therefore, students should have the opportunity to engage with appropriate technology.

NOTE: Unless otherwise discussed, you should place a print copy of all assignments into an archive folder located in our classroom. As a reminder, make certain you have activated your LiveText account if you have not already done so.

### **\*Information about Clinicals**

Note that item B under Category 3 of the assignments listed above takes place while you are in the field. Every course objective listed at the beginning of this syllabus is aligned with these field-based assignments. Therefore, it is **MANDATORY THAT YOU ATTEND CLINICALS - the class carries a 35 hour clinical requirement and you will be required to log your hours and turn your log sheet in as part of your essential course assignments.** While in the field and in class, I expect that *you will conduct yourself in a professional manner at all times*, which includes appropriate dress, communication, and interactions with adults and K-12 students.

### COURSE SCHEDULE\*

**Week 1: January 24, 2011**

**Personal Vision for Science Instruction, *How People Learn* Debrief, The Importance of Inquiry**

#### **ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

Prior to our first class meeting, please read Chapters 1 and 2 in the research text “How People Learn” Brain, Mind, Experience and School. This text was compiled by the National Research Council and published by National Academy Press. This is a resource text that I have used extensively in my work with teachers. The first two chapters of the text are on line. The web address is <http://www.nap.edu> and the ISBN is 0-309-07036-8.

*Inquiry and the National Science Education Standards*, National Research Council, October, 2008 Chapter 2 pgs.13-37 reflect on table 2-6 on page 29

#### **ASSIGNMENTS FOR WEEK 1**

- Please be prepared to discuss these readings during our first session.
- Begin to consider a Thematic Topic that will focus your development of 4 lessons.

**Week 2: January 31, 2011**

**Thematic Instruction, Best Practice, Unifying Principles  
Using the *Lesson Planning Heuristic*, The Need for  
Instructional Blocks**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009) Chapter 1 pgs.1-11 and Chapter 3 pgs. 27-39.

*Teaching Reading in Science*, Barton and Jordan 2<sup>nd</sup> edition. Rationale iii, Section 1 pgs.1-19

*Motivating Students Who Don't Care: Successful Techniques for Educators*. Finish reading by week 4.

**ASSIGNMENTS FOR WEEK 2**

- Using the ideas discussed in Section1, pgs.1-19 of TRIS, address the specifics of the *Text Style* for the sample text that you are using. Consider questions 1, 2 and 3 on pg.20 as an entry slip to session 2.
- Please be prepared to discuss these readings during our second session.
- Focusing on Category 1 items. Consider using some of the Literacy Strategies in TRIS Section 5 pgs.50-124
- Working reflections and edits on the 10 minute Introductory Lesson (Engage)

**Week 3: February 7, 2011**

**Using a Conceptual Framework 5E Model, Lessons on a 10-20-15-5 minute cycle, Introductory Lesson (Engage) Designs, 3 Pillars of Affective Instruction, Horizontal and Vertical Management Schemes**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009) Chapter 14 pgs. 231-247

*Teaching Reading in Science*, Barton and Jordan 2<sup>nd</sup> edition. Section 3, pgs.39-44

*Motivating Students Who Don't Care: Successful Techniques for Educators*.

**ASSIGNMENTS FOR WEEK 3**

- Finalizing your edits on the 10 minute Introductory Lesson (Engage).
- Complete your Category 1 ancillary resources that support your Theme. Consider any material requests for you lesson.
- All Category 1 assignments will be due next session.

**Week 4: February 14, 2011 Introductory Lesson (Engage) Presentations, Focus on Safety in the Lab, Designing an Effective Demonstration (Explore)**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009). pgs.117-118, 158-165, 324-326

**ASSIGNMENTS FOR WEEK 4**

- All Category 1 assignments.
- Introductory Lesson (Engage) Presentations
- Planning for a 10 minute Demonstration (a demonstration that sets up the Explore activity).
- Are you considering the *Score Buffer* assignment?
- Initial reflections on developing Category 2 resources.
- Finish your reading of the Mendler book on Motivation...

