

**CALIFORNIA STATE UNIVERSITY, SAN MARCOS
SCHOOL OF EDUCATION
EDSS 545 A Secondary Science Methods
(2.0 Credits) Fall 2011**

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Location: UH 460 at 5:30-8:30 on Monday (note syllabus for a few exceptions on Saturday)

College of Education 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).*

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Course Prerequisites: Admission to the Single Subject Program or pursuit of a single subject add-on credential (by permission) is required to enroll in this course as well as EDUC 350, EDUC 364, & EDUC 422 or equivalent.

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. Teacher candidates successfully completing this program receive a credential with authorization to teach English learners. *(Approved by CCTC in SB 2042 Program Standards, August 02.)*

Teacher Candidate Learning Outcomes

Teacher Candidates will be required to complete a Teaching Performance Assessment, show proof of Teacher Performance Expectations and complete critical assessment tasks-specific assignments for this course. It is the teacher candidates responsibility to understand expectations and complete assignments by stated due dates.

California Teacher Performance Assessment (CalTPA)

Beginning July 1, 2008 all California credential candidates must successfully complete a state-approved system of teacher performance assessment (TPA), to be embedded in the credential program of preparation. At CSUSM this assessment system is called the CalTPA or the TPA for short. To assist your successful completion of the TPA a series of informational seminars are offered online through Moodle Cougar Courses. TPA related questions and logistical concerns are to be addressed during the seminars. Your attention to TPA seminars will greatly contribute to your success on the assessment. Additionally, SOE classes use common pedagogical language, lesson plans (lesson designs), and unit plans (unit designs) in order to support and ensure your success on the TPA and more importantly in your credential program. The CalTPA Candidate Handbook, TPA seminars, and other TPA support materials can be found on the SOE website.

School of Education Attendance Policy

Due to the dynamic and interactive nature of courses in the School of Education, all teacher candidates are expected to attend all classes and participate actively. At a minimum, teacher candidates 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 teacher candidate have extenuating circumstances, s/he should contact the instructor as soon as possible. *(Adopted by the College of Education Governance Community, December, 1997.)*

Teacher Candidates with Disabilities Requiring Reasonable Accommodations

Teacher candidates with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disable Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Teacher candidates 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.

All University Writing Requirement

The writing requirements for this class will be met as described in the assignments. Every course at the university, including this one must have a writing requirement of at least 2500 words.

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 presentation 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.

Teacher candidates 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. Incidents of Academic Dishonesty will be reported to the Dean of Students. Sanctions at the University level may include suspension or expulsion from the University.

Plagiarism

As an educator, it is expected that each teacher candidate 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.

Electronic Communication Protocol

Electronic correspondence is a part of your professional interactions. If you need to contact instructor or other teacher candidates, e-mail is often the easiest way to do so. It is my intention to respond to all received e-mails in a timely manner. Please be reminded that electronic correspondences are a very specific form of communication, with their own form of nuances, meanings, and etiquette. For instance, electronic messages sent with all upper case letters, major typos, or slang, often communicates more than the sender originally intended. With that said, please be mindful of all electronic messages you send, to your colleagues, to faculty members in the School of Education, or to persons within the greater educational community. All electronic messages should be crafted with professionalism and care.

Things to consider:

- Would I say in person what this e-mail specifically says?
- How could this e-mail be misconstrued?
- Does this e-mail represent my highest self?
- Am I sending this e-mail to avoid a face-to-face conversation?

In addition, if there is ever a concern with an email I send to you, let's talk in person so we can correct any confusion.

Course Description/ Goals: This course will be held both fall and spring semesters for a total of 4 credits (approximately 30 contact hours per semester, 2 credits per semester). It fulfills the requirement for a methods course for all Single Subject Science credential students. Upon completion of this course, the preservice teacher will be able to formulate a basis to teach standards based science course in the secondary school in a manner that is exciting, creative and rigorous. To accomplish this, the candidate will formulate a personal framework of science education based on both a historical/philosophical perspective as well as from knowledge of the state and national frameworks and other reform documents. Using this knowledge as a framework, he (she) will learn to apply multiple strategies and resources for the development of unit plans, instructional delivery and assessments that utilize a student-centered, inquiry (problem-solving) and community based approach to the teaching of science for all students.

