CALIFORNIA STATE UNIVERSITY SAN MARCOS
COLLEGE OF EDUCATION

EDMS 545: Elementary Science Education

Summer 2008 Monday and Wednesday 5:30-10:00 PM UH 460
3 Units

Instructor: Dr. Ingrid M. Flores **Office Hours:** Before class and by appointment. Please email to set up a convenient time to meet.
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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 Prerequisites: Admission to the Multiple Subject Credential Program with Authorization to Teach English Learners

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 MATERIALS

- 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. Also available online.
- 2 Large Blue Books (Course text, Science Framework, and Large Blue Books are available at CSUSM bookstore)

Other handouts will be distributed in class or through WebCT

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 of the Learning Cycle model of instruction to teach science in a contemporary manner.
6 Use of 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 of authentic methods of assessment to evaluate learning of science concepts and processes.
9. Design of an elementary science teaching year-long unit.
10. Practice strategies to include all students in science (linguistically and culturally diverse, students with disabilities and other students with special needs).

INFUSED COMPETENCIES

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.

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)

Technology
This course infuses technology competencies to prepare candidates to use technologies, emphasizing their use in both teaching practice and student learning. Students are expected to demonstrate competency in the use of various forms of technology (i.e. word processing, electronic mail, WebCT 6, use of the Internet, and/or multimedia presentations). Specific requirements for course assignments with regard to technology are at the discretion of the instructor. Keep a digital copy of all assignments for use in your teaching portfolio.

You must use your WebCT email account for this class. The best way to contact me is by WebCT e-mail.

COURSE POLICIES

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 class session, your highest possible grade is a B. If you are absent 2 class sessions,** you will not pass the course. **Late arrivals and early departures** will lower your course grade. For every two times that you are late and/or leave early, your course grade will be lowered by one letter grade. If you have an emergency, or very extenuating circumstances, please see the instructor to make arrangements accordingly. Absences do not change assignment due dates. If you find that you cannot attend class due to an emergency or very extenuating circumstances, email any due assignments. NOTE: With few exceptions, late assignments will not be accepted.

All University Writing Requirement
In keeping with the All-University Writing Requirement, all 3-unit courses must have a writing component of at least 2,500 words (approximately 10 pages), which can be administered in a variety of ways. Writing requirements for this course will be met as described in the assignments.

Computer Use During Class Sessions
You are welcome to use a laptop computer in class when working on class assignments, for example. However, you will need to save checking email or other personal computer use for time outside of class. Most students find it disruptive when they are focusing on class activities or listening to presentations and can hear keyboarding in the classroom. Your kind consideration is greatly appreciated by all!

Person-First Language

Use “person-first” language in all written and oral assignments and discussions (e.g., “student with autism” rather than “autistic student”). Disabilities are not persons and they do not define persons, so do not replace person-nouns with disability-nouns. Further, emphasize the person, not the disability, by putting the person-noun first.

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 in the CSUSM University Catalog. 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 incidents of academic dishonesty will be reported to the Dean of Students.

Plagiarism
It is expected that each student will do his/her own work, and contribute equally to group projects and processes. Plagiarism or cheating is unacceptable under any circumstances. If you are in doubt about whether your work is paraphrased or plagiarized, see the Plagiarism Prevention for Students website http://library.csusm.edu/plagiarism/index.html. If there are questions about academic honesty, please consult the University catalog.

COURSE TOPICS

CA Science Content Standards Grades K-8
California Science Framework
The Nature of Science
The Learning Cycle Model of Teaching
Learning Cycle Science Lesson Demonstrations
Developing Essential Questions
Concept Mapping
Writing Objectives for Student Learning
Writing Science Concept Definitions
SDAIE Strategies in Science
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

COURSE ASSIGNMENTS

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. Late assignments are not accepted. Prepare carefully for class, and be ready to discuss readings and assignments thoughtfully. Note the Description of Exemplary Students at the end of this syllabus.

