BED 4311: Teaching Science in the Dual Language Classroom (CRN: 22070)
Spring 2016

Course Description:
Number: BED 4311 Teaching Science in the Dual Language Classroom
Time: Wednesday 8:30 am–11:20 am
Location: Education Building Room 405

Purpose:
This course will assist you in critically examining the theories, research, pedagogical approaches, and materials associated with effective learning and teaching in an elementary science/dual language classroom. The overarching goal of the course is to expose you to the knowledge and skills needed to design and implement a science learning environment where every student is held to high expectations and achieves maximum learning. Two specific goals of this course are: (1) to promote participation in a community of practice where pre-service teachers learn to design 5E lesson plans that build on funds of knowledge relevant to members of the local community; and (2) to understand and be able to implement the basic tenets of the Socio Transformative Constructivist view of teaching and learning (Rodriguez and Kitchen 2005). This science methods course attempts to accomplish this goal through group and classroom discussions of (1) scientific inquiry as practiced in class through hands-on investigation, and in exemplary learning environments (video lessons and publications); (2) review of case studies and vignettes depicting scientific misconceptions and ways in which students learn science; (3) designing and peer-reviewing teaching approaches that attend to cross-curricular connections (e.g., art and science) and everyday practices (e.g., food pedagogy); and (4) by reflecting on your own beliefs about science teaching and learning after delivering a 5E lesson to a group of elementary school students.

In this class students will learn to develop instructional strategies using the Texas Essential Knowledge and Skills (TEKS) for science, the Next Generation Science Standards (NGSS), STEM curricular materials, the instructional models such as sheltered instruction, and the 5E Instructional Model. During the formal teaching activity, you will use concepts from Standards I, III, VI, and V of the Pedagogy and Professional Responsibilities Standards (PPR) with particular emphasis on
constructing and implementing instructional strategies, informal and formal assessment, and managing the learning environment. The class is also designed to address the following science standards from the K-4 Comprehensive Standards:

**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 III:** The science teacher understands the process of scientific inquiry and its role in science instruction.

**Standard IV:** The science teacher has theoretical and practical knowledge about teaching science and about how students learn.

**Standard V:** The science teacher knows the varied and appropriate assessments and assessment practices to monitor science learning.

**Guiding Principles for this Course**

This course is organized around the community of practice and service learning principles and strands (Michaels, Shouse, & Schweingruber, 2008):

**Principle 1—Community of Practice:** is a concept that describes how people work together for their common interests and learn from each other's expertise to develop themselves personally and professionally. To form a community of practice in this course, the science lesson project is designed as a common goal that drives students to prepare themselves, help each other, and collaborate to achieve by the group.

**Principle 2—Service Learning:** is a teaching method that aims to enrich learning experiences and strengthen communities through services. This course includes one activity for students to contribute what they learn in this course to El Paso communities (e.g., elementary students).

**Strand 2—Reflecting on scientific knowledge** (Understanding how scientific knowledge is constructed). This strand will be addressed in the Nature of Science (NOS) topics. Proficient science learners understand that predictions and explanations can be revised on the basis of learning new facts, generating new evidence. For instance, students learn what it feels like to do science as well as what the game of science is all about.

**Strand 3—Participating productively in society** (Understanding how to present scientific evidence and interact with peers and learners). In concomitance with principle #2 above, this strand will be addressed while you teach a scientific inquiry lesson to a group of elementary school students. Proficient science learners know how to effectively present scientific evidence to their peers in the context of a classroom science investigation. For instance, students like scientists, should be able to benefit from sharing ideas with peers, interpreting data, and in group deciding which claims are most valid.

**Resources:** There is no book for this course. There will be numerous handouts, class notes on lectures, reading strategies on the weekly assigned readings, and course modules highlighting the main concepts of the course—you are highly encouraged to read and attempt to solve the questions in each module (no points earned). I will make articles and other materials available throughout the course as needed. There is also a Blackboard platform to which you will be automatically connected by being registered for this course. The Blackboard tool is intended to be a supplement to this course; there you will be able to access, quizzes, assigned readings and other important resources you may want to review on your own.

Other materials we will be using:
Texas Essential Knowledge and Skills (TEKS)
http://www.tea.state.tx.us/index2.aspx?id=6148

Texas Safety Standards
http://www.utdanacenter.org/sciencetoolkit/safety/

English Language Proficiency Standards (ELPS)
http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4

The National Science Education Standards (NSES)
http://www.nap.edu/openbook.php?record_id=4962

The New Generation Science Standards (NGSS)

Technology Requirements
- Each participant must be able to use their UTEP Blackboard account. You MUST have both a UTEP email address and password to take this course.
- You must have access to UTEP email and Blackboard prior to the beginning of the second class meeting. If you do not have one yet, you may apply for your UTEP email account, login, and password from a form available online at: https://newaccount.utep.edu

Technical Assistance: The University of Texas at El Paso offers complete technical information and help desk support at: http://issweb.utep.edu/techsupport/.

Professional Expectations of Students: Part of your preparation as a teacher includes following a professional code of behavior and responsibility. Therefore, you are expected to treat all members of the class and your instructor with respect. Consider each class as a meeting with colleagues in your field and a great opportunity to exchange ideas. Attending class meetings on time and remaining for the entire scheduled period, being well prepared, and participating in classroom discussions are key parts of professional behavior. It is your responsibility to:

- Examine the Blackboard platform for this class, and inform your instructor by the second class meeting if you run into difficulties interacting in this environment.
- Read all the class materials thoroughly and continually consult the course schedule in order to keep up on all information associated with this class.
- Participate fully in all class activities and collaborate closely with your teammates.
- Be actively present in class; stay focused on the learning activities.
- Submit ALL your course assignments via Blackboard in the prescribed format.
- Be courteous and honest in communicating with others that shows respect and sensitivity to cultural, religious, sexual, and other individual differences among all class members.
- Provide constructive feedback that helps your teammates, class members, and the instructor improve their performance, and appreciate it when they provide you with the same.
- Use the assignment templates in the preparation and submission of your assignments. If you do not follow the directions presented in the templates you will lose points.
- Turn off your cell phone before starting the class meeting. As stated above, each class is a meeting with colleagues in your field. Professionals turn off their phones in a meeting with other professionals. A ringing phone disrupts because the sound of a phone attracts attention. Disruptions of the learning process are annoying.
- iPads, tablets, or laptops in class: I do not mind you using your iPad, tablet, or laptop in class as a resource for the learning taking place in the class meeting. Using your device in class for a different purpose shows a lack of respect for your teammates and instructor and disinterest in the course that is unprofessional and not acceptable.
- Be persistent. If you run into difficulties, do not wait! Contact your instructor (see Contact Information above), or check with one of your classmates through Blackboard email. Most problems are easily solved but we have to hear from you before we can help.
Inform the instructor if you are going to be absent so that you can get an update on what you missed (i.e., assignments). If you miss class consult the PowerPoint presentation in the Content area of Blackboard.