Course Standards: **These standards will be measured and tied directly to the assessments in the course (see description of assignments and assignment of point value) .In general terms, a successful candidate should know and be able to apply the following at the completion of the course:**

- 1) The major frameworks, programs and standards for Science Education in California, the United States as well as international countries (TIMSS Study)
- 2) the history and philosophy of science education
- 3) Diverse resources, materials available for science education including texts, lab manuals and equipment as well as both informal and formal community related resources
- 4) methods of safe and effective science teaching
- 5) methods of integrating technology into science teaching,
- 6) Diverse methods in the use of various teaching strategies such as expository teaching; inquiry-based learning; the use of open-ended laboratory experiences; community or field based science

7) Diverse assessments including both formative/summative that are authentic and traditional;

8) Enrichment activities that involve students during and after school in applying science and that go beyond the standard curriculum

9) Strategies for planning of science curricula as well as specific strategies for the integration of other disciplines (interdisciplinary curriculum).

10) inclusive science education strategies including SDAIE that enhance the science curriculum for all learners.

11) Application of teacher designed research (called action research) for the ongoing purpose of improving practice.

Teacher Performance Expectation (TPE) Competencies:

This course is designed to help teachers seeking the Single Subject Credential to develop the skills, knowledge, and attitudes necessary to assist schools and district in implementing an effective program 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. Although other TPE's are addressed in the course, the primary TPE is: TPE 1B: Subject specific pedagogical skills

Required Texts:

Science Instruction in the Middle and High School (Chiappetta and Koballa) (2009 Seventh Edition) available in CSUSM bookstore for purchase or @ Amazon etc.

Use of Discrepant Events for K-12 Science Teachers (Aztec Press /University Bookstore), (Keating) available in bookstore only

California Frameworks in Science (State Dept of Education) under <http://www.cde.ca.gov/re/pn/fd/documents/science-framework-pt1.pdf> (see free downloads)

Optional Texts:

The Demon Haunted World (Sagan)

The Structure of Scientific Revolutions (Kuhn)

California Safety Manual in Science (State Dept. of Education)/Flinn Scientific Safety Manual (both available as free downloads)

Schedule: Classes will consist of formal class meetings, field trips, video conferences and independent study totaling approximately 20 seminars @ 10 seminars per semester @ 3.0 hrs.each from 5:30-8:30

Note: Both attendance and punctuality are essential to completing all work satisfactorily. Point values are assigned for each class (5 pts per class or 10 pts for field trips). In addition, only 50% of the potential value for an assignment can be credited as makeup for an assignment that is due and reviewed in a class that was not attended by the student. Two absences in one semester can result in a minimum of one grade lower; three absences can result in a non-passing grade (unless there are extenuating circumstances). Late arrivals will be penalized at the discretion of the instructor.

Course Requirements: See Overview of Assignments (p 6) and Description of Assignments (p 6-12)

Grading Standards: See grade sheet, point values and rubrics of all assignments (p6- 12)

Overview of Assignments for both semesters (by number)/Requirements: (each will count as the points noted). The final grade for part a and b will be the % of total points earned that semester converted to a letter grade (90-100=A etc.) Assignments are due on time and will not be accepted late.

