

# ED 444/544 – TEACHING SECONDARY SCIENCE

## Syllabus and Course Information Sheet – Fall 2008

Department of Teacher Education  
Colorado State University – Pueblo

**Professor:** Dr. Jeff Piquette

**Office:** LW 317

**Office Hours:** T & Th 3:30-4:00, W 1-4, Th 11-1,  
(or by appt.)

**Prerequisites:** Admission to TEP

**Meeting Times:** W 4:00 p.m. – 6:50 p.m.

**Phone:** 719-549-2825

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**Course Website:** [blackboard.colostate-pueblo.edu](http://blackboard.colostate-pueblo.edu)

**Credit Hours:** ED444 = 4, ED544 = 3

**Co-requisite:** 60 Field Hours (unless TIR)

**Classroom:** LW 316

### *Philosophy*

This course provides students with the basics of middle school and high school science curriculum and methods. Students will gain expertise in standards-based science education, including planning, instruction, and assessment based upon the 7-12 Colorado and national science standards. Utilizing materials, resources, and technology that support secondary science education, they will learn to integrate inquiry-based, project- and problem-based, and collaborative strategies into long-term and daily science activities. Each student will work individually with K-12 science educators to plan and implement classroom and laboratory activities with secondary students, reflecting and utilizing a range of strategies to evaluate their own teaching. Throughout the course, students will develop the expertise to foster scientific thinking and plan instruction to meet the needs of 7-12 students with diverse learning styles. Another mission of the course is to assure all students have a range of activities, plans, and resources available when they begin to teach science to 7-12 students.

### *Catalog Course Description*

Focuses on teaching methods, materials, and assessment strategies necessary to prepare students to teach in 7-12 standards-based science classrooms; 60 hours of field experience.

### *Required Texts*

Chiappetta, E.L. & Koballa, Jr., T.R. (2006). Science instruction in the middle and secondary schools, 6<sup>th</sup> ed. Upper Saddle River, NJ.: Prentice-Hall.

Colorado Department of Education. (1995). Colorado model content standards for science. *Available free online!*

National Research Council. (1996). National science education standards. Washington, D.C.: National Academy Press. *Available free online!*

National Science Teachers Association. (1996). NSTA pathways to the science standards (high school): Guidelines for moving the vision into practice. Washington, DC. #PK130X3 *Available free online!*

National Science Teachers Association. (1998). NSTA pathways to the science standards (middle level): Guidelines for moving the vision into practice. Washington, DC. #PK130X2 *Available free online!*

### *Course Objectives*

Upon completion of all course activities each student will meet the following benchmarks for teacher education. Numbers in boldface are the numbers of CSU-PUEBLO standards. Items in boldface are benchmarks for admission to student teaching.

1. Utilizes the Colorado and national science standards to plan and evaluate standards-based science education activities and lessons in the secondary classroom. (**CO: 3.8, 4.1, 4.2, 4.3; CSU-PUEBLO: 2.9, 2.10**)
  - Understands state and national standards, including distinct discipline standards and interdisciplinary standards.
  - Understands the developmental benchmarks for students in each area of science, developing a framework of yearlong and short-term goals for students.
  - Evaluates textbooks and other materials to align with standards.

