

**Department of Mathematics and Science Education  
Secondary Science Teacher Education Program  
Spring Semester 2006  
ESCI 4450/6450, ESCI 4460/6460, and ESCI 3450**

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**ESCI 4450/6450 Science Curriculum and Learning**

Science curriculum models for students in grades 7 through 12 in relation to goals for science education and classroom practice. Development, selection, and evaluation of curriculum materials based on research in learning.  
Prerequisite: EPSY 2020 and EFND 2030

**ESCI 4460/6460 Methods of Science Teaching**

Science instructional strategies and classroom assessment for grades 7 through 12. Classroom management, lesson planning, and safety in the science classroom.  
Prerequisite: EPSY 2020 and EFND 2030  
Corequisite: ESCI 3450 and ESCI 4450/6450

**ESCI 3450 Practicum in Science Education**

Intensive school-based experiences in grades 7 through 12 requiring students to teach in varied cultural and regional settings.

**Nature of Course Syllabi**

The course syllabi for ESCI 4450/6450, ESCI 4460/6460, and ESCI 3450 are general plans for the courses; deviations announced to the class by the instructor may be necessary.

**Attendance Policy**

Good attendance and punctuality are critical elements of teacher professionalism. It is recognized that students get sick, attend professional meetings, and have family emergencies, but attendance and participation are prerequisites to learning. For the purposes of class attendance only, the semester will be broken into 3 periods associated with each of the block courses.

Period 1 (ESCI 4460/6460) – January 9 through February 10

Period 2 (ESCI 3450) – February 13 through March 24

Period 3 (ESCI 4450/6450) – March 27 through May 1

If you miss no more than one day during any period, are on time each day, and participate fully in class activities, you may earn all the points for attendance and participation towards the grade for the course associated with that period. Two unexcused absences (without written documentation) will result in the deduction of points equivalent to 5% of your course grade. Each tardy beyond the first will result in the deduction of points equivalent to 2% from your course grade. A tardy of more than 50 minutes or leaving class with 50 minutes or more remaining will count as an absence. If you have extenuating circumstances that cause you to be absent more than twice during any period (serious illness with written documentation), please consult the instructor about how you

might make up the missed days. If you are absent from more than four class meeting during the semester, you may be dropped from the three block courses.

### **Academic Honesty**

The University of Georgia seeks to promote and ensure academic honesty and personal integrity among students and other members of the University community. In keeping with the University Honor Code and Academic Honesty Policy, each student is expected to do his/her academic work and to acknowledge fully any assistance and academic resources. All academic work must meet the standards contained in "A Culture of Honesty." All students are responsible to inform themselves about those standards before performing any academic work.

### **A Note About Observations**

During the semester you will be observed as you teach by your university instructors, classroom teachers, and your classmates. These observations are opportunities to gain insight into your teaching through the perspectives of others. Talking about your teaching with others is an important mechanism for improving your understandings about science content, teaching, and student learning. An element of several assignments for ESCI 4450/6450 and ESCI 4460/6460 require that you capture your teaching on videotape and analyze your lesson using VAT, a unique web-based video analysis tool. You will learn more about VAT during class sessions and are invited to register as a user at <http://vat.uga.edu>.

### **Textbooks**

#### **Required**

Chiappetta, E. L., & Koballa, T. R. (2006). *Science instruction in middle and secondary schools*. Upper Saddle River, NJ: Merrill Prentice-Hall.

Koballa, T. R., & Tippins, D. J. (2004). *Cases in middle and secondary science education: The promise and dilemmas*. Upper Saddle River, NJ: Merrill Prentice-Hall.

#### **Optional**

Wong, H. K., & Wong, R. T. (1991). *The first days of school: How to be an effective teacher*. Sunnyvale, CA: H. K. Wong Publications.

### **ESCI 4450/6450: Science Curriculum and Learning**

In this course, you will learn about essential aspects of science curriculum and how curriculum can be used to enable student learning. The course is organized around three major themes: (1) science is a way of thinking and investigating as well as a body of knowledge, (2) effective instructional planning enables and facilitates student learning, and (3) standards and assessment are inextricably linked, guiding how teachers teach and what students learn. Topics to be addressed include: the nature of science, inquiry, social context of science teaching, context of science, curriculum, and professional practice. The following driving questions will be explored in this course:

1. What is the nature of science? How can school science help students become scientifically literate citizens?
2. How are teaching science *by* inquiry and teaching science *as* inquiry different?
3. How can community resources and students' interests be used to plan science lessons that are relevant and appropriate?
4. What innovative instructional materials are available for use in guiding students' science learning?
5. How can teachers plan instructional units to actively engage students in meaningful science learning?
6. What are your personal teaching goals and philosophy of teaching? How can participation in activities of the professional community of science teachers enable you to develop as a teacher?

