

## BED/ELED 4311: Teaching Science in the Elementary Bilingual Classroom CRNs: 19197 & 19203

### Contact Information

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Office Hours :Thursdays (12:30 – 2:00 pm) I will try to answer Blackboard emails within the first day of receiving them (Monday-Friday). Message received after 5:00 PM Friday will be answered by Monday morning.

### Purpose

The two major goals of this course are to ***assist preservice teachers' (PSETs—you) in examining their beliefs about science teaching and learning*** and to ***portray science education from a multicultural viewpoint***. In this context, the teacher is an agent of social change, a practitioner who actively contributes toward establishing a pluralistic society by making the classroom one of the most important settings where gender, equity, anti-discriminatory principles and multicultural understanding are modeled and practiced (Rodriguez, 1998).

This course will assist you in critically examining the theories, research, pedagogical approaches, and materials associated with effective learning and teaching in elementary/dual language classrooms. This course will focus on the knowledge and skills you need to design and implement a science learning environment where every student is held to high expectations and encouraged to achieve maximum learning. You 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, instructional approaches such as the 5E Instructional Model.

### Course Procedures

*This is a hybrid course. It means that it will include both face-to-face and online delivery formats. Face-to-face and online weeks are identified in the course calendar (page 10). All the course content, materials and information about course work will be available I the Blackboard course platform. Be sure to read all the class notes and additional documents thoroughly and to continually consult the course schedule in order to keep up on all information associated with this online class. I also encourage you to manage your time and complete the required course projects as indicated in the updated course calendar. Make sure to contact me in case you experience any difficulties navigating the Blackboard course platform or if you need clarification on course projects.*

There will be ***weekly class notes***, which I will post no later than Monday morning of each week (online weeks) and on Thursday, after class (Face-to-Face weeks). The weekly class notes will appear as a link in the corresponding week folder (e.g., Home Page/Week #/Class Notes folder). Additionally, you will find a ***course module*** associated with the content of [most] weeks as scheduled in the course calendar. Although this is an optional activity, I highly encourage you to use this resource; in-group ***threaded discussions*** (TDs) will occur in the weeks indicated in the course calendar. Note that *all assignments, except the in-class activities (in Face-to-*

Face class meetings) and lesson presentations will be due no later than Sundays at midnight according to the course calendar.

## Resources

There is no book for this course. There will be numerous handouts, class notes on lectures, discussions and presentations. 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:

- English Language Proficiency Standards (ELPS)  
<http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4>
- Science Teachers Association of Texas (STAT) <http://www.statweb.org/>
- Texas Essential Knowledge and Skills (TEKS)  
<http://www.tea.state.tx.us/index2.aspx?id=6148> [*Keep a copy in your files*]
- National Science Teaching Association (NSTA)  
<http://www.nsta.org/default.aspx>
- Texas Safety Standards <http://www.utdanacenter.org/sciencetoolkit/safety/>
- The New Generation Science Standards (NGSS) [www.nextgenscience.org/next-generation-science-standards](http://www.nextgenscience.org/next-generation-science-standards).

## Professional Expectations

Consider the virtual interactions in this class as a meeting with colleagues in your field and a great opportunity to exchange ideas. Being well prepared and participating in class projects and discussions are key parts of professional behavior. Make a commitment to:

1. *Be prepared.* Interact each week and complete your assignments in a timely manner.
2. *Check the course platform regularly.* Find each week's class notes posted in the **Home Page/Week #/Class Notes folder section.**
3. *Participate.* In this learning environment, we need to 'hear your voice.' We specially need to hear your personal comments, your reactions to what you have read, plus your own experiences. All of this input adds to the shared learning, and the sense of community in our course.
4. *Inform your instructor ahead of time* (and teammates if necessary) when you cannot participate in class or group projects, or you run into difficulties completing your tasks.
5. *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. Any derogatory or inappropriate comments are unacceptable and subject to the same disciplinary action that they would receive if they have occurred in the physical classroom. If you have concerns about something that has been said, please let your instructor know immediately.
6. *Provide constructive feedback* that helps your teammates and the instructor improve their performance, and appreciate it when they provide you with the same.
7. Make sure, that your answers to course assignments will be your own work.
8. *Be persistent.* If you run into difficulties, do not wait! Contact your instructor 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.

*Instructor's responses to your questions will be made available to the whole class via Frequently Asked Questions (FAQs) postings, which you will find in the navigation menu of the course platform. Authors of questions will remain anonymous.*

## Students Expectations of Instructor

You can expect me to be prompt with assignments and feedback, knowledgeable in the topics being covered; create and provide opportunities for you to practice fundamental pedagogical content. I will treat all students equally, fairly, pleasantly, and be readily available for help.

## 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 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 pertinent TEKS.
4. Understand and address the role of underrepresented groups in the science curriculum.
5. Identify and integrate quality Science, Technology, Engineering and Mathematics (STEM) curriculum materials (e.g., Engineering is Elementary [EiE]) into instructional activities relevant to elementary and middle school 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. Reflect on the central components of your science teaching philosophy.
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 our course in the analysis of effective and teaching methods for teaching science.