2. Uses a variety of teaching methods and strategies to plan an inquiry-based science program for their students. (CO: 3.1, 4.1, 4.3, 6.1; CSU-PUEBLO: 2.10, 5.4, 5.8)
  - Utilizes the following inquiry teaching strategies that support the development of student understanding and nurture a community of science learners: asking questions, inductive and deductive approaches, open and guided inquiry, project and problem-based learning, and science projects. (CO: 3.1, 5.5; CSU-PUEBLO: 5.1, 5.2, 5.5, 5.7)
  - Plans secondary science activities based on group and collaborative learning strategies. (CO: 3.1, 5.5; CSU-PUEBLO: 5.1, 5.2, 5.5, 5.7)
  - Utilizes the following instructional strategies in ways that will maximize student learning: science demonstrations, interactive lectures, and discussions. (CO: 3.1, 5.5; CSU-PUEBLO: 5.1, 5.2, 5.5, 5.7)
  - Utilizes a variety of strategies and materials to assist students in understanding and investigating science-technology-society issues, including controversial issues. (CO: 4.1, 4.3; CSU-PUEBLO: 2.10)
  - Plans lessons involving technology to meet science standards, including use of commercial hardware and software, Internet websites, and email. (CO: 7.1, 7.2; CSU-PUEBLO: 5.10, 5.11)
  - Includes strategies to assure an equitable, multicultural science curriculum. (CSU-PUEBLO: 3.2)
3. Uses knowledge of commercial and teacher-created science resources, to plan secondary science lessons and units.
  - Understands basal and supplemental curricular resources available for teachers, including innovative middle and high school science programs, and can align commercial materials with standards. (CO: 6.1; CSU-PUEBLO: 3.1)
  - Selects science content and materials and adapts and designs curricula to meet the interests, knowledge, understanding, abilities, and experiences of students. (CO: 6.1; CSU-PUEBLO: 3.1)
  - Plans long term science units. (CO: 3.1; CSU-PUEBLO: 5.3)
  - Plans interdisciplinary teaching activities that utilize science content and methods. (CO: 3.1; CSU-PUEBLO: 5.2)
  - Plan daily lessons that include effective teaching practices and engage and motivate secondary science students.
4. Plans effective laboratory and fieldwork activities for secondary students. (CO: 4.1, 4.1; CSU-PUEBLO: 2.10, 5.2)
  - Demonstrates safety considerations in science instruction and the science classroom, including proper use of equipment, instruction and supervision of students, and solutions to common laboratory problems.
  - Utilizes a variety of approaches to laboratory work in planning activities for students (e.g., science process labs, technical skill development, problem-solving labs, etc.).
  - Plans fieldwork, including preparation of students. (CSU-PUEBLO: 7.5)
  - Identifies and use resources outside the school to plan effective science lessons. (CSU-PUEBLO: 7.5)
5. Uses multiple methods of assessment to assure that all students learn science.
  - Plans science lessons in which evaluation matches the planned standards and lesson objectives. (CO: 3.2; CSU-PUEBLO: 4.1)
  - Plans a unit of science lessons and activities that implement the following kinds of assessments: observation, teacher-made test, performance tasks, self-assessment, analysis of student work samples, and rubrics. (CO: 3.3; CSU-PUEBLO: 4.2)
  - Implements ongoing evaluation of student work in a secondary science classroom, analyzing the effectiveness of instruction and altering strategies to assure that all children master objectives. (CO: 3.4, 5.7, 6.6; CSU-PUEBLO: 4.3, 4.10)
  - Incorporates a variety of strategies, including technology to track and chart student progress in plans for a science unit. (CO: 7.4; CSU-PUEBLO: 4.9)
  - Uses student data, observations of teaching, and interactions with colleagues to reflect on and improve teaching practice. (CSU-PUEBLO: 4.8)
  - Understands procedures for assigning grades (CO: 3.4, 5.7; CSU-PUEBLO: 4.3)
  - Communicates information on student activities and progress via technology (email and website) and presents a written report on student achievement to the cooperating teacher and to parents following completion of a unit of study. (CO: 5.9, 7.3; CSU-PUEBLO: 7.2, 7.3)
6. Implements effective teaching strategies in secondary science classrooms.
  - Critiques ineffective and effective science teaching practices of self, peers, and teaching colleagues. (CO: 3.1; CSU-PUEBLO: 5.2)
  - Can problem-solve common classroom management concerns in secondary science classroom, suggesting solutions based on best practices. (CO: 5.3; CSU-PUEBLO: 1.2)
7. Utilizes a variety of professional resources, including ones own action research, to improve the quality of student learning.
  - Participates in a range of professional development activities, including professional inservices. (CO: 8.5; CSU-PUEBLO: 6.7)
  - Incorporates information from professional journals and websites of national and state science organizations into own teaching. (CO: 7.3, 8.5; CSU-PUEBLO: 6.5, 6.7)
  - After analyzing theory, practice, and research, can clearly state, in writing, and defend, positions related to following science education issues. (CSU-PUEBLO: 6.4)