Be aware of your absences. Students who are late to the class will be counted as absent for the first half of the class. It is the student’s responsibility to call attention to their presence in the class (and sign the attendance sheet) if they come in after the attendance is taken. The instructor reserves the right to drop students who have not participated during two weeks of classes (did not submit any course projects to the Blackboard Assignment section).

Inform your instructor as soon as possible if you have problems submitting your assignments on Blackboard. If the system does not allow you to turn in the assignment, you must send it via email to your instructor before the due date. Assignments submitted after the due date will not be graded for full credit—see Assignment submission policy on page 8.

**Students Expectations of Instructor:** You can expect me to be on time, prompt with assignments and feedback, knowledgeable in the topics being covered; create and provide opportunities for you to practice fundamental pedagogical content, and to bring in experts in the areas to augment my background either where needed or simply advantageous. To the best of my ability, I will treat all students equally, fairly, pleasantly, and be readily available for help outside class time.

**Student Learning Outcomes:** It is expected that by the end of the course, the successful student will be able to:

1. Identify the value of inquiry as an instructional strategy.
2. Develop the ability to assist elementary school students in designing investigations using scientific inquiry.
3. Outline strategies for modifying content area lessons to accommodate English Language Learners (ELLs) according to guiding principles like those in the NGSS, the pertinent TEKS, and the Socio-Transformative -Constructivism (sTc) Theory.
4. Understand and address the role of underrepresented groups in the science curriculum.
5. Identify and implement quality Science, Technology, Engineering and Mathematics (STEM) curriculum materials like the Engineering is Elementary (EiE) curriculum into instructional activities relevant to elementary education learning settings.
6. Demonstrate and understand the implementation of different instructional strategies and teaching materials consistent with the goals of the Next Generation Science Standards (NGSS), and the applicable Texas Essential Knowledge and Skills (TEKS).
7. Develop a well-thought-out philosophy of science teaching.
8. Demonstrate proficiency in the use of the 5E Instructional Model as a tool for lesson planning that supports the teaching and learning of basic and integrated inquiry process skills.
9. Collaborate with peers in a scientific investigation to show a willingness to engage in science as a learner.
10. Perform an analysis of effective and teaching methods for teaching elementary science.

**Assessment of Student Learning Outcomes**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Assessment of learning outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quizzes</td>
<td>Learning outcomes: 1, 3, and 6</td>
</tr>
<tr>
<td>2. Lesson plan</td>
<td>Learning outcomes: 2, 3, 4, 5, and 6</td>
</tr>
<tr>
<td>3. Growth essays</td>
<td>Learning outcomes: 1, 4, 6, and 7</td>
</tr>
<tr>
<td>4. Activities</td>
<td>Learning outcomes: 1, 2, 3, 4, 5, 9, and 10</td>
</tr>
<tr>
<td>5. Reflection</td>
<td>Learning outcomes: 1, 2, 5, 6, and 8</td>
</tr>
<tr>
<td>6. Final exam</td>
<td>Learning outcomes: 1, 2, 3, 4, 5, 6, and 7</td>
</tr>
</tbody>
</table>
## Grading Criteria

The course will be assessed based on the following criteria:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Six Online Quizzes (10 pts each) (IA). You are required to take five.</td>
<td>50</td>
</tr>
<tr>
<td>2. 5E Lesson plan (GA)</td>
<td>100</td>
</tr>
<tr>
<td>3. Growth Essays (IA)</td>
<td></td>
</tr>
<tr>
<td>- Essay 1: Impressionist tale (20 pts)</td>
<td></td>
</tr>
<tr>
<td>- Essay 2: Philosophy statement draft 1 for peer review (10 pts)</td>
<td></td>
</tr>
<tr>
<td>- Essay 3: Philosophy statement final draft (40 pts)</td>
<td>70</td>
</tr>
<tr>
<td>4. Activities* (5 points each).</td>
<td></td>
</tr>
<tr>
<td>- Activity 1: My views about science education concept map (IA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 2: Art and science grow together: Communicating through art (IA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 3: Inquiry investigation (Part I) (GA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 4: Outlining a 5E lesson plan (GA)</td>
<td>45</td>
</tr>
<tr>
<td>- Activity 5: Inquiry investigation (Part II) (GA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 6: Lesson peer review (IA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 7: Inquiry investigation (Part III) (GA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 8: Delivery of the 5E lesson on April 16 (GA)</td>
<td></td>
</tr>
<tr>
<td>- Activity 9: Art and science project approval (GA)</td>
<td></td>
</tr>
<tr>
<td>5. Reflection (IA)</td>
<td>10</td>
</tr>
<tr>
<td>6. Final exam (Online test) (IA)</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total Points</strong></td>
<td><strong>325</strong></td>
</tr>
</tbody>
</table>

*IA: Individual Assignment; GA: Group Assignment

*In the case of the 'in-class' activities, students must be present throughout the entire class meeting to earn the points.

## Grades

Overall grading will be A-F, points weighted by percentages. All work is expected to be clearly written (and word-processed), reflect thoughtful response to the assignment guidelines, and be of high quality.

- A = 90-100%
- B = 80-89.9%
- C = 70-79.9%
- D = 60-69.9%
- F = BELOW 60%

### Description of the Assignments

Below you will find a description of each assignment for this course. Please do not hesitate to consult with me if you have any questions. Assignment instructions are also available in the Course Content section/Assignments folder of the course platform.

1. **Online quizzes (IA):** There will be six online quizzes covering the assigned readings for each week, and are due before class (via Assessments section of BB) by the posted time on the deadline date (See course calendar). The format of the quizzes may include true and false, multiple choice, and short answer questions that you will need to answer completely with supporting evidence from the readings. Quizzes are also timed **(30 minutes)** so you should be sure to set yourself up in a quiet place to take this **in one attempt**. Be sure to **save your answers** after each response and finally submit the quiz when you have it completed.

