



**Teaching Science in Secondary School**  
 ONLINE SCED 4368 Fall 2020 Syllabus

<b>Instructor &amp; Contact Information:</b> Justice Toshiba Walker, PhD Primary: Blackboard Course Messages Secondary: jtwalker@utep.edu	<b>Meeting Time, Duration, &amp; Location:</b> Tuesdays (ONLINE and asynchronous) 3:00 pm - 5:50 pm August 24th – December 3rd 2020
<p><b>Office Hours:</b> Virtual drop-in office hours are scheduled weekly 60 minutes before class time (i.e., Tuesdays from 2:30-3:00pm MDT). <a href="#">Use this link</a>. Other meeting times are available by appointment. Questions are welcomed and encouraged. Email any time.</p> <p><b>Course Website:</b> We will frequently communicate through the course website which can be accessed using Blackboard. The function of the course website is primarily for discussion, collaboration on weekly readings, for sharing information or activities that you find interesting and relevant, and for submitting assignments. It is intended to function as a structure to support asynchronous instruction.</p>	

**Course Description:**

This course addresses teaching and learning in secondary science classrooms. The topics have been selected to reflect current and relevant areas in science education practice. Accordingly, they address issues that impact students, teachers and schools in diverse contexts. The course is premised on several organizing themes in education, including:

21st Century Learning: topics investigated under this theme include: Inquiry, Problem, and Design-based learning, information technologies, educational technologies, current STEM fields of research, citizenship science, and ethical decision-making.

Skills: topics investigated under this theme include: literacy, questioning, visualizations, direct instruction strategies, and teaching SPED and gifted students.

Teaching Science in Diverse Schools: topics investigated under this theme include: culturally relevant pedagogies, English language learning, gender, and workforce development.

**Student Learning Outcomes:**

TExES 7-12	By the end of the course, the student will be able to:	To evaluate these outcomes, the faculty member will use the following assessment procedures:
V, VI	Develop an understanding of current issues, practices and directions in science curriculum and the ability to inquire into these.	a. Online interactions and Discussion posts b. Quizzes and Exams c. Written Reflections
V, VI	Develop knowledge and skills in educational research	a. Online interactions and Discussion posts b. Lesson Plan Development

		c. Quizzes and Exams c. Written Reflections
V, VI	Identify and Analyze topics of importance in current science education	a. Online interactions and Discussion posts b. Electronic Databases Literature Searches c. Quizzes and Exams d. Written Reflections
ALL	Deepen their commitment to their pupils' learning of science	a. Online interactions and Discussion posts b. Lesson Plan Development c. Written Reflections
ALL	Increase their confidence to teach science	a. Online interactions and Discussion posts b. Lesson Plan Development c. Written Reflections
V, VI	Improve their ability to manage and assess their pupils' science learning. Discover innovative methods of instruction to increase effectiveness and pupils' engagement, learning, and thinking	a. Online interactions and Discussion posts b. Quizzes and Exams c. Written Reflections d. Lesson Plan Development
ALL	Improve their capacity to think reflectively and creatively about their teaching of science.	a. Online interactions and Discussion posts b. Quizzes and Exams c. Written Reflections
ALL	Increase their capacity to become an agent of change in the field of science education through effective teaching and communication.	a. Online interactions and Discussion posts b. Lesson Plan Development c. Written Reflections
ALL	Develop knowledge and strategies to design curriculum at classroom and school levels.	a. Online interactions and Discussion posts b. Lesson Plan Development d. Written Reflections

### Specific Course Objectives:

The course also places special emphasis on developing mastery along the following strands: (i) relevant science content expertise, (ii) diverse perspectives student learning and knowledge building, (iii) designing meaningful and appropriately rigorous learning experiences, (iv) leveraging effective tools to assess student learning. As such, at the conclusion of the course, students should be able to:

1. Identify and describe the goal of science education in a modern democratic society—and addressing such key ideas as: why learn science; what counts as science; and what does it mean to practice science?
2. Address science competencies suitable for the successful completion of state certification content exams (e.g., TExES).
3. Engage with an arc of pedagogical paradigms that span from traditional, to contemporary, to emerging instructional practices in science education.
4. Develop pedagogies that leverage what practice and literature suggest about how middle and secondary-aged students learn science.
5. Address specific resource, cultural, and intellectual teaching challenges within science education in urban contexts.
6. Demonstrate skills in: setting science instructional goals and objectives, curriculum planning and design, implementing differentiated instructional techniques, leveraging instructional technology, and delivering learning experiences all in learner-centric ways that are consistent with your science teaching philosophy and institutional objectives.
7. Design and foster a science learning community that is socially, culturally, and intellectually inclusive.