- Locates information relevant to educational issues and action research questions through database searches utilizing the Internet (including ERIC). (CO: 7.3; CSU-PUEBLO: 6.5)
  - Locates effective lesson plans, activities, and web-based resources to teach science in the secondary classroom. (CSU-PUEBLO: 6.5)
  - **Works collaboratively with peers and professional science educators in planning and implementing instruction.** (CSU-PUEBLO: 7.10)
  - **Effectively participates in peer evaluations of classroom teaching.** (CO: 8.5; CSU-PUEBLO: 6.6, 6.7)
  - Modifies own teaching based on the feedback of others. (CSU-PUEBLO: 8.6)
  - Understands the roles and responsibilities in planning and collaboratively teaching curricula and successfully plans/implements science lessons in a secondary classroom. (CSU-PUEBLO: 7.10)
  - **Plans and implements action research to improve the quality of student learning, including: establishing a student achievement goal and action research question; locating relevant research, implementing a strategy to improve the quality of learning, analyzing results on student achievement, and drawing conclusions based on data gathered.** (CO: 8.5; CSU-PUEBLO: 6.6)
8. **Demonstrates knowledge and skills concerning teaching and education when science is part of the content. The following standards will be evaluated by your field experience teacher(s):** CO: 3.1, 3.3, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, 5.5, 5.9, 6.1, 6.6, 7.1, 7.3, 8.2, 8.5; CSU-PUEBLO: 1.1, 1.2, 1.4, 1.7, 2.9, 2.10, 2.11, 3.1, 3.3, 3.4, 3.5, 3.6, 4.2, 4.10, 5.1, 5.2, 5.3, 5.4, 5.5, 5.7, 5.8, 5.10, 6.6, 6.8, 7.2, 7.7, 8.1, 8.2, 8.3, 8.4, 8.6, 8.7, 8.8, 8.9, 8.11). Evaluations of peers and cooperating teachers, and self-evaluations/reflections are benchmarks for admission to student teaching.

## **Requirements**

1. **Quizzes:** 2 @ 25 points, total = 50 pts.  
Each quiz will cover the readings and class activities. The final “exam” is included in these points.
2. **Science Lesson Plans:** 5 @ 15 points each, total 75 pts.  
You must turn in five lesson plans demonstrating quality science instruction. The lessons must encompass a variety of different styles such as inquiry, interactive lecture, laboratory experiments, problem/project-based learning, and a collaborative lesson. Two of these lessons may come from the science unit assignment, and thus count for both (see #4 below). Additionally, three of your five lesson plans must be for lessons that you actually teach as part of your field experience (see #5 below). You will want to coordinate one of these lessons with the lesson evaluation requirement (see #6 below). All lessons must include the components agreed upon by the class.
3. **Science Resource Notebook:** 13@4 pts. Total 52 pts.  
Each week (starting week 2), students are expected to post a resource to share with the rest of the class. It could be a book, Internet site, lesson plan, etc. The student is responsible for making sure that the resource is unique (not a duplicate of one already posted), put into the correct Blackboard Discussion Forum with enough heading information to know what it is, and a short description of what it contains. All resources should reference the authors and be applicable to this class. These resources will be available for everyone to download and compile. Occasionally, the resource may have to relate to the theme of the week. You are also required to review the resources that your classmates post and provide feedback. The feedback must contain your overall impression of the resource and comments about how you might use it in your science classes. If you don’t think you will use it, you should explain why. This feedback is due one week after the resources are posted.
4. **Weekly Reflections:** 13@3pts. And 1@11pts. Total 50 pts.  
Each student is to keep a personal journal related to what they are thinking and feeling about the course. There is a minimum requirement of one entry each week. The student should be reflecting on (a) the topics related to the course covered that week, (b) their field experiences for the week, and (c) their general attitude toward science education. These journals must be electronic, but can be somewhat informal. In other words, you do not have to have perfect grammar, spelling, etc. However, the typical “chat” usage is not acceptable. You must at least make an effort. Finally, these journals are for your eyes, my eyes, and anyone else you want to share them with. They are meant to be a private reflection on your journey through this phase of learning about what it is to be a science teacher. I will not be evaluating what you say, but on how well you reflect on each of the three items listed above. Journal entries are due at the beginning of class time for the previous week. At the end of the semester, you will read over your journal and reflect on how your image of science education has changed. This means that you need to keep a copy of each entry.
5. **Science Unit:** 100pts.  
A major requirement is the completion of a science unit, which will be shared with the class. The specific components will be discussed and agreed upon during class. It has to cover a minimum of two-weeks and contain at least 5 lesson plans. A scoring guide will be distributed so that you know how I will evaluate you.