   If you run into technical difficulties while completing and/or submitting your online quiz, you will have the opportunity to finish the test in the instructor’s office, in a paper-and-pencil format, and for the time you had left in your first attempt. The assignment submission policy applies for quizzes not taken during the prescribed time.
Find in the *Reading Strategies* section of the navigation menu, the weekly reading resource (e.g., anticipation guide) that will help you interact with the assigned readings.

2. **Lesson plan (GA):** Students work in small groups (3-4 per group) to design a 5E lesson plan focused on a food-related topic. The lesson also addresses the applicable TEKS, the main tenets of the Socio-Transformative-Constructivist (sTc) learning theory, and the teaching and learning of the scientific language. In class, we will discuss the food pedagogy approach and spend time outlining the lesson. The components should be written clearly in the lesson plan and include: (a) title and grade, (b) learning objectives, (c) Links to TEKS, (d) vocabulary instruction, and the phases of the 5E Learning Model (Engage, Explore, Explain, Elaborate, and Evaluate), (e) resources/bibliography, and (f) supportive documents (i.e., activity guide, hand-out).

Prior to the submission of the 5E lesson plan, students have the opportunity to: (a) revise a STEM curriculum, (b) evaluate a 5E lesson sample using the assignment rubric, and (c) review a 5E lesson submitted by their classmates.

The 5E lesson plan (single-spaced, 2-3 pages long only) plus supportive documents (i.e., activity guide) are submitted through the BLACKBOARD system. Each group will have a member in charge of submitting the lesson plan (only one lesson per group!).

3. **Growth essays (Impressionist tales, science teaching philosophy (first draft for peer review), and science teaching philosophy (final draft) (IA)**

   **Essay 1: Impressionist Tales**

   This is a 1-page long (double-spaced) essay that includes two paragraphs: science learning episode and language learning episode, respectively. Impressionist Tales (Bryan & Tippins, 2005) portray highly personal perspective of a special moment in time. They are written with the intention of (a) drawing the reader into the image—to make the reader see, hear, smell, feel, and taste what the story teller describes; they also (b) use evocative language that reveals the writer’s deepest feeling about the topic. Impressionist tales are similar to impressionist paintings which are set out to capture a scene in a special instant or moment of time... *what the painter sees is what the viewer sees.* Impressionist painters (Monet, Van Gogh, and Renoir) attempted to evoke a participatory sense in the viewer by painting everyday, common, more familiar scenes.

   Think back of your elementary or high school days and write two impressionist tales, the first one targeting a prior science learning episode, and the second one about a language learning event. You will integrate these stories into your science teaching philosophy statements (Essays 2 and 3).

   *The first goal* is to reflect on your science learning experiences using a significant learning episode from your elementary or secondary education in science—remember, use a single, memorable science learning event only!

   *The second goal* implies the ‘investigation’ of the language backgrounds in your family. For the purpose of this assignment, let’s define family broadly, not necessarily the people to whom we are related by blood, but instead the people who raised us and with whom we spent most of our home life. The language backgrounds we have in our personal lives impacts greatly on our beliefs and attitudes about language and language learning. By learning our own history, hopefully we can become more conscious of those beliefs and attitudes.

   *Find samples of impressionist tales in Blackboard. The instructor will introduce this writing format in class in the second class meeting.*
**Essays 2 & 3: Science Teaching Philosophy statements (first and final drafts)**

There are different reasons for having a “science teaching philosophy.” It gives you the chance to situate your science teaching and learning perspectives, revitalize your views and gain confidence to face your profession. It is also highly beneficial for you to have this statement to share with prospective employers as a competitive tool to set yourself above other candidates. You should begin your own philosophy of [science] teaching even before your placement in a field experience. Expect your thoughts about education to change as you learn and grow professionally. Allow this reflective exercise to show your growth within the profession across time and thus renew your dedication to the field of education. Research has shown that prospective teachers’ personal histories with learning science (both positive and negative) have a great influence on how they teach science. Remember, this is a science teaching philosophy statement, NOT an education philosophy statement.

In this 1 ½ page (double spaced) statement, you are expected to convey your views about the teaching and learning of science in elementary school classrooms. Make sure to: a) address briefly (one or two sentences only) your essay one, b) incorporate ideas, concepts, and principles discussed and practiced in class and c) in the final draft, address the comments and questions provided by your peers and the instructor in the revision of the first draft. Statements are cumulative or emergent, that is they evolve by addressing comments and suggestions from the instructor, and including new evidence and ideas from class topics, discussion, and activities.

Note that essay 2 will be submitted for a blind peer review exercise—the instructor will give each student a philosophy statement (essay 2) to review. You will earn the points by submitting on time your essay (5 pts) and for sending your review to the instructor (5 pts). Each student will receive feedback and comments on essay 2. **Essay 3** (final draft of your science teaching philosophy) will be reviewed and graded by the instructor.

Here are some ideas for your essay 2. Remember this essay may change by the FINAL DRAFT—be honest and humble if you are unsure at this point.

1. Your previous experiences as a science learner
2. Your goals, where you want to “go” professionally
3. Why you decided to enter the teaching profession
4. Your definition of teaching and learning in formal and informal settings
5. Your role in helping students achieve and develop
6. Your style and belief about effective teaching
7. How you wish to be remembered by students
8. Why you believe teaching is valuable
9. Recall someone who positively affected your school experiences
10. Your personal characteristics and strengths

*See Science Teaching Philosophy samples and rubric in the course platform (Blackboard).

4. **Activities (IA & GA):** These are both individual and group activities that will take place in class and outside the regular class time. In each class we will engage in activities that illustrate and document exemplary science learning/teaching strategies, and/or exemplify main ideas in the assigned readings. See activities highlighted in the course calendar (Pages 10-13).
5. **Reflection (IA):** The reflection will be focused on the 5E lesson delivered to a group of students and group inquiry projects. Students are provided with a reflection template. The completed form should be submitted to the instructor through the BLACKBOARD system.

