

**CALIFORNIA STATE UNIVERSITY SAN MARCOS**  
**COLLEGE OF EDUCATION**  
**EDMS 545B – Elementary Science Education**  
**Spring 2006 - Mondays 1:00 pm – 3:45 pm**  
**University Hall**

**General Information:**

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Office Hours: Before & after class

Other times are also available by appointment so please feel free to call or e-mail me to set up a convenient time to meet.

**Mission Statement**

The mission of the College of Education Community is to collaboratively transform public education by preparing thoughtful educators and advancing professional practices. We are committed to diversity, educational equity, and social justice, exemplified through reflective teaching, life-long learning, innovative research, and ongoing service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism, and shared governance.

**Required Textbooks:**

Tippins, D. J. & Koballa, T. R. (2002). *Learning from cases: Unraveling the complexities of elementary science teaching*. Boston, MA: Allyn & Bacon.

**Recommended:**

Friedl A. E. (2005). *Teaching science to children: An inquiry approach*. New York: McGraw-Hill.

*Other handouts will be distributed in class or through WebCT*

**Other Good Books:**

Kepler, L. (1996). *A year of hands-on science*. New York: Scholastic.

*Science Matters: Achieving Scientific Literacy*. By Robert M. Hazen

Great Explorations in Math & Science (G.E.M.S.). Lawrence Hall of Science.

<http://www.lhs.berkeley.edu/GEMS/>

Activities Integrating Math and Science. Aims Education Foundation.

<http://www.aimsedu.org/aimscatalog/default.tpl>

These and many other hands-on science books are in bookstores, museums, zoos, even grocery stores!

## **COURSE DESCRIPTION**

This course is designed to provide a comprehensive overview of the objectives, skills, concepts, experiments, materials, and methods necessary to teach science to elementary school children. A series of team activities will provide you with first-hand experiences in these areas. This course focuses on instructional methods, techniques, materials, lesson planning, curriculum development, organization and assessment in science. The integration of curricular areas is addressed. Methods of cross-cultural language and academic development will be integrated into the course.

## **COURSE OBJECTIVES**

By the end of this course, students should be able to:

1. Demonstrate proficiency with inquiry skills of observing, measuring, inferring, classifying, predicting, verifying predictions, hypothesizing, isolating variables, interpreting data, and experimenting.
2. Identify exemplary materials (curriculum kits, science programs, textbooks, equipment, technology, ancillary materials) appropriate for elementary school children.
3. Demonstrate knowledge and understanding of the California Science Framework, the California Science Content Standards, and the National Science Education Standards.
4. Demonstrate an understanding of the physical, earth and life science concepts included in the K-8 California Science Content Standards, and how to design lessons to teach the concepts.
5. Use the Learning Cycle model of instruction to teach science in a contemporary manner.
6. Use technology in elementary science teaching.
7. Demonstrate confidence in leading and performing investigations designed to teach science concepts, science process skills, and scientific attitudes.
8. Use authentic methods of assessment to evaluate student learning of science concepts and processes.
9. Design an elementary science-teaching mini-unit.
10. Practice strategies to include all students in science (linguistically and culturally diverse, students with disabilities and other students with special needs).

## **INFUSED COMPETENCIES**

### **Authorization to Teach English Learners**

This credential program has been specifically designed to prepare teachers for the diversity of languages often encountered in California public school classrooms. The authorization to teach English learners is met through the infusion of content and experiences within the credential program, as well as additional coursework. Students successfully completing this program receive a credential with authorization to teach English learners.

(Approved by CCTC in SB 2042 Program Standards, August 02))

### **Special Education**

Consistent with the intent to offer a seamless teaching credential in the College of Education, this course will demonstrate the collaborative infusion of special education competencies that reflect inclusive educational practices.

## **Technology**

This course infuses technology competencies to prepare our candidates to use technologies, emphasizing their use in both teaching practice and student learning.