6. **Teaching Evaluations:** 3@10 pts. and 1@20pts. Total 50 pts.  
Three lessons that you teach in your field experiences must be formally evaluated, using the evaluation form distributed in class. One of the lessons must include lab work. In all three cases, you must complete a self-evaluation and have the cooperating teacher who observed you evaluate them. This combination of evaluations (self and cooperating teacher) is worth 10 points. I will be grading the self evaluations on how well you reflect on the various goal areas on the evaluation form. I will not grade the content of the cooperating teacher's evaluation, but just check to see that it was completed. If a cooperating teacher's evaluation suggests that action is needed, you may be placed on a support plan to help you improve on future lessons. Finally, one of the lessons must be critiqued/evaluated by the course instructor (me). At least one of the lessons should be recorded (more, if possible) for inclusion in your teaching portfolio and to aid with my evaluation. My evaluation is worth 20 points.
7. **Mini Science Lesson:** 15 pts.  
All students must teach a mini science lesson to the rest of the class. This lesson should be based on sound pedagogy and should be done in consultation with the course instructor. More information on this requirement will be provided later.
8. **Field Experience Activities:** teacher evaluations 20 pts.  
At the end of the semester, your cooperating teacher/coach will complete an evaluation of your work in his/her classroom. Non-TIR students will also be asked to turn in a log of field experience hours and activities. Both logs and evaluations must be submitted before a passing grade can be given for the class. Logs will be evaluated based on the quality and quantity of activities performed and evaluations will be based on the quality of your performance in the classroom as shown by your cooperating teacher. You are to complete a minimum of 60 hours in the field experience. Be prepared to participate as an educator in the classroom each time you attend. Your instructor may ask you to prepare materials, activities, etc., for each class. Required activities include preparing and teaching lessons with the assistance of your teacher and conducting classroom action research.

## Grading

At the end of the course, all points will be summed, and grades assigned according to the following:

Percentage Range	Grade Level	GPA
100% to 94%	A	4.0
93% to 90%	A-	3.7
89% to 87%	B+	3.3
86% to 84%	B	3.0
83% to 80%	B-	2.7
79% to 77%	C+	2.3
76% to 70%	C	2.0
69% to 67%	D+	1.3
66% to 64%	D	1.0
63% to 60%	D-	0.7
59% and below	F	0.0

For a minimum grade of "C" in the course, all of the requirements included above must be completed and turned in for a grade.

## Course Policies

1. **Schedule and Blackboard:** The course schedule provided is very tentative. It is likely that we will have to change it as we learn more about our semester projects. Updates to this schedule will be posted to the course Blackboard site. It will be used extensively and is your primary source of information about what will be happening each week of class. I will update the site no later than 5:00pm every Friday for the following week. Please check it accordingly so that you know what is expected of you.
2. **Attendance and Participation:** Please attend all classes on time. Much of the class time will be spent in collaborative activities, and your absence will affect your own learning and that of the members of your group. Therefore, each unexcused absence will result in a loss of 2 points, and students entering class late will lose 1

point. An *excused absence* is one in which an unforeseen and unpredicted emergency results in absence or lateness. Attendance is a professional responsibility, and excused absences will be treated much as they would be for educators in public schools. Illness (with verification), deaths in the family, transportation problems (a car accident or car breakdown on the way to class) may be examples. Because the professor does not like to be placed in the position of judging the veracity of an excuse, independent, objective evidence should be submitted. To be an excused absence/tardy, the student must call and leave a message about the absence on the professor's voice mail as soon as possible (before class) so that the impact of the absence on class activities can be minimized.

Excessive absences, whether excused or unexcused, will result in a meeting with the professor and, if the professor believes that sufficient content has been missed so that the student cannot master course objectives, the student will be asked to drop the course. It is always the responsibility of the student to gain information about content, assignments, etc. that she/he missed.

Lateness or unexcused absences in *Field Experiences* cannot be tolerated – the teacher and students in the school are counting on your attendance. One unexcused absence will result in the drop of one whole letter grade in the class. Two unexcused absences will result in removal from the field experience with no opportunity to be placed in another classroom. Removal will be reported to the Department of Teacher Education. Additionally, it is crucial that you set up your field experiences early in the semester. If you do not submit your signed field experience placement form by the deadline given in class, you will receive a fractional grade penalty (e.g. A- instead of an A) for each day it is late.