1. Active Participation and Collaboration (all or nothing credit given)	5%
2. Reading Accountability Journal Entries (Concept Maps and Big Ideas Papers)	10%
3. California Science Framework and Standards Task and Presentation	10%
4. Leadership of Hands-on Science Lesson Activities	20%
5. Integration of Technology for Science Teaching and Learning	15%
6. Year-Long Science Curriculum Map and Unit Plan	25%
7. Course Reflection	5%
8. TPE reflection and response Via Task Stream – due date/time per course schedule	10%

DESCRIPTIONS OF ASSIGNMENTS

1. Active Participation and Collaboration - 5%

Teacher education is a professional preparation program and students will be expected to adhere to standards of dependability, professionalism, and academic honesty (refer to rubric attached to this syllabus).

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 and attendance for the entire class period
- Advance preparation of readings and timely submission of assignments
- A positive attitude at all times
- Active participation in all class discussions and activities
- Respectful interactions and courteous language with the instructor and other students in all settings
- Carefully considered, culturally aware approaches to solution-finding

A Participation, Collaboration, and Professionalism Rubric may be accessed in the Handouts and Readings folder on the home page of WebCT.

2. Reading Journal (Individual) - 10%

The purpose of the journal entries is to help you carry the science content from short term into long term memory and understanding so that you can more easily teach science when you become a classroom teacher. The assigned readings provide an important foundation for your increasing understanding of how to effectively teach science. You will need two large Blue Books. Reading journals (blue books) will be collected each class session and will only receive full points if completed by the date indicated in the schedule. You must use Blue Books, though you may type and staple in your entry. Spiral paper stuck in Blue Books will not be accepted.

Each class session you will be required to complete journal entries for one chapter **(your choice of which chapter from the assigned readings**). The first journal entry, which will consist of a Big Ideas Paper for one of the chapter readings assigned for Class Session 2, is due by the start of class time. The Big Ideas Paper consists of explaining the key science concepts. Then for the next class (Session 3), you will create a Concept

Map (following procedures taught in class) for one of the assigned chapter readings for that week (your choice of which chapter from the assigned readings). For Class Session 4, you will repeat the process for a Big Ideas paper, and the following week you will repeat the process for the Concept Map. This cycle/schedule will continue for the rest of the course. Every week you will turn in the Blue Book. You will alternate making entries between your Large Blue Books so that while I am grading one, you are writing in the other.

- The Concept Map should include ALL major concepts discussed in **one** chapter. Do not include information from the investigations, only the science content. The Concept Map must follow the Concept Mapping procedures taught in class.

  Each concept map has a possible total of 9 points.

  a. Most general, inclusive Concept at top…….....1 point
  b. Map clearly demonstrates hierarchy or relationships……1 point
  c. ALL major concepts included…….. 3 points
  d. 1-2 words (nouns) for Concepts…….....2 points
  e. Verbs or prepositions for linking words between concepts…….. .2 points

- The Big Ideas paper should **explain ALL major science concepts** (not the investigations) from **one** chapter reading. Be sure to write in complete sentences, not outlines, though the sentences may be bulleted. Your Big Ideas paper is **not** a reflection of your thoughts; it is a summary of the science content.

  Each Big Ideas paper is worth a total of 9 points.
  a. Complete sentences……..4 points
  b. ALL major science concepts included…… 5 points

For both Big Ideas Papers and Concept Maps, (a) indicate on each page of your Large Blue Book the title of the Chapter you are outlining, (b) write your name and date at the top of each page and (c) number each page.

3. California Science Framework and Standards Activity - 10%

Purpose of the assignment: To read a portion of the California Science Framework and the Standards for a particular grade. You will write your individual response to the readings. Then you will work with your partner to prepare and do a presentation to the class. It is essential that you do the reading and the write-ups BEFORE you meet with your partner.

3a. Task I: Framework summary response: (Individual) – 2%

- 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 were the most important ideas addressed in the reading? How does science teaching differ from instruction in other subjects? What are the most important elements of a strong science instructional program? Come to class prepared to discuss the questions and turn in your answers.

3b. Task II: Grade level Science standard response: (Individual) – 5%

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

  See an example on the next page.

3c. Task III: Team preparation and presentation – (In class with your team) – 3%

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

Get together with your team. Look at the activities that you both wrote up for Activity 3b (Task II).

Choose one activity.

