

**COURSES ID:**        **ESCI 4460/6460** - Methods of Teaching Science in the Secondary School  
                              **ESCI 3450** - Practicum in Teaching Science  
**INSTRUCTORS:**    **Dr. Mary Monroe Atwater**  
**SEMESTER/YR.:**    **Spring, 2003**

**PREREQUISITES:** Admission to the Program and Teacher Education

**TIME:** M (215, 216) W (215, 216) F (215, 216) 9:05-11:00 am  
          T (215, 216) R (215, 216) 9:05-11:00 am

**COURSE MATERIALS:**

Chiapetta, E. L., & Koballa, T. R. (2002). *Science instruction in the middle and secondary schools*. Upper Saddle River, N. J.: Merrill Prentice Hall.

Handouts  
Audiotape recorder and tapes

**GOALS:**

Our preservice science teacher education program has been designed with a vision that exemplary science learning and teaching will result. To accomplish this end, our preservice science teachers must experience formal in-class educational activities, clinical practicums, and other learning opportunities that will result in exemplary science education for all students in grades 7 - 12.

One goal of the secondary science teacher education program at The University of Georgia is the implementation of a research-based rationale for science teacher education. The articulation of a research-based rationale for science teaching serves as a mechanism for preservice teachers to integrate theory with practice. To accomplish this goal, preservice teachers must have access to a variety of experiences during which to implement their rationale for science teaching. Our secondary science teacher education has five strands and six themes that will be evident in these classes. These strands include **science teacher as liaison for the nature, history, and philosophy of science disciplines, science teacher as facilitative communicator, science teacher as multicultural educator, science teacher as theory-based decision maker, and science teacher as a professional**. The six themes are **learning environment, curriculum, planning, instruction, evaluation, and values and beliefs**.

Preservice teachers need to develop into reflective professionals, that is, teachers who make

reasoned judgements based on propositional, case, strategic, and scientific knowledge within a teaching episode. Reflective behaviors cause preservice teachers to draw upon research-based rationales, experiences, professional identity, and leadership skills which must be integral to any teacher education program.

The second goal of this program is to explore what it means to understand science topics and to investigate how some learners may come to understand these topics. You will also test how some students' understanding can be altered.

An assumption of this preservice secondary science teacher education program is that different people may have quite different ways of thinking about a particular scientific phenomenon and that these different ways of thinking all make sense, at least to the person doing the thinking. We'll explore how people make sense of selected topics in science and examine the implications of these understandings for teaching.

The third purpose of the program is to provide you an opportunity to continue your thinking about some fundamentally important issues in teaching. These are educational issues you should struggle with your entire professional career. They include: What is science? Whose knowledge and what knowledge are worth knowing? What counts as knowledge and as evidence of understanding? What qualities of thought are of value? Whose needs or concerns are most important in a classroom? Who and what count in a science classroom? How are teachers and students suppose to interact? What are students' and teachers' ethical responsibilities? How to design and implement meaningful and effective science curricula?

The fourth goal of the preservice science teacher education program is the socialization of prospective teachers within the society of teachers. Individual teachers become participating members who exhibit teaching competency and engage in continuing professional and personal growth and development. Continued personal and professional involvement, growth, and leadership include active membership in major professional organizations for science teachers such as NSTA, NABT, AAAS, and GSTA. The expression of a professional identity serves to demonstrate that you believe that teaching is a profession. Assuming a leadership role in the science department, school district, state and national levels is indicative of professional growth.

Yet another aim of these classes is to introduce you to the triple consciousness that a teacher must develop. Teachers must think about the content they teach, the needs of all of their students and how they, working with parents or guardians, can meet their students' needs, and the ways in which the students are responding to the content, activities, assignment, and the teacher. Teachers make innumerable decisions during a day. As the instructors of these classes, we will work to explicate some of the decisions we make in teaching these classes, in order for you to begin developing a triple consciousness. Another goal is to challenge you to think on different levels about learning and teaching. Finally, we wish **to help you understand yourself better as a learner and prospective teacher so that you can be successful in helping**

**students in grades 7 -12 to meaningfully understand science.**

### **CLASS STRUCTURE:**

Please **ask** for clarification whenever you have any questions about any aspect of the course. We have tried to organize this course in a coherent way, but it may not make sense to you. If you feel lost, frustrated, or confused, ask the instructors to explain what we are doing and why we are doing it! If you are feeling pleased about what we are doing, please share it with us.