#### **Course Goals**

By the end of this semester, you will be able to:

- Demonstrate your understanding of the nature of science and strategies for teaching students about the nature of science.
- Design and implement lessons that highlight different aspects of science inquiry.
- Show that you understand the hierarchical organization of core concepts in the science discipline you will teach.
- Demonstrate that you can plan science lessons and an instructional unit that help student learning and develop an interest in science.

#### **Course Requirements and Grading Summary**

1. Attendance and participation	10% (=50 points)
2. Nature of science lesson	15% (=75 points)
3. Inquiry lesson	15% (=75 points)
4. Organization of core science concepts	10% (=50 points)
5. Curriculum unit	30% (=150 points)
6. Final Portfolio	20% (=100 points)
<b>Total Possible Points</b>	<b>500 points</b>

Grades are assigned by summing each students' points and dividing by 500 to obtain a percentage with 90-100 percent= A; 80-89 percent= B; 70-79 percent= C; etc.

### Curriculum Course Assignments

If you have questions about an assignment, please consult the instructor. Many of the assignments have a performance (teaching) component to them, as well as a written component. All written components of the assignment must be typed.

1. **Attendance and participation** – This assignment is explained in the introduction to the block courses.
2. **Nature of science lesson** – An important facet of science teaching is helping students construct understandings about the value of knowledge created by science and to distinguish science from other ways of knowing. In this assignment, you will develop a lesson to engage students in the study of aspects of the nature of science. You will be graded on your lesson plan, teaching of the lesson, and a written reflection. A handout will be given in class with more details and a grading rubric. **Due April 4.**
3. **Inquiry lesson** – The purpose of this assignment is for you to develop understandings about inquiry in science teaching. You will design and conduct an inquiry lesson that highlights either teaching science as inquiry or teaching science by inquiry. The grade for this assignment will be based on your lesson plan, teaching performance, and written reflection. A handout will be given in class with more details and a grading rubric. **Due March 28.**
4. **Organization of core science concepts** – The teacher is central to helping students develop age-appropriate, expert-like understandings of science. Teachers must recognize their understanding of the hierarchical structure of the science discipline they teach. In this assignment, you will construct a map of the conceptual terrain for a science course that you plan to teach (e.g., high school biology). In doing so, you will develop a visual representation of your understanding of the hierarchical structure and interconnections that exist among the core science concepts that comprise a science course. A handout will be given in class with more details and a grading rubric. For this assignment, you may work with a partner and turn in one concept map. **Due April 14.**
5. **Curriculum unit** – Science instruction that leads to meaningful student learning is based on well organized curriculum units. Units are segments of a course of study that reflect coherence, are aligned with standards, and develop in students a deep understands of concepts, principles, and topics. In this assignment, you will develop a science curriculum unit for a high school or middle school science course that includes the following components: vision and philosophy for science education, description of context, standards, concept map, lesson plans, and assessments. A handout will be given in class with more details and a grading rubric. For this assignment, you may work with a partner and turn in one unit. **Due April 20.**
6. **Final Portfolio** – The purpose of this assignment is to enable you to consider and document your developing understandings of science teaching and learning based on national standards for science teacher preparation. You will develop an electronic portfolio in which you provide evidence and reflections specific to standards' indicators. A handout will be given in class with more details and a grading rubric. **Due on Day of Scheduled Final.**

### **ESCI 4460/6460: Methods of Science Teaching**

In this course, you will learn the essential elements of planning, teaching, and assessment in the secondary science classroom. The course is organized around three major themes: (1) engaging students in active learning in science, (2) teaching science for all students, and (3) continuing to learn from your own teaching. Topics to be addressed include: science content, teaching skills, assessment, and environment for learning. The following driving questions will be explored in this course:

1. How do adolescents learn science? What is the difference between learning and just completing the task?
2. How can teachers plan instruction to actively engage students and present a variety of representations?
3. How can teachers teach so that all students may learn science?
4. How can teachers organize the classroom environment to facilitate student learning?
5. What are the most effective ways to assess students' science learning?