**High Leverage Practice (HLP):** High-leverage practices are fundamental to science teaching and pedagogy, and, in particular, supporting diverse student populations and their socioemotional

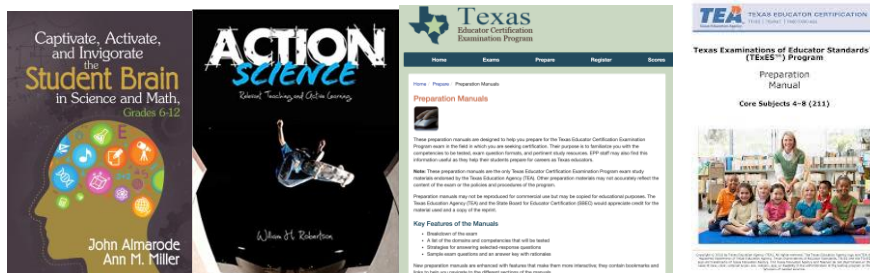
development. Accordingly, this course will incorporate the conversations around the following topics into weekly modules and discussions. More information about these practices and perspectives can be found at: <http://www.teachingworks.org/work-of-teaching/high-leverage-practices>. Those will include:

1. Leading a Group Discussion
2. Explaining and modeling content, practices, and strategies
3. Eliciting and interpreting individual students' thinking
4. Diagnosing particular common patterns of student thinking and development in a subject-matter domain
5. Implementing norms and routines for classroom discourse and work
6. Coordinating and adjusting instruction during a lesson
7. Specifying and reinforcing productive student behavior
8. Implementing organizational routines
9. Setting up and managing small group work
10. Building respectful relationships with students
11. Talking about a student with parents or other caregivers
12. Learning about students' cultural, religious, family, intellectual, and personal experiences and resources for use in instruction
13. Setting long- and short-term learning goals for students
14. Designing single lessons and sequences of lessons
15. Checking student understanding during and at the conclusion of lessons
16. Selecting and designing formal assessments of student learning
17. Interpreting the results of student work, including routine assignments, quizzes, tests, projects, and standardized assessments
18. Providing oral and written feedback to students
19. Analyzing instruction for the purpose of improving it

### Course Structure:

This is an online class that will use UTEP Blackboard, and several online resources to support asynchronous engagement. Classes will be arranged as weekly modules—that is, each week is “packaged” as a single module so that all the materials, lecture notes, submission areas, discussion posts are in one area for a given week. It is expected that students will participate in all online activities.

### Required Texts:



Almarode, J., & Miller, A. M. (2013). Captivate, activate, and invigorate the student brain in science and math, grades 6-12. Corwin Press.

Robertson, W. H. (2014). Action science: Relevant teaching and active learning. Corwin Press.

Texas Educator Certification Examination Program (2020). Preparation Manuals. Retrieved from: [http://www.tx.nesinc.com/PageView.aspx?f=HTML\\_FRAG/GENRB\\_PrepManuals.html](http://www.tx.nesinc.com/PageView.aspx?f=HTML_FRAG/GENRB_PrepManuals.html).

Texas Examinations of Educator Standards (TExES) Program Preparation Manual (2020). Retrieved from: <https://www.tx.nesinc.com/Content/Docs/236PrepManual.pdf>.

**Optional Resources:**

Bybee, R. W. (2014). NGSS and the next generation of science teachers. *Journal of science teacher education*, 25(2), 211-221.

Next Generation Science Standards (2020). Retrieved from: <https://www.nextgenscience.org/>.

Texas Essential Knowledge and Skills (2020). 19 TAC Chapter 112. Texas Essential Knowledge and Skills for Science. Retrieved from: <http://ritter.tea.state.tx.us/rules/tac/chapter112/index.html>.