6. **Final exam (IA):** This examination will cover readings, class notes, in-class activities, individual and group projects. Sample questions and format will be discussed in class and posted on the Blackboard prior the midterm evaluation. Like in the case of the online quizzes, you need to plan ahead so that you can complete this test in one attempt. *You are not allowed to log out and return to the test.*

**Academic Policies**

**Assignment Submission**

Your assignments are expected to be submitted online (via Blackboard) using the assignment template on the scheduled day and time; submit them according to the prescribed format (e.g., written report). Late work will not be accepted for full credit unless you have evidence of extenuating circumstances. Unfortunately, sometimes less than excusable circumstances arise even for professionals in the field and you made need an extension. However, I will only agree to grade late work for the first week following a due date, deducting 25% off the total grade. No assignments will be accepted past one week late. Plan carefully to ensure you meet the deadlines. If you wait until the last minute, things that can go wrong often do. Your computer will crash, the internet connection stops working, etc. Please ask if you have questions or concerns about how to do any assignment in this course. You need to check your Blackboard email regularly for communications from your instructor. Once you submit your assignment make sure it is posted.

Assignments will be submitted in the Assignments area of navigation menu, and will need to be posted as Word files or as a PowerPoint (PPT) only (*no rft. or Prezi formats please*). When submitting a group assignment, your group will designate a member to be responsible for the submission of the project—this is part of the goals your group will set up in class. Please, include in each submission the names of the students [and their responsibilities] that participated in and contributed to the preparation of the group project. Assignments that are labeled “missing” by the Blackboard system will not be accepted without the instructor’s prior written approval [email communication]. You will not be able to submit your assignments after the due date. It is your responsibility to inform [via email] your instructor as soon as possible if you run into technical difficulties while submitting/posting your assignments on Blackboard. If this happens, you need to *send your assignment via email before the due date so that your assignment can be graded for full credit.*

**Attendance Policy:** Learning in this class is considered a communal endeavor as well as an individual undertaking. Therefore, students are expected to be present and prepared at the designated time for every class session and to remain engaged in class activities until the session has concluded. Class attendance is crucial for a full understanding of course material, because many of the topics and content will be taught and communicated through class demonstrations, activities, and discussions. If you are absent from a class contact your instructor or another student to find out what occurred during the class you were absent from. Tardies are considered unprofessional behavior and result from anytime between 8:30 and 8:45 am. Three tardies (and/or leaving early [15 minutes]) will result in an unexcused absence.

- Your 1st absence is excused.
- Your 2nd absence will reduce your final grade 5 %.
- Every absence after your 2nd reduces your final grade 10 % per absence.

**UTEP Teacher Education Department Policy on Course Absences**
The UTEP Teacher Education Department considers missing two weeks of class excessive. The instructor reserves the right to drop students who have not participated during two weeks of classes (did not submit any assignments to the Blackboard Assignment section).

Communicating Effectively Online
When we talk face-to-face, we expect other people to observe certain rules of behavior. The same is true online. Here are a few pointers to help you communicate more effectively via e-mail and discussion boards:

- Clearly summarize the contents of your message in the subject line of your e-mail AND your discussion board postings.
- Avoid using all capital letters. USING ALL CAPS MAKES IT LOOK LIKE YOU’RE SHOUTING! IT’S ALSO MORE DIFFICULT TO READ.
- Avoid using sarcasm in your postings and e-mail messages. Sarcasm does not translate well in the online world.
- More information on Netiquette can be found at: www.albion.com/netiquette

Academic Integrity
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. 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, 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.

Students with Disabilities statement
If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office of disabled Student Services located in Union E Room 203. Students who have been designated as disabled must reactivate their standing with the Office of Disabled Student Services on a yearly basis. Failure to report to this office will place a student on the inactive list and nullify benefits received. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of Disabled Student Services. You may call 747-5148 for general information about the Americans with Disabilities Act (ADA).

The Disabled Student Services Office can also be reached in the following ways:
Web: http://www.utep.edu/cass/
Phone: (915) 747-5148
Fax: (915) 747-8712

Course Schedule and/or Assignment Changes
The course instructor reserves the right to adjust the course syllabus or change assignments as needed. While every effort will be made to adhere to the calendar and the course outlines, there will undoubtedly be changes due to unexpected situations or pacing that may arise during the semester. Every attempt will be made for advance ‘warning.’ These modifications will be based on the specific needs of all the students in the course, but not to exceed difficulty or the due dates of the originally proposed assignment.
**Assigned Reading Material:** Readings will be assigned and available via Blackboard in the Course Content Area. You will be responsible for reading these materials before class.

**Plagiarism:** Cheating is unethical and not acceptable. Plagiarism is using information or original wording in a paper without giving credit to the source of that information or wording; it is also not acceptable. Do not submit work under your name that you did not do yourself. You may not submit work for this class that you did for another class. If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UTEP catalog policy. Refer to [http://www.utep.edu/dos/acadintg.htm](http://www.utep.edu/dos/acadintg.htm) for further information.

**Multiple Submissions:** When turning in assignments, students may not resubmit work done for other courses. No credit will be given for a resubmission of a project or paper given in another class.

**Incomplete Grades:** An incomplete may be given, only while enrolled in the course, and if a student provides evidence of a documented illness or family crisis that precludes successful completion of the course.

**Format and Submission:** All written assignments should be double space (except lesson plans), font size 12 with 1 inch margins and submitted on Blackboard. Number your pages. Formal written projects are to follow the American Psychology Association (APA) format. Please ask if you have any questions about using the APA format, I will be happy to help!