## **COURSE REQUIREMENTS**

### **COE Attendance Policy**

Due to the dynamic and interactive nature of courses in the College of Education, all students are expected to attend all classes and participate actively. At a minimum, students must attend more than 80% of class time, or s/he may not receive a passing grade for the course at the discretion of the instructor. Individual instructors may adopt more stringent attendance requirements. Should the student have extenuating circumstances, s/he should contact the instructor as soon as possible.

For this class, each day you are absent from class drops your maximum final grade by one letter grade. If you are absent for a day your highest possible score will be A-. If you are absent twice your highest possible score will be B+ etc. If you are absent more than two days your highest possible grade is a B, which means you may not receive a passing grade for this course. Late arrivals and early departures will affect your final grade. Absences do not change assignment due dates.

### **Writing**

In keeping with the All-University Writing Requirement, all courses must have a writing component of at least 2,500 words (approximately 10 pages), which can be administered in a variety of ways.

### **Students with Disabilities Requiring Reasonable Accommodations**

Students are approved for services through the Disabled Student Services Office (DSS). This office is located in Craven Hall 5205, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with their instructor during office hours or, in order to ensure confidentiality, in a more private setting.

### **CSUSM Academic Honesty Policy**

“Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral assignments must be original work. All ideas/materials that are borrowed from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated with quotation marks.

Students are responsible for honest completion of their work including examinations. There will be no tolerance for infractions. If you believe there has been an infraction by someone in the class, please bring it to the instructor’s attention. The instructor reserves the right to discipline any student for academic dishonesty in accordance with the general rules and regulations of the university. Disciplinary action may include the lowering of grades and/or the assignment of a failing grade for an exam, assignment, or the class as a whole.”

## **TOPICS OUTLINE**

The Nature of Science

The Learning Cycle Model of Teaching

Learning Cycle Science Lesson Demonstrations  
 Writing Objectives for Student Learning  
 Writing Science Concept Definitions  
 CA Science Content Standards Grades K-8  
 California Science Framework  
 SDAIE Strategies in Science  
 Infusing Writing Activities in Science Lessons  
 Science Curriculum Kits and State Approved Texts  
 Science Process Skills and Scientific Attitudes  
 Current Issues in Science Education  
 Infusing Technology into Science Teaching  
 Authentic Assessments in Science  
 Science Projects, Student Research, Science Fairs  
 Safety in the Science Class  
 Inclusion and Teaching Science to Students with Special Needs

**COURSE ASSIGNMENTS**

1. Teacher Affect, Participation, Collaboration, Professionalism - 5%
2. Discussion Questions - 5%
3. Standards and Frameworks Task & Presentation – 5%
4. Science Fair Project and Presentation – 15%
5. Leadership on Hand-on science lesson (Group sizes to be determined) 20%
6. Science Teaching Unit and Presentation 20%
7. Essential Questions Quiz – 20%
8. Science Teaching Notebook (Individual) 5%
9. TPE reflection and response Via Task Stream 5%

Each student is responsible for ensuring that assignments are submitted correctly and on time. Late assignments will be penalized by a 10%-point reduction each day they are late. Web CT assignments not correctly posted do not count as submitted and will be subjected to the late assignment policy. Keep digital copies of all assignments for your Credential Program Electronic Portfolio and for your science notebook. You will not be assigned a course grade unless all the assignments are turned in.

**CRITERIA FOR GRADING ASSIGNMENTS**

- A** 90-100%: Outstanding work on assignment; excellent syntheses of information and experiences; great insight and application; and excellent writing.
- B** 80-89%: Completion of assignment in good form with good syntheses and application of information and experiences; writing is good.
- C** 70-79%: Completion of assignment, adequate effort, adequate synthesis of information, and application of information and experiences; writing is adequate.
- D** 60-69%: Incomplete assignment, inadequate effort and synthesis of information; writing is less than adequate.