Much of our class time in ESC 4460/6460 will be spent in some form of discussion or some form of working together or sharing project results. Because we have all been educated in a system built around lectures, we need to experience new ways of interacting in classrooms in order to make the best use of the time.

At the beginning of these courses, it will be necessary for people to get comfortable talking. However, once we begin to trust each other, we have to do more work to have good discussions. From our experiences and by reading many others, we've come up with a few guidelines for good discussions that we will attempt to follow and enforce in the classes.

For discussions to be meaningful, you will need to keep up with your work. Use class discussions to share your confusions or to try out on others some newly formed idea. Each discussant should be able to count on assistance from the other members of the class as they listen and respond. A good discussion requires listening. Trust that each speaker has something important to say, but if you don't understand what somebody says, ask them to try to say again what they mean. If that doesn't work, develop a paraphrase of what you think they meant. Monitor your own speaking so that you do not monopolize class time. Even though your ideas may be wonderful, give other people a chance to articulate theirs. Be responsible to ensure that what you say connects with the current topic.

Come to class discussions ready to work. Trying to understand what someone else is thinking and or feeling about a topic or idea is the hardest work of the course and takes all the practice we can give it. Remember, this is something a good teacher must do. Therefore, if you cannot become engaged in the topic itself, practice trying to understand what people are saying, how they are saying it, what questions they are asking each other, and the effects of exchanges between people on their mutual understanding.

Working constructively in small groups is very important in class. Most of your work will be on designing curriculum, developing evaluation, planning lessons, and discussing ideas. Please work hard to work well with others because you will learn a tremendous amount from the group. Also, you will learn different things from working with different people, so push yourself to work with a number of people in the class.

In addition to written assignments, you will be responsible for presenting samples of your work to the class as a whole, which will then be critiqued. Suggestions for improvement will be offered.

### **COURSE GRADES:**

There are five different kinds of assignments: the course journal; an Interview about an Instance (IAI); a Microteaching assignment and analysis; a Special Laboratory Presentation; and a rationale paper.

### **EVALUATION FOR ESCI 4460/6460**

#### **Weighting**

1. Class Journal (Class Journal will be graded on authenticity. This is difficult to define, but I will inform you if your journal entries are not authentic after a few weeks of journal writing.) - 10%
2. Interview about an Instance (IAI)- 25%
3. Microteaching Activity - 25%
4. Special Laboratory Presentation - 25%
5. Rationale Paper - 25%

#### **Grading**

##### **Assignments**

A+ = 100; A = 95; A- = 90; B+ = 89; B = 85; B- = 80; C+ = 79; C = 75; C- = 70; D+ = 69; D = 65; D - = 60; F+ = 59, F = 55; F- = 50

Most assignments will be graded in the following way:

- 100% (A+) Strikingly impressive, very comprehensive, excellent in every way.
- 90% (A) Complete and showing evidence of original, active, and critical thought.
- 80% (B) All specified aspects of assignments are met.
- <80 (C-F) One or more aspects of the assignments are missing or unacceptable.

**Final grade determined by the following ranges:**

A = (100-90), B = (89-80), C = (79-70), D = (69-60), F = (<60)

**Student Name** \_\_\_\_\_

**Date** \_\_\_\_\_

## DISCUSSION/ACTIVITY CHECKLIST

### Application

<u>Actions</u>	<u>Dates</u>					<u>Scale</u>
	5	4	3	2	1	
Present for class/discussion						
Attentive during discussion/ Activity (Listens to others’ Ideas)	5	4	3	2	1	
Plans ahead for discussion/ activity	5	4	3	2	1	
Asks questions about ideas she or he doesn’t understand	5	4	3	2	1	
Expresses own ideas (Supports or challenges author and others’ ideas	5	4	3	2	1	
Stays after class for further discussion or follows-up with additional work	5	4	3	2	1	

### Ethical Behavior in Class Assignments and Activities

Students are required to become informed of the standards of academic honesty at the University of Georgia. Please read these standards. Honesty and ethical behavior are expected and demanded in the teaching profession. If you are willing to cheat to obtain a better grade, then you will be willing to discuss students’ performance and problems with just anyone, treat students unfairly in classes to impede their learning, support other teachers’ unethical behavior, or fail to report child abuse when a student has shared his or her plight with you. If you are now willing to take the easy way out by getting credit for group work in which you did not help create or copying other works without giving them credit, will you not do it again? Students and professors have the responsibility of creating a professional and ethical environment in classes. The following examples constitute academic dishonesty in these classes. This list is not an exhaustive one, but it only serves as an illustration.