**Technology Requirement:**

Course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop. You should download or update the following software: Microsoft Office, Adobe Acrobat Reader, Windows Media Player, QuickTime, and Java. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

If you do not have a word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint, Outlook and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about Microsoft Office 365 and follow the instructions.

**IMPORTANT:** If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP Help Desk as they are trained specifically in assisting with technological needs of students. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you! **Note: For students with laptop computer access, visit this link to apply to check out a device with UTEP technology support: <https://semesterlaptop.questionpro.com/>.**

Course Communication (How we will stay in contact with each other): Because this is an online class, we won't see each other in the ways you may be accustomed to: during class time, small group meetings, and office hours. However, there are a number of ways we can keep the communication channels open:

Office Hours: We will not be able to meet on campus, but I will still have office hours for your questions and comments about the course. My office hours will be held on Tuesdays from 2:00-3:00pm MDT using Zoom using this link:

<https://us02web.zoom.us/j/84928390848?pwd=NkppTVhzNkRuVDR3THlMaTBzN2YzUT09>

Email: Blackboard Course Messaging is the best way to contact me. I will make every attempt to respond to your message within 24-48 hours of receipt. When messaging me, be sure to clearly state your question.

Discussion Board: If you have a question that you believe other students may also have, please post it in the Help Board of the discussion boards inside of Blackboard. Please respond to other students' questions if you have a helpful response.

Announcements: Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

### Course Assignments and Weighting:

Assignment Category	Percentage
<b>Discussion Board Engagement and Professionalism(weekly):</b> Class members are expected to— on a weekly basis—author at least ONE response to discussion board prompts on Blackboard. Writing prompts will consist of material from readings, module content, professional self-reflections, etc. Course members are also required to respond to at least TWO entries from a classmate. A rubric is available on Blackboard. Please note: this amounts to THREE Blackboard discussion posts each week.	20%
<b>Written Reflections (300 words each):</b> You will write twelve reflections based on observations of videos of teachers in practices. This is an augmented assignment that fulfills the course and teacher credentialing field experience requirement. The goal of field-based experience for this methods course is to give students first-hand experience observing in-service teachers and reviewing learning theories/practices via video. Your focus, as a student, is on the tools and strategies (pedagogy/methods) being used. You will be given a prompt/observation protocol to guide your observations for each video. You should draw on your prior experiences, course readings, and/or other sources when completing these reflections. These reflections are meant to help you synthesize course content in relation to your experiences and practice.	10%
<b>5-day Lesson Planning:</b> At three points in the course, you will be asked to produce a 5-day (one instructional unit) lesson plan that leverages a distinct active learning paradigm discussed in class (e.g., inquiry, problem, and/or design-based). The lesson plan should use the 5E or 7E learning model and template provided. Example lessons are available on Blackboard. The lesson plan should be used to deliver a content area listed in the TExES Science Domains (or Chapter 112. Texas Essential Knowledge and Skills for Science). A scoring rubric for this assignment is available on Blackboard.	30%
<b>Content Area Quizzes:</b> You will complete 5 TExES science content area quizzes. These quizzes are open book and are available on Blackboard. These quizzes are meant to engage you with science content area necessary for instructional credentialing and will be drawn from information provided in the TExES preparation manual listed in the required text resource list.	20%
<b>Final Assignment:</b> The final exam is composed of two parts: (1) an individual content area exam that is consistent with state credentialing exam and (2) a group assignment that entails building a detailed 3-unit lesson plan. The individual content area exam is not to be done in collaboration with others and will be held online. In addition, and in groups of 2-3, you and your group will put together a 3-unit (e.g., approximately 15 day) lesson plan (using the 5E or 7E learning model) and accompanying teaching resources. Each unit should distinctly leverage one of the active learning paradigms discussed in class (e.g., inquiry, problem, and/or design-based). The lesson plan should use the 5E or 7E learning model and template provided. The lesson plan should be used to deliver a content area listed in the TExES Science Domains (e.g., Chapter 112. Texas Essential Knowledge and Skills for Science). In addition to the unit plans and accompanying resources, your group should also prepare a 500-word descriptive summary of the unit, learning goals, and resource instructions. A scoring rubric for this assignment is available on Blackboard.	20%

### Grading Scheme:

Letter grade	Range of percent
A (Excellent)	100-90%
B (Above Average)	89-80%
C (Average)	79-70%
D (Below Average)	69-60%
F (Failing)	< 60%

### Course Guidelines:

Absences and/or Course Drop: According to UTEP Curriculum and Classroom Policies, “When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of “W” before the course drop deadline and with a grade of “F” after the course drop deadline.” See academic regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to non-

performance in the course, you are at risk of failing, I will drop you from the course. I will provide 24 hours advance notice via email.