## Assessment of Student Learning Outcomes

Assignment	Assessment of Learning Outcomes
1. Quizzes	Learning outcomes: 1, 3, 6, and 8
2. Lesson plan and STEM merit presentation	Learning outcomes: 2, 3, 4, 5, 6, and 8
3. Impressionist Tale and Science Teaching Philosophy Illustration	Learning outcomes: 1, 4, 6, and 7
4. Activities	Learning outcomes: 1, 2, 3, 4, 5, and 9
5. Threaded Discussions	Learning outcomes: 1, 2, 3, 4, 5, 6, 7, 8, and 9
6. Final exam	Learning outcomes: 1, 2, 3, 4, 5, 6, 7, and 8

## Grading Criteria

The course will be assessed based on the following criteria:

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%      C = 70-79.9%    E = Below 60%  
B = 80-89.9%    D = 60-90%

Assignment	Points
1. Take four [out of 5] Online Quizzes (10 points each) (IA).	40
2. 5E STEM Lesson (IA/GA) <ul style="list-style-type: none"> <li>• First draft for peer review (5 pts)</li> <li>• STEM activity (5pts) delivery during the Merit PowerPoint presentation ( 5pts)</li> <li>• Lesson peer-review (5 pts)</li> <li>• Final submission (40 pts)</li> </ul>	60
3. Reflecting in My Science Teaching and Learning (IA) <ul style="list-style-type: none"> <li>• Impressionist tale (10 pts)</li> <li>• Science teaching philosophy illustration Outline (5 pts) and final version (15 pts)</li> </ul>	30
4. Activities* (5 points each). <ul style="list-style-type: none"> <li>• Activity 1: My views about science education concept map (IA)</li> <li>• Activity 2: My STEM Lesson Plan Part 1 (IA)</li> <li>• Activity 3: Inquiry Activity Part 1 (IA/GA)</li> <li>• Activity 4: Science Activity Analysis (IA)</li> <li>• Activity 5: My STEM Lesson Plan Part 2 (IA)</li> <li>• Activity 6: Inquiry Activity Part 2 (IA/GA)</li> <li>• Activity 7: Science Activity Analysis (IA)</li> <li>• Activity 8: Inquiry Activity Part 3 (IA/GA)</li> </ul>	40
5. Participation in three Threaded Discussions (5 pts each) (IA)	15
6. Final Exam (IA) (50 points) <ul style="list-style-type: none"> <li>• Mentoring a student for an upcoming science fair (to be factor into final exam)*</li> </ul>	50
Total points	<b>235</b>

IA: Individual Assignment; GA: Group Assignment

\*optional activity. See details in the assignment description section

## Online Activities - Due Dates

Pending Assignments	Date Open (Mondays)	Due Date (Sundays)
<b>Quizzes</b>		
Practice Quiz .....	Aug. 22 at 8:00 am	Aug. 28 at 11:55 PM
Quiz 1 .....	Aug. 29 at 8:00 AM	Sep. 4 at 11:55 PM
Quiz 2.....	Sept. 5 at 8:00 AM	Sept. 11 at 11:55 PM
Quiz 3.....	Sept. 26 at 8:00 AM	Oct. 2 11:55 PM
Quiz 4.....	Oct. 10 at 8:00 AM	Oct. 16 at 11:55 PM
Quiz 5.....	Nov. 7 at 8:00 AM	Nov. 13 at 11:55 PM
<b>Impressionist Tale</b> .....	Sept. 5 at 8:00 AM	Sept. 11 at 11:55 PM
<b>Science Teaching Philosophy Illustration Outline</b> .....	Sept. 26 at 8:00 AM	Oct. 2 at 11:55 PM
<b>Science Teaching Philosophy Illustration Final Version</b> .....	Nov. 21 at 8:00 AM	Nov. 27 11:55 PM

<b>5E STEM Lesson</b> -First draft for peer review (5 pts)..... -STEM Activity & Merit Presentation (PPT) (5+5 pts) pts)..... -Lesson peer-review (5 pts)..... Final submission (40 pts) .....	Oct. 24 at 8:00 AM  Oct. 27 In Class Nov. 7 at 8:00 AM Dec. 5 at 8:00 AM	Oct. 30 at 11:55 PM  Nov. 13 at 11:55 PM Dec. 9 at 11:55 PM
<b>Group Threaded Discussions</b>  Threaded Discussion 1 ..... Threaded Discussion 2 ..... Threaded Discussion 3 .....	Aug. 29 at 8:00 AM Sept. 12 at 8:00 AM Oct. 3 at 8:00 AM	Sept. 4 at 11:55 PM Sept. 18 at 11:55 PM Oct. 9 at 11:55 PM
<b>Activities (5 pts each)</b> Activity 1: Concept map & Who is a Scientist. (IA).. Activity 2: My lesson plan Part 1 (IA)..... Activity 3: Inquiry Activity Part 1 (IA/GA)..... Activity 4: Science Activity Analysis (IA)..... Activity 5: My STEM Lesson Plan Part 2 (IA)..... Activity 6: Inquiry Activity Part 2 (IA/GA)..... Activity 7: Science Activity Analysis (IA)..... Activity 8: Inquiry Activity Part 3 (IA/GA).....	<u>Aug. 25 In class</u> Sept. 12 at 8:00 AM Sept. 26 at 8:00 AM Oct. 10 at 8:00 AM Oct. 17 at 8:00 AM Oct. 24 at 8:00 AM Nov. 1 at 8:00 AM <u>Dec. 1 In class</u>	Sept. 18 at 11:55 PM Oct. 2 at 11:55 PM Oct. 16 at 11:55 PM Oct. 23 at 11:55 PM Oct. 31 at 11:55 PM Nov. 6 at 11:55 PM
<b>Final exam (Online test) (50 pts).....</b>	Dec. 5 at 8:00 AM	Dec. 9 at 11:55 PM

## Description of Assignments

**1. Quizzes (IA):** All online quizzes cover the assigned readings to date, and are due by the posted time on the deadline date (See course calendar). The format of the quizzes include multiple-choice and short-answer questions that you will need to answer completely with supporting evidence from the readings. Quizzes are submitted through the Assessment section of the navigation menu. Note that you are expected to read the articles *before taking the quizzes*; I also encourage you to consult the Reading Strategies folder in the navigation menu.

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. There will be five online quizzes. In case you complete all quizzes, the instructor will use your best four scores in the calculation of your grade for this assignment.