**Course Schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Assignments Due</th>
</tr>
</thead>
</table>
| 1    | Jan. 20 | • Food pedagogy Part I (The Faces of Food)  
• Who is a scientist? Part I  
• Introduction and overview  
<br>**Activity 1 (Due at the end of class): My views about science education concept map (IA)** | • Read the syllabus, and make sure your UTEP email is your primary email or forward your UTEP email to the email you use. |
| 2    | Jan. 27 | • How students learn science  
• Basic and integrated inquiry skills: Pop corn activity  
• Impressionist Tales  
<br>Let your instructor know if you are having problems using the course platform (Blackboard) | Read:  
• Colburn: *Inquiry primer*  
• Finson: *Inference vs. Observation*  
<br>**Submit today in class your Student Profile form (Page 14 of the syllabus).**  
<br>**Take Syllabus quiz (Online quiz #1) before today’s class.** |
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Activities</th>
<th>Reading</th>
<th>Notes</th>
</tr>
</thead>
</table>
| 3   | Feb. 3| • Examining student work  
• Inquirizing your teaching: Investigating with parachutes.  
• Reviewing STEM education curricula | Read:  
• Scribner-MacLean: *More than just guessing*  
*Submit your Essay 1: Impressionist Tales* |                                                                         |
| 4   | Feb. 10| • Never playing the game (in-class reading)  
• The Nature of science (NOS)  
• Prior knowledge and common misconceptions: A Private Universe | Read:  
• McComas: *Key ideas to teach about the nature of science*  
*Online quiz #2 due before today's class.* |                                                                         |
| 5   | Feb. 17| **UTEP closed on this day**  
*No class meeting*                                                                 |                                                                         |                                                                         |
| 6   | Feb. 24| • Teaching the language of science to ELLs  
**Activity 2 (Due at the end of class):** Art and science grow together: Communicating through art  
**Activity 3 (Due at the end of class):** Inquiry investigation Part I (GA) | Read:  
• Crowther et al: *Academic vocabulary instruction*  
• Porter et al: *The art and science of notebooks*  
*Online quiz #3 due before today's class.* |                                                                         |
| 7   | Mar. 2 | • Basic and integrated inquiry skills: Observing, collecting data, predicting, and constructing graphs (Bird Survey on campus) | *Submit the first draft of your essay 2: science teaching philosophy* |                                                                         |
| 8   | Mar. 9 | **Spring Break (March 7-11)**                                                                                      |                                                                         |                                                                         |
| 9   | Mar. 16| • Food pedagogy Part II  
**Activity 4 (Due at the end of class):** Outlining a 5E lesson plan (GA) | Read:  
• Bybee: *The 5E Model*  
*Online quiz #4 due before today’s class.* |                                                                         |
| 10  | Mar. 23| • Literacy connections  
**Activity 5 (Due at the beginning of class):** Inquiry investigation Part II (GA) | Read:  
• Munakata: *Lessons from the little prince*  
*Online quiz #5 due before today's class.* |                                                                         |
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity/Event</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 30</td>
<td>Lesson Merit presentations</td>
<td>Submit your group’s lesson plan for peer review via BB before class. (One per group).</td>
</tr>
<tr>
<td></td>
<td><strong>Activity 6: Lesson peer review. (Due via BB April 13)</strong> (IA)</td>
<td></td>
</tr>
<tr>
<td>Apr. 6</td>
<td>Accommodating ELLs in the science classroom</td>
<td>Read:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Armon &amp; Morris: Integrating assessment for ELLs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Online quiz #6 due before today’s class.</td>
</tr>
<tr>
<td>Apr. 13</td>
<td>Writing in the science classroom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Science journaling</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Activity 7 (Due at the beginning of class):</strong> Inquiry investigation Part III (GA)</td>
<td></td>
</tr>
<tr>
<td>Apr. 16</td>
<td><strong>Science Teaching Day (Activity 8)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Place</strong>: UTEP Campus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Time</strong>: 10:00 am – 12:00 pm</td>
<td></td>
</tr>
<tr>
<td>Apr. 20</td>
<td><strong>No class meeting</strong>: Class time is fulfilled by the Science Circus day on Saturday, April 16.</td>
<td></td>
</tr>
<tr>
<td>Apr. 27</td>
<td>Art and science grow together (II)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Activity 9 (Due at the end of class)</strong>: Art and science project approval (GA)</td>
<td></td>
</tr>
<tr>
<td>May 4</td>
<td>Inquiry investigations: In class discussion and project presentations</td>
<td>Groups submit their lesson plans today via BB by 8:30 am (one lesson per group only).</td>
</tr>
<tr>
<td></td>
<td>• Discussion on the philosophy of science teaching</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Who is a scientist?</td>
<td></td>
</tr>
<tr>
<td>May 9-13</td>
<td>Finals week (No class meeting)</td>
<td>Submit essay 3 and Reflection by Friday (05/13) at 5:00 pm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Take final exam on BB this week between Monday (8:30 am) and Friday (5:00 pm)</td>
</tr>
</tbody>
</table>
References


Trade books used in this course

BED4311: Teaching Science in the Dual Language Classroom – spring 2016

Student Profile

___________________________  __________________________

(Last Name)                   (First Name)

Email address: ________________________________

Objections to syllabus or what other content do you think this course should cover and why?

___________________________________________________________________________________________________

___________________________________________________________________________________________________

___________________________________________________________________________________________________

Any additional comments you may have (e.g. what you hope to do professionally, health problems, experiences at UTEP, etc. that your instructor should be informed).

___________________________________________________________________________________________________

___________________________________________________________________________________________________

___________________________________________________________________________________________________

Time of the week you use to work on your school assignments: ______________________

Also feel free to discuss with the instructor any difficulties you may have with the course.

*I read and fully understand the requirements and course policies as stated in this syllabus.*

___________________________  ________________

Student Signature                Date
Name: ___________________________ Preferred Name: ___________

Major: __________________________

Hobbies and interests:

Science courses you have taken in college. If possible, include details such as how many years ago.

Your favorite subject/class:
A. In elementary school:____________________________
B. In high school: _________________________________
C. In college: ____________________________________

Please, share your views on the following questions:
1. Why did you choose to become an elementary teacher?
2. Please describe briefly your experience/es with science learning and whether they were positive or negative.
3. Suggest one goal you would like to accomplish [on your own] in this course by the end of the semester.
5. How would you define:
   A. Scientific Inquiry
   B. Food Pedagogy
6. Indicate on the scale below your knowledge of and previous experience with lesson planning:
## Growth Essay 1: My Impressionist Tales

<table>
<thead>
<tr>
<th>Component</th>
<th>20 ---------------------------- 15</th>
<th>14 ---------------------------- 7</th>
<th>6 ---------------------------- 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>• The essay is 1-page (double-spaced) long.</td>
<td>• The essay is 1 – ½ pages (double-spaced) long.</td>
<td>• The essay is &gt;1 – ½ pages (single-spaced) long.</td>
</tr>
<tr>
<td>One science learning episode [paragraph 1]</td>
<td>• Addresses one meaningful science learning experience. • Identifies time and location. • Describes in detail the episode. • Identifies the participants of the episode. • Draws the reader into the episode being described and uses evocative language that reflects what the writer feels about the topic.</td>
<td>• Addresses one science learning episode but fails to highlight its relevance. • Identifies either time or space. • Partial description of the learning episode. • Identifies the participants of the episode. • Partially draws the reader into the episode being described; the use of evocative language does not fully reflect what the writer feels about the topic.</td>
<td>• Addresses more than one science learning episode. • Missed to identify time and location. • Vague description of the episode. • Identifies only the main protagonist of the episode. • Does not draw the reader into the episode; the use of evocative language is minimal.</td>
</tr>
<tr>
<td>One langue learning episode [Paragraph 2]</td>
<td>• Addresses one meaningful language learning experience. • Identifies time and location. • Describes in detail the episode. • Identifies the participants of the episode. • Draws the reader into the episode being described and uses evocative language that reflects what the writer feels about the topic.</td>
<td>• Addresses one language learning episode but fails to highlight its relevance. • Identifies either time or space. • Partial description of the learning episode. • Identifies the participants of the episode. • Partially draws the reader into the episode being described; the use of evocative language does not fully reflect what the writer feels about the topic.</td>
<td>• Addresses more than one science learning episode. • Missed to identify time and location. • Vague description of the episode. • Identifies only the main protagonist of the episode. • Does not draw the reader into the episode; the use of evocative language is minimal.</td>
</tr>
</tbody>
</table>
# Growth Essay 2: Science Teaching Philosophy Statement

