

**CALIFORNIA STATE UNIVERSITY SAN MARCOS
COLLEGE OF EDUCATION
EDMS 545 Science Education
Fall 2006 7:30-11:50 and 1:00-2:20**

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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)

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.

REQUIRED TEXTS

Friedl, A.E. & Koontz, T.Y. (2005). *Teaching Science to Children, An Inquiry Approach, 6th Ed.* NY: McGraw-Hill.
Science Framework for California Public Schools. (2003) Sacramento: California Dept. of Education.
Lamb, R. *Communication Basics: An Overview of Nonviolent Communication.* Center for Nonviolent Communication.

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.

NOTE: Contract Negotiations--The instructor's union, the California Faculty Association (CFA), is entering the second year of contract negotiations and there is a possibility of a work interruption. Updates on this situation will be provided throughout the semester. Please keep in mind that faculty working conditions are student learning conditions.

Course Objectives Continued:

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).

COURSE TOPICS

Constructivism & The Learning Cycle Model of Teaching
Concept Mapping
Objectives for Student Learning & Science Concept Definitions
Developing Essential Questions
California Science Content Standards
California Science Framework
Teaching English Language Learners 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
Benchmarks and the National Science Education Standards

Teacher Performance Expectation (TPE) Competencies

Standards of Quality and Effectiveness for Professional Teacher Preparation Programs

California Commission on Teacher Credentialing

The course objectives, assignments, and assessments have been aligned with the CTC standards for the Multiple Subject Credential. This course is designed to help those seeking a California teaching credential to 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. You will be required to formally address the following TPEs in this course: TPE 1A and TPE5. To successfully meet these TPEs, you must respond on TaskStream, attach your evidence, and request feedback from me on TaskStream.

****NOTE: Entries for TPE 1A and TPE 5 will be completed during the last class session as a final exam." If you do not post the entries as directed, (1) you will not receive credit for the TPE entries and (2) you will not pass the class.**

TPE 1A: 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, and estimation.

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.

Professionalism/Dispositions

Because this course is part of an accredited program that leads to professional certification, students are expected to demonstrate behavior consistent with a professional career. Lack of professionalism in any of the following areas will alter the final grade.

1. Attend all class meetings. 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 are absent 1 day, your highest possible grade is a B. If you are absent more than 1 day, your highest possible grade is a C, which means that you will not pass the course. Late arrivals and early departures will affect your final grade. Absences do not change assignment due dates. Late assignments will receive a reduction in points for each day late.

2. Interact professionally and collaborate responsibly with your colleagues and professor. Teacher education is a professional preparation program and students will be expected to adhere to standards of dependability, professionalism, and academic honesty. Prepare carefully for class, and be ready to discuss readings and assignments thoughtfully.

3. Each written assignment is expected to have a clear organizational presentation and be free of grammar, punctuation and spelling errors. There will be a reduction in points for the above mentioned errors.

4. Complete all assignments on time. Late assignments will receive a 20% reduction in points for each day late. Occasionally a student may be asked to revise an assignment.

Students With Disabilities Requiring Reasonable Accommodations

Students must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (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.

All University Writing Requirement

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.

Person-First Language

Use "person-first" language in all written and oral assignments and discussions (e.g., "student with autism" rather than "autistic student").

Course Prerequisites

Course prerequisites include admission to the program, successful completion of the Semester 1 courses, and successful completion of the Beginning Student Teaching experience.

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.

Visual and Performing Arts

This course infuses the visual and performing arts in order to prepare our candidates with the skills to integrate the arts in their teaching. The Visual and Performing Arts Content Standards for California Public Schools (<http://www.cde.ca.gov/cdepress/standards-pdfs/visual-performing-arts.pdf>) describe what every student should know and be able to do in the visual and performing arts, pre-kindergarten through grade 12 in five strands: artistic perception; creative expression; historical and cultural context; aesthetic valuing; and connections, relationships and applications.