**2. Lesson Plan (GA):** Individual or groups of two or three students work as a group to design a 5E STEM lesson plan that addresses the applicable TEKS and the Engineering by Design Process (EDP). The components should be written clearly in the lesson plan: (a) title, grade, and source (b) learning objectives, (c) Links to TEKS, (d) the phases of the 5E Learning Cycle: Engage, Explore, Explain, Elaborate, and Evaluate, (e) references/bibliography, and (f) supportive documents (i.e., activity guide, hand-out).

The 5E STEM lesson plan (single-spaced, 2-page long document, not including supporting files) will be submitted through the Blackboard platform, and will be peer reviewed. Your instructor will assign each group another group's lesson for review. Each student will be expected to complete this review using the checklist at

the end of the lesson document. Reviewers will submit their review through the Blackboard Assignments section and by the assigned due date.

### 3. My Views about Science Teaching and Learning

*Impressionist Tale.* This is a 1-page long (single-spaced) essay that includes **two paragraphs**: a science learning episode and a reflection/2-part question. Impressionist Tales (van Maanen, 1988; Bryan & Tippins, 2005) portray highly personal perspectives of a special moment in time. They are written with the intention of drawing the reader into the image—to make the reader see, hear, smell, feel, and taste what the story teller describes; they also use evocative language that reveals the writer’s deepest feeling about the topic. Impressionist Tales are similar to impressionist paintings (e.g., *Starry night*) 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.

- **The tale (Paragraph 1):** Think back of your elementary, high school, or current college experience and write one impressionist tale/paragraph on a science learning episode.
- **The 2-part question (Paragraph 2):** This paragraph will present your brief reflection on the emotions you experienced as a learner on that occasion. It is argued that learning science is an emotional practice. In this paragraph you answer the questions “*What emotions (positive/negative) did you experience in the event described above, and how did (or are still) those emotions impact your engagement in science learning throughout your schooling career?*”

*The first goal* is for you to take time and reflect on your science learning experiences using a significant learning episode from your elementary, secondary, or tertiary education in science. *The second goal* deals with the concept of Critical Emotional Pedagogy (CEP) (Rodriguez, 2017). As teachers, we need to become aware of and understand not only our students’ (including ELLs) social and emotional experiences while engaged in science lessons, but also our own. *Find examples of Impressionist Tales in Blackboard. The instructor will introduce this writing format in the weekly class notes (Week’s 2 Folder/Class Notes).*

*Science Teaching Philosophy Illustration.* The concept map (Activity 1 from Week 1) is a good starting point for this assignment; this map contains your initial ideas about science teaching and learning in your grade level of interest. The purpose of this activity is to have you reflect on your past and current views about how students should learn science—again, beginning with your own experience as a learner. Instead of writing an essay, we will use the art elements explored in Week 5 to produce a visual representation of your science teaching philosophy. You will use the media of your choice (e.g., ink, color pencils, water colors, chalks, acrylic, oil, collage, or other format).

\*Your instructor will post examples of this assignments in Blackboard/Home Page/Illustration folder.

**4. Activities:** These are individual and group activities that will give you an opportunity to play the role of a learner in the mastery of exemplary science teaching and learning concepts. *See activities highlighted in the course calendar section of the syllabus.*

**5. Threaded Discussions (TD).** There will be three Threaded Discussion prompts available (See course calendar). Each TD will be posted on Mondays and will remain accessible until Sunday. For each TD, you are expected to make at least two contributions, one in response to the instructor’s prompt and one more in reaction to one of your team-mate’s posting. Each [weekly] participation will be awarded 0, 2, 3, or 5 points based on the indicators of the TD rubric. Three excellent participations, at 5 points each, can satisfied the 15 points.

**6. Final Exam:** 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.

**Mentoring a student for an upcoming science fair (Optional activity).** This is an optional project worth 20 points, which will be factored into the final test score. That is, if you complete this optional activity, you will take the final test for 30 points, instead of 50. In case you complete the mentoring project you will be expected to submit two short reports on the work you have done with a student. In week five, you will let your instructor know about your intention to complete this optional activity. If you do not submit this email or notification in week five, your instructor will assume that you will take the final test for 50 points as described in this course syllabus.

## 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. 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 may 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 complete any assignment in this course.

Quizzes and the Final Test will be submitted in the Assessment section of Blackboard while the other course projects will be posted in the Assignments area of the navigation menu. ***Post your projects using the format indicated in the instructions—avoid PDF and rft.*** When submitting a group assignment, your group will designate a member to be responsible for the submission of the project. Please, include in each submission the names of the students 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 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.*

### UTEP Teacher Education Department Policy on Course Absences

The UTEP Teacher Education Department considers missing two weeks of class excessive. The student may be dropped for lack of attendance. If you miss two weeks of class, contact your instructor immediately.

### Attendance Policy

Learning in this class is considered a communal endeavor as well as an individual undertaking. 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. The UTEP Teacher Education Department considers missing two weeks of class excessive. The student may be dropped for lack of attendance. If you miss two weeks of class, contact your instructor immediately.

**Communicating Effectively Online:** When we talk face-to-face, we expect other people to observe certain rules of behavior. The same is true online. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider the audience. This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.
- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- 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. If you have a dry sense of humor, use smiles :) to defuse what could be constituted as an abrupt message (but don't over use them! :)).
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

### **Academic Integrity**

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as one's own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) for possible disciplinary action. To learn more, please visit [HOOP: Student Conduct and Discipline](#).