**Week 5: February 21, 2011 Independent Study. Class will not meet.**

**ASSIGNED READINGS TO BE COMPLETED BEFORE WEEK 6, FEBRUARY 28**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009), Chapter 2 pgs. 16-28.

Chapter 12 pgs.203-223.

*Making Science Accessible to English Learners* (2000), Chapter1 pgs.1-18, Chapter 2 pgs.19-28.

**ASSIGNMENTS FOR WEEK 6**

- Reflect on the Three Modes of Instruction as described in Chapter 1 of *Making Science...* and consider their applications within a Biology classroom.
- What type of strategies might encourage all students to respond to the questions posed by the teacher?
- What theory/ies of second language acquisition would you consider as an effective tool when working with ELL students within your Biology classroom?

**Week 6: February 28, 2011 Demonstration (Explore) presentation, Reading In the Content Area, Analyzing Literacy Strategies.**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009), Chapter 2 pgs. 16-28. Chapter 12 pgs.203-223.

*Making Science Accessible to English Learners* (2000), Chapter1 pgs.1-18, Chapter 2 pgs.19-28.

**ASSIGNMENTS FOR WEEK 6**

- Reflect on the Three Modes of Instruction as described in Chapter 1 of *Making Science...* and consider their applications within a Biology classroom.
- What type of strategies might encourage all students to respond to the questions posed by the teacher?
- What theory/ies of second language acquisition would you consider as an effective tool when working with ELL students within your Biology classroom?
- All Category 2 assignments will be due on Session 8, March 14.

**Week 7: March 7, 2011                      Spring Break**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

**ASSIGNMENTS:**

**Week 8: March 14, 2011                      Writing in the Science Classroom, Incorporating the Science Writing Heuristic, Posing the Right Questions, Designing Lab (Explore), Lecture/Activity (Explain) presentations**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009), Chapter 15 pgs.249-255

*Making Science Accessible to English Learners* (2000), Chapter 5 pgs.55-76

**ASSIGNMENTS FOR WEEK 8**

- One on ones for Lab/Lecture equipment requests for your final 20 minute teaching piece.
- Chapter 5 in *MSAEL* looks into scaffolding science learning. Can you reflect on any one tool/ strategy (pgs.63-75) that might bridge into supporting student writing?
- All Category 2 assignments are due this session.

**Week 9: March 21, 2011**

**Integration of Probe Ware and Technology, Buffer Lab, Core Temperature Lab, Providing Evidence for Making a Claim**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009), pgs.155-158, Chapter 13 pgs.225-230.

**ASSIGNMENTS FOR WEEK 9:**

- A draft of your Lab/Lecture teaching session will be discussed.

**Week 10: March 28, 2011**

**Lab (Explore), Lecture/Activity (Explain) presentations**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

Spend the time set aside for your weekly reading on the preparation of your final teaching element.

**ASSIGNMENTS:**

- Lab, Lecture/Activity due.
- 3 Pillars assignment due April 25. Assessing your clinical observations.

**Week 11: April 4, 2011**

**Independent Study. Class will not meet.**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

**ASSIGNMENTS:**

- Lesson Study Analysis will be due May 2nd. This in depth analysis will follow the Lesson Study Rubric. It carries a point value of 100 points and is an essential course requirement. This study will focus on the teaching element that was **not** presented in class.

**Week 12: April 11, 2011      Controversial Issues in the Science Classroom, Examining Position Statements from NSTA and NABT, Reflecting on Student's Beliefs**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009), Section 3, pgs.131-150.

**ASSIGNMENTS FOR SESSION 12:**

- After reading the controversial topics outlined from pgs.136-143, which topic do you feel confident enough to handle at this time. Visualize a dialog that might take place within your classroom between yourself and your students.