- 1) Attendance/participation (5 pt. per class) (100 pts.)
- 2) Science Methods Text Readings/Questions/Discussion/Notes (6pts each)
- 3) Jigsaw of science frameworks and standards (10pts)
- 4) Evaluation sheets on best practices in Science video's (5 pts)
- 5) Evaluation of Science Internet sites (5 pts)
- 6) A-B-C Inquiry---Discrepant event reflection/ presentation(s)/video (30 pts)
- 7) Science lab SDAIE modification and action research findings (20 pts)
- 8) Development of an outline for a Plan for Science Safety (10 pts)
- 9) A-B Observation of science lesson and evaluation of science safety strategies (10 + 5 pts = 15 pts.)
- 10) Enrichment and extracurriculum science programs (40 pts)
- 11) Book Report on high interest science book (5 pts.)
- 12) Open ended science related event both semesters (10 @ 2 =20 pts)
- 13) Strategies for implementing field trips at the high school level (WAP visit and Reuben Fleet Museum 2@ 20 pts = 40 pts.
- 14) Researching, presenting and videotaping a mini-lecture on a current topic in science (25pts)
- 15) Two Case Studies one per semester: Issues in student teaching and proposed action plans =(10 +10=20 pts @2 =40.)

Optional/Extra credit: (maximum 10 pts)

- 1) Directorship (5 pts.)
- 2) SDSEA or CSTA or NSTA or other Conference in addition to open assignments (5 pts. one day)

Point's summary:

Fall Semester only required: Assignments #1 (50 pts); #2 (54 pts); #3 (10 pts); #6 (30 pts); #8 (10 pts) #9 a-b (10+5); #12 (10 pts); #13 (20 pts); #15 (20 pts); = 219 pts.

Total

Description of all Assignments (by number): Spring semester only included

Assignment 1 Attendance (each class counts 5 points) In the event of an absence any assignments due that night could receive only 50 % of the potential credit (if made up) since you were not there to interact and discuss the assignment.

Assignment 2 Science readings in texts (6 points each chapter) Each chapter is assigned a value of six points that includes your notes or a prompt (summary of major points, reflections, questions) and responses to specific chapter questions as well as a discussion of these with your colleagues in class.

Assignment 3 – California Science Framework and Standards (10 pts)

Spirit of the assignment: How to teach science to all students by understanding how to apply standards to an inquiry based curriculum appropriate to a subject area to read a portion of the California Science Framework and the Standard for a particular science subject area for grades 9-12. You will write your individual response to the readings. Then you will work with your subject level team to prepare and do a presentation to the class. It’s important that you do the reading and the write-ups BEFORE you meet with your team.

- 3a **Framework summary response** 3 points
- Individually: Read the California Science Framework. For the standards chapters read only the subject area standards for high school subject area (9-12) that you are assigned i.e. Physical Science, or Life Science or Earth Science Think about the readings holistically.
 - Write about a page for the non-standards chapters, in your own words, that answer 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, and have a question about (or) which you disagreed?
- 3b **Science subject standards response (only your subject area)** 2 points
- Using the standard for your chosen subject, (assume a general course) pick one standard from physical science, or life science, and or earth science. 1) Choose and write the standard; 2) come up with a brief description of an activity those students in that subject area can do and 3) state which Investigation and Experimentation standard it address for that subject.
 - In addition, 4) write a short paragraph on how this lesson might incorporate other ideas discussed in other chapters in the California Frameworks. For example, one chapter addresses the use of technology in science. Your lesson might incorporate the use of a remote data recorder for pH in a stream environment and using this data to graph the outcomes on a computer. You might have to receive professional development training (another chapter in Frameworks) to learn how to use the remote data recorder and the graphing software. Both of these ideas might be addressed in this section
- 3c. Team preparation and presentation 5 points

- Get together with your team by subject area (chemistry, physics, biology or earth science). Look at the activities that everyone wrote up for Assignment 2b. Choose one that your team feels is the best representation of the application of the standards/frameworks
- As a team, write up a lesson plan for the activity stating the standard(s) (with objectives, activities, assessment,). This lesson plan should also try to integrate the ideas from the individual team chapters 4-11 as discussed in 3b above. Put it on chart paper or an overhead transparency so it can be easily presented to the class.
- As a team, think about the entire set of standards for the subject area. If you only had time, as a teacher, to do half of it with your students, which half would you do, and why? Make a list to present to the class, and be prepared to give your reasons for your choices.
- In 8 minutes or less, present your creative lesson plan and standards choices. Be prepared to explain why your science lesson plan represents a standards based, student centered, inquiry based concept and why you chose the particular lines or sections from the standards to teach.