### **Equal Educational Opportunity**

In order to create equal educational opportunities in the class, all students are expected to demonstrate respect for the diverse voices and individual differences in the class. Particularly, no person shall be excluded from participation in, denied benefits of, or be subject to discrimination under any program or activity sponsored or conducted by the University of Texas at El Paso on the basis of race, color, national origin, religion, sex, age, veteran status, disability, or sexual orientation. Any member of the University community who engages in discrimination or other conduct in violation of University policy is subject to the full range of disciplinary action, up to and including separation from the University. Complaints regarding discrimination should be reported to the University's Equal Opportunity Office. Inquiries regarding applicable policies should be addressed to the University's Equal Opportunity Office, Kelly Hall, 3rd Floor, 915.747.5662 or [eoaa@utep.edu](mailto:eoaa@utep.edu)

### **Students with Disabilities Statement**

I will make any reasonable accommodations to meet students' learning needs. Please contact me to discuss any special needs you might have. If you need specific accommodations please make sure to contact the Center for Accommodations and Support Services (CASS). The CASS office can be reached in the following ways:

E-Mail: [cass@utep.edu](mailto:cass@utep.edu)

Web: <http://www.utep.edu/dsso>

Phone: (915) 747-5148



## Inclusiveness and Equity

Learning happens only when we feel respected as a whole human being. My top priority in our course is to cultivate relationships of trust and respect and a sense that we see each other as whole, complex human beings. That you experience this in our class is important for the sake of your learning in our course *and* for the sake of your future students' learning, so that you feel able to cultivate such relationships with them. To that end, I want you to know that all of you are welcome in our learning environment—all the parts of you as a person are welcome in our discussions, our activities, our assignments, and in our assessments. We are all complex people with a variety of perspectives, experiences, challenges, assets, and resources—our gender identities, our sexual orientations, our religions, our races, our ethnicities, our economic statuses, our immigration statuses, our parenthoods, our veteran statuses, our ages, our languages, our abilities and disabilities. All the parts of you are welcome in our learning community to the extent that you feel comfortable bringing them in. I strive to show respect for the variety and wholeness in each of you, and I expect that each of you shows respect for each other as well. If you feel marginalized in our class, and you feel comfortable discussing it, I would like to know so that I can support you, protect you, and make changes that feel more inclusive and equitable. You can also talk with our Department Chair and/or you can report a complaint of discrimination to the University's Equal Opportunity Office, Kelly Hall, Third Floor, 915-747-5662 or [eoaa@utep.edu](mailto:eoaa@utep.edu).

## Covid-19 Precautions

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area.

## 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.

**Reading Material:** Readings will be assigned and available in Blackboard in the Home Page Area/Course Readings. You will be responsible for reading these materials before class.

**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 if a student provides evidence of a documented illness or family crisis that precludes successful completion of the course.

**Make-up Work:** Make-up work will be given *only* in the case of a *documented* emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

**Format and Submission:** All written assignments should be prepared using double space (*except lesson plans*), font size 12 with 1-inch margins and **submitted on Blackboard**. 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 Calendar

Week	Date	Topic	Assignments Due
1	Aug. 25 <b>F2F</b>	<ul style="list-style-type: none"> <li>• Introduction and overview</li> <li>• Who is a scientist? Part I</li> <li>• How students learn science?</li> <li>• Science probe</li> </ul> <p><b>Activity 1:</b> My views about science education concept map</p>	<p>Submit your <i>Student Information</i> form (Page 15. <i>No points earned</i>).</p> <p><b>Practice Quiz</b></p>
2	Sept. 1 <b>Online</b>	<ul style="list-style-type: none"> <li>• BirdSleuth Curriculum</li> <li>• Basic and integrated inquiry skills: Popcorn activity</li> <li>• Impressionist Tale</li> <li>• <b>Threaded Discussion 1</b></li> </ul> <p>Course Module 1: The spirit of inquiry</p>	<p>Read:</p> <ul style="list-style-type: none"> <li>• Bell, Smetana &amp; Binns: <i>Simplifying inquiry instruction</i></li> <li>• Finson: <i>Inference vs. Observation</i></li> </ul> <p>Submit this week <b>your student profile form</b> (Page 14. <i>No points earned</i>) <b>Quiz 1</b> on this week's readings</p>
3	Sept. 8 <b>F2F</b>	<ul style="list-style-type: none"> <li>• Inquirize your teaching</li> <li>• Reviewing science education curricula</li> <li>• Science probe</li> </ul> <p>Course Module 2: Questions, variables, and hypotheses.</p>	<p>Read:</p> <ul style="list-style-type: none"> <li>• Scribner-MacLean: <i>More than just guessing</i></li> </ul> <p><b>Submit Impressionist Tale Quiz 2</b> on this week's reading</p>
4	Sept. 15 <b>Online</b>	<ul style="list-style-type: none"> <li>• BirdSleuth Curriculum</li> <li>• The Nature of science (NOS)</li> <li>• Science probe</li> </ul> <p>Course Module 3: The Nature of Science</p> <p><b>Activity 2:</b> My Lesson Plan Part 1</p> <p><b>Threaded Discussion 2</b></p>	<p>Read:</p> <ul style="list-style-type: none"> <li>• Crowther, Lederman, and Lederman: Understanding the true meaning of the nature of science</li> </ul>
5	Sept. 22 <b>F2F</b>	<ul style="list-style-type: none"> <li>• BirdSleuth Curriculum</li> <li>• Practicing with the Art Elements/ Communicating through Art</li> </ul>	<p>Read:</p> <ul style="list-style-type: none"> <li>• Porter et al: <i>The art and science of notebooks</i></li> </ul>

