

University of Texas at El Paso
College of Education
Department of Teacher Education
MSED 4311 (14261) “Teaching Science in Intermediate and Middle Grades”
Fall 2010

Class meeting time: W 12:00 noon – 2:50 p.m.

Class meeting place: Alderete Middle School, Room S103, UTEP Science/Math Lab

Professor: Dr. David Carrejo

Office: College of Education, EDUC 811

Phone: 747-5566

E-mail: dcarrejo@utep.edu (best means of contact)

Office Hours: M 3 – 4:30, T 2 – 4:30, R 3:00 – 4:30, or by appointment

This syllabus is subject to change as needed. Any changes to the syllabus will be announced in class.

No cellular phones or beepers are permitted in class.

If you have or suspect a disability and need accommodations you should contact Disabled Student Services (DSSO) at 747- 5148 or at dss@utep.edu or come by Room 106 Union East Building.

Required Texts

- There are no required textbooks for this course. We will be relying on open resources for teaching middle school science and the district scope and sequence.
- Any other necessary handouts and/or readings not available from open resources will be passed out in class. ***ALL COURSE HANDOUTS WILL BE MADE AVAILABLE ON BLACKBOARD (through my.utep.edu) You MUST have a valid UTEP login and password to access my.utep.edu, BLACKBOARD, and many other relevant UTEP websites.*** A UTEP e-mail address is required for all e-correspondence and more effective communication.

Resources for Middle School Science

- Annenberg Media: <http://www.learner.org/>
- National Science Education Standards: http://www.nap.edu/openbook.php?record_id=4962
- National Science Teachers Association: <http://www.nsta.org/index.html>
- Project 2061: <http://www.project2061.org/>
- Science Netlinks: <http://www.sciencenetlinks.com/>

Policy on Academic Dishonesty

The University of Texas at El Paso prides itself on its standards of academic excellence. In all matters of intellectual pursuit, UTEP faculty and students must strive to achieve based on the quality of work produced by their individual. In the classroom and in all other academic activities, students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. It is imperative, therefore, that all faculty, insist on adherence to these standards.

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

TEExES integration and SBEC standards

- Course objectives primarily reflect TExES standards and SBEC standards for educator certification.
 - TExES website: <http://www.texas.ets.org/texas/>
 - SBEC website: <http://www.sbec.state.tx.us/SBECOnline/default.asp>
- TExES Science Content and Pedagogy and Professional Responsibilities (PPR) Preparation Manuals: <http://www.texas.ets.org/texas/prepMaterials/>

English Language Proficiency Standards

This course integrates English Language Proficiency Standards for English Language Learners (ELLs) in order to provide strategies for language acquisition and academic success in all content areas for students at different levels (beginning, intermediate, advanced, and advanced high) in the domains of listening, speaking, reading and writing.

ELP Standards: <http://www.tea.state.tx.us/curriculum/biling/elps.html>

Course Objectives

This course examines various instructional strategies including organizing, planning, writing and implementing science lessons and units as well as experiments, materials, resources, and using technology/equipment to teach science concepts in a safe science classroom environment. It provides UTEP students an opportunity to review the scope and sequence of the National Science Standards, TEKS, and text materials, to understand experiencing science in the classroom, to apply this information when selecting the most appropriate strategies and materials to meet the needs of students in groups and individually, and to participate in hands-on, minds-on science activities, experiments, and investigations.