#### **Course Goals**

By the end of this semester, you will be able to:

- Demonstrate knowledge of the fundamental skills needed for planning, teaching, and evaluating in the secondary classroom.
- Show that you can effectively engage students in active science learning through multiple teaching strategies.
- Plan, conduct, and assess a class discussion.
- Explain how students learn science and apply these ideas in lesson planning.
- Demonstrate that you can teach science to small groups of learners.

#### **Course Requirements and Grading Summary**

1. Attendance and participation	10% (=50 points)
2. Demonstration lesson	15% (=75 points)
3. Learning environment plan	20% (=100 points)
4. Discussion	15% (=75 points)
5. Assessment analysis	20% (=100 points)
6. Final Portfolio	20% (=100 points)
Total Possible Points	500 points

Grades are assigned by summing each students' points and dividing by 500 to obtain a percentage with 90-100 percent= A; 80-89 percent= B; 70-79 percent= C; etc.

### Curriculum Course Assignments

If you have questions about an assignment, please consult the instructor. Many of the assignments have a performance (teaching) component to them, as well as a written component. All written components of the assignment must be typed.

- 1. Attendance and participation** – This assignment is explained in the introduction to the block courses.
- 2. Demonstration lesson** – This assignment will enhance your understanding of a powerful teaching strategy known as demonstration. After viewing some demonstrations, you will plan and conduct a demonstration lesson. Your demonstration will involve questions that you ask students. You will be graded on your lesson performance, your lesson plan, and a written reflection. A handout will be distributed in class that with details about this assignment and a scoring rubric. **Due January 26.**
- 3. Learning environment plan** – A positive learning environment is crucial to students' academic success and wellbeing. To promote a positive learning environment, the teacher must engage in actions that are consistent with the educational aims of the school and considerate of students' personal and educational needs. In this assignment, you will develop a plan to motivate and engage students as science learners. Your plan will address what science teachers need to know about the first days of school, how students learn, possible causes of middle and high school students' inappropriate behavior, strategies for building positive teacher-student and student-student relationships, and organizational and management strategies to develop productive learning habits among students. A handout will be given in class with more details and a grading rubric. For this assignment, you may work with a partner and complete one write-up. **Due February 24.**
- 4. Discussion** – The purpose of the assignment is for you to develop comfort in leading discussions about science topics that facilitates student learning. You will plan and conduct a discussion. The grade for this assignment will be based on your lesson plan, teaching performance, and written reflection. A handout will be given in class with more details and a grading rubric. **Due February 2.**
- 5. Assessment analysis** – This assignment will allow you to take an in-depth look at students' science test performance. To complete this assignment, you will grade and examine a set of tests given by you or another teacher. You will analyze the students' performance using descriptive statistics. In a three-page double-spaced paper, you will present your analysis as well as your hypotheses on why the students performed as they did. A handout will be given in class with more details and a grading rubric. For this assignment, you may work with a partner and complete one write-up. **Due March 3.**
- 6. Final Portfolio** – The purpose of this assignment is to enable you to consider and document your developing understandings of science teaching and learning based on national standards for science teacher preparation. You will develop an electronic portfolio in which you provide evidence and reflections specific to standards' indicators. A handout will be given in class with more details and a grading rubric. **Due on Day of Scheduled Final.**

### **ESCI 3450: Practicum in Science Education**

In this practicum, you will interact with students and teachers in schools. The intent of this practicum is to allow you to experience science teaching and learning in middle and high school classrooms. The practicum will also enable you to test some of your developing understandings about students, teaching, planning, assessment, and the learning environment. The topics addressed in the practicum are the same as those described for ESCI 4450/6450 and ESCI 4460/6460. While in science classrooms, you will observe, work with small groups of students, assist classroom teachers in many ways, and perhaps teach lessons to classes. It is important to remember that while in schools and interacting with teachers and students, **YOU ARE THE UNIVERSITY OF GEORGIA**. Please ensure that your actions reflect well on yourself and the University.

The driving questions and course goals for this practicum are the same as those for ESCI 4450/6450 and ESCI 4460/6460. Your time in science classrooms should enable you to develop richer and better-informed answers for the driving questions and achieve the goals within the context of secondary school science.