- As a team, write up a lesson plan for the activity (with objectives, assessment, and a brief description of the activity}. Put it on chart paper or PowerPoint so it can be easily presented to the class. Make sure you quote the line from the standard on which your lesson plan is based.
- As a team, come up with a brief overview of the Science Standards for your grade. Don't try to give us every single line of the standard. Summarize it in such a way that we see generally what students are supposed to learn in physical, earth, and life science and in investigation and experimentation in that grade.
- In 8 minutes or less, present your lesson plan and standards choices. Be prepared to explain why your lesson plan represents really good science for kids.
- Your grade for this assignment will be based on the content and quality of your presentation, and on the level of collaboration with your team.

Sample Response to Assignment 3b.

Grade Four

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

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

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

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

Investigation and Experimentation

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

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

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

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

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

4. Leadership of Hands-on Science Activities (Due on assigned day for the lesson) **- 20%**
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 groups of two or three to lead a science lesson based on the Learning Cycle Model of Instruction. Each group will be assigned a specific grade level for which you will plan and teach the lesson. This will determine the grade level and California Science Standard your lessons will cover. You will prepare and teach your lesson to your classmates. Each lesson team will be allocated a **maximum** of 30 minutes of class time to teach. Use activities from the textbook, Internet sites or other science resources. 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 that is a strong overview of all your lesson plan components. Include: Standards, objectives, definitions of important science concepts in the lesson, assessment/criteria, learning cycle phases, a detailed explanation of the science content, and accommodations/adaptations/everyday applications. Additionally, include a list of at least 3 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 brief examples during the lesson. **Bring children's literature reflecting science concepts relating to your lesson topic to showcase.**

Science Lesson Plan Handout

- Prepare a handout which includes the information under Lesson Plan Format (see pages 9-11 of syllabus, making sure you include:
    - names at the top
    - references at the end of the lesson plan.

IMPORTANT NOTE: At least three full days PRIOR to your presentation, email your complete lesson plan and your PowerPoint Presentation to me for review. Include all team members' names and the date you will present to the class in the email. After I email you back regarding needed changes and you make revisions, email the revised ones to me for approval. Finally, bring copies of the data sheets for students in the class, and post the lesson plan and data sheets on the appropriate thread in the WebCT discussion board for access by your classmates

On the day of your lesson presentation, please begin the lesson by turning in 1 hard copy of your lesson plan and data sheets to me. You should also give me copies for each team member of the Hands-On Lesson Plan Rubric available in the Handouts and Readings folder of your WebCT homepage.

Learning Cycle Template

Elements to Include Within Your Lesson Plan Format (see pages 9-11 of syllabus)

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 1 science area (life science, physical science, or earth science) standard and 1 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 demonstrate understanding of _____."

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

Essential Question(s): What are your essential question(s) for this concept? What leads to the big idea? What is it that students should be able to answer by having successfully participated in your lesson? Use high level questions and ensure that these are not lower level fact or info. questions (refer to Bloom's Taxonomy). For example, instead of "Why did warming the bottle cause the attached balloon to inflate? ask "How can you prove that air is a real substance that occupies space?"

Assessment: How will your students demonstrate that they have met the objective(s)? 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 phase of the Learning Cycle. Include what the teacher will do and what the students will do:

The Learning Cycle

a. Exploration (Begin with students making predictions; then have a hands-on SCIENCE activity.)

b. Concept Invention (Make sure students share and discuss data and ideas in the first part of this stage; then the teacher introduces new terms and provides further explanations.)

c. Concept Application (Should be a 2nd hands-on SCIENCE activity.)

Applications:

- Applications to everyday life and explanations (at least 3)

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

Web Sites: At least 3 interactive relevant web sites with descriptions

Children's Literature Books: Title, author, publisher, year of 2 children's books on the topic.
BRING BOOKS TO CLASS.

References: Title, author, publisher, year

Lesson Plan Format

Elements of the learning experience

Lesson Title: What is the title of your lesson?