Incomplete Grade Policy: Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

Engagement: Course members (i.e., students) are expected to complete all online class modules and thoroughly prepared to engage course reading on weekly discussion board. There will be a 5% deduction of your total grade for any missed modules. This is in addition to penalties associated with missed assignments.

Completion Period: Because this is an asynchronous course, the expectation is that you complete each module within the completion window provided for each (i.e., one week). Assignments are to be submitted through Blackboard Assignment/Google Classroom on the date indicated by 11:59 PM. No hard copies of assignments will be accepted. If assignments are accepted late, a 10-point penalty for every 24-hour period of tardiness may be deducted beginning after the submission due date and time (e.g an assignment due May 28th at 9:00 am via Blackboard is considered late at 9:00am on May 29<sup>th</sup>). Any possibility for an extension must be approved at least 48 hours in advance of the due date and does not guarantee penalty waiver. To be clear: assignments may not be accepted if no prior arrangement has been made with the instructor. Late assignments will only be accepted penalty free in documented cases of technical difficulties that are reported 48 hours before the due date. Please try to submit assignments on time or early.

Missed Assignments: Missed assignments will not be accepted, however there will be opportunities to complete extra credit throughout the semester. Those opportunities are listed in the course schedule. Additional opportunities will be announced on Blackboard and will typically include opportunities to complete additional reflections, quizzes, or teaching assignments (e.g., virtual tutoring).

Language Use: For this course to meet objectives and to be effective it is expected course members be respectful to one another and the diverse groups with which we engage. This is especially important when discussing or sharing about our different perspectives and experiences. In addition, it is an essential aspect of this course that we practice, demonstrate and reflect on the language we use to describe and discuss individuals with language or intellectual differences. This guideline is not intended to limit your freedom of expression, but instead to deepen your consideration of how we use language and the impacts that use has on how we understand others.

Class Community and Professionalism: Course members are expected to participate actively and meaningfully in each class module, and the discussion board. This includes making connections between reading assignments, discussions and activities. It is expected for members to ask questions and raise issues throughout our time together in ways that serve to promote thinking, exchange of ideas and critical reflection.

Academic Integrity: Students are expected to uphold the highest standards of academic integrity that are consistent with course norms and practices. 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.

Accommodations Policy: The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at [cass@utep.edu](mailto:cass@utep.edu), or apply for accommodations online via the CASS portal.

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).

Inclusiveness and Equity: A priority in our classroom is to cultivate relationships of trust and respect and a sense that we see each other as whole, complex human beings. To that end, I want you to know that all of you is welcome in our virtual classroom space—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).

Carefully Edited Written Products: Carefully proof and edit your writing. Excellent grammar and syntax, as well as, appropriate APA citations are expected. Guidance on this format can be found at: <http://owl.english.purdue.edu/owl/resource/560/01/> or <http://www.apastyle.org/>.

**Supplemental Resources** (Where you can go for assistance):

**Technology Resources:** Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus. If these technical challenges affect your participation in the course, please report them the UTEP Helpdesk promptly, and then forward the case number to me.

**Academic Resources:** **UTEP Library:** Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.

**University Writing Center (UWC):** Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources. **Math Tutoring Center (MaRCS):** Ask a tutor for help and explore other available math resources. **RefWorks:** A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide. **Grammarly:** <https://www.grammarly.com/>.