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy of science teaching statement is 1 – 1½ pages and double-spaced; submission uses the assignment template.</td>
<td>Excellent (5)</td>
</tr>
<tr>
<td>Philosophy statement addresses:</td>
<td></td>
</tr>
<tr>
<td>• Your beliefs about science education</td>
<td></td>
</tr>
<tr>
<td>• Addresses essay one (prior learning experiences in science and L2).</td>
<td></td>
</tr>
<tr>
<td>The tone in your philosophy statement:</td>
<td></td>
</tr>
<tr>
<td>• Incorporates science education terminology (e.g., inquiry learning, hypothesis, misconceptions)</td>
<td></td>
</tr>
<tr>
<td>• Is personal; in your writing you use the ‘I’ instead of the third person.</td>
<td></td>
</tr>
<tr>
<td>Mechanics of Standard English</td>
<td></td>
</tr>
<tr>
<td>Appropriate expression of concepts, varied and accurate vocabulary, no mechanical errors. Make sure to do a spell check before submitting/posting your assignment.</td>
<td></td>
</tr>
<tr>
<td>Revision of the concept map from Activity 1.</td>
<td></td>
</tr>
<tr>
<td>Answer these questions as a separate note at the end of the essay:</td>
<td></td>
</tr>
<tr>
<td>• Do you have new ideas now that you want to add to your science education map?</td>
<td></td>
</tr>
<tr>
<td>• What changes/additions would you make? (This concept map is not part of the 1 ½ page philosophy statement). Add a revised copy to your submission.</td>
<td></td>
</tr>
</tbody>
</table>
Growth essay 3: Science Teaching Philosophy Rubric (Final Draft)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Philosophy of science teaching statement is 1 – 1 ½ pages and double-spaced; submission uses the</strong> assignment template.</td>
<td></td>
</tr>
<tr>
<td><strong>2. Philosophy statement:</strong></td>
<td></td>
</tr>
<tr>
<td>• Is fully focused on science teaching and learning in elementary/middle school classrooms.</td>
<td></td>
</tr>
<tr>
<td>• Briefly addresses the autobiography (essay 1) as a science learner.</td>
<td></td>
</tr>
<tr>
<td>• Clearly addresses reviewers’ comments on Essay 2. Use bullets or numbers at the end to explain how each comment and suggestion was addressed.</td>
<td></td>
</tr>
<tr>
<td>• Incorporates science education terminology (e.g., misconceptions, inquiry investigations)</td>
<td></td>
</tr>
<tr>
<td>• On a separate page (#3).</td>
<td></td>
</tr>
<tr>
<td>A. Provide a revision of the concept map constructed on the first class meeting.</td>
<td></td>
</tr>
<tr>
<td>• Insert an updated version of your concept map.</td>
<td></td>
</tr>
<tr>
<td>• What concepts/ideas have become relevant in your concept map? Why?</td>
<td></td>
</tr>
<tr>
<td>B. In the drawing/painting done in class (activity 3) you conveyed your views about how to teach and learn science in elementary school classrooms. If today you were to produce a second drawing, would your depiction look different? How?</td>
<td></td>
</tr>
<tr>
<td>C. Mechanics of English</td>
<td></td>
</tr>
<tr>
<td>• Varied and accurate vocabulary, no mechanical errors. Proofread your essay before submitting/posting your assignment.</td>
<td></td>
</tr>
</tbody>
</table>

*For example:*
Reviewer’s comment 1: The statement goes beyond the space limit.
I reorganized my statement and was able to put my ideas into a 1 ½ page-document.
### 5E Lesson Plan: [Lessons should target grade level 3]