GRADING STANDARDS

A = 93-100
A- = 90-92
B+ = 87-89

B = 83-86
B- = 80-82
C+ = 77-79

C = 73-76
C- = 70-72
F = 0-69

It is expected that students will proofread and edit their assignments prior to submission. Students will ensure that the text is error-free (grammar, spelling), and ideas are logically and concisely presented. The assignment's grade will be negatively affected as a result of this oversight. Each assignment will be graded approximately 80% on content and context (detail, logic, synthesis of information, depth of analysis, etc.), and 20% on mechanics. All citations, where appropriate, will use American Psychological Association (APA) format. Consult APA Manual, 5th edition for citation guidance.

You must maintain a B average (3.0 GPA) in your teacher education courses to receive a teaching credential from the State of California. Courses are not accepted if final course grades are below a C+.

Exemplary "A" Students

1. Demonstrate serious commitment to their learning, making full use of the learning opportunities available and searching out the implications of their learning for future use.
2. Complete all assignments thoroughly, thoughtfully and timely.
3. Make insightful connections between assignments and their developing overall understanding of social studies concepts; continually question and examine assumptions in a genuine spirit of inquiry.
4. Show high level achievement of course goals.
5. Display a "can do" attitude, give 100%, and work to help others learn too.

Grading will include a component of “professional demeanor.” Students will conduct themselves in ways that are generally expected of those who are entering the education profession, including the following:

- On-time arrival to all class sessions
- Advance preparation of readings and timely submission of assignments
- Respectful participation with instructor and other students in all settings
- Carefully considered, culturally aware approaches to solution-finding

ASSESSMENT OF COURSE OBJECTIVES

1. Teacher Dispositions	5%
2. Leadership of Hands-on Science Activities	10%
3. Learning Cycle Lesson Drawings	5%
4. Learning Cycle Lesson Explanations	5%
5. Essential Questions Quiz	5%
6. Reading Accountability Journal	20%
7. Framework Summary Response	5%
8. Science Curriculum	20%
9. Science Exploratorium Lesson Plan/Presentation	10%
10. Final Exam (completion of TPEs for Science)	15%

Descriptions of Assessments

Teacher Dispositions

5%

Each student will self evaluate his (her) own teaching affect and 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 teacher 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 protocol: 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.

PCP Rubric: Participation, Collaboration and Professionalism

Students are expected to actively participate, collaborate, and demonstrate professionalism at all times.

	Excellent	Acceptable	Unacceptable	Comments
<p><u>Attitude</u> Do you show a positive attitude toward class, “the work” and learning?</p>	Always displays a positive attitude. May offer constructive criticism and include alternatives that show initiative.	Sometimes 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.	
<p><u>Participation</u> Do you participate in class discussions productively, sharing your knowledge and understandings?</p>	Attends every class, always on time and well prepared, and never leaves early. Gives closest attention to class activities & 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.	
<p><u>Professionalism</u> Do you exhibit professional behavior at all times?</p>	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.	
<p><u>Collaboration</u> Can you monitor and adjust your participation to allow for others' ideas to be heard? Are you supportive of others' ideas and work?</p>	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.	
<p><u>Contributions</u> Do you contribute to whole class and group work? Do you “do your share”?</p>	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.	
<p><u>Disposition toward teaching</u> Do you exhibit a positive disposition towards teaching all students?</p>	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 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.	
<p><u>Leadership</u> Do you interact productively with your peers and show leadership initiative?</p>	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.	

Leadership of Hands-on Science Activities (team)

10%

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 CA Science Content Standards. Strategies for English language learners, technology integration, and methods for teaching students with disabilities should be included.

You will work in teams to lead science lessons based on the Learning Cycle Model of Instruction. You will teach these to your classmates. Begin the lesson by turning in 1 copy of the rubric completed as a team evaluation. Each lesson will be allocated a maximum of 35 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 require different hands-on science activities using manipulatives. **ALWAYS begin Exploration with students making PREDICTIONS.** 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 need to know and demonstrate the stages of the Learning Cycle, or you will not be given credit for your lesson.**

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 essential questions about the lesson on the board, for students to consider during the lesson.** These questions should be **higher level questions** (analysis, synthesis or evaluation level) according to Bloom’s Taxonomy. Make sure that you include the **3 stages of the Learning Cycle.** **Begin the lesson with students writing their predictions about the outcomes of the activity.** Make sure that science content background and applications to everyday life are addressed. You need to **EXPLAIN** Strategies for English language learners and adaptations for students with disabilities.