1. Writing papers or reports in which others' ideas are used without giving them credit. Plagiarism.
2. Giving dishonest excuses for missing class or practicum assignments.
3. Copying the efforts of someone else on written assignments.
4. Attempting to undermine your partner's efforts during your practicum.
5. Being late for your practicum experiences or not meeting your teaching obligations during your practicum.
6. Copying another's answers on an examination or a quiz.

## **CLASS ASSIGNMENTS**

**ALL ASSIGNMENTS EXCEPT THE JOURNAL ARE TO BE TYPED.**

### **COURSE NOTEBOOK:**

Please purchase a loose leaf notebook in which you keep your class notes from discussions and work on your various projects. Keep track of some of the key ideas you form during discussions. This practice will help you document some of your thinking during class discussions and small group work.

### **COURSE READINGS:**

The course readings are a carefully selected mixture of written material that portray some of what the instructors believe to be key issues in science learning and teaching. Some are original materials that represent some of the key research and theoretical approaches. The writers of these articles might not agree with each other, but they offer a range of world views from which to think about science learning and teaching. These readings we hope you will return to several times; many were not selected because they were easy to read, but ones of worth and complexity.

### **CLASS JOURNAL:**

The class journal is an important aspect of these classes. Your journal will be read every two weeks. You will find responses to your entries. This journal is called a dialogue journal, so divide each loose leaf page in two columns and write in one column only. The professor's responses can be written in the other column.

If your journal is to be helpful to you, you need to write in it **once a week**. Selections from you

journals are due every other Monday class. They will be returned the following Monday. Dr. Thomson and I will take turns reading the journal.

Your first question is probably "What do I write about?". Since this journal will help you to develop into a science teacher, write about anything relevant to learning, teaching, or schooling. For example, you could have an entry about your experiences in a science class you are taking this quarter that confused you or you could write about your experiences during your field experience.

Journal writing serves several functions. For ESCI 4460/6460, its major purposes are (1) to develop your abilities to observe and describe educational events, (2) to improve your abilities to reflect on and communicate about your work in education, (3) to help you identify particular themes or concerns that are most important to you, and (4) to provide a place for you to discuss your reactions to the course itself. You choose what to share when you hand in your journal. If there is anything in your journal you do not want to submit, please remove those pages before you hand in your journal. Comments are written to help you think about your concerns and meet the purposes of the journal.

Journals will be graded on authenticity. There are no right or wrong entries, but there are entries that don't represent real thinking or puzzling or observing or caring or involvement. Authenticity is difficult to measure, but we will work hard to recognize it when it's there and inform you in your journal when it is not detected.

Please hand in all your journal entries, new and old, in an 8 \_ by 11 envelope. Please write your name on the envelope. If you desire, you can decorate the front and back of your envelope.

### **TEN MINUTE TEACHING HOUR**

(Based on an activity designed by Drs. Mary M. Atwater, David Butts and Ronald Simpson)

Your assignment is to develop an outline for teaching a lesson about a science topic or some other topic in which you have an interest such as a hobby. Each student should be prepared to teach on his or her day.

WHAT: A science topic or another topic of your choice

WHO: The entire class

WHEN: Volunteers will have an assigned time listed on the door of this class on January 9, 2003.

WHERE: Room 215

HOW LONG: Ten Minutes

**RESPONSIBILITY:** You have the responsibility of gathering all of the needed materials for your lesson. The Department of Science Education does maintain a material and equipment room. The room is found in Room 219 Aderhold.

**CONCERNS:** If you choose to teach a science topic, please be aware of safety. If you have any concerns about safety precautions, please discuss these with me prior to teaching your lesson. If glassware is used, safety goggles are required. No fire is to be used. No dangerous fumes can be generated because we do not have hoods in this room. No lab activity food can be consumed by the students.

