

CALIFORNIA STATE UNIVERSITY SAN MARCOS
COLLEGE OF EDUCATION
Cohort 52/CRN 21792 EDMS 545 - Elementary Science Education
TR 1:00-3:45 Spring 2004 UH460

Instructor: Dr. Kathy I. Norman, 311 Univ.Hall **email:** knorman@csusm.edu
Phone: 760-750-4314 **Office Hours:** TR 3:45-4:45 and by apt.

RequiredTextbooks: *Teaching Children Science. An Inquiry Approach*
By Alfred E. Friedl. NY: McGraw-Hill.
EDMS 545 Science Education Course Handouts. Dr. Kathy Norman.
Successful Inclusive Teaching (3rd ed.).
By J. S. Choate, (2000). Needham Heights, MA: Allyn and Bacon.
Moon Journals; Writing, Art and Inquiry through Focused Nature Study.
By J. Chancer and G. Rester-Zodrow. Portsmouth, NH: Heinemann.

Recommended Books: *A Year of Hands-on Science.* (1996). By Lynne Kepler. New York: Scholastic.
200 Goocy, Slippery, Slimy, Weird & Fun Experiments. (1993).
By Janice VanCleave. New York: JohnWiley
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>

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 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).

COE 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 on-going service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism and shared governance.
(adopted by COE Governance Community, October 1997)

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

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. Absences and late arrivals/early departures will affect the final grade. 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, if you miss 2 class sessions, your highest possible grade is a B. If you miss 3 class sessions, your highest possible grade is a C. If you miss more than 20% of the class (3 class sessions), you may not receive a passing grade for the course. Late arrivals and early departures each count as ½ absence. Absences do not change assignment due dates. Late assignments will receive a 20% reduction in points for each day late. After one week, late assignments will receive no credit.

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.

Email

****You must go to ACD 202 to activate your CSUSM e-mail account if you have not already done so.**

COURSE ASSIGNMENTS

1. Class Start-up: Folders/Science Info/Activity/Announcements (pairs)	3 points
2. Reading Summaries (individual)	20 points
3. Participation, Collaboration, Professionalism (individual)	20 points
4. Science Action Research Project (individual)	15 points
5. Leadership of Hands-on Science Lesson (pairs)	10 points
6. Science Exploratorium Lesson Plan and Presentation (pairs)	10 points
7. Science Teaching Unit and Presentation (pairs)	20 points
8. Final Assignment (individual)	2 points

Late assignments will be penalized by a 20-point reduction each day they are late.
Keep digital copies of all assignments for your Credential Program Electronic Portfolio.

COURSE GRADES

Course Grades will be determined by points earned:

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

An "A" student is one who:

- completes all assignments on time and demonstrates the ability to summarize, analyze, and/or reflect at high levels.
- varies sources of information for assignments, demonstrating high degree of effort in pursuing varied perspectives around important educational issues.
- completes all the reading assignments and develops thoughtful and thorough responses.
- produces work that reveals a strong commitment to self-discovery and learning.
- produces work at a high professional level in terms of both writing and content.
- develops a high quality presentation, demonstrating significant learning around a contemporary issue.
- presents confidently and intelligently, demonstrating effective teaching skills.
- completes assignments in/out of class with a focus on learning and exploration, pushing him/herself to better understand the profession through quality work.
- attends almost every class meeting and is fully engaged during class.
- pushes him/herself to new understandings by participating in discussions, sharing his/her opinions, and valuing others' perspectives.
- contributes to the positive environment of the class by respecting all members.

A "B" student is one who:

- completes all or almost all assignments, all or most on time, and demonstrates the ability to summarize, analyze, and/or reflect at fairly high levels, showing consistent improvement over time.
- varies sources of information for assignments, demonstrating high degree of effort in pursuing varied perspectives around important educational issues.
- completes all or most of the reading assignments and develops thoughtful and fairly thorough responses.
- produces work that reveals a commitment to self-discovery and learning.
- produces work that is close to professional level in terms of both content and writing, working to develop a strong command of writing, speaking, planning and presenting.
- develops presentations, demonstrating significant learning
- presents confidently and intelligently, demonstrating effective teaching skills.
- completes assignments in/out of class with a focus on learning and exploration, pushing him/herself to better understand the profession through quality work.
- attends almost every class meeting and is regularly engaged during class.

- pushes him/herself to new understandings by participating in discussions, sharing his/her opinions, and valuing others' perspectives.
- contributes to the positive environment of the class by respecting all members.

A “C” student is one who:

- completes or attempts most of the assignments, mostly on time, and demonstrates the ability to do some quality summarizing, analysis, and reflection, showing improvement over time.
- varies sources of information for assignments, demonstrating effort in pursuing varied perspectives around important educational issues.
- completes most of the reading assignments and develops thoughtful and sometimes thorough responses.
- produces work that reveals a commitment to some self-discovery and learning.
- produces work that is not yet at a professional level in terms of both writing and content.
- develops a quality presentation, demonstrating learning around a contemporary issue.
- presents confidently and intelligently, demonstrating some effective teaching skills.
- completes assignments in/out of class with a focus on learning and exploration, pushing him/herself a little to better understand the profession.
- attends most class meetings and is often engaged during class.
- pushes him/herself to some new understandings by participating to a moderate degree in discussions, sharing his/her opinions, and valuing others' perspectives.
- contributes to the positive environment of the class by respecting all members.

A “D” student is one who doesn’t meet all of the minimal standards of a “C” student; “F” is earned by someone who hasn’t completed significant portions of the required work and fails to meet the “C” student standards.

ASSIGNMENT DESCRIPTIONS

1. CLASS START-UP: FOLDERS/SCIENCE INFO/ACTIVITY/ANNOUNCEMENTS 3 points

You and a partner will be in charge of (a) passing out folders, (b) sharing interesting science information from the news, (c) passing out a fun/interesting science activity, and (d) making announcements at the beginning of one class. After students have signed in, you will (e) collect and alphabetize folders before giving back to the instructor.

2. READING SUMMARIES (INDIVIDUAL) one per chapter 20 points

Students will be assigned readings and should use one of the following forms to record typed summaries of the SCIENCE CONTENT (do NOT include summaries of the learning activities or lessons):

- A Big Ideas paper explaining the key science concepts (sentence form, not outlines)
- A visual or symbolic representation of the key science concepts
- A graphic organizer that demonstrates the key science concepts and their relationships to one another (samples will be provided in class)

PRIMARY TEACHING PERFORMANCE EXPECTATIONS

TPE 1A: Subject-Specific Pedagogical Skills for Multiple Subject Teaching Assignments

TPE 4: Making Content Accessible

TPE 5: Student Engagement

TPE 6: Developmentally Appropriate Teaching Practices

TPE 6A: Developmentally Appropriate Practices in Grades K-3

TPE 6B: Developmentally Appropriate Practices in Grades 4-8

3. PARTICIPATION, COLLABORATION AND PROFESSIONALISM (individual) 20 points

Students will engage in active learning each class session, and will be expected to actively participate, collaborate, and demonstrate professionalism at all times.