**Individual Resources:** **Military Student Success Center:** Assists personnel in any branch of service to reach their educational goals. **Center for Accommodations and Support Services:** Assists students with ADA-related accommodations for coursework, housing, and internships. **Counseling and Psychological Services:** Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

**COVID-19 Precautions:** The University of Texas at El Paso requires everyone to wear a mask in common spaces, or where two or more individuals are located, including, but not limited to, classrooms. You must wear a mask covering your nose and mouth at all times in this class. If you choose not to wear a mask, you may not enter the classroom. If you remove your mask, you will be asked to put it on and/or leave the classroom. Students who refuse to wear a mask and/or follow preventive COVID-19 guidelines will be dismissed from the class and will be subject to disciplinary action according to Section 1.2.3 Health and Safety and Section 1.2.2.5 Disruptions as defined in the UTEP Handbook of Operating Procedure. For each day that you attend campus—for any reason—you must complete the questions on the UTEP screening website (<https://screening.utep.edu>). The website will verify if you are permitted to attend class in-person. Under no circumstances should anyone come to class when feeling ill or exhibiting any of the known COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, and alternative instruction will be provided. Students are advised to minimize the number of encounters with others to avoid infection. Please note that if COVID-19 conditions deteriorate in the City of El Paso, all course and lab activities will be transitioned to remote delivery.



## Course Schedule

This is a tentative schedule. Any necessary changes will be announced via Blackboard.

Module 1: 8/24-8/30	
<b>Guiding Objectives:</b> By the end of this module, student will be able to identify key course objectives and routines in order to develop and implement successful active learning strategies in STEM teaching and learning.	
<b>Guiding Ideas:</b> What is meant by engagement (in education) and how has it been leveraged in your own learning experiences? In what ways are approaches to engagement unique to science education? Are there other forms beyond the emotional, behavioral, and cognitive?	
Topics	Activities
Course Structure & Syllabus Overview TPCK: Technological Pedagogical Content Knowledge Overview: High Leverage Practices (HLP) HLP: Implementing Organizational Routines 7-E Lesson Components and Planning	<b>By 8/27:</b> <a href="#">Read: Week 1 Presentation Slides</a>  Reading Assignment: Action Science Chapter 2: Constructivism and the Classroom Teacher (p. 11-20)  Reading Assignment: Captivate, Activate & Invigorate Chapter 1: The Recipe for an Engaged Brain (p. 1-15)  Initial Discussion Prompt Post  <b>By 8/30:</b> Two Peer Discussion Post Responses  Reflection #1: Personal Sketch/Teaching Statement

**Module 2: 8/31-9/6**

**Guiding Objectives:** Traditional Science Methods (Science Teaching as Inquiry Based Learning): By the end of this module, students will be able to describe constructivist perspectives in science education in order to understand how inquiry-based activities contribute to student learning.

**Guiding Ideas:** What is meant by active learning and how might it be used to support knowledge construction? How is active learning distinct from other forms of learning (e.g., passive or instructionist approaches)? What affordances and constraints exist with an active approaches?

Topics	Activities
<p>Concept Overview Part 1: Theoretical Framings</p> <p>HLP: Eliciting Student Knowledge &amp; Engaging Learners</p> <p>Building Background Knowledge</p> <p>Using Models</p> <p>Academic Content Vocabulary</p>	<p><b>By 9/3:</b>  <a href="#">Read: Week 2 Presentation Slides</a></p> <p>Reading Assignment: Action Science Chapter 4: Linking Pedagogy a Science Content in Practice (p. 31-40)</p> <p>Reading Assignment: Captivate, Activate &amp; Invigorate Chapter 2: Building Background Knowledge (p. 20-41)</p> <p>Initial Discussion Prompt Post</p> <p><b>By 9/6:</b>            Two Peer Discussion Post Responses</p>

**Module 3: 9/7-9/13**

**Guiding Objectives:** By the end of this module, students will be able to identify learning affordances associated with inquiry-based instruction in order to develop appropriate implementation strategies and assessment measures.

**Guiding Ideas:** What is meant by scientific inquiry and what goal is such an approach meant to achieve? What affordances and constraints exist with an inquiry approach? How has inquiry been taken up in your own practice or learning experience?