Grade Level:
Content Area: *Example: Life Science, Physical Science or Earth Science*
Subject Matter: *Example: Heat Transfer, Plant Reproduction, Air Pressure, The Digestive System, etc*

Time period for the learning experience *Example: two 30 minute sessions Science*

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

Learning Goals/Learning objectives for the learning experience:

State adopted content standards: *Example: write all content standards directly from the State frameworks*

Learning goals based on the content standards for students: *Example: learning goals that directly relate to the content standards.*

Class description

Example: type of class (self contained, subject specific), time of year, general background of students learning in relationship to new learning (challenges and prior learning)

Example: English Learner: Beginning, intermediate, and advanced (use the ELD standards to determine the needs of each of these students).

Example: Special education: one student with a learning disability(ies) and one with another special education identified disability

Example: GATE student: identify the student's needs

Example: Regular education: remaining students

Developmental needs of the students at this age

Example: give examples based on the different learning needs for K-3 and 4-6 students
Example: developmental age-appropriate skills and needs of the students
Example: engaging activities (hands on, etc)

Assessment Plan

Example: Goals/objectives are assessed based on the content standards and learning goals
Example: Type of assessment: Prior knowledge (pre assessment), Formative (progress monitoring), Summative (final product)
Example: Feedback strategies: how students will be informed of specific successes and challenges and future activities to fill the individual student's gaps.

Materials

Example: Review teacher's manuals, pacing guides, and appropriate supplemental materials to determine the materials you will need to present this lesson. Materials should include lists of supplies that will be needed to present this lesson.

Instructional strategies

1. Address the subject matter learning goals and developmental needs of the students described.

   Example: Instructional strategies are what the teacher does during the instruction.

   Example: Student activities are what the students do during the lesson and independent practice.

INSTRUCTIONAL STRATEGIES	STUDENT ACTIVITIES
Example: Put one instructional strategy in each box with an explanation and amount of time you are anticipating. Expand the number of boxes to match each strategy.	*Example: Put one student activity to match the instructional strategy in each box with an explanation and amount of time you are anticipating. Expand the number of boxes to match each student activity.*
Exploration	
Concept Introduction	
Concept Application	

2. Explain why the instructional strategies, student activities and resources are appropriate for this lesson.

   Example: Why are the instructional strategies and student activities appropriate for this class based on content and student development?

   Example: How do they address the developmental needs of these students?

   Example: How do they help the students make progress toward achieving the state adopted academic content standards for students in this content area?

   Example: Understand connections between lesson content and the outside world.

Differentiated Instruction

Differentiated instruction based on the learning goals and instructional strategies: English Learners

TASKS	Beginning EL	Intermediate EL	Advanced EL
Identify one instructional strategy or student activity that could challenge the student.			
Describe how you would adapt the strategy or activity to meet the learning needs of the student considering subject matter pedagogy in your description.			
Explain how your adaptation would be effective for the student in making progress towards the goals of your lesson			

Differentiated instruction based on the learning goals and instructional strategies: Special Education

TASKS	LEARNING DISABILITY	GROUP SELECTED DISABILITY
Identify 1 instructional strategy or student activity from the plans that could be challenging for the student considering the description of your student		
Describe how you would adapt the strategy or activity to meet the needs of the student		
Explain how your adaption would be effective for the student making progress toward achieving the learning goal		

Differentiated instruction based on the learning goals and instructional strategies: GATE

TASKS	Describe GATE students needs:
Identify 1 instructional strategy or student activity from the plans that will be challenging for the student considering the description of your student	
Describe how you would adapt the strategy or activity to meet the needs of the student	
Explain how your adaption would be effective for helping the student make progress going beyond the learning goal	

Web Sites: At least 3 interactive relevant web sites with descriptions
References: Title, author, publisher, year

5. Integration of Technology for Science Teaching and Learning – 15%

Technology provides unique resources for teaching and learning in science. In this assignment, you will apply your understanding of educational technology to a specific science lesson.

Procedures to follow:

a. Read Chapter 3 in the Friedl & Koontz text.
b. You will use your hands-on learning cycle lesson plan already created by you.
c. You will integrate technology in your lesson by providing **opportunities for your students to engage in standards-based technology activities during the lesson**.