Assignments 4 and 5 (Spring Semester only) (Evaluation and Use of Technology Resources)

Assignment 4 (Internet Sites) (5pts);

Assignment 5 (Best Practices in Science Videos) (5pts)

Spirit of the Assignments: individually explore Internet and video science resources; rate them and provide feedback to classmates regarding their potential use.

For assignment #4 explore in detail at least three internet sites; for assignment #5 explore either the Annenberg and (or) the Lucas internet site for Best Practices in Science

Teaching and one video/DVD resource and prepare the following for each (three in all):

- 1) Name/ access information (so someone else can access)
- 2) Rating 1-5 with justification for use by teacher, student (appropriateness for what subject or level)
- 3) How would you use it
- 4) Electronic documentation so the technology director can collect and send complete copies to all

Assignment 6: Inquiry based Discrepant Event Presentation (30 pts)

Spirit of the Assignment: to develop and teach a particular kind of a science inquiry lesson that teaches both sciences thought processes and science content. You will practice your discrepant event on at least middle or high school age student and reflect on the child's responses and what they indicate about how much he/she understood.

Working by yourself or with a partner you will actually present your discrepant event to the class and give a copy of the lesson plan to each class member.

6a. **Discrepant Event Lesson Plan and Presentation** 15 points

- Determine a discrepant event lesson that ideally connects to the subject matter of your CP1 experience. You can get one from Discrepant Events, by Keating, or go

to another resource such as online, bookstore, library and look for books on Science Tricks, or Science Magic.

- Get together the materials needed for the discrepant event. (If you can't get certain things, look for another event to do.)
- Practice doing the event. (If you can't get it to work, you may need to find another event to do.)
- Make sure you understand the science behind the event. If you got it from an Internet website, there may be background info on the site.
- Do your discrepant event with at least one middle or high school age student prior to doing it in class and take careful notes on the student's responses. (This ties in with Assignment 6b reflections.)
- Present your DE to the class. (You may discuss your findings from the pre-event DE with your classmates as part of this presentation. You are limited to 15 minutes presentation time.)
- After presenting your event, give a copy of the DE lesson plan to each member of the class and your reflective individual journal to the instructor (see 6B)

6b. **Discrepant event journal (Reflection on Pre-Event)** 5 points

- After you have done your pre-event discrepant event with a student, look at your notes and think about how it went. (You may realize that your event needs to be modified before you do it with the class.)
- Write a description of what happened, with special attention to what the student said and did. Analyze the student's response: what portions of the event did the student understand (not understand) what was happening? Did they understand the underlying science concept? What modifications to what you say or do might be necessary for better understanding?

6c. **Recording the Discrepant Event during CP1** 10 points

Sometime during CP 1 perform the DE that you practiced in the course with a group of students. Have all or at least part videotaped. This will be used for two purposes: 1) practice for the TPA in which you videotape and evaluate a lesson; 2) use with science methods class to evaluate/reflect on the use of Discrepant Events with students (will be done second semester)

**Assignment 7: Science Lab (SDAIE) modification using the action research model)
Spring Semester only (20 pts)**

Spirit of the Assignment: take an existing science lab or activity and rewrite it to be more appropriate particularly by second language learners (use SDAIE techniques). Evaluate using the action research model by comparing outcomes of experimental lab (SDAIE) with control (original lab or activity). See suggested for ideas in Choate Ch 13.

For the assignment: Use the SDAIE lab or activity you have prepared and incorporate it into a class during advanced student teaching and compare it to outcomes from a control class using the original lab or activity (10 pts total). For your presentation: 1) bring overhead copy of original science lab or activity and revised SDAIE lab (6pts); 2) List of changes/ adaptations you made (4pts); 3) Design an action research proposal using the design explained in class. This will be presented prior to implementation in

class for input from classmates and instructor (5pts). 4) Present the findings (triangulated data) by comparing various outcomes from the two lab classes one, which used original lab (control) and another who used the modified SDAIE lab (experimental). Some tools for measuring the success (lack of success) of the lab approaches might be: teacher observations, focus groups, and student assessment of understanding, Quickwrite and class discussions. Discuss briefly your findings (5 pts).