**Week 13: April 18, 2011      Formative Assessment in Science, Strands and Bands Activity Analyzing the ACT College Readiness Skills, Looking at a Model Lesson**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

*The Biology Teacher's Handbook* NSTA Press 4<sup>th</sup> edition (2009), Chapter 16, pgs.257-266  
*Making Science Accessible to English Learners* (2000), Chapter 6 pgs.77-86

**ASSIGNMENTS:**

- Lesson Study Analysis
- 3 Pillars assignment due April 25. Assessing your clinical observations.

**Week 14: April 25, 2011      Advisory One on Ones, Making Science Accessible for all Learners, Lesson Modifications and Differentiated Instruction**

**ASSIGNED READINGS TO BE COMPLETED BEFORE THIS CLASS:**

*Making Science Accessible to English Learners* (2000), Chapter 7, pgs.87-121

**ASSIGNMENTS:**

- Lesson Study Analysis due next week.
- 3 Pillars assignment due.

**Week 15: May 2, 2011      Revising Our Personal Vision of Science Education, Celebrating What We Have Accomplished, Preparing for Student Teaching**

## **APPENDIX I: Explanation of State Standards**

### **1. Core Standards for All Science Teachers**

- 1F. Displays, illustrates, and defends the results of an investigation.
- 2A. Understands the processes, capabilities, limitations and implications of technology and technological design and redesign.
- 2B. Understands technology and technological design as the use of tools throughout human history.
- 5I. Demonstrates the ability to use instruments or to explain functions of the technologies used to study matter and energy.
- 9E. Researches and reports examples of creative and critical thinking skills in scientific research and technological innovation.
- 9F. Researches and reports examples of predictions, hypotheses, and theories in both valid and biased scientific thinking.
- 9G. Researches and reports examples of the development of science through time and the impact of societal values on the nature of science.

### **2. Content Area Standards for Biology**

- 1H. Develops, selects, and implements safe and appropriate laboratory, field and classroom activities to develop students' understanding of cell biology.
- 2H. Demonstrates the use and application of the instruments used in biotechnology studies.
- 2J. Develops, selects, and implements safe and appropriate laboratory, field and classroom activities to develop students' understanding of biotechnology.
- 3H. Develops, selects, and implements appropriate classroom activities to develop students' understanding of evolution.
- 4E. Designs and explains models that demonstrate how organisms react to stimuli within and beyond the organism.
- 4H. Develops, selects, and implements appropriate laboratory, field and classroom activities and strategies to develop students' understanding of the biology of organisms and their diversity.
- 5I. Demonstrates the use of various instruments, technologies, and strategies in the research of ecology.
- 5J. Develops, selects, and implements safe and appropriate laboratory, field and classroom activities to develop students' understanding of the local, regional and global ecosystem

- 6E. Designs models that demonstrate the building and breakdown of obvious molecules in biological reactions.
- 6H. Demonstrates the use of instruments, technologies, and strategies that analyze the composition of the matter, energies, and degrees of organization in organisms.
- 6I. Develops, selects, and implements safe and appropriate laboratory, field and classroom activities that develop students' understanding of the physical and chemical factors associated with living systems.

### **3. Illinois Professional Teaching Standards**

- 1. The teacher understands the central concepts, methods of inquiry, and structures of the discipline and creates learning experiences that make the content meaningful to all students.
- 2. The teacher understands how individuals grow, develop and learn and provides learning opportunities that support the intellectual, social and personal development of all students.
- 3. The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners
- 4. The teacher understands instructional planning and designs instruction based upon knowledge of the discipline, students, the community, and curriculum goals.
  - 4.H Understands the uses of technology to address student needs
  - 4.R Accesses and uses a wide range of information and instructional technologies to enhance student learning
- 5. The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.
- 6. The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.
- 7. The teacher uses knowledge of effective written, verbal, nonverbal, and visual communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.
- 8. The teacher understands various formal and informal assessment strategies and uses them to support the continuous development of all students.
- 10. The teacher is a reflective practitioner who continually evaluates how choices and actions affect students, parents, and other professionals in the learning community and actively seeks opportunities to grow professionally.