3. **Late Assignments:** An assignment is late if it is not turned in at the place, date, and time established by the professor. All assignments turned in late will result in a reduction of 10% of possible points for each day late. The professor understands that at times there are extraordinary circumstances that occur and should be taken into consideration. These circumstances must be shared with the professor before the due date (and not the night before) in order for any extension to be given.
4. **Incomplete Grades:** A grade of "Incomplete" will only be assigned if a student and the professor has agreed upon the grade before the end of the last week of classes and will not be assigned merely because work may be incomplete. Extraordinary circumstances such as excused illness or death in the family must have occurred for an incomplete to be considered. In all cases, if an incomplete is granted, it is the responsibility of the student to submit a timeline of due dates for all incomplete assignments. Failing to meet such timelines will result in grades of "0" on those assignments.
5. **Extra Credit:** Because the course grade is an evaluation of proficiency on the competencies described in the syllabus, extra credit will not be accepted in the course.
6. **Writing Requirements:** Please proof all work you submit. A percentage of the points for each activity are assigned for the quality of writing.
7. **Civility:** Learning is facilitated when all members of the community act in a respectful and civil manner to each other. The following types of behavior are not professional, and will result in feedback from the professor. If continued, they will result in a request to withdraw from the course, with this information sent to the Department of Teacher Education:
  - Name-calling, including the use of personal or racial epithets.
  - Negative, offensive comments about the work of peers, children, etc.
  - Explosive, angry, confrontational behavior that appears harassing, violent, or threatening. This may be either verbal or non-verbal.
  - Rude speech or non-verbal behavior which interferes with others learning, for example repeated speaking while others (peers or the instructor) have the floor to talk, making distracting or other non-verbal expressions that are unprofessional (e.g., making faces in response to peers' comments).
  - Inappropriate care of the environment, including destruction of the university's or others' property.

8. **Plagiarism:** Honesty is an essential characteristic of all educators. Please reference all ideas and information you receive from others, from printed materials, and from sources such as the Internet. Failing to do so will result in a grade of “0” for the assignment, with no opportunity to redo. Examples of plagiarism may include turning in an assignment (or part of an assignment) completed by someone else or copied from published or printed materials or the Internet or turning in the same assignment (e.g., a lesson plan) in more than one class.
9. **ADA Accommodations:** This University abides by the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, which stipulates that no student shall be denied the benefits of an education "solely by reason of a handicap." If you have a documented disability that may impact your work in this class and for which you may require accommodations, please see the Disability Resource Coordinator as soon as possible to arrange accommodations. In order to receive accommodations, you must be registered with and provide documentation of your disability to: the Disability Resource Office, which is located in the Psychology Building, Suite 232.

## ***Other Information about the Course***

### ***Relationship to Conceptual Framework for Teacher Education***

The secondary science methods course seeks to establish a strong in-class learning community founded on 1) common goals and shared expectations among all participants, 2) strong collaborative learning relationships among students both inside and outside the university classroom, and 3) the development of learning communities in middle school and high school science classrooms. A major focus of course activity across the semester will be expanding students' learning communities from those of “traditional” student-student relationships to those formed when professional educators plan and work together. To accomplish this, extensive peer mentoring and peer review activities are planned, with students working together to plan and to evaluate their own and each others’ work. Activities include peer evaluations of teaching and a group action research plan.

Another focus of the class will be expansion of the student’s role into the larger teaching/learning community, moving from that of university student to that of beginning teacher. Throughout the semester, students will assume the roles of apprentice teachers in science classrooms, working with science educators. The nature of changing relationships with 7-12 students and with cooperating teachers and peers will be reflected upon during the semester. Through research and planned professional development activities, students will be required to assume an additional role as a professional educator in professional science and education organizations.

In this class the instructor will assume the role of instructor (directing some instruction), facilitator (of learning groups, providing feedback), and learner. In addition, the instructor will provide a model of the scientist/teacher, approaching issues of teaching and learning with the disposition of a scientist and researcher.