<table>
<thead>
<tr>
<th>Lesson title &amp; Connection with Food Pedagogy</th>
<th>10-7 pts</th>
<th>6-4 pts</th>
<th>3-1 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The title is intriguing, succinct and represents the lesson plan</td>
<td>- The title is intriguing and represents the lesson plan</td>
<td>- The title is intriguing but does not represent the lesson plan</td>
<td></td>
</tr>
<tr>
<td>- The lesson clearly builds on a food-related topic that allows the students to contribute to their own learning.</td>
<td>- The lesson partially addresses a food-related topic; the connection with students’ experiences with the food item/recipe is unclear; it does not build on food as part of the Foods of Knowledge students possess.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning objectives</th>
<th>10-7 pts</th>
<th>6-4 pts</th>
<th>3-1 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Concise description of what learners are expected and able to do by the end of the lesson</td>
<td>- Descriptions of what learners are expected to learn are general.</td>
<td>- The description of the learning objectives is vague.</td>
<td></td>
</tr>
<tr>
<td>- Objective statements include a variety of actions verbs (lower and higher order) that address different cognitive levels.</td>
<td>- Most action verbs in the objective statements are from either lower or higher order thinking levels that do not address different cognitive levels.</td>
<td>- Action verbs in the objective statements do not support meaningful learning.</td>
<td></td>
</tr>
<tr>
<td>- There is evidence in the evaluation section that students’ learning is linked to the concepts and skills addressed in the learning objectives.</td>
<td>- Fail to show connections with the evaluation section.</td>
<td>- The lesson needs a great deal of improvement; a substitute teacher will have difficulties delivering this lesson.</td>
<td></td>
</tr>
<tr>
<td>- Objective statements are clear enough that a substitute teacher would not have difficulties delivering the lesson.</td>
<td>- Some clarifications are needed; a substitute teacher may have difficulties delivering this lesson.</td>
<td>- Includes learning objectives but they are not identified; the action verbs are vague (e.g., to study)</td>
<td></td>
</tr>
<tr>
<td>- Includes at least two objectives from each category (content and language).</td>
<td>- Includes learning objectives but they are not identified; the action verbs are vague.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEKS alignment And focus on sTc</th>
<th>10-7 pts</th>
<th>6-4 pts</th>
<th>3-11 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lists pertinent standards for the target grade level.</td>
<td>- Listed standards do not fully relate to the lesson.</td>
<td>- Lesson is loosely connected to the standards.</td>
<td></td>
</tr>
<tr>
<td>- There is evidence (i.e., in the evaluation section) that student’s learning is linked to the listed standards.</td>
<td>- Partial evidence (i.e., in the evaluation section) that student’s learning is linked to the listed standards.</td>
<td>- The lesson does not address the four elements of the Socio Transformative Constructivist learning theory.</td>
<td></td>
</tr>
<tr>
<td>The lesson clearly addresses the four principles of the Socio Transformative Constructivism learning theory.</td>
<td>- The lesson partially addresses the four elements of the Socio Transformative Constructivist learning theory; the elements are not identified.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary Instruction</th>
<th>20-15 pts</th>
<th>14-8 pts</th>
<th>7-1 pt</th>
</tr>
</thead>
<tbody>
<tr>
<td>- In this section, the lesson identifies one vocabulary instruction format (i.e., Tiered instruction, frontloading).</td>
<td>- In this section, the lesson identifies one vocabulary instruction format (i.e., Tiered instruction, frontloading).</td>
<td>- Lesson does not identify one vocabulary instruction format (i.e., Tiered instruction, frontloading).</td>
<td></td>
</tr>
<tr>
<td>- Lesson describes the use of the target vocabulary instruction format. The vocabulary instruction format is also addressed in the body of the lesson (5Es).</td>
<td>- Lesson describes the use of the target vocabulary instruction format but it is not addressed in the body of the lesson (5Es).</td>
<td>- Lesson does not describe the use of the target vocabulary instruction format.</td>
<td></td>
</tr>
<tr>
<td>- Vocabulary of the lesson is identified/listed (i.e., Tier 1, Tier 2, and Tier 3 words).</td>
<td>- Vocabulary of the lesson is vaguely identified/listed (i.e., Tier 1, Tier 2, and Tier 3 words).</td>
<td>- Vocabulary list is missing major scientific concepts.</td>
<td></td>
</tr>
<tr>
<td>- The assessment strategy identified in the body of</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Lesson Body

- **Lesson clearly describes what the teacher and the student will do in each stage of the 5E cycle.**
- **Engagement** (hook/attention grabber): describes one task that creates interest and leads students into exploration.
- **Exploration**: describes an activity/strategy that encourages students to work together without direct instruction; students test and form new predictions; students try alternatives and record observations.
- **Explanation**: includes at least 4 questions the teacher would use to lead a whole class discussion; teacher introduces new terms; [formally] provides definitions; uses students' experiences as basis for explanations; [teacher] asks students for evidence/justification.
- **Elaboration**: describes an extension [new] activity that is hands-on/minds-on; there is evidence that students use this activity to apply concepts and skills.
- **Evaluation**: includes both formative and summative assessment formats; assessments address the concept and skills stated in the learning objectives.

**30-20 pts**

- General description of what the teacher and the student will do in each stage of the 5E cycle.
- **Engagement** (hook/attention grabber): unclear description of a strategy that creates interest. Engagement does not clearly connect with the exploration phase.
- **Exploration**: describes an activity/strategy that seems isolated, unrelated to the previous phase; although students are encouraged to work together they need teacher’s guidance and instruction; students practice some inquiry skills only (e.g., test predictions).
- **Explanation**: includes at least 2-3 questions the teacher would use to lead a whole class discussion; teacher introduces some new terms; [formally] provides some definitions; use experiences unrelated to students’ own work as basis for explanations; [teacher] fails to ask students for evidence/justification.
- **Elaboration**: describes a known activity that is hands-on/minds-on; there is little evidence that students use this activity to apply concepts and skills.
- **Evaluation**: includes both formative and summative assessment formats; assessments partially address the concept and skills stated in the learning objectives.

**19-10 pts**

- Vague description of what the teacher and the student will do in each stage of the 5E cycle.
- **Engagement** (missing hook/attention grabber): activity or strategy does not create interest in the topic of the lesson.
- **Exploration**: students are not encouraged to work together without direct instruction; students do not have the opportunity to practice inquiry skills (e.g., test and form new predictions, try alternatives, record observations).
- **Explanation**: does not include questions the teacher would use to lead a whole class discussion; teacher does not introduce new terms; definitions are not provided; students’ previous experiences are not used as basis for explanations; students are not questioned for evidence/justification.
- **Elaboration**: a new hands/minds-on activity is not described; there is no evidence that students use this activity to apply concepts and skills.
- **Evaluation**: includes a vague description of the assessment; does not identify the assessment type.

**9-1 pts**

- Includes some text books and websites references used in the lesson.
- Some supporting documents are included at the end of the lesson as appendixes.

### References and Supporting Documents

- Includes text books and websites references used in the lesson.
- Supporting documents are included at the end of the lesson as appendixes.

**5 pts**

- Includes text books and websites references used in the lesson.
- Supporting documents are included at the end of the lesson as appendixes.

**3 pts**

- Includes some text books and websites references used in the lesson.
- Some supporting documents are included at the end of the lesson as appendixes.

**1 pt**

- Not included
**Mechanic of English and Format**

- Appropriate expression of concepts, varied and accurate vocabulary, no errors occur with regards to grammar, conventions and spelling.
- Lesson plans are consistent in format (e.g., double space, font size 12 with 1 inch margins, cited references when included follow the APA format).
- Lesson template is used.
- Lesson is 3-4 pages long (not including supporting documents).

- Clear expression and vocabulary, some mechanical errors exist but not to get in the way of understanding.
- Lesson plan has some formatting problems.
- Lesson template is not used.
- Lesson is 5-8 pages long (not including supporting documents).

- Some mechanical errors exist but not to get in the way of understanding.
- Many errors with regards to grammar, spelling, and conventions.
- There is no obvious formatting structure.
- Lesson template is not used.
- Lesson is >9 pages long (not including supporting documents).