6	Sept. 29  <b>Online</b>	<ul style="list-style-type: none"> <li>Teaching the language of science to ELLs</li> <li>Measuring with toys</li> <li>Interactive word walls</li> <li>Science snacks</li> </ul> <p><b>Activity 3: Inquiry investigation Part 1</b> Course Module 4: Science vocabulary</p>	<p>Read:</p> <ul style="list-style-type: none"> <li><i>Crowther et al: Academic vocabulary instruction</i></li> </ul> <p><b>Submit your philosophy illustration outline</b></p> <p><b>Quiz 3 on this week's reading</b></p>
7	Oct. 6  <b>Online</b>	<ul style="list-style-type: none"> <li>Basic and integrated inquiry skills: Observing, collecting data, predicting, and constructing graphs</li> <li>Examining student work</li> <li>BirdSleuth Curriculum</li> <li>Bird survey around your house</li> </ul> <p>Course Module 5: Graphing skills <b>Threaded Discussion 3</b></p>	
8	Oct. 13  <b>Online</b>	<ul style="list-style-type: none"> <li><i>Outlining a 5E lesson plan</i></li> </ul> <p>Course Module 6: The 5E Model <b>Activity 4: Science Activity Analysis</b></p>	<p>Read:</p> <ul style="list-style-type: none"> <li><i>Bybee: The 5E Model</i></li> </ul> <p><b>Quiz 4 on this week's reading</b></p>
9	Oct. 20  <b>F2F</b>	<ul style="list-style-type: none"> <li>Literature connections</li> </ul> <p><b>Activity 5: My Lesson Plan Part 2</b></p>	<p>Read:</p> <ul style="list-style-type: none"> <li><i>Munakata: Lessons from the little prince</i></li> </ul>
10	Oct. 27  <b>F2F</b>	<ul style="list-style-type: none"> <li>STEM Activity and Lesson Merit Presentation</li> </ul> <p><b>Activity 6: Inquiry Activity Part 2</b></p>	<p><b>Submit your group's lesson plan for peer review (One per group).</b></p>
11	Nov. 3  <b>Online</b>	<ul style="list-style-type: none"> <li>Discussion on Lesson planning</li> </ul> <p><b>Activity 7: Science Activity Analysis</b></p>	
12	Nov. 10  <b>F2F</b>	<ul style="list-style-type: none"> <li>Accommodating ELLs in the science classroom</li> <li>Writing and speaking in science</li> <li>Science Journaling</li> </ul> <p>Course Module 7: Accommodating ELLs in the science classroom.</p>	<p>Read:</p> <ul style="list-style-type: none"> <li><i>Gomez-Swiep, Straits, &amp; Topps: 5E for ELLs</i></li> </ul> <p><b>Submit review of lesson plan</b> <b>Quiz 5 on this week's reading</b></p>

13	Nov. 17  <b>Online</b>	Art and science grow together (Inquiry Project)	
14	Nov. 24	Thanksgiving	
15	Dec. 1  <b>F2F</b>	<ul style="list-style-type: none"> <li>• Discussion on the philosophy of science teaching</li> <li>• Who is a scientist? Part II</li> <li>• Inquiry investigations: In class discussion and project presentations</li> </ul> <p><b>Activity 8: Inquiry Investigation Part 3</b> <b>December 1 Last day of classes</b></p>	<b>Submit your science teaching philosophy illustration</b>
16		<b>December 5-9: Finals Week</b>	<p><b>Submit your group's or individual lesson plan by Friday, December 10 at 5:00 pm.</b></p> <p><b>Take final exam on Blackboard this week between Monday (8:00 am) and Friday (5:00 pm)</b></p>

## References

- Bell, R. L., Smetana, L., & Binns, I. (2005). Simplifying inquiry instruction. *The Science Teacher*, 72(7), 30-33.
- Bryan, L. A., & Tippins, D. J. (2005). The Monets, Van Goghs, and Renoirs of science education: Writing impressionist tales as a strategy for facilitating prospective teachers' reflections on science experiences. *Journal of Science Teacher Education*, 16, 227-239.
- Bybee, R. W. (2014). The 5E instructional model: Personal reflections and contemporary implications. *Science & Children*, 51(8), 10-13.
- Colburn, A. (2000). An inquiry primer. *Science Scope*, 23(6), 42-44.
- Crowther, D. T., Lederman, N. G., & Lederman, J. S. (2005). Understanding the true meaning of the nature of science. *Science & Children*, 43(2), 50-52.
- Crowther, D. T., Tibbs, E., Wallstrum, R., Storke, E., & Leonis, B. (2011). Academic vocabulary instruction within inquiry science: The Blended/Tiered approach. *AccELLerate!* 3(4), 17-20.
- Finson, K. (2010). Inference or observation? *Science & Children*, 48(2), 44-47
- Llewellyn, D. (2007). Making the most of concept maps. *Science Scope*, 74-77.
- Gomez-Swiep, S., Straits, W., & Topps, J. (2015). 5E for ELLs. *Science & Children*, 53(2), 80-86.
- Michaels, S., Shouse, A. & Schweingruber, H. (2008). Ready, Set, Science! Putting Research to Work in K-8 Science Classrooms. National Academy Press.
- Munakata, M. (2005). Lessons from the Little Prince. *Science & Children*, 40-42.
- Porter, K., Yokoi, C., & Yee, B. (2011). The art and science of notebooks: An interdisciplinary approach to teaching students to record accurately. *Science & Children*, 42-46.
- Roriguez, A. J. (1998). Strategies for counterresistance: Toward sociotransformative constructivism and learning to teach science for diversity and for understanding. *Journal of Research in Science Teaching*, 35(6), 589-622.

Scribner-MacLean, M. (2012). More than just guessing: The difference between prediction and hypothesis. *Science Scope*, 37-40. Yager, R. E. 1988. Never playing the game. *The Science Teacher*, 55 (6): 77.

### **Some Trade Books Used in this Course**

Anaya, R. (2012). *The first tortilla: A bilingual story*. University of New Mexico Press

Andrews, K. (2016). *Mira forecasts the future*. New York: Sterling Children's Books.