Topics	Activities
<p>Concept Overview Part 2 Practical Framings</p> <p>Inquiry Implementation &amp; Assessment Strategies</p> <p>Effective Questioning</p> <p>Addressing the Needs of Diverse Learnings (including English Language Learners)</p> <p>HLP: Connecting Pedagogy &amp; Curricula with Student Experiences</p>	<p><b>By 9/10:</b>  <a href="#">Read: Week 3 Presentation Slides</a></p> <p>Reading Assignment: Captivate, Activate &amp; Invigorate Chapter 3: Prime the Brain-Activate Prior Knowledge (p. 44-62)</p> <p>Initial Discussion Prompt Post</p> <p><b>By 9/13:</b>            Two Peer Discussion Post Responses</p> <p>Reflection #2: <a href="#">TIMSS Video</a>-teaching Weather (requires registration/user ID login)</p>

**Module 4: 9/14-9/20**

**Guiding Objectives:** By the end of this module, students will be able to identify learning constraints associated with inquiry-based instruction in order to critique implementation strategies and assessment measures.

**Guiding Ideas:** What is meant by collaborative and cooperative learning? How does collaborative and/or cooperative learning support inquiry-based approaches to science learning? What is a learning technology and how might it be used to support collaborative or cooperative learning?

<b>Topics</b>	<b>Activities</b>
Sociocultural Perspective on Inquiry Introduction to Learning Centers Collaborative/Cooperative Learning HLP: Explaining and Modeling Content, Practices, and Strategies	<b>By 9/17:</b> <a href="#">Read: Week 4 Presentation Slides</a>  Initial Discussion Prompt Post  <b>By 9/20:</b> Two Peer Discussion Post Responses  Reflection #3: <a href="#">Exploring Smithsonian Science Education Center</a>

**Module 5: 9/21-9/27**

**Guiding Objectives:** By the end of this module, students will be able to identify content area priorities in order to design targeted curricular and pedagogical strategies using an inquiry-based approach.

**Guiding Ideas:** What is meant by formal and informal learning? What experiences have you had in informal learning environments? How was that experience distinct from formal experiences you've encountered? What are the impacts of informal learning activities on students' learning? What affordances and constraints exist with each in science learning?

Topics	Activities
Content Knowledge Implementation Part 1  Novelty: Thinking Outside the Box  HLP: Designing Single Lessons or Sequences of Lessons	<p><b>By 9/24:</b>  <a href="#">Read: Week 5 Presentation Slides</a></p> <p>Initial Discussion Prompt Post</p> <p><b>By 9/27:</b>            Two Peer Discussion Post Responses</p> <p>Reflection #4: <a href="#">TIMSS Video</a>-teaching blood</p> <p>QUIZ: TExES Content Knowledge (Domains I - II)</p> <p>Build a 5 Day Inquiry-based Lesson Plan</p>

**Module 6: 9/28-10/4**

**Guiding Objectives:** By the end of this module, students will be able to leverage key understandings in order to design practical inquiry-driven learning experiences.

**Guiding Ideas:** What are the goals of science education? How do inquiry-approaches support or constrain these goals? How do inquiry approaches provide opportunities for socioculturally relevant learning experiences?

Topics	Activities
<p>Content Knowledge Implementation Part 2</p> <p>HLP: Selecting and Building Lesson Assessments</p>	<p><b>By 10/1:</b> <a href="#">Read: Week 6 Presentation Slides</a></p> <p>Reading Assignment: Action Science Chapter 3: Making Science Relevant in the Middle Grades (p. 21-30)</p> <p>Reading Assignment: Captivate, Activate &amp; Invigorate Chapter 5: Why Do We Need to Know This? (p. 95-120)</p> <p>Initial Discussion Prompt Post</p> <p><b>By 10/4:</b> Two Peer Discussion Post Responses</p> <p>Reflection #5: <a href="#">Web-based Inquiry Science Environment</a> (requires registration/user ID login)</p> <p>QUIZ: TExES Content Knowledge (Domains I - IV)</p>

**Module 7: 10/5-10/11**

**Guiding Objectives:** By the end of this module, students will be able to describe social constructivist perspectives in science education in order to understand how problem-based activities contribute to student learning.

**Guiding Ideas:** What is meant by problem based learning (PBL) and what goal is such an approach meant to achieve? What affordances and constraints exist with a PBL approach? How has PBL been taken up in your own practice or learning experience?