Prepare a PowerPoint 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. **Bring the Children’s literature books to class to show.**

Science Lesson Handout

- Prepare a handout which includes the information under Lesson Plan Format, making sure you include:
 - team members’ names at the top
 - references at the bottom.

After teaching the lesson in class, you should each write a one page reflection. The reflection should include strengths, weaknesses, and recommendations for improvement. Each person should turn in the reflection at the next class session, along with a copy of your Peer Evaluation form.

IMPORTANT NOTE: At least **three full days PRIOR to your team’s presentation**, email your complete lesson plan and your PowerPoint Presentation to the instructor for review. Include your cohort and the date you will present to the class. After I have approved these, you should make copies of the lesson to bring for classmates on the day of the presentation. After your presentation (by the next class), turn in your **Reflection and your Peer Evaluation Form.**

Lesson Plan Format

Lesson Title: What is the title of your lesson?

Grade Level: What is the grade level?

Student Groupings: How will you group students for instruction?

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

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 concept.)

Essential Questions (higher level; see Bloom's taxonomy): What are your essential question(s) for this concept? What leads to the big idea?

Assessment: How will your students demonstrate that they have met the objective? What evidence demonstrates that they have achieved the objective?

Criteria for Assessment: What criteria will you use to grade the assessment? How will you know if someone has successfully completed the assessment?

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

The Learning Cycle

- a. Exploration (Begin with students making predictions.)
- b. Concept Invention
- c. Concept Application

Accommodations/Adaptations/Applications:

- Strategies for English language learners 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 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

Arts Standards Integration: Explain how you will integrate learning in the Arts.

References: Title, author, publisher, year

RUBRIC FOR HANDS-ON SCIENCE LESSONS

Title of Lesson: _____

Names: _____

Activity	Criteria/ Quality of Work	Score
<u>Materials</u> <u>5pts</u>	Materials were provided so that all students could easily participate - 5 pts. Materials were provided so that some students could easily participate - 3 pts. Materials were provided so that a few students could easily participate - 1 pt. Materials were not provided so that students could easily participate - 0 pt. (5 points maximum)	
<u>Essential Questions</u> <u>5pts</u>	You included 2 essential questions in the lesson, asking about the "big idea." These were not simple knowledge or application questions, but questions relating the lesson to the big idea (5 points maximum)	
<u>Assessment & Criteria</u> <u>5pts</u>	You included an explanation of a performance assessment during which students showed evidence that they achieved the objectives. You also included the criteria to be used for grading the assessment. (5 points maximum)	
<u>Concept Exploration</u> <u>10pts</u>	1) All students participated in a developmentally appropriate hands-on science activity, made observations, and collected data. Predictions were made at beginning 2) Are children provided with hands-on activities (sometimes problem solving) prior to being introduced to the new ideas? 3) Do the exploration activities elicit children ideas relative to those activities? 4) Are the exploration activities clear lead-in's to the introduction of the idea? That is, do the exploration activities provide the experiences children need to meaningfully grasp the new idea when that new idea is presented? 5) Is there a likelihood that the children will come up with the key idea as a consequence of the exploration activities? (2 points for each of the above)	
<u>Concept Invention</u> <u>10pts</u>	1) Students shared their observations, data and explanations. Teacher provided further explanations and terminology, and tied it all together. 2) When the new idea or skill is introduced, does the teacher directly relate the presentation to what children have experienced in the exploration activity? 3) Does the teacher attempt to elicit the key idea from the children before presenting that idea? 4) Is there an attempt by the teacher to check on children's understanding of the newly presented concept or skill? 5) Is there an attempt by the teacher to give children an example of what the concept is not? (2 points for each of the above)	