The lesson outline should include (1) the goal or purpose of the lesson, (2) the materials needed to teach the lesson, (3) a description of the lesson, (4) the way you would determine if students learned anything about the topic (student evaluation), and the way you would determine your success in teaching the lesson (teacher evaluation).

After each presentation, five minutes will be used to determine the strengths of the presentation (What do you like about the presentation?). And ways for improving the lesson (How could this be a more effective lesson?) by your classmates. Then, the next presentation will be given.

Please sign up for your time to come in and talk to me about your lesson (a conference). A sign up schedule will be posted on the door. In preparation for this conversation, please reflect on the following questions:

1. In what four ways do you see teaching as challenging?

a.

b.

c.

d.

2. In what way do you see teaching as frustrating?

a.

b.

Also, please bring your lesson outline.



## CLASS ASSIGNMENTS:

Course assignments provide the opportunity and impetus for you to apply, explore, and test the materials from the readings and class discussion in different settings. The practice of writing up your assignments will facilitate your mastery of techniques and theories that are important in teaching. Sometimes the instructions for **doing** assignments may seem vague to you because many are open-ended assignments. There are no set answers or endings, and part of the assignment will be figuring out a way to do it that works best for you. However, if you don't understand the **purpose** of any of the assignments, **DEMAND** an explanation. If you need additional assistance, please do not hesitate to visit the professor who gave the assignment during office hours or make an appointment. We are here to help you to develop and grow.

## INTERVIEW ABOUT AN INSTANCE: WHAT DO STUDENTS KNOW?

There are several parts to this assignment. First each group composed of a maximum of three students identifies a science topic. Then you will brainstorm to develop an instance related to the topic about which to conduct an interview and identify questions that should keep the interviewee thinking and talking about the instance (the Instance plus possible questions will be called the Interview Protocol). You will develop an instance to discover what a student understands about a science concept. Your group will be given class time to develop the teaching instance. I will be available for consultation during this time. Your selected instance must be approved by the professor.

Once the group has decided on a protocol, each member will interview at least two students (either a middle school, high school, or college student). Keep in mind that a good IAI will get the interviewee talking freely, so that you need to ask relatively few questions. You might at the beginning of the interview, indicate to the interviewee that there are no right or wrong answers. You are only interested in what he or she is thinking. Also, you might tell them at the beginning that you will want to discover how well you have done by asking them questions later about your performance as an interviewer. Your questions should serve to clarify what they meant, and to make sure that they don't go off on tangent. These interviews are formally known as interviews about an instance and **should be tape recorded**. When you have finished the main part of the IAI, ask the interviewee what he or she thought about the IAI and your actions as an interviewer. Did they enjoy the teaching interview? Did you make them feel comfortable? Did they feel like they were being tested?

Go over the tape as soon as possible after the first interview to evaluate what worked and what did not work. You must have all the interviews and the beginning analysis completed and written before your first fieldwork experience. The purpose of this assignment is to think through the results of your interviews thoroughly enough so that you will know how important it is to determine what students already know about the concept and how important questioning is.



At a meeting outside of class, you should meet with other members of your group to discuss what happened when you each used the interview protocol. I suggest that you bring copies of the interview transcription for the group members. At some point, the group members must analyze its data and write a report. The interviews of all of the members in your group must be utilized in the analysis of data and the report even if you decide to write your own report.

In this IAI report, you must have:

1. List the names of the people in your group and include a copy of the teaching interview protocol that you developed in the group.
2. Summarize the decisions you made in the group as you developed this initial protocol in the pilot tests. In this summary, indicate why you picked this particular science topic and what kinds of responses you expected. Why is this an important topic in the discipline? In discussing the expected responses, speculate about what these responses could mean about what and how someone thinks about the Instance.
3. Describe what happened when you used the interview protocol. Was your instance really appropriate for discovering what a person knows about science concepts? Did the interviewee really understand the science concept? Did the questions you planned work - that is did people talk freely, were you able to keep silent, did you ask for clarification when they said confusing things, etc.? What was unexpected about the responses you got? Where did people get stuck? *Use quotes from your interviews* to justify the conclusions you reached. You will need to transcribe your tape in order to write the description and analysis. Include a copy of all of the transcripts in your IAI report. The names of the interviewees should be changed so that they can remain anonymous.
4. How do you think you would modify the protocol for your teaching? Give the reasons why you have suggested these changes.