## ***Curriculum Design***

Aspects of curriculum design include the following:

1. Extensive use of **collaborative groups**, following the Johnson and Johnson model, with assignment of roles, interdependent goals, and individual checks of mastery.
2. **Apprenticeship** activities with secondary science educators, in which teachers mentor, provide input and feedback.
3. Extensive use of **self-analysis** and **peer review** of teaching, including in-class critique of video case studies teaching examples and analysis of teaching episodes of class members.
4. Attempts to make learning contextual by use of **case studies**, as well as field experience activities linked to theories and activities in the college classroom.
5. High expectations for skill and learning acquisition through evaluation of knowledge (quizzes) as well as the use of evaluation checklists and rubrics for all projects based on input science educators.
6. Use of a variety of strategies to integrate skills, knowledge, and activities, including the use of **nesting, sequenced curricula, threaded, and integrated strategies**. Areas of the teacher education curriculum, which have been integrated, include student skills at collaboration, lesson design, research/inquiry, technology, diversity, assessment, management, reflection, literacy, and content knowledge.

## ***References for the Course/ References for Further Reading***

- American Association for the Advancement of Science. (1993). Benchmarks for science literacy. New York: Oxford University Press.
- American Association for the Advancement of Science. (1993). Science for all Americans: A Project 2061 report on literacy goals in science, mathematics, and technology. New York: Oxford University Press.
- Brown, A.L., and J.C. Campione, J.C. (1994). Guided discovery in a community of learners. In Classroom lessons: Integrating cognitive theory and classroom practice, K. McGilly, ed.: 229-270. Cambridge, MA: MIT Press.
- Bruer, J.T. (1993) . Schools for thought: A science of learning in the classroom. Cambridge, MA: MIT Press.
- Chiappetta, E.L., & Koballa, Jr., T.R. (2006). Science instruction in the middle and secondary schools, 6<sup>th</sup> ed. Upper Saddle River, NJ.: Prentice-Hall.
- Colorado Department of Education. (1995). Colorado model content standards for science.
- Darling-Hammond, L. (1992). Standards of practice for learner centered schools. New York: National Center for Restructuring Schools and Learning.
- Harlen, W. (1992). The teaching of science. London: David Fulton Publishers.
- Hazen, R., and James T. (1992). Science matters: Achieving scientific literacy. New York: Doubleday.
- Loucks-Horsley, S., Brooks, J.G., Carlson, M.O., Kuerbis, P., Marsh, D.P., Padilla, M., Pratt, H., and Smith, K.L. (1990). Developing and supporting teachers for science education in the middle years. Andover, MA: The National Center for Improving Science Education.
- National Committee for Science Education Standards and Assessment. (1994). National science education standards: Draft for review and comment. Washington, DC: National Research Council. November 1994.
- National Research Council. (1996). National science education standards. Washington, D.C.: National Academy Press.
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- National Science Teachers Association. (1998). NSTA pathways to the science standards (middle level): Guidelines for moving the vision into practice. Washington, DC. #PK130X2
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- National Science Teachers Association. (1993). Scope, sequence, and coordination of secondary school science. Volume I: The content core. Washington, DC. 1993.
- Schoen, D. (1987). Educating the reflective practitioner: Toward a new design for teaching and learning in the professions. San Francisco: Jossey-Bass.
- Shulman, L.S. (1987). Knowledge and teaching foundations of the new reform. Harvard Education Review, 57 (1), 1-22.