- Do you participate in class discussions productively, sharing your knowledge and understandings?
- Do you interact productively with your peers, taking on a variety of roles (leader, follower, etc.)?
- Do you contribute appropriately to group work—do you “do your share”?
- Are you able to accept others’ opinions? Are you supportive of others’ ideas?
- Do you support your peers during their presentations?
- Can you monitor and adjust your participation to allow for others’ ideas to be heard?
- Do you show a positive attitude and disposition towards teaching all students?
- Do you exhibit professional behavior at all times?

Rubric for PCP: Participation, Collaboration and Professionalism

	Excellent	Acceptable	Unacceptable	
Attitude 3 points possible	Always displays a positive attitude. May offer constructive criticism and include alternatives that show initiative.	Displays a positive attitude. May offer constructive criticism and include alternatives that show initiative.	Seldom has a positive attitude. Often is critical. Does not offer alternative solutions to criticism.	
Participation 3 points possible	Attends every class, always on time and well prepared, and never leaves early. Gives closest attention to class activities and speakers.	Attends every class, on time and prepared, and never leaves early. Gives most attention to class activities and speakers.	Is not always ready when class time begins. Doesn't give full attention in class; sometimes talks when others are speaking.	
Professionalism 3 points possible	Consistently behaves, talks and works in a professional manner, regardless of task/topic.	Most of the time, behaves, talks and works in a professional manner, regardless of task/topic.	Seldom behaves, talks, and works in a professional manner, regardless of task/topic.	
Collaboration 3 points possible	Consistently listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Most of the time listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Is not always a good team player.	
Contributions 3 points possible	Consistently provides useful ideas; always stays focused on the task. Exhibits a lot of effort and valuable contributions.	Most of the time provides useful ideas and stays focused. A satisfactory group member who does what is required.	Rarely provides useful ideas; not always focused. Reluctant to participate. Lets others take charge.	
Disposition toward teaching 3 points possible	Consistently demonstrates concern in learning to teach all children. Always demonstrates strong commitment toward developing (a) an understanding of children, (b) teaching strategies, and (c) knowledge of the CA Standards for the Teaching Profession (CSTP), Teacher Performance Expectations (TPE), and CA Content Standards.	Most of the time demonstrates concern in learning to teach all children. Often demonstrates commitment toward developing (a) an understanding of children, (b) teaching strategies, and (c) knowledge of the CSTP's, TPE's, and CA Content Standards.	Rarely shows concern in learning to teach all children. Rarely demonstrates commitment toward developing (a) an understanding of children, (b) teaching strategies, and (c) knowledge of the CSTP's, TPE's, and CA Content Standards.	
Leadership 2 points possible	Shows strength through leadership in class activities; other students respect you as a leader.	Effectively participates and contributes, but rarely shows leadership qualities.	Does not show leadership in any area of class.	

You will do a self assessment, using this rubric, and write a 1-2 page rationale. The professor will also do an assessment, using this rubric.

Total Score: _____

4. SCIENCE ACTION RESEARCH PROJECT (INDIVIDUAL)

15 points

Students will do an action research project of science instruction involving input from classroom observations, a K-8 teacher or teachers and K-8 students. It will include 5 parts: your observations, teacher interview, student surveys, chart comparison, and paper summarizing the results according to 5 themes that arose during the data collection.

Observations of Science Lessons

A. Ask an elementary teacher if you can observe 2-3 science lessons in his or her class. Then answer the following:

1. How would you define science instruction in this classroom?
2. What are the characteristics of science instruction?
3. What do the students do during science instruction?
4. What materials are used?
5. How often do the students engage in hands-on activities?
6. Do they each participate and have a role?
7. How is the classroom organized for science instruction?
8. What science materials are in the classroom?
9. What evidence is there of science?
10. Do you see writing infused within the science lessons? If so, what are some examples?
11. Are there children in the class who are learning English? What differences and similarities exist for children who are learning English?

Feel free to add more descriptive information in regard to science instruction.

B. After you have answered the above questions find time to interview the teacher..

Ask the teacher to answer the Teacher Survey. Please inform the teacher that the school and district will not be identified, only the grade level. Please do not put the teacher's name on the survey.

Teacher Survey

1. How do children learn science?
2. How do you organize instruction so that children learn concepts related to the California science standards?
3. What are the different activities that you do during science instruction?
4. How do you group the students during science activities?
5. How often do you teach science?
6. How often do the children participate in hands-on science activities?
7. Do you integrate writing activities into science lessons? What are some examples?
8. What is the easiest thing about teaching science?
9. What is the most difficult thing about teaching science?
10. If you could design the ideal science program, what would be the characteristics of the program?
11. How do you organize instruction for science in two languages or in a language other than English? What challenges does this present for you?
12. How do you adapt instruction for students with special needs? Are there particular techniques or issues related to science teaching and students with special needs?

Feel free to include other questions during the interview. If possible, take a portable tape recorder to record the responses for later transcription, as it is easy to miss some things when you are taking notes. Be sure to ask the teacher if she or he minds if you use the tape recorder, and do not use it if the teacher is hesitant.

C. Ask the teacher if you can hand out the Student Survey to the students in the class. (You may do this with 6 or more students.) Do **not** have the students put their names on the surveys. Feel free to include other questions on the survey, but do not make it too long for the students to answer. This survey will work with third graders and up; you can try it with second graders but I would suggest reading the questions aloud one at a time for them. If you are working with K, 1 or 2 use the following alternative strategy: Choose approximately 6 students (if you are in a bilingual class choose 3 who have English as their native language and 3 with Spanish or whatever other language is spoken in

the class). Interview each student using the survey questions. Record the answers, if possible, and transcribe the taped interviews. Be flexible and adapt the survey to the level of the students.

Student Survey

Please answer the following questions.

Grade level: _____ Are you a Boy Girl ?

What language(s) do you speak? English Spanish Other

1. What happens during science in your class? How does your teacher teach you science?
2. How often do you do hands-on science activities in class?
3. What sorts of science activities do you do in class?
4. Do you work in groups to do science activities? If so, what do you do in the groups? Does each person have a job to do?
5. Do you have science materials to use during science activities? What sorts of materials do you use?
6. What are some of the science topics you have studied this year in science class?
7. Do you like science time? What do you like best about it?
8. Are you a good student in science? What helps you learn best?

D. Examine the three sets of data (your observations, those of the teacher and students) for matches and mismatches. Create a grid to organize the data:

Comparison Chart

	My Observations	Teacher Interview	Student Surveys
How is science taught/what happens during science time?			
What does the teacher do?			
Do the students participate in hands-on science activities?			
Adaptations and Accommodations			

E. Using the data you have collected and the match/mismatch chart, type a 2-3 page PAPER of the science instruction. Be sure to organize your discussion around 5 themes that evolved from your observations, teacher interview and student surveys.

F. Turn in 2 copies of the following. Staple all together in the following order, with the paper on top.

1. Your 2-3 page PAPER describing matches and mismatches of data. Be sure to organize your discussion around 5 themes that evolved from your observations, teacher interview and student surveys.
2. Your own answers to questions (in A above) as you observed in the classroom
3. Teacher Interview questions (B above) and answers
4. Student Surveys (C above) with student answers
5. Comparison Chart (D above) of your observations, teacher interview answers and student survey answers.