- Punctual submission of your lesson plan for peer review: /5 pts
- Merit presentation of your lesson plan in class: /5 pts

These last 10 points were already assigned

*Food Pedagogy* consists of a collection of teaching and learning resources about how to grow, shop for, prepare, cook, display, taste, eat, and dispose of food by a range of agencies, actors and media. All of these activities are packed with tacit, and by making such everyday knowledge explicit, we have the opportunity to make explicit both traditional literacies, typically learned in books or school, and Funds of Knowledge. Food is a used as a vehicle for learning.
The content of this course addresses the following Texas Examinations of Educator Standards (TExES) competencies in the domain for the Generalist EC-6 and Bilingual Generalist EC-6 programs. These standards will be addressed and/or assessed with the following course activities and assignments

**Competency: Safe and proper laboratory processes.**

The beginning teacher:
D. Selects and safely uses appropriate tools, technologies, materials for instructional activities........
E. Understands concepts of precision, accuracy and error with regard to reading and recording numerical data from a scientific instrument...........................................................
F. Understands how to gather, organize, display and communicate data in a variety of ways (e.g., charts, tables, graphs, diagrams, written reports, oral presentations)..............................
G. Understands the international system of measurement (i.e., metric system) ......................

**Competency: Scientific inquiry**

The beginning teacher:
A. Understands plans and implements instruction that provides opportunities for all students to engage in non-experimental- and experimental-inquiry investigations...........................................
B. Focuses inquiry-based instruction on questions and issues relevant to students and uses strategies to assist students with generating, refining and focusing scientific questions and hypotheses.................................................................................
D. Knows how to guide students in making systematic observations and measurements.............
E. Knows how to promote the use of critical-thinking skills, logical reasoning and scientific problem solving to reach conclusions based on evidence.................................................................
F. Knows how to teach students to develop, analyze and evaluate different explanations for a given scientific result.............................................................................................................
G. Knows how to teach students to demonstrate an understanding of potential sources of error in inquiry-based investigation....................................................................................................
H. Knows how to teach students to demonstrate an understanding of how to communicate and defend the results of an inquiry-based investigation.................................................................
J. Understands the roles that logical reasoning, verifiable evidence, prediction and peer review play in the process of generating and evaluating scientific knowledge..........................................
K. Understands the historical development of science and the contributions that diverse cultures and individuals of both genders have made to scientific knowledge..........................................................

- 5E Lesson plan
- Inquiry investigation (Parts II, and III)
- Bird tour on campus
- Pop corn activity
- Parachute activity

- 5E Lesson plan, final test, essays 2 and 3, readings from week 2, and reflection
- Inquiry investigation (Part I), online quizzes
- Science Circus Day
- 5E Lesson and Science Circus Day
- Inquiry investigation (II & III) and 5E Lesson
- Pop corn activity, parachute activity, bird watching tour, activities 2 and 8 (art and science)
- Inquiry investigation (I, II, & III)
- Online and in-class quizzes, and reading from
<table>
<thead>
<tr>
<th>Competency: Impact on daily life/environment</th>
<th>week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>The beginning teacher:</td>
<td></td>
</tr>
<tr>
<td>A. Understands that decisions about the use of science are based on factors such as ethical standards, economics and personal and societal needs.</td>
<td></td>
</tr>
<tr>
<td>F. Understands the role science can play in helping resolve personal, societal and global challenges.</td>
<td>Final test, and online and in-class quizzes</td>
</tr>
<tr>
<td></td>
<td>Final test, and online and in-class quizzes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competency: Unifying concepts and processes in science</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The beginning teacher:</td>
<td></td>
</tr>
<tr>
<td>A. Understands how a unifying, explanatory framework across the science disciplines is provided by the concepts and processes of systems, order and organization; evidence, models and explanation; change, constancy and measurements; and form and function.</td>
<td></td>
</tr>
<tr>
<td>B. Demonstrates an understanding of how patterns in observations and data can be used to make explanations and predictions.</td>
<td>Inquiry investigation (Parts II and III)</td>
</tr>
<tr>
<td>F. Understands how change and constancy occur in systems.</td>
<td>In-class inquiry activities, readings from week 2</td>
</tr>
<tr>
<td>G. Understands the complementary nature of form and function in a given system.</td>
<td>Inquiry investigation</td>
</tr>
<tr>
<td></td>
<td>Inquiry investigation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competency: Theory and practice of science teaching</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The beginning teacher:</td>
<td></td>
</tr>
<tr>
<td>A. Understands how developmental characteristics, prior knowledge and experience and students’ attitudes influence science learning.</td>
<td></td>
</tr>
<tr>
<td>B. Selects and adapts science curricula, content, instructional materials and activities to meet the levels of interest, knowledge and understanding as well as the abilities, experiences and needs of all students, including English-language learners.</td>
<td>5E Lesson (peer review, final draft, and delivery), online test, online and in-class quizzes, and reflection.</td>
</tr>
<tr>
<td>C. Understands how to use situations from students’ daily lives to develop instructional materials that investigate how science can be used to make informed decisions.</td>
<td></td>
</tr>
<tr>
<td>D. Understands common misconceptions in science and has effective ways to address those misconceptions.</td>
<td></td>
</tr>
<tr>
<td>E. Understands developmentally appropriate design and implementation of hands-on learning experiences in science and selects effective, appropriate instructional practices, activities, technologies and materials to promote students’ scientific knowledge, skills and inquiry processes.</td>
<td></td>
</tr>
</tbody>
</table>
## Competency: Assessment in science learning

The beginning teacher:

- **B.** Understands the importance of monitoring and assessing students’ understanding of science concepts and skills on an ongoing basis, including how to use formal and informal assessments of student performance and how to use products (e.g., projects, lab journals, rubrics, portfolios, student profiles, checklists) to evaluate students’ understanding of and participation in the inquiry process.
- **C.** Selects — or designs — and administers a variety of appropriate assessment methods (e.g., performance assessment, self-assessment, formal/informal assessment, formative/summative assessment) to monitor students’ understanding and progress and to plan for instruction.

- Readings from weeks 5 and 6, 5E lesson plan (design, review, and delivery), and final test.

## Competency: Life science

The beginning teacher:

- **A.** Understands that living systems have different structures that perform different functions.
- **B.** Understands and describes stages in the life cycles of common plants and animals.
- **C.** Understands that organisms have basic needs.

- Inquiry investigation (I, II, and III)