The following questions should frame your planning:

1. How will you organize and manage the environment so that all students have access to the technology they will use in your lesson?
2. How will you assess whether or not your students have reached the learning objectives of your lesson?
3. How will you assess whether or not the technology your students used helped them reach the learning objectives?

In summary, in your lesson plan create a category called "Integration of Technology":

1. Describe in full detail the integration of student use of technology in your lesson. What technology are you integrating in your lesson relative to science content and your learning objectives?

2. Describe in full detail how you will organize and manage the technology and the learning environment so that all students can use the technology by responding to the following questions:

I. What do you want the students to learn or be able to do by using your planned technology?
II. What will the students do? Describe the task that you will assign to students. This may be framed as a "challenge" task.
III. What forms of products (student work) will the students generate from the technology experience?
IV. Describe how you will assess whether or not your students reached the learning objectives, and whether or not the technology you planned helped them reach the learning objectives.

NOTE*** Please access further guidelines for this assignment in the Handouts and Readings folder located on the home page of WebCT. You should ensure that all discussion points (1 & 2 above) are fully addressed in your discussion.

A complete listing of the ISTE NETS for Teachers (NETS•T) is provided for your convenience. However, you should consult the student ISTE NETS to help you plan standards-based technology activities.

Student use of technology may include (but is not limited to):

a. PowerPoint presentations by students.
b. Interactive websites you select for students to use. (Note: you must provide 5 examples of interactive websites connected to your lesson content and learning objectives.)
c. Inspiration or Kidspiration for concept mapping.
d. Kid Pix in which students graphically represent their learning.
e. Students using video technology.
f. Students using digital cameras.
g. A Filamentality hot list.
h. Interactive templates accessed online for teacher-created science games for students to access at computers.
i. A science-based WebQuest
j Another idea of your own choosing for technology integration.

6. Year-Long Science Curriculum Map and Unit Plan (Teams of 4; each group member writes 1 unit) - **25%**

The goal of this assignment is for you to develop year-long plans for instruction in science based on the California Science Content Standards, as well as develop skills for teaching in the elementary grades. For this assignment, you will plan a year of science instruction for one grade level, based on the California Science Content Standards. You will divide the Science Content Standards for one grade level into four units. For each unit, you will use the science standards (and their descriptions in the Science Framework) to design enduring understandings, desired outcomes, end-of-unit assessments, and rubrics to use in grading the assessments. For the final part of this assignment you will develop ideas for three learning cycle lessons for each unit, based on the Science Standards, Enduring Understandings, Desired Outcomes and Final Assessments in the units. You will work in a group of four—one person will create one unit from each of the four total units your group decides on as comprising the year-long plan.

When you complete this assignment, you will have a curriculum plan for teaching the science standards, units and lessons for teaching science for a full year for one grade level. We will share these, so that everyone leaves with curriculum plans, units and lessons for a full year of teaching science at all grade levels. You may share these with your cooperating teachers and use them in your student teaching.

Science Curriculum Unit Template (Created by Each Team Member)

Grade: _____

Unit Title _____

1. Timeline in weeks _____

2. Standards

Content (Physical, Life, Earth Science) Standards
Investigation and Experimentation Standards

3. Enduring Understandings (info and processes you hope students remember and understand next year)

4. Desired Outcomes (reads like an objective; tell what students can DO after instruction)

5. Final Summative Assessment over Unit (end of unit assessment over the whole unit, all standards)

6. Rubric listing Criteria that you will look for in Final Assessment

Rubric over Final Assessment

Criteria	Exceeds Expectations	Meets Expectations	Below Expectations	Points Comments

7. Ideas for 3 Lessons for each Unit-

Each Lesson should include:

1. Title
2. Standard numbers
3. Ideas for
   a. Exploration (4-6 lines)
      (Begin with students making predictions; then present a hands-on SCIENCE activity.)
   b. Concept Invention (4-6 lines)
      (Make sure students share and discuss data and ideas in the first part of this stage; the teacher then introduces new terms and provides further explanations.
   c. Concept Application (4-6 lines)
      (Should be a 2nd hands-on SCIENCE activity)