Grades will be determined by points earned:

- A = 93-100    C+ = 77-79
- A- = 90-92    C = 73-76
- B+ = 87-89    C- = 70-72
- B = 83-86    D = 60-69
- B- = 80-82    F = 0-59

## **ASSIGNMENT DESCRIPTIONS**

### **1. Teacher Dispositions (affect) – 50 points**

The spirit of the assignment is for each student to self-evaluate his/her own teaching affect and to write up an action plan for improvement in those areas deemed necessary (this will be done in class with a partner). During the final class a discussion of progress towards this goal will be made with instructor's input. Expectations are that those positive behaviors (dispositions) will be modeled during the class with both colleagues and instructors. Your teach affect will be analyzed using the following dispositions:

- General classroom attendance, promptness, and participation: is on time, respects time boundaries (breaks, etc.), regularly attends class, and actively participates.
- Attention to classroom discussion protocols (per Epstein's Five Stage Rocket): respects time limitations, recognizes and respects the perspectives of fellow classmates, gives wait time, listens actively, uses non-interruptive skills, mediates disagreements by working to understand others' perspectives and finding common ground, genuinely encourages all to participate.
- Social and cooperative skills (as illustrated in cooperative projects): assumes responsibility of one's roles, is open to consensus and mediation, effectively communicates ideas, attends group meetings, is dependable, respects others' ideas, expects quality work from self and colleagues, manages time effectively, uses organizational skills and leadership skills, is assertive but not aggressive, uses reflection as a means of evaluation, motivates and offers positive reinforcement to others.
- Attention to assignments: meets time deadlines, produces quality products, responds cooperatively to constructive criticism, uses rubrics or other stipulated criteria to shape an assignment, prioritizes tasks and performs/supervises several tasks at once.
- General classroom demeanor: is professional, creative, kind, sensitive, respectful, has a sense of humor, is supportive of fellow classmates and instructors; recognizes others' perspectives as valid and works to include all "voices" in the classroom; is aware of and responsive to issues and behaviors that might marginalize colleagues in the classroom.
- Flexibility: is responsive when reasonable adjustments to the syllabus, curriculum, schedule, and school site assignments become necessary (common to the educational arena); can work through frustrations by problem-solving with others and not letting emotional responses dominate or impair thinking; "bounces" back easily; can work calmly under stress.
- Openness to and enthusiasm for learning: can engage with a variety of educational ideas with an open mind and a sense of exploration; demonstrates passion for and metacognition of learning across the curriculum and within discipline areas; takes advantage of learning opportunities and seeks out additional opportunities for learning.

### **2. DISCUSSION QUESTIONS: (Based on readings from *Learning from Cases* textbook)**

Due on the day of class – **50 points**

Each student will be required to submit a discussion question for the class based on the readings of the assigned chapters from the book, *Learning from Cases*. Half the class will submit questions for a given week and the second half will submit questions for next set of readings. As a result, each student will submit one question every other week. Each student must, however, read all the assigned readings for each week regardless of whether or not a question is submitted.

At the end of the semester you will copy and paste your individual questions as posted on WebCT with the date and time they were submitted shown. Turn in to the instructor a copy of this

for a grade. Late submissions will not be accepted. Since the questions will be used to direct the class discussions and activities, if you submit a question beyond the expected time, it will not count towards your grade for this assignment.

The question should be submitted to the WebCT class postings under the heading identified for discussion questions by 8 AM on the day of the class when such readings are assigned. The specific chapters assigned for each day will be shown in the class schedule in the appendixes to this syllabus. The discussion question should be an open-ended question that provides opportunity for discussion and calls for diverse responses. In addition, it should reflect that you read the assigned readings. The dates when the questions are due are reflected in the course schedule. Examples of such questions will be available on WebCT.

### **3. CALIFORNIA SCIENCE FRAMEWORK AND STANDARDS – 50 points**

Spirit of the assignment: to read a portion of the California Science Framework and the Standard for a particular grade. You will write your individual response to the readings. Then you will work with your grade level team to prepare and do a presentation to the class. It's important that you do the reading and the write-ups BEFORE you meet with your team.

#### **3a. Framework summary response (Individual) - 10 points**

- Read the first part of the California Science Framework, up to page 20. This includes Board Policy, the Introduction and Chapters One and Two.
- Think about the reading holistically.
- Write about a page, in your own words, that answers these questions: What do you think are the most important ideas addressed in the reading? Were there any ideas in the reading which were very new to you, or which disagreed with something you thought?