Assignment 8 Development of a personal Plan for Science Safety (10 pts)

Spirit of the Assignment: Use your readings from the safety manuals/documents and interview with the science teacher to propose an outline of a **Plan for Science Safety** that you will (can) use within your science discipline. This might include: safety contracts, demonstrations, laboratory protocols, etc.

Assignment 9A Observation of science lesson and teaching strategies and use of science safety within the curriculum (10 + 5 pts= 15 pts)

Spirit of the assignment: to intelligently observe a science lesson. During your observation/participation time you will find a science teacher who may or may not be your own master teacher. You will 1) 9A: interview the teacher before and after the lesson. If possible, it's good to also talk with some of the students after the lesson (see guidelines for 9a below (10 pts); 2) 9B: address with the teacher the specifics of how she (he) approaches science safety. This might include as a minimum: lesson plans they use to teach safety, lab safety contract, general rules used, and any general experiences in dealing with science safety). Collect samples if you can and include what you would do in your classroom to address science safety (5 pts). You will put both of these responses (9A-B) together with your own observations and conclusions to write your report.

General guidelines for completing 9 a (10 pts):

GENERAL INFORMATION: grade level, district, description of the activity.

BEFORE (Interview)

- How did the teacher come to do this lesson?
- How did he/she pick the topic?
- Where did the materials come from?
- In general, how does the teacher think the students will respond to the lesson?
- Identify some students in the class who will like this lesson and do well on it.
- Identify some students who might have difficulty, either cognitive or behavioral and describe the problems they are likely to have and how the teacher might adapt for them

DURING (observation)

- Is there a written or unwritten plan for this lesson?
- What are the objectives (if this/these are unstated, you will have to figure them out)
- How does the teacher know that the objectives were met at the end of the lesson (formative or summative assessments)?

- How does the teacher know as the lesson is going on whether the students are getting it? (Formative i.e. checking for understanding)
- Does the teacher make any adaptations to address the needs of the children who have difficulty?
- Can you clearly follow the procedures the teacher is using and the understanding of the science concept and do they relate directly to the objectives?

AFTER (interview teacher, and if possible, some students)

- How did the lesson go?
- Did the teacher correctly predict the performance of specific students?
- Did the adaptations (if there were any) work?
- How about the class as a whole – were the students engaged?
- Did they learn the skills and or content?
- How does the teacher know whether they got it or not?
- Were there any logistical problems?

If you taught this lesson, how would you change it? (Include as many things as you can think of. Even if the lesson was wonderful, come up with at least one modification of your own.) Remember, there is no such thing as a perfect lesson.

Assignment #9B: General Guidelines for completing (Science Safety in the Science Curriculum) (5pts)

Prepare a Science Safety Plan Summary that you propose to use in your own classes: based on: 1) specifics on how the MT approaches science safety. This might include as a minimum: lesson plans they use to teach safety, lab safety contract, general rules used, and any general experiences in dealing with science safety). 2) The textbook, California Safety Manual, Flinn Safety Manual and Class discussion. (5 pts).

Assignment #10: Enrichment and Extracurriculum Science Programs (Spring Semester only (40 pts)

Spirit of the Assignment: Students will research, overview and discuss some of the major extracurricular activities used in Science such as Science Research Projects (Science Fair/ Pure Science), Odyssey of the Mind (Problem Solving), Science Olympiad and Invention Convention (Applied Science). Two of these models will be applied by simulating the actual process used by teachers. The process includes the following: 1) Students will be assigned teams and specific problems for Odyssey of the Mind (Long Term Problem, Spontaneous Problem and Style) and the Invention Convention. 2) Using the processes recommended and timelines (and examples reviewed) teams will follow the processes and enter their formative tasks on Google Docs (instructor will provide ongoing feedback and evaluation on Google Docs for each team; 3) Teams will present their final solution to each project and be evaluated by the rubric (see syllabus) and compared to the other teams.