Your report must include the following additional information. It is recommended that you work with your group and that a group report be submitted. A group report is not required, you can submit an individual report. Some people schedules are just too complicated to ever meet with the group out of class. The report must be **typed**. **The names of the interviewees should be changed so that the students remain anonymous.**

### **Description of Instance**

A brief recapitulation of the instance and of the purpose of the interview protocol will be found in this section. Why was this an engaging teaching instance, what subject matter notions do you think apply, etc.?



## Analysis of Interviews

A full description of your findings using some analysis format is the purpose of this key. How did the interviewees conceptualize the instance on which the teaching interview was based? For this description, you should use the analysis system your group develops. The readings will provide examples of some of the ways of analyzing what people say such as quotes to support assertions or tables. Integrate concepts from the readings into your analysis.

Whenever possible, use the results from other members in your group to refine your analysis even though other members might have interviewed different kinds of students (precollege and college). For example, you might say that your interviewee said Z, but that **Z means more when** you compare it to what some other interviewee said to another member of the group because Z was used in different context. Use quotes from your interviewees to justify the conclusions you reach about your interviewees' conceptualizations.

Please delineate the conceptions that the interviewees had about the science concept(s). Spend time providing evidence for your conclusions about what the interviewees knew about the IAI. Some of your readings may assist you in your interpretations of the IAI. A variety of approaches can be utilized such as looking for themes or patterns in the interviewees conceptions and focusing on the use of different kinds of analogies. Be creative and make sure you read the article, "Children's Understanding" by Jones, Lynch, and Resnick.

## Interpretations of Findings

Your understanding about doing these interviews will be found in this section. What surprised you about your findings? Why was this a good instance? What can't you make sense of? How has your understanding of the subject matter changed? How are you progressing as someone who can engage another person in a conversation about the science embedded in an interesting Instance? What changes would you make to improve this instance?

Some students in the past have had difficulty outlining their paper. I suggest you look at the article, "Children's Understanding" by Jones, Lynch, and Resnick. **The normal headings for a research paper include the following: (a) Introduction which includes the research question(s) or statement of the problem and review of literature, (b) Methodology (Description of the sample or participants in the study, Description of the Instruments or Interview Protocol Used, Data Collection, and Procedures for Data Analysis), (c) Results (What did you find), (d) Conclusions, and (e) Discussion and Implications.**

## Microteaching Activity:

Design and implement one microteaching activity. The microteaching activity should be designed to teach a specific science concept and last for no longer than 30 minutes. You will teach the

microteaching activity on campus to the students in this class. This may be a group activity; if so, at least two students must work together to do the microteaching.

During the microteaching activity, you will teach a science concept (s) and/or process (es) using any kind of method other than the lecture method. Your presentation will be evaluated by other members of the class and the professor. A grade will be awarded based upon the evaluation of other students and the professor using the Teaching Effectiveness Questionnaire.

### **Special Laboratory Presentation**

In groups of two, you will develop and teach a science laboratory to your peers. The laboratory can be one that is appropriate for either middle or high school. You get to choose the laboratory topic, but the topic must be approved by the professor. Please be aware of safety issue and what facilities we have in Room 216 before selecting a laboratory. We would like for you to choose a topic in the science field you plan to teach. Some examples might be diffusion, osmosis, active transport, center of gravity, chemical reactions (no generation of toxic fumes), etc. You will be responsible for collecting all the materials, preparing any solutions, washing glassware, disinfecting safety goggles, and putting away all materials after the laboratory. You will be responsible for assessing what materials and equipment the Science Education Department has for your laboratory. The materials and equipment are found in Room 219. If materials need to be ordered, you must tell the professor in enough time so that materials can be acquired. No equipment can be ordered so you must be familiar with what we have in the department. A list of materials and equipment will be available to you.

Your presentation will be graded based on the criteria found in the Teaching Effectiveness Questionnaire” by both your peers and professor. You must make a copy of your lesson plans for each member of the class, along with any other hand-outs. The laboratory should take no longer than 55 minutes to complete, including the opening and closing of the lesson. Groups will conduct the laboratories during different times in the course.

