University of Texas at El Paso
College of Education
Department of Teacher Education
ELED 4311 (28418) Teaching Science in Elementary Schools
Spring 2017

Class meeting time: W 8:00 a.m. – 10:50 a.m.
Class meeting place: Purple Heart Elementary School, Room 223
Professor: Dr. David Carrejo
Office: College of Education, EDUC 414-C (Dean's Suite)
Phone: 747-6378
E-mail: dcarrejo@utep.edu (best means of contact)
Office Hours: 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 elementary school science and the school's curriculum.

- 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 Elementary School Science

- Annenberg Media: http://www.learner.org/resources/discipline-science.html
- National Science Education Standards: http://www.nap.edu/openbook.php?record_id=4962
- National Science Teachers Association: http://www.nsta.org
- Project 2061: http://www.project2061.org/
- Science Netlinks: http://www.sciencenetlinks.com/
- TeachEngineering: https://www.teachengineering.org/

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.

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.

Standard	*Student Learning Outcome*
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. Standard II. The science teacher understands the correct use of tools, materials, equipment, and technologies.	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 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 elementary 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

- **Attendance and Participation:** 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. 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 may result in a student earning one-letter grade lower in the course.
- **Due dates:** Assignments are due on the specified dates. Late assignments will not be accepted. Type or word-process written assignments. All assignments should be double spaced with a 12-point font. Number your pages.
- **Calendar changes:** 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.

Course Assignments

1. **Observations**

   During our face-to-face meetings, you will be required to complete a minimum of 10 hours of observation in a classroom (focusing primarily on science instruction, but it can include other instruction as well). At the beginning of the semester you will be assigned a cooperating teacher to accomplish this assignment. You will maintain a log of the hours served, and you will maintain observation notes. Both will be turned in at the end of the semester together with a 2-page observation summary reflection of your observations in the classroom. **These forms may be found on page 6 of this syllabus and on Blackboard.**

2. **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. The homework assignments will reflect not only the appropriate science content for grades K-5 but also the content you should expect to see on your certification test.

3. **Lesson Planning and Implementation Project (2 parts)**

   Working in pairs, you will be required to create a lesson plan for a given topic that meets the following criteria: 1) it is appropriate for grades 1 – 5; 2) it is aligned with the Purple Heart ES Scope and Sequence for science; and 3) it is aligned with STAAR objectives as well as TEKS standards. You will implement your lesson in a teaching activity to a group of Purple Heart elementary students during our regularly scheduled class period. Topics will be approved and finalized by me. You will receive constructive feedback in the form of written analysis from me.

   Part 1. Working in groups of three, you will prepare a written lesson plan to be submitted for a grade. This will be submitted before you actually teach the lesson. The format for the lesson plan will be discussed in class and **a guide is provided on page 9 of this syllabus.**

   Part 2. Each team will be assigned at random to introduce/implement their lesson plan on a date specified in class. You will distribute copies of your lesson to each member of the class, and you will submit an electronic copy of your final lesson (including any PowerPoint slides and handouts) to me via e-mail. Lessons should be **50 minutes in length, based on the typical elementary school schedule.** If you have any need for manipulatives or other teaching material, please inform me before you teach your lesson (at least TWO DAYS IN ADVANCE).

4. **Written Reflections/Blackboard postings**

   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

Assignment	Points
Class Attendance and Participation	30
Reflection Paper – 3 @ 10 pts.	30
Homework assignments – 5 x 15 pts	75
Complete 12 hours of classroom observation/notes	10
Observation Summary Paper	10
Final Project: Lesson Planning and Implementation	45
TOTAL	200

Grade Distribution:	**Grade**	**Percentage (%)**
	A	**90 - 100**
	B	**80 - 89.9**
	C	**70 - 79.9**
	D	**60 - 69.9**
	F	**below 60**

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 April to be the time period for the lesson implementations.***

Date	Topic/Issue	Activity Focus	Assignment
January 18	Introduction to course Inquiry Constructing Knowledge	• What is science? (The role of science in society) • What is inquiry? (Standards-based science) • What is constructivism? (How we learn)	
January 25	More on science learning	• The 5-E Model • How do we integrate math and science? • Graphic organizers • Journals	
EARTH SCIENCE			
February 1	Earth Science	• Rocks/Minerals	**Observation 1**
February 8	Earth Science	• Weather • Seasons	**Observation 2**
February 15	Earth Science	• Topography • Cartography (Map-making)	**Homework 1 due** **Observation 3**
LIFE SCIENCE			
February 22	Biology	• Life Cycle (Living Organisms) • Classification • Heredity	**Reflection 1 due** **Observation 4**
March 1	Chemistry	• States of Matter • Radioactive Decay	**Homework 2 due** **Observation 5**
PHYSICAL SCIENCE			
March 8	Space Science	• The solar system • Orbits/Kepler's Laws • Motions/Phases of the Moon	**Reflection 2 due** **Observation 6**
March 15	**SPRING BREAK – NO CLASS**		
March 22 **Meet at UTEP**	Physics	• Newton's Laws of Motion • Inclines & Gravity • Energy	**Homework 3 due**
March 29 **Meet at UTEP**	Physics	• Light & Shadows • Density	**Homework 4 due** **Reflection 3 due**
April 5	Lesson Implementation and peer observations		
April 12	Lesson Implementation and peer observations		
April 19	Lesson Implementation and peer observations		
April 26	Lesson Implementation and peer observations		
May 3	Lesson Implementation and peer observations		
May 10	**EXAM WEEK – Last Day of Class (Meet at Purple Heart)**		**Homework 5 Due** **Observation summary due**