Assignment 11 Book Report on high interest science book (5 pts.) Spring Semester only

Spirit of the assignment: read a new book in fiction or non-fiction that you would like to read for general interest, deep background or for inclusion in your own class. By reading

yourself you increase the likelihood that you will include science reading as part of the curriculum for your own students. Share this electronically with your classmates.

For this assignment read, summarize, rate (1-5 with justification) and make recommendations on how you might incorporate into your teaching either directly indirectly. Share this formal review electronically with instructor and classmates as well as during the general class discussion.

Assignment 12 Attendance at a formal or informal science event, presentation or site (10 pts each semester 20 pts in all) Both semesters

Spirit of the assignment: by attending formal or informal outside events a science teacher is more likely to encourage their own students to seek out such events and include them as part of their curriculum. After having completed assignment # 12 write up a brief report summarizing it and how you might use it in your teaching 1) do a 1-2 minute presentation in class and 2) send an electronic copy to all via email.

Assignment 13 Attendance at a field trip to the Wild Animal Park (Fall 20 pts) and Reuben Fleet Science Museum (Spring 20 pts)

Spirit of the assignment: by attending this field trip students will: 1) general procedures for planning an implementing a field trip in science; 2) how to access and use resources provided by a site prior to going; 3) Pre, during and post lesson plans using a) prepared curricular materials at a field site; b) teacher developed and implemented curricular plans

Assignment #14 Researching a current issue or topic in science and presenting a mini-lecture in class on that topic (25 pts). Spring Semester only

The spirit of the assignment:

A) Research a current issue or topic (outside the traditional science textbook) that could be used in a class you are scheduled to teach in CP2. The instructor will model a mini-lecture prior to student presentations and a rubric will be developed through a class discussion based on information on effective lectures from Ch 11. During this 15- minute mini-lecture you will practice applying some of the pedagogical strategies from Chapter 11 in the course text (Using Lectures in Science). The class audience and instructor will discuss your presentation and evaluate/provide feedback using the rubric for a Science Mini-Lesson (see syllabus). 15 pts

B) **Based** on this discussion, use this mini-lecture in a revised version (based on class and instructor input) as part of one of their classes in CP 2. Videotape the presentation in CP1 (with the use of Discrepant Events), and use this as a context for review by the whole class/instructor to provide more feedback in conjunction with completing TPA 4. 10 pts

Assignment #15 Issues in Science Student Teaching (Case Study Approach): both semesters (20 pts each semester)

The spirit of the assignment: Share issues/ problems/solutions to various scenarios that occur during beginning and advanced student teaching related to curriculum, teaching strategies and classroom management. The Case Study Model used will be discussed in class and used as an approach to address real solutions and subsequent outcomes from

these action plans. One written Case Study will be required each semester. (5 +5=10 pts @2 =20.)

Course Schedule/Calendar and Outline:

Fall Semester EDSS 545 A:

*=Assignment/Reading due

#1 September 12 (Monday 5:30-8:30 UH 460)

- Class introductions
- *Read syllabus prior to class with special attention to the following: 1) copy fall semester grade sheet ; 2) assignments required ; 3) description of each assignment .
BRING ANY QUESTIONS TO CLASS
- *Prior to class be prepared to respond to these questions: **How would you define Science? How should it be taught in high school? What do you think is important for you to learn this year?**
- **Graphic Organizer for EDSS 545**
- In Class: Introduction to inquiry based science through the discrepant event (DE) model with in class presentation “Bouncing Balls” (What are the basic pedagogical elements of an effective DE?)
- Preparation time in class for *Science Frameworks and Standards Jigsaw Assignment* #3 a-c (to be discussed in class)
- **Review Assignments for Next time:** (to be discussed in class); 1) format procedure for Reading Logs for text reading assignments (questions for discussion TBA) : 2) sign up for dates for DE (2-3 presentations) Assignment # 6; 3) Science Frameworks jigsaw assignment #3a-c; 4) readings and chapter questions (TBA)from Text (Ch 1 and 2) (see above Reading logs)