### **Rationale Paper:**

Your rationale for science teaching paper must be typed and should be very inclusive of your ideas about science learning and teaching. It should contain at least the following items:

- A. Your reasons for teaching science;
- B. An outline of your goals for your science students;
- C. A description of the learning environment you will provide for your students;
- D. An account of **specific** science activities and teacher and student actions in the classroom; and

E. Assessment and evaluation of learning and teaching in your classrooms.

Each item above must include comments from readings to justify why you will do what you describe. Use research support as much as you possible.

Your rationale paper will be very important in your program of study. You might be asked to revisit this paper in another science education class. Hence, please keep a copy of this rationale paper.

### **SCHEDULE FOR ESCI 4460/6460 and ESCI 3450**

(DATES ARE SUBJECT TO CHANGE)

#### **Week of January 6-10**

***Thursday, Jan 9 - Introduction, Syllabus, Index Card Information, Expectations for the courses, Practicum Placements (9:05-11:00)***

Journal Assignment: Describe some episode in learning science that really stands out in your mind. Speculate on the reasons this episode so impressed you.

#### **Week of January 13-17**

***Monday, Jan 13 - Ten Minute Teaching Assignment (9:05-11:00)***

***Wednesday, Jan 15 - Ten Minute Teaching Assignment (9:05-11:00)  
- Questioning and Inquiry (9:05-11:00)***

Reading Assignment:

Chiapetta, E. L., & Koballa, Jr. T. R. (2002). *Science instruction in the middle and secondary schools*. Upper Saddle River, NJ: Prentice-Hall. Chapter 6, pp. 116-120.

Kellough, R. D., Cangelosi, J. S, Collette, A. T., Chiapetta, E. L., Souviney, R. J., Trowbridge, L. W., & Bybee, R. W. . (1996), *Integrating mathematics and science for intermediate and middle school students*. Englewood Cliffs, NJ: Prentice-Hall. Chapter 4, 86-91

#### **Week of January 20 - 24**

***Monday, Jan 20 - MLK birthday***

***Wednesday, Jan 22 - Lesson Plans & Teaching***

**- Laboratory Safety/Liability (9:05-11:00)**

Chiapetta, E. L., Koballa, Jr., T. R. (2002). *Science instruction in the middle and secondary schools*. Upper Saddle River, NJ: Prentice-Hall. Chapter 6, pp. 239-248.

Kellough, R. D., Cangelosi, J. S, Collette, A. T., Chiapetta, E. L., Souviney, R. J., Trowbridge, L. W., & Bybee, R. W. . (1996), *Integrating mathematics and science for intermediate and middle school students*. Englewood Cliffs, NJ: Prentice-Hall. Chapter 4, pp. 94-106

Hassard, J. (1992). *Minds on science: Middle and secondary school methods*. New York: HarperCollins. Chapter 9, pp. 317-330.

Simpson, R. D., & Anderson, N. D. (1981). *Science, students, and schools*. New York: Macmillan Publishing Company. p. 161

Chiapetta, E. L., Koballa, Jr., T. R. (2002). *Science instruction in the middle and secondary schools*. Upper Saddle River, NJ: Prentice-Hall. Chapter 9, pp. 173-197.

Trowbridge, Bybee, and Powell. (2000). pp. 229-230

Hassard, J. (1992). *Minds on science: Middle and secondary school methods*. New York: HarperCollins. pp. 377-387.

Handouts

***Thursday, Jan 23 - Preparing for field experience***

**Week of January 27 - February 14 -- Practicum (9:05 - 11:00)**

**February 13 - 15 --GSTA Conference**

**February 14 --GSTA Presentations**

**Week of February 17 - 21**

***Monday, February 17 - Reflections on the Teaching Experience***

***Thursday, February 20 - Developing IAI***

***Friday, February 21 - Developing IAI and Protocol and Testing Protocol Group Work ; approval of the instructor for the IAI topic (9:05-11:00)***

Reading Assignments:

Finding out what children think by Beverly Bell, Roger Osborne & Roger Tasker  
Children's Understanding by Jones, Lynch & Resnick Chapter 11, 175-182