Topics	Activities
<p>Concept Overview: Theoretical &amp; Practical Framings</p> <p>PBL Implementation &amp; Assessment Strategies</p> <p>HLP: Identifying Real World Applications</p> <p>Pacing Strategies</p>	<p><b>By 10/8:</b>  <a href="#">Read: Week 7 Presentation Slides</a></p> <p>Reading Assignment: Action Science Chapter 6: Unlocking Resources for Active Learning (p. 51-60)</p> <p>Reading Assignment: Captivate, Activate &amp; Invigorate Chapter 6: Too Much, Too Fast-Maintaining and Engaging Pace (p. 124-148)</p> <p>Initial Discussion Prompt Post</p> <p><b>By 10/11:</b>            Two Peer Discussion Post Responses</p> <p>Reflection #6: <a href="#">TIMSS Video</a>-teaching sunspot pulleys</p>

**Module 8: 10/12-10/18**

**Guiding Objectives:** By the end of this module, students will be able to identify learning constraints and affordances associated with problem-based instruction in order to critically assess implementation strategies and assessment measures.

**Guiding Ideas:** Distinguish inquiry and problem-based approaches to learning? What are the affordances and constraints of each? How might technology be leverage to support each? Which do you prefer, why?

<b>Topics</b>	<b>Activities</b>
Sociocultural Perspective on PBL  HLP: Leveraging Professional Learning Communities	<b>By 10/15:</b> <a href="#">Read: Week 8 Presentation Slides</a>  Reading Assignment: Action Science Chapter 5: Using the 5 E's in Action Science (p. 41-50)  Initial Discussion Prompt Post  <b>By 10/18:</b> Two Peer Discussion Post Responses  Reflection #7: <a href="#">Digital Modeling Using Net LOGO</a>



**Module 9: 10/19-10/25**

**Guiding Objectives:** By the end of this module, students will be able to identify content area priorities in order to design targeted curricular and pedagogical strategies using a problem-driven approach.

**Guiding Ideas:** How might enacting a PBL approach differ with individual work as compared to collaborative or cooperative styles of engagement? Which content areas (if any) do you think are best suited for PBL? Which are least? Why?

Topics	Activities
<p>Content Knowledge Implementation Part 3</p> <p>HLP: Setting Up and Managing Small Group Work</p>	<p><b>By 10/22:</b>  <a href="#">Read: Week 9 Presentation Slides</a></p> <p>Initial Discussion Prompt Post</p> <p><b>By 10/25:</b>            Two Peer Discussion Post Responses</p> <p>Reflection #8: <a href="#">TIMSS Video</a>-teaching rocks</p> <p>QUIZ: TExES Content Knowledge (Domains I-VI)</p> <p>Build a 5 Day Problem-based Lesson Plan</p>

**Module 10: 10/26-11/1**

**Guiding Objectives:** By the end of this module, students will be able to leverage key understandings in order to design practical PBL-driven learning experiences.

**Guiding Ideas:** What is mean by novelty in science education and how can inquiry or PBL approaches be situated to support engagement in this way? What are the disadvantages of over emphasizing novelty in science learning?

Topics	Activities
Content Knowledge Implementation Part 4	<p><b>By 10/29:</b> <a href="#">Read: Week 10 Presentation Slides</a></p> <p>Reading Assignment: Action Science Chapter 7: Action Science and the Future (p. 61-68)</p> <p>Reading Assignment: Captivate, Activate &amp; Invigorate Chapter 4: Captivate with Novelty (p. 67-90)</p> <p>Initial Discussion Prompt Post</p> <p><b>By 11/1:</b> Two Peer Discussion Post Responses</p>

**Module 11: 11/2-11/8**

**Guiding Objectives:** By the end of this module, students will be able to describe constructionist perspectives in science education in order to understand how design-based activities contribute to student learning.

**Guiding Ideas:** What is meant by design based learning and what goal is such an approach meant to achieve? What affordances and constraints exist with a design approach? How has design been taken up in your own practice or learning experience (if at all)?