<i>Standard</i>	<i>Student Learning Outcome</i>
Standard I. The science teacher manages classroom, field, and laboratory activities to ensure the safety of all students and the ethical care and treatment of organisms and specimens.	The science teacher manages classroom, field, and laboratory activities, and understands the correct use of tools, materials, equipment, and technologies in order to ensure the safety of all students and the ethical care and treatment of organisms and specimens.
Standard II. The science teacher understands the correct use of tools, materials, equipment, and technologies.	
Standard III. The science teacher understands the process of scientific inquiry and its role in science instruction.	The science teacher understands the history, theory, and context of inquiry-based instruction in order to effectively facilitate problem solving and authentically assess inquiry in the classroom.
Standard IV. The science teacher has theoretical and practical knowledge about teaching science and about how students learn science.	The science teacher applies theories and principles of learning science in order to plan and implement appropriate and effective instructional activities for all students.
Standard V. The science teacher knows the varied and appropriate assessments and assessment practices to monitor science learning.	The science teacher selects and/or designs and administers a variety of appropriate assessment instruments and/or methods (e.g., formal/informal, formative/summative) to monitor student understanding of science knowledge and skills.
Standard VI. The science teacher understands the history and nature of science.	
Standard VII. The science teacher understands how science affects the daily lives of students and how science interacts with and influences personal and societal decisions.	The science teacher, informed by their understanding of the history and nature of science, demonstrates the impacts, the integration, and the relevance of science to real world settings within a socio-cultural context.
Standard XI. The science teacher knows unifying concepts and processes that are common to all sciences.	The science teacher becomes a life-long learner who renews skills by critically and effectively reflecting upon, evaluating, and implementing research-based materials in the science classroom.

Course Goals

- A. **Learner-Centered Knowledge.** The teacher draws on a rich knowledge base of content, pedagogy, and technology to provide students with relevant and meaningful science experiences by participating in classroom activities, presentations, and investigations/ experiments.
- B. **Learner-Centered Instruction.** Through course requirements based on current research and innovative middle school practices, the teacher creates a collaborative learning environment by planning a science program/curriculum that is aligned with standards and accommodates the developmental needs of all students.
- C. **Equity in Excellence for All Learners.** The teacher responds appropriately to diverse groups of learners by demonstrating the knowledge and understanding of varying learning styles, the impact of culture on learning, and the relationship between interaction patterns and success in the science classroom.
- D. **Learner-Centered Communication.** The teacher works to develop effective professional and interpersonal communication skills by being an advocate for all students.
- E. **Learner-Centered Professional Development.** The teacher, as a reflective practitioner dedicated to all students' successes, demonstrates a professional standard by being punctual and attending all class meetings, participating fully in class and group experiences, maintaining a positive learning attitude, and completing all assignments in a way that reflects professional growth and development (typed and turned-in on date requested).

Course Requirements

- It is expected that students will attend **all classes** and actively participate in working on projects and class discussions. Students are expected to prepare for each class session. **Lateness to class is strongly discouraged. With the emphasis on collegiality it is important that all group members be in class to contribute to the group's effort in developing an understanding of what it means to teach science effectively.**
- Readings will be assigned, and you will be expected to complete the readings and prepare to present/discuss in class all key points and examples. Assignments are due on the specified dates. **Late assignments will not be accepted.**
- The schedule of topics and reading assignments may change over the course of the semester. **Any changes to the syllabus will be announced in class. Every student is responsible for these changes whether or not the student is present in class.**
- **Type or word-process assignments.** All assignments should be double spaced with a 12-point font. Number your pages, preferably using a header or footer; if you aren't sure how to create a header or footer with your word processing program, please find out. Include a bibliography listing the sources for ideas, quotations, etc., when applicable. Correct grammar and spelling are expected.

Attendance Policy

There will be a student sign-in sheet at the beginning of each class. If a student misses a session, it is the responsibility **of the student** for knowing and completing all work required. **Each attendance will count towards the final grade. Two tardies (including early leaves) will count as one absence. More than two absences will result in a student earning one-letter grade lower in the course.**

Course Assignments

1. *Homework assignments*

There will be short homework assignments, primarily skills-based, throughout the semester. They will be due the following week **without exception**. Assignments will be announced and passed out in class and due dates will be determined.