Rubric for Unit of Year-Long Science Curriculum

Your name: _____ **Grade Level:** _____

	Included (Y/N)	**Page in Unit**
Unit Title (Descriptive)- 3 pts		
Unit Timeline in weeks – 2 pts		
Complete Content Standards - 5 pts		
Complete Invest/Experim. Standards – 5 pts		
Enduring Understandings – 5 pts		
Desired Outcomes - 5 pts		
Final Summative Assessment - 10 pts		
Rubric over final Assessment listing criteria – 10 pts		
Lesson 1 - 15 pts 1. Title 2. Standard numbers 3. Learning Cycle Stages a. Exploration b. Concept Invention c. Concept Application		
Lesson 2 - 15 pts 1. Title 2. Standard numbers 3. Learning Cycle Stages a. Exploration b. Concept Invention c. Concept Application		
Lesson 3 - 15 pts 1. Title 2. Standard numbers 3. Learning Cycle Stages a. Exploration b. Concept Invention c. Concept Application		
*Your Unit Presentation- 10 pts 1. Overview of your Unit 2. Description of 3 Lessons		

***Presentation: For your presentation, briefly describe your own unit and all lessons.**

***** NOTE: A hard copy of your own unit plan is due in your folder the last day of class (7/02/08*).***

Checklist:

1. Did you include a listing of complete Content and Investigation and Experimentation Standards? _____
   Content (Physical, Life, Earth Science) Standards
   Investigation and Experimentation Standards
2. Are your Enduring Understandings what you hope students remember and understand next year?_____
3. Are your Desired Outcomes what students can DO after instruction? _____
4. Is your Summative Assessment a final cumulative assessment over the whole unit, enduring understandings, desired outcomes, and all standards? _____
5. Does your rubric have a list of Criteria that you will look for in the Final Assessment, with levels of achievement (such as exceeds, meets, does not meet expectations)? _____
6. Do you have 3 lessons in each unit? _____
7. Did you include the standards in each lesson? (be sure to include at least standard numbers) _____
8. Did you include the 3 stages of the Learning Cycle? _____
9. Did you begin your Explorations with students making predictions? _____
10. Did your Explorations all have a hands-on science activity? _____
11. Did you begin each Concept Invention with students sharing and discussing data and ideas? _____
12. Did you include the teacher introducing new terms and providing further explanations during the second part of Concept Invention? _____
13. Did you include a 2nd hands-on science activity in each Concept Application? _____

7. Course Reflection (Individual) - 5%

1) Explain 3 things you will take from this course that you will want to infuse in your own professional teaching. Word process a one-page response to this prompt. Please be very specific and clear in your discussion in regards to the 3 items.

2) On a separate sheet of paper, explain 3 ways you have changed as a result of taking this course. Word process approximately a one-page response to this prompt. Be very specific and clear in your discussion in regards to the 3 changes.

Please type your name at the top of both pages.

8. Teaching Performance Expectations (TPEs) Competencies Via Taskstream - 10%

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

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

A. MAKING SUBJECT MATTER COMPREHENSIBLE TO STUDENTS

TPE 1A: 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.

Responses to TPE's: It is important to recognize that the TPEs are threaded throughout the credential program, as a whole and are addressed multiple times in each course. Each assigned response will relate to course assignments, discussions, field placements, and/or readings that provide a deeper understanding of the specified TPE. As you write, the goal is to describe your learning as it relates to the TPE, to analyze artifacts (assignments) and explain how they are evidence of your learning, and to reflect on the significance of your learning (the "so what") and where you need to go next related to the TPE.