#### **Course Requirements and Grading Summary**

1. Attendance and participation	85% (=425 points)
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#### **Choose 1 out of the following 3**

2. Multicultural essay	15% (=75 points)
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3. Review of research articles or research seminars	15% (=75 points)
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4. GSTA participation	15% (=75 points)
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Total Possible Points	500 points
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Grades are assigned by summing each students' points and dividing by 500 to obtain a percentage with 90-100 percent= A; 80-89 percent= B; 70-79 percent= C; etc.

#### **Curriculum Course Assignments**

Assignments are designated for either the curriculum or methods course for purposes of grading and record keeping, but they may be carried out during the practicum experience. If you have questions about an assignment, please consult the instructor. Many of the assignments have a performance (teaching) component to them, as well as a written component. All written components of the assignment must be typed.

- 1. Attendance and participation** – This assignment is explained in the introduction to the block courses.
- 2. Multicultural essay** – The purpose of this assignment is to demonstrate that you have increased your readiness to teach students who are in some way different from yourself (e.g., ethnicity, gender, socio-economic status, learning disability). For this assignment, you will read a research article on some aspect of cultural diversity in science and then draw conclusions between the article and what you are observing in the classroom. You will hand in a paper of approximately three, double-spaced pages. You should also illustrate your paper with photographs, drawings, sketches, computer

graphics, etc. A handout will be given in class with more details and a grading rubric. **Due February 16.**

2. **Review of research articles or research seminars** – At the core of meaningful science teaching is currency in your understanding of science and science education. You have the option of (a) attending two science or science education seminar or (b) reading three recent science and/or science education research articles. In this assignment, you will write a three, double-spaced page paper that summaries what you learned from either the seminar or articles and how what you learned could be used to enrich the science learning experiences of students. A handout will be given in class with more details and a grading rubric. **Due February 16.**
3. **GSTA participation** – The Georgia Science Teachers Association annual conference will be held February 17-18, 2006 in Columbus, GA. Students are invited to be co-presenters in the session “*Using the Georgia Performance Standards to Engage Students in Standards-Based Science Learning*” that is scheduled from 4:00 to 4:55 on Friday, February 17. The abstract for this session is presented below. A lesson plan for the investigation to be presented will be written in advance of the presentation. **Due February 16.**

Using the Georgia Performance Standards to Engage Students in Standards-Based Science Learning

Abstract: The Standards-Based Science Continuum developed by the Education Development Center is extremely useful for assessing the effectiveness of science lessons. The Continuum highlights many aspects of the Characteristics of Science Standards, including data collection and evidence, scientific claims, argumentation, and conceptual coherence. In this workshop, investigations of wind vanes, yeast metabolism, and other topics addressed in the middle school science curriculum will be conducted and discussed. Discussion will touch on the Content Standards, but will focus primarily on the Characteristics of Science Standards. As part of the discussion, participants will be introduced to the Standards-Based Science Continuum and taught how to use it to gauge the extent to which their lessons attend to the Characteristics of Science Standards. Lesson plans for each of the investigations conducted during the workshop will be distributed.

My proposed structure for this course as well as various course assignments are based on conversation with and instructional materials developed by Dr. Norm Thomson, Dr. Carolyn Wallace, Dr. Steve Oliver, Dr. Lynn Bryan, Dr. Art Recesso, and Dr. Frank Crawley. Thanks guys for your insights about science teaching and learning.

**Tentative Schedule of Topics, Activities and Readings for the Semester**

Week 1

- January 9 –Thoughts & Actions of Beginning Science Teachers  
 January 10 – Teaching Science  
     Activity: Prepare to teach a science lesson  
 January 11 – Initial Lesson Critique, Individual Meetings  
     Readings: *Science Instruction*, Chapter 1; NSTA Standards for Science  
     Teacher Preparation (<http://www.msu.edu/~dugganha/rethink.htm>)  
 January 12 – Standards & Science Teaching, Dr. Dava Coleman  
     Readings: *Science Instruction*, Chapter 2; also consider Georgia  
     Performance Standards (<http://www.georgiastandards.org>)  
 January 13 – VAT [Video Analysis Tool], Dr. Art Recesso  
     Readings: VAT overview (<http://vat.uga.edu>)