**Week of February 24 - March 14 Practicum (9:05 - 11:00)**

**Week of March 17 - 21 Spring Break**

**Week of March 24 - 28**

*Monday, March 24 - Reflections*

*Tuesday, March 25 - Instructional Methods (9:05-11:00)*

5E Instructional model: engagement, exploration, explanation, elaboration, evaluation  
Trowbridge, Bybee, and Powell. (2000). Chapter 15, pp. 243, 245-247

Handouts

**Due: IAI Thursday, March 27 - Microteaching Activity Week of March 31 --  
April 4 " \1 4 Tuesday, April 1 - Microteaching Activity (9:05-11:00)**

*Thursday, April 3- Microteaching Activity (9:05 - 11:00)*

*Friday, April 4- Learning Environments (9:05-11:00)*

Reading Assignment:

Chiapetta, E. L., Koballa, Jr., T. R. (2002). *Science instruction in the middle and secondary schools*. Upper Saddle River, NJ: Prentice-Hall. Chapter 11,p. 219-235

Oakes & Lipton (Chapter 7). *Classroom management: Caring and Democratic communities*, pp. 239-277.

Case Study: Silverman, R., Welty, W. M., & Lyon, S. (1994). *Multicultural education cases for problem solving*. New York: McGraw-Hill. (pp. 89-107).

## **Week of April 7-11**

***Tuesday, April 8 - Learning Environments: Motivation & A Safe Learning Environment***

Reading Assignment:

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, 41(10), 1040-1048.

Trowbridge, Bybee, & Powell. (2000). p. 327, pp.350-355.

***Tuesday, April 8 - Multicultural Education***

Reading Assignment:

Chapter 3 in book

Fordham, S. (1997). "Those loud Black girls": (Black) women, silence, and gender passing in the academy. In M. Sellers & L. Weis (Eds.), *Beyond Black and White: New faces and voices for U.S. schools* (pp. 81-114). Albany, NY: State University of New York Press.

Patthey-Chavez, G. G. (1993). High school as an arena for cultural conflict and acculturation for Latino Angelinos. *Anthropology and Education Quarterly*, 24(1), 33-60.

***Thursday, April 10 - Multicultural Education***  
***- Due: Critique of Teaching – both middle and high school***

## **Week of April 14 - 18**

***Tuesday, April 15 - Learning Theories***

***Thursday, April 17 - Classroom Management***

***Friday, April 18 - Special Laboratory (9:05-11:00) " \l 5Week of April 21 – 25***

***Tuesday, April 22 - Special Laboratory (9:05-11:00)***

***Thursday, April 24 - Special Laboratory (9:05-11:00)***

## **Week of April 28 - May 2**

*Tuesday, April 29 - Special Laboratory (9:05-11:00)*

*Thursday, May 1 - Wrap-up and Evaluations of Class (9:05-11:00)*

*Friday, May 2 - Reading Day*

*Monday, May 5 - (8:00 am - 11:00 am) Rationale Paper Due*

Rationale papers can be submitted earlier.

## QUESTIONS TO HELP FOCUS YOUR READINGS

### **Children's Thinking by Bell, Osborne, and Tasker - Atwater**

What are the purposes of an IAI?

How does the structure, format, and technique of an IAI protocol help to ensure that the IAI will fulfill these purposes?

What are responsibilities of the interviewer?

What are the teaching implications of this article?

### **Children's Understanding by Jones, Lynch, and Resnick**

What does the Piagetian term "conservation of matter" mean?

What other conservations are there? Why are they significant?

What did Jones and others do? (E.g., who asked, about what, using what protocols?)

How did they analyze the responses they got? (Hint: There is no simple answer.)

On page 421, what's a perceptual response? Are all correct answers correct?

What are their criticisms of standard school texts? Are they valid for science textbooks?

How important do you think it is for high school students to understand the particulate nature of matter? Why?

What are some of the teaching implications of this article?

### **Those Loud Black Girls by Fordham**

What does Fordham mean by the academy and passing?

What does Fordham mean when she writes, "Resulting persona makes the female appear not to be female"?

Do you believe that there are different kinds of womanhood? Why or why not?

How would you describe the Black females discussed in this article? Have you known such females?

What are the implications for science teaching from this article?

**Patthey-Chavez, G. G. (1993). High school as an arena for cultural conflict and acculturation for Latino Angelinos. *Anthropology and Education Quarterly*, 24(1), 33-60.**

What are the expectations that the teachers in the school have for the students and learning?