*** Also do a self-assessment, using the rubric for this assignment. Turn in your completed rubric stapled on top of the assignment.

PRIMARY TEACHING PERFORMANCE EXPECTATIONS

TPE 1A: Subject-Specific Pedagogical Skills for Multiple Subject Teaching Assignments
Teaching Science in a Multiple Subject Assignment
TPE 2: Monitoring Student Learning During Instruction
TPE 6: Developmentally Appropriate Teaching Practices
TPE 6A: Developmentally Appropriate Practices in Grades K-3
TPE 6B: Developmentally Appropriate Practices in Grades 4-8
TPE 10: Instructional Time
TPE 11: Social Environment

SECONDARY TEACHING PERFORMANCE EXPECTATION

TPE 8: Learning about Students

5. LEADERSHIP OF HANDS-ON SCIENCE LESSON (PAIRS) 10 points
Critical Assessment Task (CATs)

Students will lead hands-on science lessons during class. The lessons should model inquiry instruction, good questioning skills, and be content-understandable and non-judgmental. The lessons should be based on the California content standards. SDAIE strategies, technology integration, and methods for teaching students with disabilities should all be included and pointed out during the lesson.

You will work in pairs to lead science lessons based on the Learning Cycle Model of Instruction. You will teach these to your classmates. Each lesson will be allocated 45-55 minutes of class time to teach. Your classmates will not role-play elementary students, but will learn the science content and how to teach it. Treat your classmates as teachers, not elementary students.

The lessons should include hands-on lessons, and should emphasize particular science concepts. The Exploration and Application phases of the Learning Cycle must require different hands-on science activities using manipulatives. Hands-on activities are 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 the science process skills with science manipulatives.

Be sure you understand the concepts you are emphasizing, and that you can explain them. The lessons should be developmentally appropriate for K-6, and should follow the NSTA Safety Guidelines. Begin the lesson by writing two essential questions about the lesson on the board, for students to consider during the lesson. Make sure that you include the 3 stages of the Learning Cycle. Make sure that science content background and applications to everyday life are addressed. You need to explain SDAIE strategies and adaptations for students with disabilities.

Prepare a Powerpoint Computer Presentation to use in your lesson. The presentation should include a detailed explanation of the science content, as well as a list and definitions of science concepts important to the lesson. Additionally, include a list of at least 5 web sites (with short descriptions) that address the science topic and concepts through simulations, graphics and movies. You should have links to these web sites and show examples during the lesson.

Science Lesson Handout

Prepare a Science Lesson Handout which includes the information below.

Bring copies of the activity for person with (a) team members' names at the top and (b) reference at the bottom.

*** Also do a self-assessment, using the rubric for this assignment. Turn in your completed rubric stapled on top of the assignment.

Lesson Plan Format

Lesson Title: What is the title of your lesson?

Grade Level: What is the grade level?

California Science Content Standard(s): What standards are addressed? Include at least one science area (life science, physical science, or earth science) standard and one investigation standard.

Lesson Objective(s): What do you want students to be able to do?

Write in complete sentences. Use an action verb and explain how students will demonstrate their new knowledge and understanding. "The students will _____."

Science Concept(s): What are you trying to teach?

Do not say "The students will _____." (That is an objective, not a science concept.)

Student Groupings: How will you group students for instruction?

Materials/Resources/Technology: What does the teacher need? What do the students need?

Assessment: How will your students demonstrate that they have met the objective? Is there a clear match between the standards, objectives and the assessment?

Lesson Procedures: Explain the procedures for each. Include what the teacher will do and what the students will do.

- Exploration (Students should first make predictions.)
(minutes?)
- Concept Invention
(minutes?)
- Concept Application
(minutes?)

Accommodations/Adaptations/Applications:

- SDAIE strategies and explanations (5)
- Adaptations for students with disabilities and explanations (5)
- Applications to everyday life and explanations (5)

Science Content Background: 1-2 page summary of the science content background

Web Sites: 5 interactive relevant web sites with descriptions

Children's Literature Books: Title, author, publisher, year of 5 children's books on the topic

References: Title, author, publisher, year of resources

Class Evaluations of Lesson

Each team will prepare an evaluation instrument to be used by five class members not on the team, The evaluation instruments should have the team member's names, title and science topic at the top. Have five categories to judge the presentations, and a rating scale of one to five, with one representing the best. **Give the instructor a copy of the evaluation that includes a description of each person's role in researching and presenting the lessons.**

PRIMARY TEACHING PERFORMANCE EXPECTATIONS

TPE 1A: Subject-Specific Pedagogical Skills for Multiple Subject Teaching Assignments
TPE 2: Monitoring Student Learning During Instruction
TPE 4: Making Content Accessible
TPE 5: Student Engagement
TPE 6: Developmentally Appropriate Teaching Practices
TPE 6A: Developmentally Appropriate Practices in Grades K-3
TPE 6B: Developmentally Appropriate Practices in Grades 4-8
TPE 9: Instructional Planning
TPE 10: Instructional Time
TPE 13: Professional Growth

SECONDARY TEACHING PERFORMANCE EXPECTATION

TPE 7: Teaching English Learners

6. SCIENCE EXPLORATORIUM LESSON PLAN AND PRESENTATION (PAIRS) 10 points **Critical Assessment Task (CATs)**

Develop an inquiry activity to teach to elementary students. You may work in pairs on this assignment.

You will prepare a hands-on science lesson and poster about a science concept. You will present the lesson at our Elementary School Science Exploratorium. 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 lessons should include hands-on lessons, and should emphasize particular science concepts. The Exploration and Application phases of the Learning Cycle must require different hands-on science activities using manipulatives. Hands-on activities are 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 the science process skills with science manipulatives.)

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

Lesson Plan Format

Lesson Title: What is the title of your lesson?

Grade Level: What is the grade level?

California Science Content Standard(s): What standards are addressed? Include at least one science area (life science, physical science, or earth science) standard and one investigation standard.

Lesson Objective(s): What do you want students to be able to do?
Write in complete sentences. Use an action verb and explain how students will demonstrate their new knowledge and understanding. "The students will _____."

Science Concept(s): What are you trying to teach?
Do not say "The students will ____." (That is an objective, not a science concept.)

Student Groupings: How will you group students for instruction?

Materials/Resources/Technology: What does the teacher need? What do the students need?

Assessment: How will your students demonstrate that they have met the objective? Is there a clear match between the standards, objectives and the assessment?

Lesson Procedures: Explain the procedures for each. Include what the teacher will do and what the students will do.

- Exploration (Students should first make predictions.)
(minutes?)
- Concept Invention
(minutes?)
- Concept Application
(minutes?)

References: Title, author, publisher, year of resources

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?

*** Also do a self-assessment, using the rubric for this assignment. Turn in your completed rubric stapled on top of the reflection assignment.