Week 2

- January 16—MLK Holiday  
 January 17—Model Science Lesson  
     Readings: *Science Instruction*, Chapter 3  
 January 18—Planning for Science Teaching  
     Reading: Mager’s Tips on Instructional Objectives  
     (<http://www.gsu.edu/~mstmbs/CrsToolsMagerobj.html>); also consider  
     (<http://www.personal.psu.edu/staff/b/x/bxb11/objectives/>)  
 January 19—Planning for Science Teaching  
     Readings: *Science Instruction*, Chapter 4; *Cases-4.1*  
 January 20—Science Teaching  
     Readings: *Science Instruction*, Chapter 11

Week 3

- January 23—Demonstration Lesson  
     Activity: Prepare to teach a demonstration lesson  
 January 24—Lesson Critique, Small Group Meetings  
     Activity: Begin VAT analysis of lesson  
 January 25—Science Teaching Continues  
     Readings: GPS for elementary grades (<http://www.georgiastandards.org>)  
 January 26—Science Teaching Continues  
     **Due: Demonstration Lesson**  
 January 27—Soaring in Science, Holsenbeck Elementary 8:30-12:00  
     Activity: Prepare activities for 1<sup>st</sup> graders

Week 4

- January 30—Leading a Discussion  
     Activity: Prepare to lead a discussion on a science topic  
 January 31—Lesson Critique, Small Group Meetings  
     Activity: Begin VAT analysis of discussion  
 February 1—Lesson Assessment System  
     Readings: *Science Instruction*, Chapter 6; *Cases-6.3*  
 February 2—Lesson Assessment System  
     **Due: Discussion**  
 February 3—Preparation for Practicum Experience & Introduction to Portfolio  
     Readings: *Science Instruction*, Chapter 8, pp. 107-113; *Cases-2.1*

## Week 5

February 6-10—Practicum Experience, Oglethorpe County Schools  
Readings: *Science Instruction*, Chapter 5; *First Days* (Wong)

## Week 6

February 13-16—Practicum Experience, Oglethorpe County Schools  
**Due: GSTA Lesson Plans, Multicultural Essay, or Review of Articles/Seminars**  
February 17—GSTA presentation in Columbus, GA

## Week 7

February 20-24—Practicum Experience, Oglethorpe County Schools  
Readings: *Science Instruction*, Chapter 8, pp. 113-122.  
**Due: Learning Environment Plan**

## Week 8

February 27-March 3—Practicum Experience, Oglethorpe County Schools  
**Due: Assessment Analysis**

## Week 9

March 6—Practicum Debriefing  
March 7—Science Curriculum Materials, Textbooks  
March 8—Science Curriculum Materials, Non-Text Resources  
Readings: *Science Instruction*, Chapter 15  
March 9—Science Curriculum Materials Continues  
March 10—Core Science Concepts  
Activity: Begin to develop core concept map

## Week 10

March 14-18—UGA Spring Break

## Week 11

March 20—Inquiry  
Readings: *Science Instruction*, Chapter 7  
March 21—Inquiry Continues  
Readings: *Cases-6.1*  
March 22—Inquiry Lesson  
Activity: Prepare to teach inquiry lesson  
March 23—Lesson Critique, Small Group Meetings  
Activity: Begin VAT analysis of inquiry lesson  
March 24—Inquiry Continues

## Week 12

March 27—Nature of Science  
Readings: *Science Instruction*, Chapter 7; McCommas' *Ten Myths of Science*  
March 28—Nature of Science Continues  
**Due: Inquiry Lesson**  
March 29—Nature of Science Continues  
March 30—Nature of Science Lesson  
Activity: Prepare to teach nature of science lesson  
March 31—Lesson Critique, Small Group Meetings  
Activity: Begin VAT analysis of nature of science lesson