What are the things that are important to the students in the school?

Identify some of the problems that exist in the school?

What are the implications for science teaching from this article?

**COURSE ID: ESCI 3450**

**INSTRUCTOR: Dr. Mary M. Atwater**

**SEMESTER/YR: SPRING 2003**

**FIELDWORK - PRACTICUM:**

You will have six weeks of field experiences. The practicum will occur in two parts. The first three weeks will be either in a middle school or a high school. For the second part of the practicum, students will exchange to another kind of school so that each student will have a practicum experience in both the middle and high school settings . We hope to have a cooperating teacher (mentor) working with two students in the class. During your practicum experience, you will not be attending class Monday through Friday. We expect you to spend at least one full class period in your practicum classes. Please inform us if you do **not have a car (Use the index card provided on the first day of class)**. We will try to pair you with another student who has transportation. You can indicate on the informational index card your subject preference. It is important that our students experience working with different kinds of students, thus no student will teach only advance classes.

Each student must purchase insurance through either PAGE or National Education Association by **January 21, 2003**. Insurance forms can be obtained in the Educational Field Experiences Office in **Room 315 Aderhold Hall**.

**Week of January 27 - Week of February 14 -- Practicum (9:05-11:00)**

**Week of February 24 – Week of March 14 – Practicum (Exchange Schools) (9:05-11:00)**

**EVALUATION FOR ESCI 3450**

**Weighting**

**Field Experience (Mentor’s recommendation included) 25%**

**Management Plan 10%**

**Critique of Teaching Activity (Each one worth 7.5%) 15%**

Assignments will be graded in the following way:

- 100% (A+) Strikingly impressive, very comprehensive, excellent in every way.
- 90% (A) Complete and showing evidence of original, active, and critical thought.
- 80% (B) All specified aspects of assignments are met.
- <80 (C-F) One or more aspects of the assignments are missing or unacceptable.



## **Critique of Teaching Activity for Middle and High School**

This teaching activity will occur during your field experience in both your middle and high school practicums. You are free to select the topic and style of presentation in consultation with your cooperating teacher. Your presentation will be videotaped for your later viewing. Only videotape yourself teaching and interacting with students. Plan to conduct a session that is student centered. Two-thirds of the teaching activity should involve students or a student. Upon completion of the teaching activity, you will be asked to assess the strengths and weakness. Your evaluation should focus on the following areas of your teaching: the quality of your scientific knowledge, the goals and objectives of the lesson, the organization of the lesson, the methods utilized in the class, interpersonal relations (listening, asking and using questions), and personal enthusiasm. You might want to use the “Teaching Effectiveness Questionnaire” to guide you in your evaluation. In your evaluation, give specific examples for the reasons you think you were effective or ineffective in teaching. Also, indicate what you would you change and the reasons. Even though you are paired with another student during your practicum, you must teach this activity by yourself.

## **Classroom Management Plan**

This plan should be based on your readings and experiences in the practicum. The following topics should be included in your classroom management plan:

- Organization of classroom, including seating arrangement
- Class rules - input from the teacher and students
- Laboratory rules
- School contract
- Starting class
- Student management: individual needs versus class needs
- Distribution of materials and giving directions
- Students responsible for their own conduct
- Dealing with off task and disruptive behavior

You may include other topics that you think might be pertinent.

## Grading

### Rubric for Professional Component

5 = Always or almost always    4 = Most of the time    3 = Occasionally    2 = Seldom  
1 = Never or almost never

#### Professional Component

<u>Criteria</u>	<u>Scale</u>					
Organization	5	4	3	2	1	
Participation		5	4	3	2	1
Preparedness	5	4	3	2	1	
Professional Attitude		5	4	3	2	1
Professional Behavior	5	4	3	2	1	
Teaching Effectiveness	5	4	3	2	1	

#### Assignments

A+ = 100; A = 95; A- = 90; B+ = 89; B = 85; B- = 80; C+ = 79; C = 75; C- = 70; D+ = 69; D = 65; D- = 60; F+ = 59; F = 55; F- = 50

#### Final grade determined by the following ranges:

A = (100-90), B = (89-80), C = (79-70), D = (69-60), F = (<60)