PRIMARY TEACHING PERFORMANCE EXPECTATIONS

TPE 1A: Subject-Specific Pedagogical Skills for Multiple Subject Teaching Assignments
Teaching Science in a Multiple Subject Assignment
TPE 2: Monitoring Student Learning During Instruction
TPE 4: Making Content Accessible
TPE 5: Student Engagement
TPE 6: Developmentally Appropriate Teaching Practices
TPE 6A: Developmentally Appropriate Practices in Grades K-3
TPE 6B: Developmentally Appropriate Practices in Grades 4-8
TPE 13: Professional Growth

SECONDARY TEACHING PERFORMANCE EXPECTATION

TPE 8: Learning about Students
TPE 12: Professional, Legal, and Ethical Obligations

7. **SCIENCE TEACHING UNIT AND PRESENTATION (PAIRS)** 20 points

Critical Assessment Task (CATs)

(may work in pairs)

You will create a typed unit on a specific science topic. You may work in pairs on this assignment.

*** Also do a self-assessment, using the rubric for this assignment. Turn in your completed rubric stapled on top of the assignment.

Unit Components:

1. **Unit Plan** (1 page; include title, grade level, goals for unit, Calif. Science Content Standards (content and investigation) addressed, and one-two line descriptions of each learning cycle lesson)
2. **Authentic Assessment**
3. **Rubric for Assessment** (see <http://rubistar.4teachers.org/> for assistance)
4. **Accommodations/Adaptations/Applications:**
 - a. SDAIE strategies and explanations (5)
 - b. Adaptations for students with disabilities and explanations (5)
 - c. Applications to everyday life and explanations (5)
5. **Science Content Background:** 1-2 page summary of the science content background
6. **Web Sites:** 5 interactive relevant web sites with descriptions
7. **Children's Literature Books:** Title, author, publisher, year of 5 children's books on the topic
8. **References:** Title, author, publisher, year of resources
9. **Five Learning Cycle Lesson Plans** (details on next page)
Adapt from Commercial Lessons in books and science curricula. Do not re-invent activities.

Lesson Plan Format

Lesson Title: What is the title of your lesson?

Grade Level: What is the grade level?

California Science Content Standard(s): What standards are addressed? Include at least one science area (life science, physical science, or earth science) standard and one investigation standard.

Lesson Objective(s): What do you want students to be able to do?

Write in complete sentences. Use an action verb and explain how students will demonstrate their new knowledge and understanding. "The students will _____."

Science Concept(s): What are you trying to teach?

Do not say "The students will ____." (That is an objective, not a science concept.)

Student Groupings: How will you group students for instruction?

Materials/Resources/Technology: What does the teacher need? What do the students need?

Assessment: How will your students demonstrate that they have met the objective? Is there a clear match between the standards, objectives and the assessment?

Lesson Procedures: Explain the procedures for each. Include what the teacher will do and what the students will do.

- Exploration (Students should first make predictions.)
(minutes?)
- Concept Invention
(minutes?)
- Concept Application
(minutes?)

The lessons should include hands-on lessons, and should emphasize particular science concepts. The Exploration and Application phases of the Learning Cycle must require different hands-on science activities using manipulatives. Hands-on activities are 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 the science process skills with science manipulatives.

You will present your unit during a Powerpoint Presentation during our last class.

PRIMARY TEACHING PERFORMANCE EXPECTATIONS

TPE 1A: Subject-Specific Pedagogical Skills for Multiple Subject Teaching Assignments
Teaching Reading-Language Arts in a Multiple Subject Assignment
Teaching Science in a Multiple Subject Assignment
TPE 4: Making Content Accessible
TPE 5: Student Engagement
TPE 6: Developmentally Appropriate Teaching Practices
TPE 6A: Developmentally Appropriate Practices in Grades K-3
TPE 6B: Developmentally Appropriate Practices in Grades 4-8
TPE 9: Instructional Planning
TPE 10: Instructional Time
TPE 13: Professional Growth

SECONDARY TEACHING PERFORMANCE EXPECTATION

TPE 3: Interpretation and Use of Assessments

TPE 7: Teaching English Learners

8. **FINAL ASSIGNMENT (INDIVIDUAL)**

2 points

This reflections assignment will be given in class.

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 Educ
Science News	American Biology Teacher	Journal of Research in Science Teaching

EISENHOWER NATIONAL CLEARINGHOUSE <http://enc.org>

The Eisenhower National Clearinghouse (ENC) has recently launched an all-new web site, ENC Online, at <http://enc.org>. ENC, which was established by the U.S. Department of Education, provides K-12 math and science educators with information about teaching materials, innovative ideas, and professional development.

The content on ENC Online has been organized into four major categories. They are Curriculum Resources, Web Links, Professional Resources, and Topics. Through Curriculum Resources, teachers can locate teaching or professional development materials using subject words, grade level, cost, and type of material to meet their specific needs.

Teachers have said that the Digital Dozen, a monthly selection of exemplary math and science web sites, is one of their favorite features on the site. It is now found in the Web Links area. (Teacher can now also choose to have Digital Dozen delivered to their email boxes when registering with ENC.) Web Links also includes links to sites offering lesson plans, arranged by math or science topics.

The Professional Resources area is intended to become a part of a teacher's professional support system. A Timesavers section found within the Professional Resources area offers a collection of the most popular professional resources in one place for quick linking and use. Standards and state frameworks are also found under Professional Resources, as are federally funded resources, professional development strategies, and research articles.

ENC has always created projects and publications on relevant topics for teachers. The Topics area arranges hundreds of articles, teacher interviews, and selected curriculum resources and web sites thematically. Key education issues addressed in the Topics area include inquiry and problem solving, integrating educational technology, equity, and assessment. These areas include the materials developed for ENC Focus, our quarterly magazine for math and science educators.

Guided Nature Walk

This assignment takes the place of one class (noted on the class schedule). Please do the assignment at your convenience and bring a 1-page summary to turn in on the date noted on the class schedule.

Go on a guided nature walk in Southern California. The web site below lists guided nature walks that are held each week, by week, in our area:

[http://www.hunefeld.com/Hike%20Folder/\\$%20Activities%20upcoming.htm](http://www.hunefeld.com/Hike%20Folder/$%20Activities%20upcoming.htm)

Many guided nature hikes in San Diego County are listed at the following web sites.

<http://www.ci.san-marcos.ca.us/cs/trails/mainframe.html>

<http://www.ci.escondido.ca.us/glance/uniquely/daley/hikes.html>

<http://www.torreypine.org/tpprogs.htm>

<http://www.sdnhm.org/canyoneers/calendar.html>

<http://www.mtrp.org/events.asp> (enter in the date you want to go)

<http://www.anzaborrego.statepark.org/activities.html>

<http://www.volcanmt.org/schedule1.htm>

<http://www.sdrp.org/trails.htm>

<http://www.chulavistanaturecenter.org/Events/ongoing.asp>

<http://www.sandiegoaudubon.org/septfield.html>

<http://www.sandiegonth.com/rec-parks.asp>

<http://www.sdreader.com/php/evlist.php3?cat=OUTDOORS>

http://sd.znet.com/~schester/fallbrook/hiking/los_penasquitos_canyon.html

<http://www.sandiego-online.com/forums/outdoors/index.shtml>

<http://www.theadventurepages.com/?action=browse&categoryid=645>

After going on the nature walk, type a 1-page summary (titled "Guided Nature Walk") that includes the following information:

- Date and place you went
- The organization, association or group that sponsored the walk
- Summary of what you learned
- How you can bring this into your teaching
- Specific Calif. Science Content Standards that can be taught here
- Logistics of taking a class of elementary students there and what they would do

While I encourage you to do a Guided Nature Walk to become aware of the multitude of offerings in the county through which you can learn and teach science, your schedule may not permit you to select a guided walk. If you prefer to take a nature walk by yourself, please title it "Nature Walk" and include the following information in addition to that listed above:

- Two-three page summary of the science content background of the area (plant and animal life, geology, ecology, etc.). Also include a detailed description of arrangements that could be made to take children there to learn science.