## Week 13

April 3—Curriculum Unit Planning

Readings: *Science Instruction*, Chapter 16, pp. 262-265

April 4—Multifaceted Science Assessment

Readings: *Science Instruction*, Chapter 16, pp. 266-268 & p. 278

April 5—Multifaceted Science Assessment Continues

**Due: Nature of Science Lesson**

April 6—Curriculum Unit Planning, Small Group Meetings

April 7—Curriculum Unit Planning, Small Group Meetings

## Week 14

April 10—Laboratory and Field Work

Readings: *Science Instruction*, Chapter 13

April 11—Laboratory and Field Work Continues

April 12—Safety in the Laboratory and Classroom

Readings: *Science Instruction*, Chapter 14

April 13—Safety in the Laboratory and Classroom

Readings: *Cases*, 7.1

April 14—Presentation of Core Concept Maps

**Due: Organization of Core Science Concepts**

## Week 15

April 17—TBA

April 18—TBA

April 19—TBA

April 20—Presentation of Selected Aspects from Curriculum Units

**Due: Curriculum Unit**

## Week 16

April 24—Electronic Portfolio Preparation, Small Group Meetings

April 25—Electronic Portfolio Preparation, Small Group Meetings

April 26—Electronic Portfolio Preparation, Small Group Meetings

April 27—Electronic Portfolio Preparation, Small Group Meetings

April 29—Electronic Portfolio Preparation, Small Group Meetings

## Final Exam Day

Presentation of Portfolio Elements

**Due: Electronic Portfolio**

## Final Portfolio Topics, from NSTA Standards for Science Teacher Preparation

**ESCI 4450/6450****Science Curriculum & Learning**

Standard 2. Nature of Science

Standard 3. Inquiry

Standard 4. Context of Science

Standard 6. Curriculum

Standard 7. Social Context of Science

Teaching

Standard 10. Professional Practice

**ESCI 4460/6460****Methods of Science Teaching**

Standard 1. Content

Standard 5. Skills of Teaching

Standard 8. Assessment

Standard 9. Environment for Learning

### *Daily Practicum Tasks*

1. Find the appropriate place to park in the school lot. Introduce yourself at the office as a future science teacher representing the University of Georgia. Always be patient and courteous, wear a smile, and comment positively about the school, students, and teachers. Your positive comments may make someone's day, its infectious, and they will remember and look forward to your arrival each day.
2. "Sign in" in the office upon your arrival, get a nametag, and "sign out" when you exit the school. Remember that the principal is responsible for knowing at all times who is in her/his building.
3. Walk around the campus so you get to know more about the high school and middle school science areas, where the faculty restrooms are located, etc.
4. If one exists, consider visiting the faculty workroom to find out what goes on there. It is recommended that you not discuss politics or religious affiliation. For issues that involve the politics of the school remain neutral or quiet—you are a visitor and guest of the school, not a sounding board, mediator, or negotiator. Similarly, some teachers may use the faculty workroom to complain about colleagues or students. Avoid the discussion, but learn from what you hear.

### *Possible Practicum Experiences*

1. Examine the school's web site. From the web site or other sources, learn about the school motto, mascot, philosophy and rules. If you don't find the student handbook and school calendar, ask where this information can be obtained. The student handbook includes information about school rules, grading, homework arrangements, curriculum, extracurricular activities, etc.
2. Make a sketch of the classrooms you are working in and learn the names of students. Do this the first day and memorize the names of students the first night. This is not only the first element of effective classroom management, but it shows the students that you care about who they are. Ask your teacher about how she/he prepares for the first day of school, introduces the year's work and classroom rules. What are the safety rules in the science classroom and how are emergencies handled, first aid, and fire extinguishers? Is students' work displayed in the classroom? If teachers are using a computerized system for record keeping, ask to see how it is done.
3. Conduct interviews with first-year teachers and ask them about the joys and challenges that they associate with their jobs. Write a report summarizing the teachers' responses and giving your opinion about whether you share their ideas about the joys and challenges of teaching.
4. Interview a science teacher who has served as the mentor for beginning teachers in the past. Ask the teacher about his or her expectations for a beginning science teacher in the areas of lesson planning, instruction, classroom management, and learning assessment. Prepare a report summarizing your findings and drawing conclusions regarding your own preparation for science teaching.
5. The National Science Teachers Association (NSTA) is the largest organization in the world committed to the advancement of science teaching. Access the NSTA web site [[www.nsta.org](http://www.nsta.org)] and check out its teacher resources, events for science teachers, and

professional journals—*The Science Teacher*, for high school teachers, and *Science Scope*, for middle school teachers. Join NSTA as a student member.