#### **3b. Grade level Science standard response (Individual) - 20 points**

- Using the standard for your chosen grade, pick a line item from physical science, life science, and earth science. For each one, come up with a brief description of an activity that children in that grade can do that also addresses one of the Investigation and Experimentation standards for the grade.
- You should end up with three sections, each of which includes a content line (physical, life, or earth science), an Investigation and Experimentation line, and a one or two sentence description of an activity that combines the two. The whole thing should be about a page.
- See example next page.

#### **3c. Team preparation and presentation (Team) - 20 points**

**You will be given 30-40 minutes of class time to work with your team.**

- Get together with your team. Look at the activities that everyone wrote up for Assignment 3b. Choose one.
- As a team, write up a lesson plan for the activity (with objectives, assessment, and a brief description of the activity). Put it on chart paper or an overhead transparency so it can be easily presented to the class. Make sure you quote the line from the standard on which your lesson plan is based.
- As a team, come up with a brief overview of the Science Standard for your grade. Don't try to give us every single line of the standard. Summarize it in such a way that we see generally what students are supposed to learn in physical, earth, and life science and in and in investigation and experimentation in that grade.

- In 8 minutes or less, present your lesson plan and standards choices. Be prepared to explain why your lesson plan represents really good science for kids.
- Your grade for this assignment will be based on the content and quality of your presentation, and on the level of collaboration of the group

### **Sample response to Assignment 3b.**

Grade Four

Physical Science

1. b Students know how to build a simple compass and use it to detect magnetic effects, including the Earth's magnetic field

Investigation and Experimentation

6. f Follow a set of written instructions for a scientific investigation.

Activity

Following directions from the Internet, the students will work in partner pairs to build compasses, using paper cups, thread, a needle and a magnet. They will observe and record the action of the compass indoors and outdoors, and in proximity to various objects.

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Life Science

2. c Students know decomposers; including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

Investigation and Experimentation

6. c Formulate and justify predictions based on cause-and-effect relationships.

Activity

The students will predict the growth of mold on bread that has no preservatives. They will observe and record the progress of the mold in various circumstances (if the bread is left in the open air, if the bread is in a closed sandwich bag, etc.)

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Earth Science

- 5.c Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

Investigation and Experimentation

6. b Measure and estimate the weight, length, or volume of objects.

Activity

In groups of four, students will create landforms (using common dirt) on cookie sheets. They will add measured amounts of water to their landforms, and will collect and measure the dirt that runs off.

#### **4. HANDS-ON SCIENCE LESSON PRESENTATION –200 points - Due on assigned day for the lesson**

Spirit of the Assignment: to develop and teach a particular kind of a science inquiry lesson that teaches both science thought processes and science content.

You will work in groups of two or three to lead a science lesson based on the Learning Cycle Model of Instruction. You will prepare and teach this lesson to your classmates. Each team will be allocated a maximum of 30 minutes of class time to teach their lesson. Use activities from the textbook, Internet sites or other science resources. The team should teach the lesson as you would to elementary school students. However do not ask your colleagues to act as elementary kids.

Each group will be assigned a specific grade level for which you will plan and teach the lesson. This will determine the grade level and California Science Standard your lessons will cover. The group will work together reviewing each other's lesson ideas, sharing resources, and making sure each member presents a different part of the lesson. Collaboration between group members is essential to divide up the work, and support each other.

Each team will present one lesson that follows the Learning Cycle lesson format and will emphasize a science concept related to the California Science Standards. The lesson will have at least one hands-on activity, it is NOT reading or completing worksheets (though they may require students to read something or complete lab observation sheets). You should take the activities "off of paper" and require students to use science process skills with science manipulatives. Each hands-on activity is required to have predictions made and recorded before beginning the activity and a data sheet where students can record observations or data collected from the activity. Try to have students make quantitative measurements (length-meters, weight-grams, time), remember to use metric units of measurement.