#2 September 19 (Monday 530-830 UH 460)

- *Science Frameworks and Standards Jigsaw Assignment* #3 a-c
- *Discrepant Events (two present) #6 a-b
- * Discussion of /Reading Logs and Questions from Text Ch 1-2
- *The use of Inquiry Based/Open ended vs. Closed ended science lab experiments “Paper Towel Experiment” (in class)
- **Review Assignments for Next time:** 1) Read and prepare reading logs and chapter questions (TBA) for Ch 3 and Ch 4; 2) Discrepant Event (2-3 presentations)

#3-#4 September 24 (Saturday 900-300 UH 460)

- *Discrepant Events (four presentations) #6 a-b
- * Discussion of /Reading logs and Questions in Text (Chap 3-4 due)* #2
- *The use of Inquiry Based/Open ended vs. Closed ended science lab experiments “Paper Towel Experiment” (in class)
- Overview of Issues in Student Teaching: Discuss/introduction use of Case Study Model (Action research) for Assignment #15 (also see Addendum C in Syllabus for Case Study Model)
- Discussion of assignment requirements for science teacher observation sheet and science safety issues #9 A/B with master teacher

- **Review Assignments for Next time:**
 - 1) Reading logs and chapter questions (TBA) for Ch 5 and Ch 6;
 - 2) Discrepant Events (2-3 presentations)
 - 3) Identify major issue(s) or problems for Case Study 1 Issues in Student Teaching (write out proposed problem(s) for discussion next class)
 - 4) Completion of Final report for Assignment 9 A /B with master teacher.

#5 September 26 (Monday 5:30-8:30 in UH 460)

- ***Discrepant event presentations (two)* #6 a-b**
- *** Discussion of Reading logs and Chapter Questions for (Ch 5 and Ch 6)* #2**
- Discussion of major problem or issue in Student Teaching for Case Study 1 (this is preliminary report #1)
- Final Report/Discussion of findings from MT Observation 9A/B
- **Review Assignments for Next time:** 1) Reading logs and Chapter Questions for Ch7 and CH. 10; 2) Case Study 1 (preliminary report #2 on development of action plan/baseline data etc.)

#6 Independent Study: No formal meeting Sometime between September-November or whenever scheduled by you. To be completed before class #10 during this semester

Assignment #12: attend a science related informal or formal event or presentation equivalent in time and effort to one class session (3 hrs). This could be a field trip, museum, lecture or some other equivalent experience that will assist you either directly or indirectly in becoming a science teacher. Your choice!! To complete this requirement: 1) complete a one-page summary with potential applications to teaching; 2) send by email to all of us; 3) do a 1-2 minute presentation to the class during class #10. The report and oral presentation should include a summary of what you learned and implications for your own teaching.

#7 October 17 (Monday 5:30-8:30) Video Conference

- ***Discrepant event presentations (two)* #6 a-b**
- *** Discussion of /Reading logs chapter questions for Ch 7 and Ch 10)* #2**
- Discuss your preliminary action plan and baseline data from Case Study Model for Assignment #15 (also see Addendum C in Syllabus for Case Study Model Final Report). This is preliminary report #2
- **Review Assignments for Next time:** Go over assignments for next classes:
 - 1) WAP Field Trip #13; Class #8-#9
 - 2) Application of these resources: Science safety manual (CA); Flinn safety manual and Ch 14 Science Safety (read/notes/questions) for the development of a Plan for Science Safety assignment #9 A; Class #8-#9 (Discussion) Final Report Due Class #10
 - 3) Prepare your Final Case Study Report (Assignment #15) for the issue(s) discussed during preliminary reports #1 and #2 during CP 1 (see Addendum C in Syllabus for Case Study Final Report) Class #10