6. Start a notebook of science teaching ideas and materials. Organize your notebook into sections (e.g., classroom management, assessment, safety, demonstrations, etc.) and add your reflections regarding the usefulness of ideas and materials included.
7. Interview two students about their science learning experiences. In a paragraph, describe how their comments reflected the themes of scientific literacy: (1) science as a way of thinking, (2) science as a way of investigating, (3) science as a body of knowledge, and (4) science and its interactions with technology and society.
8. Gather instructional materials from a teacher that he or she uses to teach students about the nature of science. Compare the concepts taught by the teacher with those discussed by Dr. William McComas in his chapter about the myths of science. [This chapter is available on-line at Dr. McComas' web site.]
9. Administer Chiappetta and Koballa's "Myths of Science" quiz to several teachers or students and then discuss their answers with them. Write a paragraph that describes their responses to the quiz and thinking about the nature of science. [The quiz is in the November 2004 issue of *The Science Teacher*, page 58-61 and on page 90 of your textbook.
10. Draw a floor plan for a middle school or high school classroom that would facilitate quality science instruction and reduce the probability of student misbehavior. On the floor plan, show the location of students' and teacher's desk, student laboratory stations, safety equipment (e.g., first aid kit, fire blanket, safety shower, etc.), materials and equipment storage, chalkboard or overhead projector and screen, and doorways. Also draw lines to represent student traffic patterns.
11. Observe a science class taught by a veteran teacher and pay particular attention to how he or she addresses the areas of classroom management, including interpersonal relationships, organization and management, and lesson design and teaching. Arrange to meet with the teacher after the class to discuss your observations. Direct the discussion to have the teacher talk about his or her reasons for the management decisions and strategies you observed.
12. Talk with a school principal or the assistant principal in charge of discipline. Ask about the school's disciplinary procedures and under what conditions it is considered appropriate for teachers to send students to the school office for discipline.
13. Select a concept or topic from a middle or high school science course that you believe student find boring. Develop a plan to teach the concept or topic in a way that will motivate students to be engaged science learners.
14. Interview two science teachers about their lesson assessment practices. Ask about alignment among standards, instruction, and assessment.
15. Develop a set of class rules that you would display in your classroom. Show the class rules to science teachers and ask what changes they would recommend. Write a paragraph that describes how you would introduce class rules to students. Include in your paragraph information about the level of student involvement in constructing the class rules.

16. Ask a veteran science teacher to assess his or her own lesson assessment practices using the checklist presented in Table 6.3 of the textbook. Discuss your own thoughts with him or her about lesson assessment and determine what changes he or she would suggest to improve the checklist and your own thinking about lesson assessment.
17. Interview two science teachers about the new Georgia Performance Standards for the courses that they teach. Ask how they new standards will impact their teaching and student learning.
18. Show your map of the core concepts in the science discipline you plan to teach to veteran science teachers. Have them comment on your map and describe how a map that they might construct would be different from your map.
19. Talk with teachers about web sites and computer software that they consider valuable resources for teaching science. Explore one or more of the site or software packages. Describe in a paragraph how the sites or software could be used to help student learn science.
20. Ask teachers to allow you to examine curriculum units that they have developed. After examining the units, talk with the teachers about them. Ask about the vision and philosophy that supports the unit, the standards addressed in the unit, and how student learning of unit content is assessed.
21. Make arrangements to observe a lesson taught by a veteran middle or high school science teacher and to speak with the teacher after the lesson. Ask the teacher about the lesson's purpose, planning, instruction, classroom management, and assessment. Write a paragraph about your experience in which you compare your thoughts about the lesson with those of the teacher. Share your paragraph with other beginning teachers.
22. Find out what resources are available for teaching science. Also, check out the library/media center for science books, videos, etc. What is the annual science budget for science? Is the budget the same or different for other subjects?
23. Interview any two of the following school staff people to gain their perspectives of the school, their role in the lives of students and teachers, and why they enjoy their careers: office staff worker, cook, custodian, nurse, guidance counselor, security officer, bus driver, etc.
24. During one lesson observation make a seating chart and record the distribution of classroom discussion by making a tally of the way the period is spent. Your recording categories could be: discussion, worksheet assignments, group work, question-and-answer, student notetaking, etc. Your tallies may reveal differences by gender, race, or room position. Write a paragraph that summarizes your observations.
25. Observe two lessons that are other than science. Carefully focus on the style of instruction. How do the lessons compare to science lessons? Based on your observations, what seems to make science lessons unique? Summarize your responses to the questions in a paragraph.
26. Request a copy of the year's syllabus for the classes you observe. Also, ask for some sample lesson plans and tests. Become familiar with the Georgia Performance Standards for the classes you observe.

27. Teach as often as possible. First consider team-teaching with a peer or your mentor teacher. Also, request to teach small groups of students. Then, try to teach a lesson or part of a lesson on your own.