<u>Science Content Background</u> 10 pts	Your team provided a thorough explanation of the science content background in the PP presentation - 10 pts. Your team provided a short explanation of the science content background - 6 pts. Your team provided an incomplete explanation of the science content background - 2 pts. Your team provided a poor explanation of the science content background - 0 pts. (10 points maximum)	
<u>Relevant Web Sites</u> 10 pts	Your PP presentation and lesson plan included 5 web sites with descriptions and links to the sites. (2 points for each)	
<u>Concept Application</u> 10 pts	1) Are hands-on activities used in the application/elaboration stage? 2) Are there explicit attempts to offer children corrective and confirmatory feedback? 3) Will any new element (refinement) be added to broaden and deepen children's understanding or skill? 4) Can the application/elaboration activities serve as exploration activities for a new idea? (2.5 points for each)	
<u>Strategies for English language learners</u> 5 pts	Numerous (5) Strategies for English language learners are explained (1 pts for each)	
<u>Applications to real life</u> 5 points	5-6 applications to everyday life are described (1 points for each)	
<u>Adaptations for Students with Disabilities</u> 5 points	5 adaptations to meet the needs of students with disabilities are included (1 points for each)	
<u>Arts</u> 5pts	You integrated one or more arts standards in a meaningful way – 5 pts. Arts included, but did not include standards – 3 pts. Little relation to the arts – 1 pt.	
<u>Handout</u> 10 pts	Handout included everything listed for lesson plan (1 points OFF for each missing item)	
<u>Presentation</u> 5 pts	Your team was ready to present at the beginning of class, had all materials ready and all handouts copied, and stayed within the time allocated. You kept students on-task and did not waste time - 5 pts. Your team accomplished some of the items listed - 3 pts. Your team accomplished few of the items listed - 1 pts. Your team did not accomplish any of the items listed - 0 pts. (5 points maximum)	
	TOTAL POINTS/100	

Learning Cycle Lesson Drawings (individual) **5%**

After each Team presentation, you will make a drawing illustrating what you learned during the lesson. Be sure to pay attention during the lesson so that you have something to draw and so that your drawing illustrates your understanding of the lesson.

Learning Cycle Lesson Explanations (individual) **5%**

After each Team presentation, you will write an explanation of the science concepts taught, usually about ½-1 page. Be sure to pay attention during the lesson so that you have something to explain!

Essential Questions Quiz (individual) **5%**

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

Reading Accountability Journal Entries for Ch. 2-21 (individual) **20%**

The assigned readings provide an important foundation for your increasing understanding of how to effectively teach science. To aid you in remembering the readings, and assist you with meaningful class participation, you are asked to respond to each reading assignment by coming to class with a 1-2 page entry in your Reading Accountability Journal. (You will need to purchase 2 large Blue Books). Reading accountability journals will generally be collected at each class session and will only receive full points if completed by the date indicated in the schedule.

For each of chapters 2-21, complete one of the following in a large Blue Book (purchase 2 large books):

1. Prepare a concept map (10-15 concepts with linking words), using correct **concept mapping procedures taught in class** or
 2. Prepare a Big Ideas “paper” explaining the key science concepts (**sentence form, not outlines**)
- Put your name at the top of each page

Grading: Maximum of 5 pts. for each chapter’s concepts. 20 CHAPTERS X 5 PTS=100 PTS

Framework Summary Response (individual) **5%**

Read the first part of the California Science Framework, up to page 22. This includes Board Policy, the Introduction and Chapters One and Two.

- Think about the reading holistically.
 - Type 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?
- Come to class prepared to discuss the questions and turn in your answers.

Science Curriculum (group) **20%**

Instructions will be given in class.

Final Exam (completion of TPEs for Science) (individual) **15%**

This will be the final class activity, completed in a computer lab.

Science Exploratorium Lesson Plan/Presentation (pairs)

10%

Develop an inquiry activity to teach to elementary students. You may work in pairs on this assignment (pairs, not three, four or five). 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. 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.)

Type a 1 page abbreviated 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?

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.)

Essential Question(s): What are your essential question(s) for this concept?

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?

Assessment Criteria: What criteria will you use for grading the assessment? How will you know students have successfully completed the assessment?

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

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

References: Title, author, publisher, year of resources

The Reflection (to turn in after the Exploratorium; 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?

After the Exploratorium, you will do a self-assessment by completing the RUBRIC below.