Good luck and have a great walk! Please do NOT include a brochure, information card, or other published documentation from the place you walked. Just include your summary. If you did not go on a Guided walk, don't forget to also include the [a] science content summary and [b] description of arrangements for taking children as described in the paragraph above.

**Teaching Performance Expectations
Standards of Quality and Effectiveness for Professional Teacher Preparation Programs
California Commission on Teacher Credentialing September 6, 2001**

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,

B. ASSESSING STUDENT LEARNING

TPE 2: Monitoring Student Learning During Instruction - Candidates for a Teaching Credential use progress monitoring at key points during instruction to determine whether students are progressing adequately toward achieving the state-adopted academic content standards for students. They pace instruction and re-teach content based on evidence gathered using assessment strategies such as questioning students and examining student work and products. Candidates anticipate, check for, and address common student misconceptions and misunderstandings.

TPE 3: Interpretation and Use of Assessments

Candidates for a Teaching Credential understand and use a variety of informal and formal, as well as formative and summative assessments, to determine students' progress and plan instruction. They know about and can appropriately implement the state-adopted student assessment program. Candidates understand the purposes and uses of different types of diagnostic instruments, including entry level, progress-monitoring and summative assessments. They use multiple measures, including information from families, to assess student knowledge, skills, and behaviors. They know when and how to use specialized assessments based on students' needs. Candidates know about and can appropriately use informal classroom assessments and analyze student work. They teach students how to use self-assessment strategies. Candidates provide guidance and time for students to practice these strategies.

Candidates understand how to familiarize students with the format of standardized tests. They know how to appropriately administer standardized tests, including when to make accommodations for students with special needs. They know how to accurately interpret assessment results of individuals and groups in order to develop and modify instruction. Candidates interpret assessment data to identify the level of proficiency of English language learners in English as well as in the students' primary language. They give students specific, timely feedback on their learning, and maintain accurate records summarizing student achievement. They are able to explain, to students and to their families, student academic and behavioral strengths, areas for academic growth, promotion and retention policies, and how a grade or progress report is derived. Candidates can clearly explain to families how to help students achieve the curriculum Standards of Quality and Effectiveness for Professional Teacher Preparation Programs

C. ENGAGING AND SUPPORTING STUDENTS IN LEARNING

TPE 4: Making Content Accessible

Candidates for Teaching Credentials incorporate specific strategies, teaching/instructional activities, procedures and experiences that address state-adopted academic content standards for students in order to provide a balanced and comprehensive curriculum. They use instructional materials to reinforce state-adopted academic content standards for students and they prioritize and sequence essential skills and strategies in a logical, coherent manner relative to students' current level of achievement. They vary instructional strategies according to purpose and lesson content. To meet student academic learning needs, candidates explain content clearly and reinforce content in multiple ways, such as the use of written and oral presentation, manipulatives, physical models, visual and performing arts, diagrams, non-verbal communication, and computer technology. They provide opportunities and adequate time for students to practice and apply what they have learned. They distinguish between conversational and academic language, and develop student skills in using and understanding academic language. They teach students strategies to read and comprehend a variety of texts and a variety of information sources, in the subject(s) taught. They model

active listening in the classroom. Candidates encourage student creativity and imagination. They motivate students and encourage student effort. When students do not understand content, they take additional steps to foster access and comprehension for all learners. Candidates balance instruction by adjusting lesson designs relative to students' current level of achievement.

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 re-engage 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.

TPE 6: Developmentally Appropriate Teaching Practices

Background information for TPE 6: TPEs describe knowledge, skills, and abilities for all credential candidates, and they underscore the importance of generically-effective strategies for teaching a broad range of students. The purpose of TPE 6 is to establish additional expectations that are of greatest importance in teaching students at distinct stages of child and adolescent development. It is not the intent of TPE 6 to describe practices that are appropriate or effective only at one developmental level. •Standards of Quality and Effectiveness for Professional Teacher Preparation Programs. This TPE describes professional practices that are most commonly used and needed for students in each major phase of schooling, grades K-3, 4-8, and 9-12. 2

TPE 6A: Developmentally Appropriate Practices in Grades K-3

During teaching assignments in Grades K-3, candidates for a Multiple Subject Teaching Credential understand how to create a structured day with opportunities for movement. They design academic activities that suit the attention span of young learners. Their instructional activities connect with the children's immediate world; draw on key content from more than one subject area; and include hands-on experiences and manipulatives that help students learn. Candidates teach and model norms of social interactions (e.g., consideration, cooperation, responsibility, empathy). They understand that some children hold naïve understandings of the world around them. Candidates provide educational experiences that help students develop more realistic expectations and understandings of their environment. They know how to make special plans for students who require extra help in exercising self-control among their peers or who have exceptional needs or abilities.

TPE 6B: Developmentally Appropriate Practices in Grades 4-8

During teaching assignments in Grades 4-8, candidates for a teaching credential build on students' command of basic skills and understandings while providing intensive support for students who lack basic skills as defined in state-adopted academic content standards for students. They teach from grade-level texts. Candidates design learning activities to extend students' concrete thinking and foster abstract reasoning and problem-solving skills. They help students develop learning strategies to cope with increasingly challenging academic curriculum. They assist students, as needed, in developing and practicing strategies for managing time and completing assignments. Candidates develop students' skills for working in groups to maximize learning. They build on peer relationships and support students in trying new roles and responsibilities in the classroom. They support students' taking of intellectual risks such as sharing ideas that may include errors. Candidates distinguish between misbehavior and over-enthusiasm, and they respond appropriately to students who are testing limits and students who alternatively assume and reject responsibility.