Topics	Activities
<p>Concept Overview: Theoretical &amp; Practical Framings</p> <p>HLP: Specifying and Reinforcing Productive Student Behavior</p>	<p><b>By 11/5:</b>  <a href="#">Read: Week 11 Presentation Slides</a></p> <p>Reading Assignment: Captivate, Activate &amp; Invigorate Chapter 7: Make Learning a Long-Lasting &amp; Invigorating Experience (p. 153-171)</p> <p>Initial Discussion Prompt Post</p> <p><b>By 11/8:</b>            Two Peer Discussion Post Responses</p> <p>Reflection #9: <a href="#">Designing with Biology</a></p>

**Module 12: 11/9-11/15**

**Guiding Objectives:** By the end of this module, students will be able to identify learning constraints and affordances associated with design-based instruction in order to critically assess implementation strategies and assessment measures.

**Guiding Ideas:** Distinguish between design-based approaches and other forms of active learning? Select a science content area and describe how you would leverage design, problem, and inquiry based approaches to support learning in that area.

<b>Topics</b>	<b>Activities</b>
Design Implementation & Assessment Strategies  HLP: Coordinating and Adjusting Instruction During a Lesson	<b>By 11/12:</b> <a href="#">Read: Week 12 Presentation Slides</a>  Reading Assignment: Captivate, Activate & Invigorate Chapter 8: Building an Engaging Science or Mathematics Lesson or Unit (p. 175-187)  Initial Discussion Prompt Post  <b>By 11/15:</b> Two Peer Discussion Post Responses  Reflection #10: <a href="#">Designing Circuits</a>

**Module 13: 11/16-11/22**

**Guiding Objectives:** By the end of this module, students will be able to identify content area priorities in order to design targeted curricular and pedagogical strategies using a design-based approach.

**Guiding Ideas:** What unique assessment affordances doe inquiry, problem, and design-based science instruction support? Identify a few assessment constraints of each of these methods?

<b>Topics</b>	<b>Activities</b>
Sociocultural Perspective on Design  HLP: Interpreting the Results of Student Work	<b>By 11/19:</b> <a href="#">Read: Week 13 Presentation Slides</a>  Initial Discussion Prompt Post  <b>By 11/25:</b> Two Peer Discussion Post Responses  Reflection #11: <a href="#">Problem Based Learning Revisited: A Case Example</a>  QUIZ: TExES Content Knowledge (Domains I & VIII)  Build a 5 Day Design-based Lesson Plan

**Module 14 11/23-11/29**

**Guiding Objectives:** By the end of this module, students will be able to leverage key understandings in order to design practical design-driven learning experiences.

**Guiding Ideas (extended):** In developing an active learning experience, what considerations should one make in deciding which approach to leverage for learning? Be sure to identify strengths and weaknesses of each approach in your assessment.

Topics	Activities
Content Knowledge Implementation Part 5	<p><b>By 11/26:</b>  <a href="#">Read: Week 14 Presentation Slides</a></p> <p>Initial Discussion Prompt Post</p> <p><b>By 11/29:</b>            Two Peer Discussion Post Responses</p> <p><b>Reflection #12:</b> Post Course Teaching Statement</p> <p><b>By 12/3:</b>            Build a 3 Unit Lesson Plan using Inquiry, Problem, and Design-based approaches</p>

**Module 15: 11/30-12/3**

**Guiding Objectives:** By the end of this module, students will be able to leverage key understandings in order to design practical inquiry, problem, and design-driven learning units of instruction.

**Guiding Ideas (extended):** In developing an active learning experience, what considerations should one make in deciding which approach to leverage for learning? Be sure to identify strengths and weaknesses of each approach in your assessment.

<b>Topics</b>	<b>Activities</b>
TEExES Content Knowledge (Cumulative: Domains I-X)	<b>By 12/3:</b> <a href="#">Read: Week 15 Presentation Slides</a>  <b>Extra Credit Reflection #13: Your choice (select a video example of a teaching implementation)</b>  No Discussion Board Posts this week!

**FINALS WEEK**

**Guiding Objectives:** By the end of this module, students will be able to leverage key understandings in order to design practical inquiry, problem, and design-driven learning units of instruction.

**Guiding Ideas (extended):** In developing an active learning experience, what considerations should one make in deciding which approach to leverage for learning? Be sure to identify strengths and weaknesses of each approach in your assessment.

<b>Topics</b>	<b>Activities</b>
N/A: Finals Week-Work on Unit Plans	<b>By 12/11:</b> <a href="#">Read: Week 16 Presentation Slides</a>  No Discussion Board Posts this week!