2. *Lesson/Microteaching Project (2 parts)*

At the beginning of the semester, you will form groups of 4 (**no more than 4 per group**) for a lesson project. You will work in your group to prepare a lesson and participate in a lesson implementation during our regularly scheduled class. Each person in the group will take charge of one part of the lesson and teaching to a 6th grade science class at Alderete Middle School. *I require that you construct a lesson in one of the following domains: earth science, life science, physical science. Topics will be finalized by me based on the 6th grade scope and sequence at Alderete Middle School and discussions with the cooperating teacher. You will receive constructive feedback in the form of written analysis from me as well as your peers. At the end of the semester you will receive copies of ALL lesson plans and ALL feedback for your own use and reference.*

Part 1. Each group will prepare a lesson plan to be submitted for a grade. These will be submitted before you actually teach the lesson. The format for these lesson plans will be discussed in class and a guide is provided on pages 6 and 7 of this syllabus. I strongly encourage you to work with your group members to brainstorm, design, and plan this lesson in a collegial fashion. I understand that you each have unique needs, based on your experiences in learning science and your experiences as an intern in a mentor school.

Part 2. Each group will present the lesson in Ms. Ludwig's 6th grade classroom on a date specified in class. You will submit an electronic copy of your final lesson to me via e-mail. If you have any need for lab equipment, manipulatives or other teaching material (including copies of your activities), please inform me before you teach your lesson and Ms. Ludwig and I will provide what you need.

3. *Written Reflections*

Over the course of the semester, you will be asked to synthesize what you are reading and integrate it with the activities you are doing in class. At four points throughout the semester (see calendar), you will be asked to prepare a short (1-2 page) written reflection on a topic connected to a concept discussed in class or in science education (see description of assignment and rubric in the syllabus) OR a question (possibly a set of questions) from the textbook.

Grades

In this course all grades are important, but some assignments take more time and thought so therefore some may have a different weight.

- **Class Participation/Attendance** 15%
- **Homework Assignments** 25%
- **Lesson Plan/Microteach** 40%
- **Written Reflections** 20%

Final grade is first determined by a weighted average, based on the number of points each of the above is worth. Second, the result of the weighted average is converted to a percentage.

Grade Distribution:	Grade	%
	A	93-100
	B	85-92
	C	75-84
	D	65-74
	F	0-64

General calendar – Topics, chapters, and dates are subject to change. Due dates for homework assignments will be announced in class. We are aiming for the month of November to be the time period for the lesson implementations.

Date	Topic/Issue	Activity Focus	Assignment
August 25	Introduction to course Inquiry Constructing Knowledge	<ul style="list-style-type: none"> • What is science? (The role of science in society) • What is inquiry? (Standards-based science) • What is constructivism? (How we learn) • How do we integrate math and science? 	
September 1	More on science learning	<ul style="list-style-type: none"> • The 5-E Model • Integrating Content with Language Acquisition (ICLA) • Graphic organizers • Journals 	
EARTH SCIENCE			
September 8	Earth Science	<ul style="list-style-type: none"> • Rocks/Minerals • The Rock Cycle 	Lesson topics due
September 15	Earth Science	<ul style="list-style-type: none"> • Sunshadows • Light 	
September 22	Earth Science	<ul style="list-style-type: none"> • Topography • Cartography (Map-making) • Lenart Spheres, Globes • Interpreting Weather Maps 	Reflection Due
September 29	Space Science	<ul style="list-style-type: none"> • Characteristics of the solar system • The solar system • Orbits/Kepler's Laws • Motions/Phases of the Moon 	
LIFE SCIENCE			
October 6	Biology	<ul style="list-style-type: none"> • Cells • Classification • Health • Heredity 	Reflection Due
October 13	Chemistry	<ul style="list-style-type: none"> • The Periodic Table • Radioactive Decay 	
PHYSICAL SCIENCE			
October 20	Physics	<ul style="list-style-type: none"> • Newton's Laws of Motion • Gravity • Waves • Energy 	
October 27	Physics	<ul style="list-style-type: none"> • Solubility • Density 	Reflection Due
November 3	<i>LESSON/MICROTEACHING</i>		
November 10	<i>LESSON/MICROTEACHING</i>		
November 17	<i>LESSON/MICROTEACHING</i>		
November 24	<i>SCHOOL CLOSED</i>	THANKSGIVING WEEK	
December 1	Last Day of Class <i>LESSON/MICROTEACHING</i>		Reflection Due
December 9	EXAM WEEK		