TPE 7: Teaching English Learners

Candidates for a Teaching Credential know and can apply pedagogical theories, principles, and instructional practices for comprehensive instruction of English learners. They know and can apply theories, principles, and instructional practices for English Language Development leading to comprehensive literacy in English. They are familiar with the philosophy, design, goals, and characteristics of programs for English language development, including structured English immersion. They implement an instructional program that facilitates English language development, including reading, writing, listening and speaking skills, that logically progresses to the grade level reading/language arts program for English speakers. They draw upon information about students' backgrounds and prior learning, including students' assessed levels of literacy in English and their first languages, as well as their proficiency in English, to provide instruction differentiated to students' language abilities. They understand how and when to collaborate with specialists and para-educators to support English language development. Based on appropriate assessment information, candidates select instructional materials and strategies, including activities in the area of visual and performing arts, to develop students' abilities to comprehend and produce English. They use English that extends students' current level of development yet is still comprehensible. They know how to analyze student errors in oral and written language in order to understand how to plan differentiated instruction. Candidates

for a Teaching Credential know and apply pedagogical theories, principles and practices for the development of academic language, comprehension, and knowledge in the subjects of the core curriculum. They use systematic instructional strategies, including contextualizing key concepts, to make grade-appropriate or advanced curriculum content comprehensible to English learners. They allow students to express meaning in a variety of ways, including in their first language, and, if available, manage first language support such as para-educators, peers, and books.³ They use questioning strategies that model or represent familiar English grammatical constructions. They make learning strategies explicit.

Candidates understand how cognitive, pedagogical, and individual factors affect students' language acquisition. They take these factors into account in planning lessons for English language development and for academic content. Teachers are not expected to speak the students' primary language, unless they hold an appropriate credential and teach in a bilingual classroom. The expectation is that they understand how to use available resources in the primary language, including students' primary language skills, to support their learning of English and curriculum content. •Standards of Quality and Effectiveness for Professional Teacher Preparation Programs

D. PLANNING INSTRUCTION AND DESIGNING LEARNING EXPERIENCES FOR STUDENTS

TPE 8: Learning about Students

Candidates for a Teaching Credential draw upon an understanding of patterns of child and adolescent development to understand their students. Using formal and informal methods, they assess students' prior mastery of academic language abilities, content knowledge, and skills, and maximize learning opportunities for all students. Through interpersonal interactions, they learn about students' abilities, ideas, interests and aspirations. They encourage parents to become involved and support their efforts to improve student learning. They understand how multiple factors, including gender and health, can influence students' behavior, and understand the connections between students' health and their ability to learn. Based on assessment data, classroom observation, reflection and consultation, they identify students needing specialized instruction, including students whose physical disabilities, learning disabilities, or health status require instructional adaptations, and students who are gifted.

TPE 9: Instructional Planning

Candidates for a Teaching Credential plan instruction that is comprehensive in relation to the subject matter to be taught and in accordance with state-adopted academic content standards for students. They establish clear long-term and short-term goals for student learning, based on state and local standards for student achievement as well as on students' current levels of achievement. They use explicit teaching methods such as direct instruction and inquiry to help students meet or exceed grade level expectations. They plan how to explain content clearly and make abstract concepts concrete and meaningful. They understand the purposes, strengths and limitations of a variety of instructional strategies, including examining student work, and they improve their successive uses of the strategies based on experience and reflection. They sequence instruction so the content to be taught connects to preceding and subsequent content. In planning lessons, they select or adapt instructional strategies, grouping strategies, and instructional material to meet student learning goals and needs. Candidates connect the content to be learned with students' linguistic and cultural backgrounds, experiences, interests, and developmental learning needs to ensure that instruction is comprehensible and meaningful. To accommodate varied student needs, they plan differentiated instruction. When support personnel, such as aides and volunteers are available, they plan how to use them to help students reach instructional goals. •Standards of Quality and Effectiveness for Professional Teacher Preparation Programs.

E. CREATING AND MAINTAINING EFFECTIVE ENVIRONMENTS FOR STUDENT LEARNING

TPE 10: Instructional Time

Candidates for a Teaching Credential allocate instructional time to maximize student achievement in relation to state-adopted academic content standards for students, instructional goals and scheduled academic tasks. They establish procedures for routine tasks and manage transitions to maximize instructional time. Based on reflection and consultation, they adjust the use of instructional time to optimize the learning opportunities and outcomes for all students.

TPE 11: Social Environment

Candidates for a Teaching Credential develop and maintain clear expectations for academic and social behavior. The candidates promote student effort and engagement and create a positive climate for learning. They know how to write and implement a student discipline plan. They know how to establish rapport with all students and their families for supporting academic and personal success through caring, respect, and fairness. Candidates respond appropriately to sensitive issues and classroom discussions. They help students learn to work responsibly with others and

independently. Based on observations of students and consultation with other teachers, the candidate recognizes how well the social environment maximizes academic achievement for all students and makes necessary changes. •

F. DEVELOPING AS A PROFESSIONAL EDUCATOR

TPE 12: Professional, Legal, and Ethical Obligations

Candidates for a Teaching Credential take responsibility for student academic learning outcomes. They are aware of their own personal values and biases and recognize ways in which these values and biases affect the teaching and learning of students. They resist racism and acts of intolerance. Candidates appropriately manage their professional time spent in teaching responsibilities to ensure that academic goals are met.

Candidates for a Teaching Credential understand and honor legal and professional obligations to protect the privacy, health, and safety of students, families, and other school professionals. They are aware of and act in accordance with ethical considerations and they model ethical behaviors for students. Candidates understand and honor all laws relating to professional misconduct and moral fitness.

TPE 13: Professional Growth

Candidates for a Teaching Credential evaluate their own teaching practices and subject matter knowledge in light of information about the state-adopted academic content standards for students and student learning. They improve their teaching practices by soliciting feedback and engaging in cycles of planning, teaching, reflecting, discerning problems, and applying new strategies. Candidates use reflection and feedback to formulate and prioritize goals for increasing their subject matter knowledge and teaching effectiveness.

RUBRIC FOR LEADERSHIP OF HANDS-ON SCIENCE LESSONS (10 points)

Score	Criteria	Quality of Work			
_____	<u>Concept Exploration</u> 1 point max	Predictions were made at beginning. All students participated in a developmentally appropriate hands-on science activity, made observations, and collected data.	Some students participated in a developmentally appropriate hands-on science activity, made observations, and collected data.	You provided a demonstration of a hands-on science activity.	None of the students participated in a hands-on science activity. No demonstration occurred.
_____	<u>Concept Invention</u> 1 point max	Students shared their observations, data and explanations. Teacher provided further explanations and terminology, and tied it all together.	A minimum of student sharing and explaining occurred. Teacher provided some explanation.	No student sharing occurred. Teacher provided all explanations.	No student sharing occurred. Little teacher sharing occurred.
_____	<u>Concept Application</u> 1 point max	All students participated in a developmentally appropriate hands-on science activity, made observations, and collected data.	Some students participated in a developmentally appropriate hands-on science activity, made observations, and collected data.	You provided a demonstration of a hands-on science activity.	None of the students participated in a hands-on science activity. No demonstration occurred.
_____	<u>SDAIE Strategies</u> 1 point max	Five SDAIE strategies are explained.	3-4 SDAIE strategies are explained.	1-2 SDAIE strategies are explained.	No SDAIE strategies are explained.
_____	<u>Adaptations for Students with Disabilities</u> 1 point max	Five adaptations to meet the needs of students with disabilities are included.	3-4 adaptations to meet the needs of students with disabilities are included.	1-2 adaptations to meet the needs of students with disabilities are included.	No adaptations to meet the needs of students with disabilities are included.
_____	<u>Applications to real life</u> 1 point max	Five applications to everyday life are described.	3-4 applications to everyday life are described.	1-2 applications to everyday life are described.	No applications to everyday life are described.
_____	<u>Science Content Background</u> 1 point max	Your team provided a thorough explanation of the science content background.	Your team provided a short explanation of the science content background.	Your team provided an incomplete explanation of the science background.	Your team provided a poor explanation of the science background.
_____	<u>Relevant Web Sites</u> 1 point max	Your PP presentation included 5 web sites with descriptions and links to the sites.	Your PP presentation included 3-4 websites with descriptions and links to the sites.	Your PP presentation included 1-2 websites with descriptions and links to the sites.	Your PP presentation included no web sites with descriptions and links to the sites.
_____	<u>Literature Books</u> 1 points max	You showed 5 children's books.	You showed 3-4 children's books.	You showed 1-2 children's books.	Children's books not included.
_____	<u>Handout</u> 1 point max	Handout included all components listed for the Lesson Plan.	Handout included 7-8 of the components.	Handout included 4-6 of the components.	Handout included 1-3 of the components.