OBSERVATION LOG SHEET

Name of Student: _____ UTEP ID#_____

School: _____ Grade: _____

Date	***Time-In***	***Time-Out***	***Cooperating Teacher Signature***	***Activities/Comments (Please specify)***

_____ has completed _____ hours of field observation and teaching a science lesson. If you have any questions, you may contact me at dcarrejo@utep.edu

_____

David J. Carrejo, PhD, Associate Professor

FIELD-BASED ASSIGNMENT: OBSERVATION NOTE SHEET

Please make sure that this document is verified and signed-by the classroom teacher

Make multiple copies as needed

Student's Name: _____ Signature: _____

Cooperating Teacher: _____ Signature: _____

Grade: _____ Lesson: _____

Date: _____ Duration: _____

Observation guidelines:

To make sure your classroom observation is effective try to be aware of:

- teachers' roles and responsibilities
- lesson planning – objectives/TEKS addressed
- classroom management – behavior, groupings, resources, timing and student support
- classroom organization – how groups or activities are set out and prepared
- differentiation – special educational needs, inclusion, support for ELLs, gifted students
- assessment for learning – short- and long-term, including tests and exams
- the role of technology
- the role of support staff in the classroom.

You should also try to be aware of the differences between teaching styles, students and resources. No two lessons will be the same.

And don't forget the simple things – dress smartly, bring a notepad and pen to make note of all the things you are learning and most of all **enjoy it**!

My Observation Notes:

LESSON PLAN GUIDE

The lesson plan should be typed and roughly 2-3 pages long. Design a lesson 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/inquiry. 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.**
- **Grade level.**
- **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/STAAR alignment** – Provide specific, standard expectations for teaching the selected concept/procedures for selected grade level**. Identify and provide specific, related STAAR questions for the standard expectations.**
- **Materials and Resources** needed for the lesson.
- **Instructional Sequence**: a chronological plan that outlines what happens first, second, third, and so forth. This should include at least the following (don't forget to put an estimate of the time needed for each part of the lesson):

    1. An introduction to the lesson (setting the task(s))
    2. The task(s)/activities you will use.
    3. Group work and/or individual work.
    4. Whole class discussion (group presentations)
    5. Extension and overview (closure).

- **Assessment techniques** you plan to use during the lesson. Describe what you will do during the lesson to assess student understanding. Describe what you will do with the materials produced (e.g., will you mark questions as you walk around, will you collect journals and write comments, will you evaluate group presentations with a rubric?) Attach copies of any written assessments (tests, rubrics, observational checklists, format for anecdotal records).

Feedback and Allocation of Points for Lesson/Microteaching Plan
(Comments will follow each numbered item and a rubric will be used to score the assignment)

I. Lesson Goals

__/5

II. Identification of appropriate standards (TEKS) and STAAR assessment

__/5

III. Introduction to Lesson

__/5

IV. Aligning Activity/ies with Materials/Resources (and use of the 5E model)

__/5

V. Group work

__/5

VI. Assessment

__/5

VII. Other comments

TOTAL SCORE: __/30

	Exceeds Expectation	**Meets Expectation**	**Does Not Meet Expectation**
Lesson Goals	Goals are highly relevant and aligned well with topic. Goals align with standards for elementary school science curriculum or school district scope and sequence. **5 pts.**	Goals may tend to be more skills-based rather than conceptual-based. Some goals may not be appropriate for grade level specified. **3 – 4 pts.**	Goals are not clearly identified and/or are not aligned to elementary school science curriculum, standards, and scope and sequence. **0 – 2 pts.**
TEKS Alignment	Standards are aligned well to lesson and clearly identified. **5 pts.**	Standards listed are only partially aligned to topic but most relevant standards have been identified. **3 – 4 pts.**	No standards are identified and/or most relevant standards are missing. **0 – 2 pts.**
Introduction to Lesson (tied to instructional sequence)	"Setting up the task" is clear – expectations of students are well described and presented. Students are well aware of expectations. Expectations are fully aligned with goals. **5 pts.**	"Setting up the task" is brief but "works." Students are aware of expectations but some confusion is still evident. Some slight misalignment with goals is evident. **3 – 4 pts**	Expectations of students are not described or presented. Students are not aware of what they are to do for activity/task. **0 – 2 pts.**
Activity(ies)	Activity(ies) is relevant to topic and is well connected to goals and instructional sequence. Materials and resources are clearly listed and follow the 5E model. **5 pts.**	Activity(ies) is relevant to topic. They may only partially reach goals but are connected to instructional sequence and follow the 5E model. **3 – 4 pts**	Activity(ies) is not used. Lesson relies on direct instruction only. **0 – 2 pts.**
Group Work	Lesson is very conducive to group work. Group work is critical to lesson implementation. **5 pts.**	Lesson is conducive to group work but instructional sequence only touches on the use of groups. **3 – 4 pts**	Lesson is not conducive to group work. Lesson relies on direct instruction only. **0 – 2 pts.**
Assessment	Assessment goals are clearly stated and relevant. **5 pts.**	Assessment goals are vague. **3 – 4 pts**	Assessment goals/ideas are missing. **0 – 2 pts.**