Turn in your self-assessment rubric and your reflection at the next class session.

RUBRIC FOR ACTIVITY, POSTER AND PRESENTATION-Science Exploratorium

Score	Criteria	Quality of Work		
		Excellent	Acceptable	Unacceptable
_____	<u>Visual Display</u> 10 pts. 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> 10 pts. 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> 10 pts. 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> 10 pts. 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> 20 pts. 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> 20 pts. 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> 20 pts. 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 _____

Cooperative Learning Roles for Science Group Members:

- Materials Manager
- Reporter
- Recorder
- Timekeeper/Taskmaster
- Lead Investigator

Heterogeneous groups are best. The teacher assigns the group members and the roles; roles are rotated.

Compassionate Communication

We will be including a study of Rachel Lamb's booklet Communication Basics: An Overview of Nonviolent Communication. This booklet is published by the Center for Nonviolent Communication. In Nonviolent Communication (also called Compassionate Communication), Marshall Rosenberg presents his approach to communication that centers on compassionate connection. Marshall encourages all individuals, and especially educators, to motivate "by a reverence for life." Rosenberg's Compassionate Communication process offers educators the tools to create exceptional learning environments.

Compassionate Communication (also called Nonviolent Communication) will help you:

- Maximize the individual potential of all students
- Improve trust and connection in your classroom community
- Strengthen student interest, retention and connection to their work
- Find cooperation without using demands
- Improve classroom teamwork, efficiency and results

Marshall B. Rosenberg, Ph.D. is the internationally acclaimed author of *Nonviolent Communication: A Language of Life*, and *Speak Peace in a World of Conflict*. He is the founder and educational director of the Center for Nonviolent Communication (CNVC). He travels throughout the world promoting peace by teaching these remarkably effective communication and conflict resolution skills. See www.cnvc.org resources for additional books and resources on how to use compassionate communication in teaching.

Bloom's Hierarchy

Knowledge	<ul style="list-style-type: none">• observation and recall of information• knowledge of dates, events, places• knowledge of major ideas• mastery of subject matter• <i>Question Cues:</i> list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
Comprehension	<ul style="list-style-type: none">• understanding information• grasp meaning• translate knowledge into new context• interpret facts, compare, contrast• order, group, infer causes• predict consequences• <i>Question Cues:</i> summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
Application	<ul style="list-style-type: none">• use information• use methods, concepts, theories in new situations• solve problems using required skills or knowledge• <i>Questions Cues:</i> apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover
Analysis	<ul style="list-style-type: none">• seeing patterns• organization of parts• recognition of hidden meanings• identification of components• <i>Question Cues:</i> analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer

<p>Synthesis</p>	<ul style="list-style-type: none"> • use old ideas to create new ones • generalize from given facts • relate knowledge from several areas • predict, draw conclusions • <i>Question Cues:</i> combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite
<p>Evaluation</p>	<ul style="list-style-type: none"> • compare and discriminate between ideas • assess value of theories, presentations • make choices based on reasoned argument • verify value of evidence • recognize subjectivity • <i>Question Cues</i> assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize

SB 2042 - AUTHORIZATION TO TEACH ENGLISH LEARNERS COMPETENCIES

PART 1: LANGUAGE STRUCTURE AND FIRST- AND SECOND-LANGUAGE DEVELOPMENT	PART 2: METHODOLOGY OF BILINGUAL, ENGLISH LANGUAGE DEVELOPMENT, AND CONTENT INSTRUCTION	PART 3: CULTURE AND CULTURAL DIVERSITY
I. Language Structure and Use: Universals and Differences (including the structure of English)	I. Theories and Methods of Bilingual Education	I. The Nature of Culture
A. The sound systems of language (phonology)	A. Foundations	A. Definitions of culture
B. Word formation (morphology)	B. Organizational models: What works for whom?	B. Perceptions of culture
C. Syntax	C. Instructional strategies	C. Intra-group differences (e.g., ethnicity, race, generations, and micro-cultures)
D. Word meaning (semantics)	II. Theories and Methods for Instruction In and Through English	D. Physical geography and its effects on culture
E. Language in context	A. Teacher delivery for <u>both</u> English language development <u>and</u> content instruction	E. Cultural congruence
F. Written discourse	B. Approaches with a focus on English language development	II. Manifestations of Culture: Learning About Students
G. Oral discourse	C. Approaches with a focus on content area instruction (specially designed academic instruction delivered in English)	A. What teachers should learn about their students
H. Nonverbal communication	D. Working with paraprofessionals	B. How teachers can learn about their students
I. Language Change		C. How teachers can use what they learn about their students (culturally responsive pedagogy)
II. Theories and Factors in First- and Second-Language Development	III. Language and Content Area Assessment	III. Cultural Contact
A. Historical and current theories and models of language analysis that have implications for second-language development and pedagogy	A. Purpose	A. Concepts of cultural contact
B. Psychological factors affecting first- and second-language development	B. Methods	B. Stages of individual cultural contact
C. Socio-cultural factors affecting first- and second-language development	C. State mandates	C. The dynamics of prejudice
D. Pedagogical factors affecting first- and second-language development	D. Limitations of assessment	D. Strategies for conflict resolution
E. Political factors affecting first- and second-language development	E. Technical concepts	IV. Cultural Diversity in U.S. and CA.
		A. Historical perspectives
		B. Demography
		C. Migration and immigration

This form and information submitted is Confidential.

Peer Evaluation Form
To be copied and used for Leadership of Science Activities and Science Curriculum

Name: _____ **Date:** _____ **Assignment:** _____

Instructions: Copy front to back, and complete a copy for each group assignment. *Please evaluate the contributions of each member of your group for each group assignment in the course. Be sure to include your own self-assessment when completing this evaluation. Turn in to the instructor after completing the related assignment. Be sure to name the assignment you are completing the evaluation for.*

Scale: 1= Exceptional, 2= Above Avg., 3= Average, 4= Below Avg., 5= Poor

1. How would you rate the performance of your group peers on the assignment checked above in terms of the contributions each member of your group has made to the assignment through the semester?

<u>Student Name</u>	<u>Rating</u>	<u>Contribution</u>
---------------------	---------------	---------------------

- You
-
-
-
-

Comments:

2. How would you rate the performance of each group member in playing the leadership role for his or her particular set of assigned project tasks?

<u>Student Name</u>	<u>Rating</u>	<u>Leadership</u>
---------------------	---------------	-------------------

- You
-
-
-
-

Comments:

This form and information submitted is Confidential.

3. How would you rate the performance of each member of your group in contributing to the overall success of the assigned project?

<u>Student Name</u>	<u>Rating</u>	<u>Performance</u>
---------------------	---------------	--------------------

- You
-
-
-
-

Comments:

Ranking: Please rank each member of your group in terms of his or her overall contribution to the project/assignment. You may rank more than 1 person on each level.

Scale: 1= Most significant contributor, 2= Next most significant contributor, etc.

- 1.
- 2.
- 3.
- 4.
- 5.

Comments:

Your Full Name _____ Cohort _____

SCIENCE EDUCATION GRADESHEET

This will be attached to your Class Folder. Keep your own copy in your Science Notebook.

Attendance

(present, late or absent—sign your name and indicate if late. For previous classes, indicate if present for whole class or left early)

Class

1 _____
 2 _____
 3 _____
 4 _____
 5 _____
 6 _____
 7 _____
 8 _____

Reading Accountabilities (5 points each)

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	Ch. 21 _____ point
Ch. 8 _____ point	Ch. 15 _____ point	

Assessment of Course Objectives

Percent of Grade

Your Grade

Final Points

1. Teacher Dispositions	5%
2. Leadership of Hands-on Science Activities	10%
3. Learning Cycle Lesson Drawings	5%
4. Learning Cycle Lesson Explanations	5%
5. Essential Questions Quiz	5%
6. Reading Accountability Journal	20%
7. Framework Summary Response	5%
8. Science Curriculum	20%
9. Science Exploratorium Lesson Plan/Presentation	10%
10. Final Exam (completion of TPEs for Science)	15%

Final Course Grade _____

Final Letter Grade _____