The Learning Cycle lesson format

##### Considerations Before the Lesson

- I. Grade Level and California Science Standard the lesson is addressing
- II. Objectives (3-4) (use behavioral objectives with action verbs; e.g. the students will....)
- III. Two essential questions that the learner should be able to answer after the lesson and background information; what information would a teacher need to teach the lesson if they didn't have any science background on the particular concept.
- IV. Assessment
- V. Materials needed for the lesson

##### Anticipatory Set

- VI. Engagement/Exploration Phase: Describe the procedure in detail for conducting the exploration phase of the lesson. What will the teacher and students do, what are possible questions the students will have (see rubric for details)?

##### Instruction/Concept Introduction

- VII. Concept Invention Phase: Describe in detail how to teach the concept (see rubric for details). You may use PowerPoint here.



Beyond:

VIII. Concept Application Phas: How will you specifically address this section? If at all possible include other hands-on activity (see rubric for details).

IX. At least 5 applications to everyday life.

Supplementary Material

X. At least 5 SDAIE strategies

XI. At least 5 adaptations for students with disabilities

XII. A 1-2 page summary of the science content background

XIII. A list of 5 relevant web sites (with descriptions)

XIV. References

Note:

- Resources from the Internet may be used as part of Concept Invention Phase. Images, movies, simulations, sounds, and other exciting resource are available free over the Internet.
- Be sure you understand the concepts you are teaching, and that you can explain them.
- The lesson should be developmentally appropriate for elementary level and should follow the NSTA Safety Guidelines.
- Make sure that you include the three stages of the Learning Cycle and that the science content background is addressed.

Your Hands-On Learning Cycle Science Lesson will have two parts:

Part I: Present the lesson to the class as you would to elementary school grades focusing on the three phases of the learning cycle. It may not be possible to cover the 3 phases in the assigned time, but you must ensure that the students get a chance to explore the concept and you introduce the concept.

Part II. Share other teaching and content aspects of the lesson using PowerPoint. Include a description of websites (at least five) used in developing the lessons in your handout to the class. Share any other pertinent information a teacher would need to present the lessons. Also take time to present the detailed textbook content related to the topic beyond what the lesson covers that is relevant for the unit in that topic. You should use PowerPoint for this part.

Each group will prepare a handout that includes all the parts listed above. Bring a copy for the instructor during the day of your presentation and post a copy to WebCT for your classmates to access for their notebooks.

## **5. ESSENTIAL QUESTIONS QUIZ – 200 points**

The goal of this assignment is to ensure that students pay attention to the relevant grade level content of the lessons developed in class. The quiz will be based on the essential questions stated in your hands-on lesson assignments. These quizzes will be open notebook, but not open handout. That means you should take careful notes during each lesson presentation.

## **6. Science Project & Presentation – 150 points**

Develop an inquiry activity that uses a discrepant event appropriate for elementary students. You will work in groups as assigned in class.

You will prepare a hands-on science lesson and poster about a discrepant event that leads to a science concept. You will present the lesson at an Elementary School Science Fair Exposition.

The audience will be 5/6th grade students at an elementary school to be identified later in the semester. Be sure you understand the concept(s) you are emphasizing, and that you can explain it. The activity should be developmentally appropriate, and should follow the NSTA Safety Guidelines. Prior to teaching the lesson, turn it in to your instructor for review. After teaching the lesson, turn in a copy of your Reflection. The activity should include hands-on tasks and should emphasize particular science concepts. The activity should allow students to explore and then you will explain the concept behind the activity.

On the day of the fair, you will do the activity repeatedly (about 10 times) to teams of about 7 students.

Turn in your typed Lesson Plan with your names at the top and REFERENCES at the bottom.

1. Science Concept (and definition) you are teaching. Write it out in a complete sentence. Do not say, "The students will \_\_\_\_." (That is an objective, not a science concept.)
2. Essential Questions
3. 1-3 Behavioral Objectives
4. California Science Content Standards addressed
5. Exploration Activity
6. Concept Invention
7. Concept Application Activity
8. The Reflection (answer the following):
  - a. How did the children respond? (What did they say and do?)
  - b. How do the children's actions and responses demonstrate their level of understanding?
  - c. How did you (or can you) improve upon your lesson to facilitate understanding?
  - d.