Andros, C. (2017). *Charlotte the scientist is squished*. Boston: Clarion Books/Houghton Mifflin Harcourt

Beaty, A. (2007). *Iggy Peck, Architect*. Abraham Books for Young Readers.

Beaty, A. (2013). *Rosie Revere, Engineer*. Harry N. Abrahams. Beaty, A. (2016). *Ada Twist, Scientist*. Harry N. Abrahams

ChavarriaChavez, B. (2000). *Magda's tortillas*. Arte Publico Pr.

Cowley, J. (2002). *Big moon tortilla*. Honesdale, PA: Boyds Mills Press.

Davies, J. (2004). *The boy who drew birds: A story of John James Audubon*. Boston: Houghton Mifflin

DePaola, T. (1978). *The popcorn book*. Holiday House.

De St Exupery, A. (1943). *The little prince*. Reynal & Hitchcock.

Galdone, P., & Galdone, J. C. (1984). *The three little pigs*. Boston: Houghton Mifflin.

Gibbons, G. (1993). *From seed to plant*. Holiday House.

Gibbons, G. (2012). *Ladybugs*. Holiday House.

Lionni, L. (1970). *Fish is fish*. New York: Pantheon Books.

Lionni, L. (1963). *Swimmy*. New York: Pantheon Books.

Lowell, S., Bowman, M., & Lobel, M. (1992). *The three little javelinas*. Northland Pub.

Martin, J. (1998). *Snowflake Bentley*. Boston: Houghton Mifflin.

Paulsen, G. (1995). *The tortilla factory*. Harcourt Brace, San Diego.

McDonnell, P. (2011). *Me...Jane*. New York: Little, Brown and Co. Moreno

Winner, R. (2002). *Lucas and his loco beans*. BrainStorm 3000.

Young, E., & Wong, B. D. (1992). *Seven blind mice*. New York: Philomel Books.

**BED 4311: Teaching Science in the Bilingual/Elem Classroom**  
**Student Profile** (*Submit this form in Week 3*)

Name: \_\_\_\_\_

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

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Any additional comments (e.g. pressing issues this semester that may affect your performance) that you need to share with your instructor.

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If you experience any difficulties with the course—*please do not wait*, contact the instructor as soon as possible—email, phone, or in-person meeting.

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

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Date

## Assignment Rubrics

### Growth Essay 1: My Impressionist Tale

Component	10	5	1
<b>Length</b>	<ul style="list-style-type: none"> <li>The essay is 1-page (single-spaced) long.</li> </ul>	<ul style="list-style-type: none"> <li>The essay is 1 - ½ pages (double-spaced) long.</li> </ul>	<ul style="list-style-type: none"> <li>The essay is &gt;1 - ½ pages (double-spaced) long.</li> </ul>
<b>One science learning episode</b> <i>[Paragraph 1]</i>	<ul style="list-style-type: none"> <li>Addresses <u>one</u> meaningful science learning experience</li> <li>Identifies time and location</li> <li>Describes in detail the episode</li> <li>Identifies the participants of the episode.</li> <li>Draws the reader into the episode being described and uses evocative language that reflects what the writer feels about the topic.</li> </ul>	<ul style="list-style-type: none"> <li>Addresses one science learning episode but fails to highlight its relevance.</li> <li>Identifies either time or space</li> <li>Partial description of the learning episode.</li> <li>Identifies the participants of the episode.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Addresses more than one science learning episode</li> <li>Missed to identify time and location.</li> <li>Vague description of the episode.</li> <li>Identifies only the main protagonist of the episode</li> <li>Does not draw the reader into to the episode; the use of evocative language is minimal.</li> </ul>
<b>Critical Emotions</b> <i>[Paragraph 2]</i>	<ul style="list-style-type: none"> <li>Identifies emotions and feelings (positive/negative) associated with the learning episode.</li> <li>Answers the 2-part question.</li> <li>Cites correctly at least one publication dealing with the concept of emotions; the citation clearly supports a statement of claim.</li> </ul>	<ul style="list-style-type: none"> <li>Provides a list of emotions and feelings (positive/negative).</li> <li>Answers the 2-part question in a general manner.</li> <li>Incorrect citation; unclear relationship between the citation and the point being made.</li> </ul>	<ul style="list-style-type: none"> <li>Provides a list of emotions and feelings (positive/negative).</li> <li>Provides a general answer to the 2-part question; includes an incorrect/unrelated citation.</li> </ul>
<b>Mechanics of English and Format</b>	<ul style="list-style-type: none"> <li>Appropriate expression of concepts, accurate vocabulary, no errors occur with regard to grammar, conventions and spelling.</li> <li>Document is consistent in format (font type and size).</li> </ul>	<ul style="list-style-type: none"> <li>Clear expression and vocabulary, some mechanical errors exist but do not get in the way of understanding.</li> <li>Document has some formatting problems.</li> </ul>	<ul style="list-style-type: none"> <li>Unclear expression of concepts, mechanical errors exist. Many errors with regard to grammar, spelling and conventions.</li> <li>There is no formatting structure.</li> </ul>

**Science Teaching Philosophy Illustration (15 pts)**

<i>Criteria</i>	<i>Feedback</i>		
	<i>Excellent (5)</i>	<i>Satisfactory (3)</i>	<i>Underperform (1)</i>
<ul style="list-style-type: none"> <li>• <i>Uses one art or mixed media (e.g., watercolor, collage, acrylics, etc).</i></li> <li>• <i>Represents the most salient ideas (at least 4) or beliefs concerning the teaching of science.</i></li> <li>• <i>The visual work can be of any size, realistic or abstract.</i></li> <li>• <i>After reading the statement, one can see the relevance of the salient ideas/beliefs.</i></li> </ul> <p><i>Statement</i></p> <ul style="list-style-type: none"> <li>• <i>The statement is 100-word long; it is personal and incorporates science education terminology.</i></li> <li>• <i>It truly uses at least two art elements to tell the viewer about where and how those main ideas about science teaching are depicted in the illustration.</i></li> <li>• <i>It is fully focused on science teaching/learning.</i></li> <li>• <i>Appropriate expression of concepts, accurate vocabulary, no errors occur with regard to grammar, conventions and spelling.</i></li> </ul>			