Total Points _____

RUBRIC FOR ACTIVITY, POSTER AND PRESENTATION-Science Exploratorium (10 points)

Score	Criteria	Quality of Work		
		Excellent	Acceptable	Unacceptable
_____	<u>Visual Display</u> 1 point max	3 sided visual display shows great creativity and is thought-provoking. Graphically demonstrates concept.	3 sided visual display shows creativity and thoughtfulness; has graphics or pictures.	Visual display is present, but required little imagination or creativity.
_____	<u>Timing</u> 1 point max	You easily adjusted your teaching to the time allocated. You showed creativity and flexibility.	You adjusted somewhat to the time allotted .You showed some creativity and flexibility.	You did not easily adjust your teaching to the time allocated. You showed little creativity and/or flexibility.
_____	<u>Student Data Sheet</u> 1 point max	You had copies of a data sheet for all students.	You had data sheets, but not for all students.	You did not require students to keep data.
_____	<u>Materials</u> 1 point max	You have necessary materials for all students to participate in hands-on lesson.	You have necessary materials for some students to participate in hands-on lesson.	You had materials for demonstrations only.
_____	<u>Your Understanding</u> 2 point max	It was obvious that you had a complete and thorough understanding of the science content.	You did not have a complete understanding of the science content.	You had misconceptions about the science content.
_____	<u>Your lesson</u> 2 point max	Learning Cycle Lesson is (a)hands-on, (b)developmentally appropriate, & (c)feasible for all students.	Two of the 3 characteristics are present.	Teacher does a hands-on activity for students.
_____	<u>Reflection</u> 2 point max	You wrote a complete reflection about how children demonstrated understanding, and how you could or did improve.	You wrote some about how children responded, showed understanding, & how you could or did improve.	You wrote little about how children responded, showed understanding, & how you could or did improve.

Total Points _____

SCIENCE TEACHING UNIT RUBRIC (20 points)

Topic _____

Score	Criteria	Quality of Work			
_____	<u>Unit Plan</u> 1 point max	Unit plan was included, with title, grade level, goals, standards, lesson descriptions.	Unit plan included some, but not all, of the components.	Unit plan was very brief and did not include all components.	No unit plan was included.
_____	<u>Authentic Assessment and Rubric</u> 1 point max	Complete description of authentic assessment for the unit was included, as well as a rubric for the assessment.	Assessment description and/or rubric were not complete.	Assessment and/or rubric were very brief.	Assessment and/or rubric were missing.
_____	<u>SDAIE Strategies</u> 1 point max	Five SDAIE strategies are explained.	3-4 SDAIE strategies are explained.	1-2 SDAIE strategies are explained.	No SDAIE strategies are explained.
_____	<u>Adaptations for Students with Disabilities</u> 1 point max	Five adaptations to meet the needs of students with disabilities are included.	3-4 adaptations to meet the needs of students with disabilities are included.	1-2 adaptations to meet the needs of students with disabilities are included.	No adaptations to meet the needs of students with disabilities are included.
_____	<u>Applications to real life</u> 1 point max	Five applications to everyday life are described.	3-4 applications to everyday life are described.	1-2 applications to everyday life are described.	No applications to everyday life are described.
_____	<u>Science Content Background</u> 1 point max	A complete explanation of science content background was included.	Some science background was included.	A very brief explanation of the science content background was included.	No explanation of the science content background was included.
_____	<u>Web Sites</u> 1 points max	You included 5 web sites with descriptions and links to the sites.	Web sites were not described.	Web sites were incomplete.	You did not include web sites.
_____	<u>Children's Literature Books</u> 1 points max	You included the bibliographic info for 5 children's books on the topic.	You left out some of the information (title, author, year, publisher)	Minimal information on children's books was included.	Children's books not included.
_____	<u>Five Learning Cycle Lessons</u> 2 points each <u>10 points total</u>	Lesson plans included title, grade, objective, standards, concepts, groupings, resources, complete description of learning cycle stages and assessment.	Learning Cycle Lesson plans included most of the components.	Lesson plans included some of the components.	Lesson plans very brief and non-descriptive.
_____	<u>References</u> 1 point max	You included all bibliographic information on references.	You left out some of the information (title, author, year, publisher)	Minimal reference information was included.	References not included.
_____	<u>Presentation</u> 1 point max	Your presentation was outstanding, creative, interesting. Your explanations showed evidence of a thorough understanding of the topic and teaching.	Your presentation followed the guidelines, and showed that you had an understanding of most aspects of the topic and teaching applications.	You followed a few of the guidelines for presentations. There was some evidence of planning and practice You had a limited understanding of the topic.	You did not do a presentation.

Total Points _____

RUBRIC FOR SCIENCE INSTRUCTION ACTION RESEARCH PROJECT (15 points)

Score	Criteria	Quality of Work		
		Excellent	Acceptable	Unacceptable
_____	<u>Classroom Observations</u> 2 points max	All questions are followed by <u>specific observations</u> .Two or more observations are made and referred to for each question.	Questions are followed by brief answers. Two or more observations are made and referred to for each question, but they are <u>vague</u> .	Observations are not very specific.
_____	<u>Student Surveys</u> 2 points max	Six student responses follow each question.	Student responses are brief.	Less than six surveys are included and most responses are brief.
_____	<u>Teacher Interview</u> 2 points max	Interviewed teacher in person. All questions are followed by the specific and detailed teacher responses.	Interviewed teacher in person. Some teacher responses are detailed and specific.	Not clear if the teacher was interviewed. Some questions are followed by the teacher's responses.
_____	<u>Comparison Chart</u> 2 points max	Organized data on a grid depicting answers to all grid questions from your observations, teacher interview and student surveys.	Organized data on a grid, but data is incomplete. Not all grid questions were addressed.	A grid was used, but has little information and does not show the results of the observations, interview, and surveys.
_____	<u>Analysis of Information in the form of a Paper</u> 7 points max	Analysis of information included detailed descriptions of matches & mismatches of data. Organized by 5 themes. Included recommendation. 2-3 pages.	Brief analysis of information; brief description of matches and mismatches of data. Theme organization weak. Brief recommendations	Incomplete analysis and descriptions of matches and mismatches of data. Did not organize by themes. Minimal or no recommendations.