## **7. SCIENCE TEACHING UNIT AND PRESENTATION–200 points**

The goal of this assignment is for the student to develop long term planning for instruction as well as developing skill for integrated teaching in the elementary grades. For this assignment, you will plan a unit of instruction for an appropriate grade for an interdisciplinary team that includes science and other subject areas as desired. This unit will be appropriate for approximately two-three weeks of instruction for a heterogeneous elementary classroom. You will work with one or two partners of your choosing.

Details of this assignment will be shared in class. Pay attention to the description when completing this assignment.

## **8. TEACHING PERFORMANCE EXPECTATION (TPE) COMPETENCIES VIA TASKSTREAM – 50 points**

### **Standards of Quality and Effectiveness for Professional Teacher Preparation Programs California Commission on Teacher Credentialing**

This course is designed to help those seeking a Multiple Subjects Credential develop the skills, knowledge and attitudes necessary to assist schools and districts in implementing effective programs for all students. The successful candidate will be able to merge theory and practice in order to realize a comprehensive and extensive educational program for all students. Students will document their knowledge and understanding of TPE 1A and TPE 5 through assignments completed in EDMS 545B.

For each of the TPEs, write a one page maximum reflection on how the course activities enable you to meet these two TPEs. You will be required to attach artifacts from the course that demonstrate your abilities as explained in your reflections.

## A. MAKING SUBJECT MATTER COMPREHENSIBLE TO STUDENTS

### TPE 1A: Subject-Specific Pedagogical Skills for Multiple Subject Teaching Assignments - Teaching Science in a Multiple Subject Assignment

Candidates for a Multiple Subject Teaching Credential demonstrate the ability to teach the state-adopted academic content standards for students in science (K-8). They balance the focus of instruction between science information, concepts, and investigations. Their explanations, demonstrations, and class activities serve to illustrate science concepts and principles, scientific investigation, and experimentation. Candidates emphasize the importance of accuracy, precision,

## C. ENGAGING AND SUPPORTING STUDENTS IN LEARNING

### TPE 5: Student Engagement

Candidates for Teaching Credentials clearly communicate instructional objectives to students. They ensure the active and equitable participation of all students. They ensure that students understand what they are to do during instruction and monitor student progress toward academic goals. If students are struggling and off-task, candidates examine why and use strategies to reengage them. Candidates encourage students to share and examine points of view during lessons. They use community resources, student experiences, and applied learning activities to make instruction relevant. They extend the intellectual quality of student thinking by asking stimulating questions and challenging student ideas. Candidates teach students to respond to and frame meaningful questions.

**You will be using assignments and tasks from this course to meet these TPEs in the electronic portfolio.**

## **9. SCIENCE TEACHING NOTEBOOK - 50 points** (individual) (Due on the last day of class).

The purpose of this assignment is to provide each student with a collection of all the resources developed and shared in this course. Each student will keep a class notebook of all the activities in this course. AT the end of the semester, organize your notebook into one electronic folder and burn a CD copy of the notebook containing the following:

- I. California Science Content Standards for grades K-6 (download from <http://www.cde.ca.gov/board/pdf/science.pdf> and print)
- II. Discussion questions (those submitted by you)
- III. Standards and Frameworks tasks
- IV. Learning Cycle Lessons presented in class
- V. Essential Questions quiz
- VI. Science Unit Plan
- VII. Other Class Handouts and incidental assignments.

You will turn in a copy of your electronic CD notebook on the last day of class.

## **Community Building – Sharing Roles (Directors Role): Extra Credit – 20 points**

In the spirit of giving ownership of the class community to the students, the class determines and takes control of the various activities done in class. Each student will take on leadership roles as Directors of one of the class activities. Some leadership roles include:

- Director of Directors – Assigns/Coordinates Directorships – keeps list
- Name Tags Director – Make sure everybody has a name tag each class
- Contact Information/Community affairs Director—Make class list with current contact info & keep records of class events such birthdays etc
- Assignments Directors
  - o Attendance
  - o Discussion Questions
  - o Standards and Frameworks
  - o Hands-on lessons Presentations
  - o Science Fair Director
  - o Essential Questions Director
  - o Unit Plan Director
  - o Notebooks Director
  - o Taskstream Director
- Photographer – takes photos of various class activities. Shows them to class.
- Webmaster – Find science/science ed websites, coordinate WebCT tasks – present to class
- Time Keeper – Keep time for allocated tasks and presentations and breaks
- Environmental Directors – Ensures tightness of the room after class as well as environmental related issues
- Science & Education News – Collects and shares science news from various resources with class –videos, news clips etc
- Noise Control

## **RESOURCES**

### **JOURNALS**

Science	Science Scope	Physics Teacher
Science and Children	The Science Teacher	Journal of Chemical Education
Science Education	School Science and Math	Innovations in Science & Technology
Education		
Science News	American Biology Teacher	Journal of Research in Science Teaching

## APENDIX A: Tentative Class Schedule

Class #	Date/Time	Topic
1	1/23	Course Overview: What is Science? The Nature of Science and Inquiry Process in Science Review Syllabus Sign up for Leadership of Science Activities <b>Bring Syllabus to class</b>
2	1/30	Inquiry Processes in Science & the learning cycle Hands-on activities <b>Read Learning Cycle Handout on WebCT – by ALL</b>
3	2/06	Standards & Frameworks Tasks & Presentations <b>Read Cases 3.3 &amp; 4.4 from Learning from Cases text.</b> <b>Question Due by Group A</b> <b>Bring Science Education Standards to Class</b>
4	2/13	Planning and Managing Inquiry based Lessons <b>Read Cases 2.1, 4.1 &amp; 6.1 from Learning from Cases text.</b> <b>Question Due by Group B</b>
5.	2/20	Problem-based learning & Activities <i>Learning Cycle Lesson Presentations x 2</i> <b>Read Cases 2.2 &amp; 4.3 from Learning from Cases text.</b> <b>Question Due by Group C</b>
6	2/27	Using Cooperative strategies & questioning and Wait time as a Learning tools <i>Learning Cycle Lesson Presentations x 2</i> <b>Read Cases 2.3 &amp; 3.2 from Learning from Cases text.</b> <b>Question Due by A</b>
7	3/06	Science Projects, Student Research, Science Fairs and Science Safety <i>Learning Cycle Lesson Presentations x 2</i> <b>Read Cases 4.2, 8.3, 9.4 &amp; 10.2 from Learning from Cases text</b> <b>Question Due by B</b>
8	3/13	Units Planning & Integrating Science with other subjects Read Cases 6.2 & 6.3 from Learning from Cases text. <i>Learning Cycle Lesson Presentations x 2</i> <b>Question Due by C</b>

9	3/20	<p>Introduction to Science Kits &amp; Assessments of Understanding and Inquiry  <i>Learning Cycle Lesson Presentation x 2</i>  <b>Read the entire Chapter 7 from Learning from Cases text</b>          Question Due by A</p>
10	4/03	<p>Adapting Science curriculum for children with Special Needs  <i>Learning Cycle Lesson Presentations x 2</i>  <b>Read Cases 5.3 &amp; 8.1 from Learning from Cases text</b>          Question Due by B</p>
11	4/10	Science Fair Day - Tentative Date
12	4/17	<p>Developing Science WebQuests  <b>Read Cases 8.2 &amp; 3.1 from Learning from Cases text</b>  <b>Discussion Question Due by C</b>  <b>Essential Questions Quiz</b></p>
13	4/24	<p>Unit Plan Workshops – Group Work  <b>TPEs Assignment Due via Task Stream</b>          Teaching for Understanding &amp; Professional Development for Elementary Science Teachers  <b>Read Chapter 5.4, 9.2 &amp; 10.1 of Learning from Cases text.</b></p>
14	5/01	<p><b>Last Day of classes</b>          State Approved Textbooks          Contemporary Issues in Science Education  <b>Read Cases 9.1 &amp; 9.3 from Learning from Cases text</b>  <b>Discussion Question Due by ALL – A, B &amp; C</b>  <b>Notebook Due</b>  <b>Unit Plan/Capstone Presentations</b>  <b>Unit Plans Due</b></p>