Lesson Plan Guide

Each lesson plan should be typed and roughly 1-2 pages long. Design a lesson for the unit that will build on and extend students' understanding of a chosen science topic in some meaningful way. Your students need to be actively thinking during your lesson. You should strive to keep students mentally active. Teach *through* problem solving. Refer to your Abruscato textbook or any other resource(s) as needed. Your lesson plan should be something that is useful to you as you teach the lesson. It should include information that helps others understand your thinking behind your planning. The plan should include at least the following:

- **Title**
 - **Goals** of your lesson. Be as specific as possible. Include the specific ideas and processes you hope to help your students develop and/or understand.
 - **TEKS Standards/TAKS alignment** – Provide specific, standard expectations for teaching the selected concept/procedures for selected grade level. Identify and provide specific, related TAKS questions for the standard expectations.
 - **ELP Standards alignment** – Provide specific ELP standard alignment for selected grade level.
 - **Materials and Resources** needed for the lesson.
 - **Instructional Sequence:** You are required to use the 5E model as presented/discussed in class.
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Feedback and Allocation of Points for Lesson/Microteaching Plan (Comments will follow each numbered item)

I. Choice of Lesson	__/5
II. Identification of appropriate NSES/TEKS/ELP standards	__/5
III. Use of the 5E Model	__/10
IV. Activity/ies	__/5
V. Assessment	__/5
VI. Other comments	

TOTAL SCORE: __/30

Written Reflections

This assignment is intended to help you consolidate your learning and to begin the process of developing ideas related to your learning experience. A minimum one (1)-page paper (double-spaced) is required. The paper should be a deep reflection on the content of the materials studied or developed, discussing a specific concept (or concepts) revealed during the experience. This is an individual assignment, not a group project and will be graded using the attached rubric.

Based on our work in class and the textbook address the following:

- 1) Identify the concept(s) that has become an insight to you.
- 2) Describe how and why it is new or different from how you have thought or what you have done before. You may wish to use the following to begin addressing this issue:
 - a. A thought that really struck me...
 - b. Here's why...
 - c. This reminds me of...
 - d. I was wondering...
 - e. What puzzles me is...
- 3) What implications could it have for future practice?

Allocation of Points for Reflection

If you meet each goal completely, you will receive full points for that goal. Incomplete or skipped goals will receive partial or no points.

Goal:	Points:
Clear identification of concept and related insight clearly explained. <i>10 points</i>	
Described how or why the concept was new or how the concept is related to something that you knew before. <i>10 points</i>	
Reflected on the implication(s) for future learning or practice. (You are strongly encouraged to refer to the readings.) <i>10 points</i>	

Total: /30 points

A: 26 – 30 points

Reflection about concept well presented with depth and detailed explanation. Impact on individual teaching and reflection about personal practices well presented and description of how or why the concept was new is supported well in the paper.

B: 21 – 25 points

Reflection about activities and how they could/will impact teaching and learning weak (superficial/lacked depth) and needs work. Impact on current teaching lacked depth and showed little personal reflection. Implications for future practice limited or also weak.

C: 15 – 20 points

Overall, the assignment very weak and reflection non-existent. No discussion of how or why the concept was new or related to something you knew before. Listed or identified the concept but little or no discussion with any depth about impact on current or future practice.

Fail: 15 points or fewer

Failed to meet structure requirements (or turn in assignment). Very shallow presentation.