Total Points _____

4. What adaptations could be made for students with special learning needs?

5. What did the teachers do to facilitate learning for you?

6. What did you have difficulty with?

7. Suggestions for the teachers?

Science Class Schedule, Cohort 52/CRN 21792, TR 1:00-3:45

T Jan. 20

Orientation to Class; index card IDs
Discuss Class Start-Up and Sign-up Sheet: Science Info/Activity/Folders/Announcements
Collaboration Skills and Cooperative Learning: Toys in Space
The Learning Cycle Model of Instruction
Learning Cycle Lesson
Team Time: Learning Cycle Lessons
Assignment: Talk to Cooperating Teacher – science unit topics; teach when student teaching
For next class: Print out CA Science Content Standards and bring to class
For next class: Read Chapters 1-2 and do Chapter Summaries

R Jan. 22

Class Start-Up A: Folders/Science Info/Activity/Announcements
Bring Science Content Standards to class: from <http://www.cde.ca.gov/standards/science>
Bring Topic for Science Unit, as assigned by Cooperating Teacher
Unit Time
CA Science Content Standards Grades K-8
Writing Objectives for Student Learning
Writing Science Concept Definitions
Learning Cycle Lesson presented by Instructor
Team Time for Learning Cycle Lessons
Assignment: Bring books and resources for Science Units to next class
For next class: Read Chapters 3-4 and do Chapter Summaries

T Jan. 27

Class Start-Up B: Folders/Science Info/Activity/Announcements
Concept Mapping
Bring books and resources for Science Units
Unit Time
Science Process Skills and Scientific Attitudes
Learning Cycle Lesson presented by Instructor
For next class: Read Chapter 5 and do Chapter Summary

R Jan. 29

Class Start-Up C: Folders/Science Info/Activity/Announcements
Discuss Moon Journals Assignment
Integrating the Arts into Science Learning Cycle Lessons
For next class: Read Chapter 6 and do Chapter Summary

T Feb. 3 - Acquiring Library Resources for Science Teaching
For next class: Read Chapter 7 and do Chapter Summary

R Feb. 5

Class Start-Up D: Folders/Science Info/Activity/Announcements
Turn in Chapter Summaries for Ch 1 – 7
Team 1 Learning Cycle Lesson: Static Electricity
Team 2 Learning Cycle Lesson: Magnetism
Teaching English Language Learners in Science
For next class: Bring Resources for Moon Journals Writing and Art Activities
For next class: Read Chapter 8 and do Chapter Summary

T Feb. 10

Class Start-Up E: Folders/Science Info/Activity/Announcements
Bring Resources for Moon Journals Writing and Art Activities
Team 3 Learning Cycle Lesson: Current Electricity
Integrating Writing into Science Activities
Moon Journals Writing and Art Activities
Unit Planning Time
For next class: Read Chapter 9 and do Chapter Summary

R Feb. 12

Class Start-Up F: Folders/Science Info/Activity/Announcements
Team 4 Learning Cycle Lesson: Sound
Team 5 Learning Cycle Lesson: Light, Lenses and Color
Science Curriculum Kits and State Approved Texts
Authentic Assessments in Science
For next class: Read Chapters 10-11 and do Chapter Summaries

T Feb. 17

Class Start-Up G: Folders/Science Info/Activity/Announcements
Turn in **1 page** Lesson for Science Exploratorium and **1/2-1 page** “Data Sheet”
Team 6 Learning Cycle Lesson: Air and Air Pressure
Team 7 Learning Cycle Lesson: Weather/Climate
Inclusion and Teaching Science to Students with Special Needs
For next class: Read Chapter 12 and do Chapter Summary

R Feb. 19 - Guided Nature Walk

For next class: Read Chapter 13-14 and do Chapter Summaries

T Feb. 24

Class Start-Up H: Folders/Science Info/Activity/Announcements
Turn in Chapter Summaries for Ch. 8– 14
Turn in Science Action Research Project
Team 8 Learning Cycle Lesson: Space Science
Team 9 Learning Cycle Lesson: Sun, Moon and Stars
Inclusion and Teaching Science to Students with Special Needs
For next class: Read Chapter 15 and do Chapter Summary

R Feb. 26 - Hansen Symposium

For next class: Read Chapter 16 and do Chapter Summary

T Mar. 2

Class Start-Up I: Folders/Science Info/Activity/Announcements
Discuss Guided Nature Walks/Turn in Summaries
Team 10 Learning Cycle Lesson: Geology
Team 11 Learning Cycle Lesson: Oceans
Science Projects, Student Research, Science Fairs
For next class: Read Chapter 17 and do Chapter Summary

R Mar. 4– Science Exploratorium at Elementary School

For next class: Read Chapters 18-19 and do Chapter Summaries

T Mar. 9

Class Start-Up J: Folders/Science Info/Activity/Announcements
Turn in Final Assignment
Discuss Science Exploratorium
Turn in Exploratorium Reflection
Complete PCP Rubrics with Rationales in class
Team 12 Learning Cycle Lesson: Plants or Animals
Team 13 Learning Cycle Lesson: Nutrition or Fitness
Safety in the Science Class
For next class: Read Chapter 20 and do Chapter Summary

R Mar. 11 – last class

Class Start-Up K: Folders/Science Info/Activity/Announcements
Turn in Chapter Summaries for Ch 14-20
Turn in Units
Unit Presentations

SCIENCE METHODS GRADESHEET

Attendance (present, late or absent—sign your name and indicate if late or left early)

1/20	_____
1/22	_____
1/27	_____
1/29	_____
2/3	_____
2/5	_____
2/10	_____
2/12	_____
2/17	_____
2/19	_____
2/24	_____
2/26	_____
3/2	_____
3/4	_____
3/9	_____
3/11	_____

Reading Summaries

Ch. 1 _____ point	Ch. 8 _____ point	Ch. 15 _____ point
Ch. 2 _____ point	Ch. 9 _____ point	Ch. 16 _____ point
Ch. 3 _____ point	Ch. 10 _____ point	Ch. 17 _____ point
Ch. 4 _____ point	Ch. 11 _____ point	Ch. 18 _____ point
Ch. 5 _____ point	Ch. 12 _____ point	Ch. 19 _____ point
Ch. 6 _____ point	Ch. 13 _____ point	Ch. 20 _____ point
Ch. 7 _____ point	Ch. 14 _____ point	

Assignments

Points Possible

Your Grade

Late assignments will be penalized by a 20-point reduction each day they are late.

Class Start-up: Folders/Science Info/Activity/Announcements	3	_____
Reading Summaries (individual)	20	_____
Participation, Collaboration, Professionalism	20	_____
Science Action Research Project (individual)	15	_____
Leadership of Hands-on Science Lesson (pairs)	10	_____
Science Exploratorium Lesson Plan and Presentation (pairs)	10	_____
Science Teaching Unit and Presentation (pairs)	20	_____
Final Assignment (individual)	2	_____

FINAL GRADE = _____