****NOTE: 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.**

RESOURCES

JOURNALS

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

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

Tentative Course Schedule: Summer 2008

Class	Date	Topic	Readings & Work Due
1	6/02	-Course Overview -The Nature of Science - Inquiry Process in Science - How do we make decisions about what to teach and how we teach it? - **Science Content Standards & Frameworks** - Intro: The Learning Cycle Model of Instruction	**Bring course syllabus to class** **Bring course text to class** - Read Chapter 1 of *Teaching Science to Children* Bring Science Content Standards (K-8) to class
2	6/04	- Overarching themes students should learn in science: **Big ideas** - Using the Learning Cycle to teach science as inquiry - Focus on sequencing instruction to support learning outcomes - Writing Essential Questions - Writing learning objectives - Instructor-led learning cycle lesson	- Read Chapter 2 of *Teaching Science to Children* - Bring Science Content Standards (K-8) to class - Read CA Science Framework: pgs 1-22 **Framework and Standards Task I due (indiv.)** **Framework and Standards Task II due (indiv.)**
3	6/09	- **Concept maps and science content** - Science kits - Science process skills and scientific attitudes - **Lesson Planning** - National Science Education Standards - Instructor-led learning cycle lesson	- Read Learning Cycle Handout on WebCT and bring a copy to class - Read Chapter 4, 5 or 6 of *Teaching Science to Children* - BIP ** due on one of: Ch. 4, 5, or 6 in BBB*** **Framework and Standards Task III & presentations due (team)**
4	6/11	What are the best indicators that students have learned and understand the intended outcomes? - Focus on Assessment : Performance assessments - Adapting science curriculum for children with Special Needs	ONLINE CLASS **Standards Task III final version due posted to WebCT (one posting per team)** **Draft of Hands on Learning Cycle Lesson Plan due by end of class- post to WebCT**
5	6/16	- Integrating writing into science activities - Safety Guidelines for the Science Classroom - Teaching Science to English Learners - **Developing & Planning Science Units** - Instructor-led learning cycle lesson	- Read Chapter 7, 8, or 9 of *Teaching Science to Children* - Concept Map due in BBB on one of: Ch. 7, 8, or 9
6	6/18	- What teaching activities can we use to make science content accessible to ALL students? - Instructor-led learning cycle lesson - Hands-on Lessons	- Read Chapter 10, 11, or 12 of *Teaching Science to Children* - BIP due in BBB on one of Ch. 10, 11, or 12 **Hands-on Lesson Presentations x 4 – Post WCT**
7	6/23	- What teaching activities can we use to make the content accessible to ALL students? (cont'd) - **Integration of Technology in science teaching and learning** - Instructor-led learning cycle lesson - Hands-on Lessons	- Read Chapter 14, 15 or 16 of *Teaching Science to Children* - Concept Map due in BBB on one of: Ch. 14, 15 or 16 - Read Chapter 3 of *Teaching Science to Children* **Hands-on lesson Presentations x 3 - Post WCT**
8	6/25	- Strategies to ensure participation of ALL students - Intro: Developing Science WebQuests &Technol. - **TPEs 1A (science) and TPE 5** - Instructor-led learning cycle lesson - Hands-on Lessons	- Read Chapter 17, 18 or 19 of *Teaching Science to Children* - BIP due in BBB on one of Ch. 17, 18, or 19 **Hands-on lesson Presentations x 3 - Post WCT**
9	6/30	- Developing Science WebQuests & Technology for science teaching (cont'd)	ONLINE CLASS **Integration of Technology Assign - Post to WCT** **TPE 1A & TPE 5 drafts due-Post drafts to WCT**
10	7/02	Curriculum Plan Sharing Course Wrap-Up	**- Course Reflection Due** **- Yr-Long Curriculum Plan (4 Units) Due-Post** **- Final TPE postings due on TaskStream**

****** *BIP = Big Ideas Paper* ****BBB = Big Blue Book*

GRADING STANDARDS

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

It is expected that students will proofread and edit all 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 reference/resource citations should use appropriate citation form. Please consult with the American Psychological Association (APA) format in the 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 science concepts; continually questioning and examining assumptions in a genuine spirit of inquiry.
4. Attends every class, always timely, and shows high level achievement of course goals.
5. Display a "can do" attitude, give 100%, and works to help others learn too.
6. Contributes a great deal to class environment, showing respect and concern for all members.

"B" Students

1. Completes all assignments, all on time, and demonstrates the ability to summarize, analyze, and/or reflect at fairly high levels, showing consistent improvement over time.
2. Completes all of the reading assignments and develops thoughtful and fairly thorough responses.
3. 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.
4. Develops presentations demonstrating significant learning.
5. Presents confidently and intelligently, demonstrating effective teaching skills.
6. Attends every class meeting and is regularly engaged during class.
7. Contributes to the positive environment of the class by respecting all members.