#8-9 November/December (TBA) (Saturday 9-3 at Wild Animal Park) Assignment #13

- Issues in organizing a field trip
- Resources available at park for school sites
- Implementation and analysis of grade level WAP curriculum guides
- Strategies for doing animal observation studies
- Discussions of Science Safety based on readings from Ch 14, Flinn Safety Manual and California Safety Manual, Master Teacher strategies. Final Plan for Science Safety 9A due Class #10
- **Review Assignments for Next time:** 1) Presentation of Plan for Science Safety #9 A; 2) Case Study action plan outcomes #15

10 December 5 (Monday 5:30-8:30)

- Overview of Science Safety with discussion/questions from 1) Science Safety Manual or Flinn Scientific ; 2) Ch 14 text; and 3) Discussion of safety issues with master teacher #9b
- ***Presentation of Plan for Science Safety #9A**
- **Issues in student teacher: *Case study action plan outcomes/discussion of: action plan findings/final report #15 (Addendum C model)**
- Instructor Evaluations
- **Review Assignments for Next Time:** Discuss_Second semester schedule

Addendum A Grade Sheet for Fall Semester (please copy for grade folder)

Name **EDSS 545 A Fall Semester
Grade Sheet**

Assignment Number/Name

#1 Attendance (5pts each class) indicate nights absent by date (50 pts possible)

#2 Science text reading logs and chapter questions(6pts each) indicate scores on each chapter assigned below)

Ch 1_ 2_3_4_5_6_7_10_14_

(54pts)

#3 California Frameworks/Standards (5 pts + 5pts)

Individual report

Group Presentation

#6 Inquiry based lesson (Discrepant Event) 30 pts 15 pts

Presentation

5 pts

Reflection (pre-event)

Videotape DE During CP1 10pts

#8 Personal Outline plan for Science Safety (10pts)

#9A/B Observation of Science Lesson/Plan for Science Safety Report (10pts + 5 pts)

12 Independent Study at formal or informal science event (Report) 10 Pts

#13 Attendance and Report on Science Field Trip (20 pts)

#15 Issues in Science Teaching (Case Study Approach)(20 pts)

Total Possible= 219 pts

Points Earned=

Average/Grade=

Addendum C (Case Study Preliminary and Final Reports)

Case Study (Action Research) Considerations for Assignment #15 Issues in Student Teaching

A case study is a formal but dynamic strategy of teacher led research (action research) that uses a collaborative process to problem solve some issue in education (in this case science education). Some generalized steps should include at a minimum at least the following preliminary steps leading to a final report:

- 1) **Identify a problem** (Preliminary Report #1) what factors are inhibiting your ability to teach or the students' ability to learn. *It may take many forms such as: infrastructure: I room is too small to have laboratory type exercises; management: one of my students will not do any homework; teaching materials: I have no lab manuals and little materials; teaching strategies: I do not know how to deal academically with such a wide range of abilities in my class. ETC.*
- 2) **Brainstorm possible solutions** (Preliminary Report #2) based on general knowledge from classes, readings, master teachers and prior experiences. After you have discussed the issue with your colleagues and instructor get feedback and suggestions from them. *Ex. From infrastructure problem: swap rooms with another science teacher one day a week when they are not using the lab. This should be coordinated with the principal and based on state mandated requirements for safety in science laboratories*
- 3) **Propose an action plan with specific actions and a timeline (includes collecting baseline data)** Preliminary report #2
For three weeks with plenty of warning to the students change rooms to use the lab. Identify additional problems this may create and propose changes. Gather baseline data to compare final data.
- 4) **Gather data from observations and responses to your plan (Final Report)**
Students took an extra five minutes to get to this lab so I said if they were on time this would result in a bonus of 5 pts on their lab report for at least the first three weeks.
- 5) **Final Report should include aspects of 1-4 in addition to the outcomes and implications** from the action plan: What were the successes and the challenges to the plan? What would you do next to improve on it?

I would request an adequate lab space from the principal or whoever schedules a year prior. I would make a recommendation on which room might be a good fit for my curriculum and point out the state requirement for adequate space and safety for laboratory based science classes.