### 5E Lesson Plan (40 pts)

	5 pts	3 pts	1 pt.
<i>Learning objectives</i>	<ul style="list-style-type: none"> <li>-Concise description of what learners are expected and able to do by the end of the lesson</li> <li>- Objective statements include a variety of actions verbs (lower and higher order) that address different cognitive levels.</li> <li>- There is evidence in the evaluation section that students' learning is linked to the concepts and skills addressed in the learning objectives.</li> <li>-Objective statements are clear enough that a substitute teacher would not have difficulties delivering the lesson.</li> <li>- Includes at least two objectives from each category (content and language).</li> </ul>	<ul style="list-style-type: none"> <li>- Descriptions of what learners are expected to learn are general.</li> <li>-Most action verbs in the objective statements are from either lower or higher order thinking levels that do not address different cognitive levels. -Fail to show connections with the evaluation section.</li> <li>-Some clarifications are needed; a substitute teacher may have difficulties delivering this lesson.</li> <li>- Includes learning objectives but they are not identified; the action verbs are vague (e.g., to study)</li> </ul>	<ul style="list-style-type: none"> <li>-The description of the learning objectives is vague.</li> <li>-Action verbs in the objective statements do not support meaningful learning. -The lesson needs a great deal of improvement; a substitute teacher will have difficulties delivering this lesson.</li> <li>-Includes learning objectives that do not provide students with opportunities to demonstrate how much and how well they mastered the main concepts of the lesson.</li> </ul>
	5 pts	3 pts	1 pt.
<i>TEKS alignment</i>	<ul style="list-style-type: none"> <li>-Lists pertinent standards for the target grade level.</li> <li>-There is evidence (i.e., in the evaluation section) that student's learning is linked to the listed standards.</li> <li>The lesson clearly addresses the principles of the Socio Transformative Constructivism learning theory.</li> </ul>	<ul style="list-style-type: none"> <li>-Listed standards do not fully relate to the lesson. -</li> <li>Partial evidence (i.e., in the evaluation section) that student's learning is linked to the listed standards. -</li> <li>The lesson partially addresses the four elements of the Socio Transformative Constructivist learning theory; the elements are not identified.</li> </ul>	<ul style="list-style-type: none"> <li>-Lesson is loosely connected to the standards.</li> <li>-The lesson does not address the four elements of the Socio Transformative Constructivist learning theory.</li> </ul>
	5 pts	3 pts	1 pt.
<i>Vocabulary Instruction</i>	<ul style="list-style-type: none"> <li>-In this section, the lesson identifies one vocabulary instruction format (i.e., Tiered instruction, frontloading).</li> <li>-Lesson describes the use of the target vocabulary instruction format. The vocabulary instruction format is also addressed in the body of the lesson (5Es).</li> <li>-Vocabulary of the lesson is identified/listed (i.e., Tier 1, Tier 2, and Tier 3 words).</li> </ul>	<ul style="list-style-type: none"> <li>-In this section, the lesson identifies one vocabulary instruction format (i.e., Tiered instruction, frontloading).</li> <li>-Lesson describes the use of the target vocabulary instruction format but it is not addressed in the body of the lesson (5Es).</li> <li>-Vocabulary of the lesson is vaguely identified/listed (i.e., Tier 1, Tier 2, and Tier 3 words).</li> <li>- The assessment strategy identified in the body of</li> </ul>	<ul style="list-style-type: none"> <li>- Lesson does not identify one vocabulary instruction format (i.e., Tiered instruction, frontloading).</li> <li>-Lesson does not describe the use of the target vocabulary instruction format. -</li> <li>The lesson does not address vocabulary instruction in the 5E section.</li> <li>-Vocabulary list is missing major scientific concepts.</li> </ul>

	- Lesson includes at least one assessment strategy focused exclusively on the scientific terminology students encountered in the lesson.	the lesson is not clearly focused on the scientific terminology students encountered in the lesson.	- The lesson does not include an assessment strategy focused on the scientific terminology students encountered in the lesson.
	<b>20-15 pts</b>	<b>14-10 pts</b>	<b>9-1 pts</b>
<i>Lesson Body</i>	<p>-Lesson clearly describes what the teacher and the student will do in each stage of the 5E cycle. -  <b>Engagement</b> (hook/attention grabber): describes one task that creates interest and leads students into exploration.  <b>-Exploration:</b> describes a STEM-based activity/strategy that encourages students to work together in the solution to the posed problem or challenge; students imagine, plan, test, and improve their designs; students formulate predictions and record observations and most importantly use the Engineering by Design process (EDP).  <b>-Explanation:</b> 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.  <b>-Elaboration:</b> describes an extension [new] activity that is hands-on/minds-on; there is evidence that students use this activity to apply concepts and skills.  <b>-Evaluation:</b> includes both formative and summative assessment formats; assessments address the concept and skills stated in the learning objectives.</p>	<p>-General description of what the teacher and the student will do in each stage of the 5E cycle. -  <b>Engagement</b> (hook/attention grabber): unclear description of a strategy that creates interest. Engagement does not clearly connect with the exploration phase.  <b>-Exploration:</b> describes an activity that although builds on the EDP process seems unrelated to the previous phase; although students are encouraged to work together they there is no evidence that the students will imagine, plan, test, and improve a design; students practice a few inquiry skills only (e.g., test predictions).  <b>-Explanation:</b> 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.  <b>-Elaboration:</b> describes a known activity that is hands-on/minds-on; there is little evidence that students use this activity to apply concepts and skills.  <b>-Evaluation:</b> includes both formative and summative assessment formats; assessments partially address the concept and skills stated in the learning objectives.</p>	<p>-Vague description of what the teacher and the student will do in each stage of the 5E cycle.  <b>-Engagement</b> (missing hook/attention grabber): activity or strategy does not create interest in the topic of the lesson. -  <b>Exploration:</b> students are not encouraged to work together; students do not have the opportunity to practice the EDP process; the activity seems focused on producing an artifact; no inquiry skills (e.g., test and form new predictions, record observations) are practiced.  <b>-Explanation:</b> 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. -  <b>Elaboration:</b> a new hands/minds-on activity is not described; there is no evidence that students use this activity to apply concepts and skills.  <b>-Evaluation:</b> includes a vague description of the assessment; does not identify the assessment type.</p>
	<b>5 pts</b>	<b>3 pts</b>	<b>1 pt.</b>
<i>Mechanics of English and Format</i>	<p>-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 2 pages long (not including supporting documents).</p>	<p>-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 3-4 pages long (not including supporting documents)</p>	<p>-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 &gt;5 pages long (not including supporting documents)</p>