## *Tentative Class Schedule*

Week	Topic/Activities	Class Resources	Assignments
1	Discuss the framework for the class and class requirements Focus on “what is science teaching?” <b>Activities:</b> Analyze teaching situations and materials to determine the extent they reflect authentic science.	Colorado and national Standards Video teaching episodes (Annenberg video)	<ul style="list-style-type: none"> <li>• Arrange field experiences and start them ASAP</li> </ul>
2	Focus on the national and Colorado 7-12 science content standards; the nature of standards-based instruction, from planning to assessment; and aligning curriculum with standards and choosing what to teach <b>Activities:</b> Case study on selecting what to teach: Too much content, not enough time! View basals and match to standards View resources on textbook evaluation	Standards <u>Pathways</u> texts Basal texts in various science areas	<ul style="list-style-type: none"> <li>• Read Chs 1 &amp; 2 in Chiappetta text.</li> <li>• Skim NSTA <u>Pathways</u> books – these books are good resources to help develop your knowledge of best practices in science education.</li> <li>• Post resource!</li> <li>• Weekly reflection</li> </ul>
3	Focus on inquiry teaching, the strategies and techniques for teaching inquiry-based science <b>Activities:</b> Share research and discuss critical issue. View Annenberg video and discuss inquiry Agree upon lesson plan components	Annenberg video examples of Inquiry Teaching	<ul style="list-style-type: none"> <li>• Read Chapters 5 &amp; 6</li> <li>• Next 20 pages of Pathways book</li> <li>• Post resource!</li> <li>• Weekly reflection</li> </ul>
4	Focus on inquiry teaching: guided and open inquiry <b>Activities:</b> Critique teaching episodes of inquiry Discuss teaching strategies	More Annenberg (if class chooses to)	<ul style="list-style-type: none"> <li>• Read chapter 12</li> <li>• Post resource!</li> <li>• Weekly reflection</li> </ul>
5	Focus on unit planning and collaborative learning <b>Activities:</b> Share lesson plans/resources and activities Critique teaching episodes of collaborative learning Brainstorm a unit plan	Sample units	<ul style="list-style-type: none"> <li>• Read chapter 13</li> <li>• Next 20 pages of Pathways book</li> <li>• Post resource!</li> <li>• Weekly reflection</li> </ul>
6	Focus on current issues in secondary science education: nature of adolescent learners and science education; difficult issues facing science educators (e.g., equity in science ed.) <b>Activities:</b> Develop Web of questions/important issues facing science educators and discuss them	Case Studies	<ul style="list-style-type: none"> <li>• Read Chapters 3 &amp; 4</li> <li>• Next 20 pages of Pathways book</li> <li>• Post resource!</li> <li>• Weekly reflection</li> </ul>
7	Focus on assessment in science education: standardized tests, Written assessments, authentic assessments, and rubrics <b>Activities:</b> Practice writing valid test questions Practice writing rubrics Practice evaluating student work Share resources and activities	Basal materials Sample tests and quizzes Sample rubrics Computer grading Programs	<ul style="list-style-type: none"> <li>• Read chapter 6</li> <li>• Post assessment resource!</li> <li>• Weekly reflection</li> </ul>
8	Focus on the science laboratory <b>Activities:</b> Discuss the role of lab and its management Assign lab prep activity	Sample labs and lab manuals	<ul style="list-style-type: none"> <li>• Read chapter 13</li> <li>• Post lab related resource!</li> <li>• <b>Resource notebook graded</b></li> <li>• Weekly reflection</li> </ul>

9	Focus on lab safety and management <b>Activities:</b> Visit CSM stockroom/prep area and practice preparing solutions, etc.	Flinn Catalog Safety Handouts	<ul style="list-style-type: none"> <li>• <b>Quiz 1</b></li> <li>• Read chapter 14</li> <li>• Post lab safety resource!</li> <li>• Weekly reflection</li> </ul>
10	Focus on issues central to Chemistry <b>Activities:</b> Brainstorm and discuss key issues central to teaching chemistry	Chemistry resources handout	<ul style="list-style-type: none"> <li>• Next 20 pages of Pathways book</li> <li>• Post chemistry resource!</li> <li>• Weekly reflection</li> </ul>
11	Focus on issues central to Biology <b>Activities:</b> Brainstorm and discuss key issues central to teaching biology	Biology resources handout	<ul style="list-style-type: none"> <li>• Next 20 pages of Pathways book</li> <li>• Post biology resource!</li> <li>• Weekly reflection</li> </ul>
12	Focus on issues central to Physics and Earth & Space science <b>Activities:</b> Brainstorm and discuss key issues central to teaching physics and earth and space science	Physics and Earth & Space science resources handout	<ul style="list-style-type: none"> <li>• Next 20 pages of Pathways book</li> <li>• Post physics/geology resource!</li> <li>• Weekly reflection</li> </ul>
13	Focus on classroom management <b>Activities:</b> Share units Case studies focusing on classroom management	Case Studies	<ul style="list-style-type: none"> <li>• Read chapters 6 and 9</li> <li>• <b>Unit due</b></li> <li>• Post classroom management resource!</li> <li>• Weekly reflection</li> </ul>
14	Catch-all and synthesis <b>Activities:</b> Discussion of best practices Critiques of teaching demonstrations Share resources and units	Class-developed units	<ul style="list-style-type: none"> <li>• Post resource for class!</li> <li>• Weekly reflection</li> </ul>
15	<b>Activities:</b> Final activity, Wednesday, Dec. 10, 3:30-5:50pm		<ul style="list-style-type: none"> <li>• <b>Quiz 2</b></li> <li>• <b>Field experience evaluations due</b></li> <li>• <b>Resource notebook graded</b></li> <li>• <b>Final reflection</b></li> </ul>