**Comments**

### Link to TExES Competencies (Science domain)

<p>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.</p>	<p>These standards will be addressed and/or assessed with the following course activities and assignments</p>
<p><b>Competency: Safe and proper laboratory processes.</b></p> <p>The beginning teacher:</p> <p>D. Selects and safely uses appropriate tools, technologies, materials for instructional activities.....</p> <p>E. Understands concepts of precision, accuracy and error with regard to reading and recording numerical data from a scientific instrument.....</p> <p>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).....</p> <p>G. Understands the international system of measurement (i.e., metric system) .....</p>	<ul style="list-style-type: none"> <li>• 5E Lesson</li> <li>• Inquiry investigation (Parts II, and III)</li> <li>• Bird survey</li> <li>• Popcorn activity</li> <li>• Inquiry activities</li> </ul>

<p><b>Competency: Scientific inquiry</b></p> <p>The beginning teacher:</p> <p>A. Understands plans and implements instruction that provides opportunities for all students to engage in non-experimental- and experimental-inquiry investigations.....</p> <p>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.....</p> <p>D. Knows how to guide students in making systematic observations and measurements.....</p> <p>E. Knows how to promote the use of critical-thinking skills, logical reasoning and scientific problem solving to reach conclusions based on evidence.....</p> <p>F. Knows how to teach students to develop, analyze and evaluate different explanations for a given scientific result.....</p> <p>G. Knows how to teach students to demonstrate an understanding of potential sources of error in inquiry-based investigation.....</p> <p>H. Knows how to teach students to demonstrate an understanding of how to communicate and defend the results of an inquiry-based investigation.....</p> <p>J. Understands the roles that logical reasoning, verifiable evidence, prediction and peer review play in the process of generating and evaluating scientific knowledge.....</p> <p>K. Understands the historical development of science and the contributions that diverse cultures and individuals of both genders have made to scientific knowledge.....</p>	<ul style="list-style-type: none"> <li>• 5E STEM lesson plan, final test, impressionist tale, and readings from week 2.</li> <li>• Inquiry investigation (Part I), online quizzes</li> <li>• Inquiry investigation (II &amp; III) and 5E Lesson</li> <li>• Popcorn activity, inquiry activities, bird survey, activities 3, 6 and 9.</li> <li>• Inquiry investigation (I, II, &amp; III)</li> <li>• Quizzes, and reading from week 4</li> </ul>
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<p><b>Competency: Impact on daily life/environment</b></p> <p>The beginning teacher:</p> <p>A. Understands that decisions about the use of science are based on factors such as ethical standards, economics and personal and societal needs.</p> <p>F. Understands the role science can play in helping resolve personal, societal and global challenges.</p>	<ul style="list-style-type: none"> <li>• Final test and quizzes</li> <li>• Final test and quizzes</li> </ul>
<p><b>Competency: Unifying concepts and processes in science</b></p> <p>The beginning teacher:</p> <p>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.</p> <p>B. Demonstrates an understanding of how patterns in observations and data can be used to make explanations and predictions.</p> <p>F. Understands how change and constancy occur in systems.</p> <p>G. Understands the complementary nature of form and function in a given system.</p>	<ul style="list-style-type: none"> <li>• Inquiry investigation (Parts II and III)</li> <li>• Activities, readings from week 2</li> <li>• Inquiry investigation</li> <li>• Inquiry investigation</li> </ul>

<p><b>Competency: Theory and practice of science teaching</b></p> <p>The beginning teacher:</p> <p>A. Understands how developmental characteristics, prior knowledge and experience and students' attitudes influence science learning.</p> <p>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.</p> <p>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.</p> <p>D. Understands common misconceptions in science and has effective ways to address those misconceptions.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>• 5E STEM lesson (peer review, final draft, and delivery), final test, quizzes, discussions, course activities, and reflection on science teaching views.</li> </ul>
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<p><b>Competency; Assessment in science learning</b></p> <p>The beginning teacher:</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>• Readings from weeks 6 and 8, 5E STEM lesson plan (design and review), and final test.</li> </ul>
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<p><b>Competency: Life science</b></p> <p>The beginning teacher:</p> <p>A. Understands that living systems have different structures that perform different functions.</p> <p>B. Understands and describes stages in the life cycles of common plants and animals.</p> <p>C. Understands that organisms have basic needs.</p>	<ul style="list-style-type: none"> <li>• Inquiry investigation (I, II, and III)</li> </ul>
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