



**“The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates.
The great teacher inspires.” -- William Arthur Ward, writer**

SCED 4367/4368 (21326/29619)
ONLINE HYBRID
SYNCHRONOUS/ASYNCHRONOUS
Teaching Mathematics & Science in Secondary School
Spring 2022

This syllabus is subject to change as needed. Any changes to the syllabus will be announced via email or posted on Blackboard. Please note this course is a 100% Online Course.

Instructor Contact Information: Ruby Lynch-Arroyo, PhD

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Synchronous Virtual Class Meeting Times: Thursdays 3:00 pm – 5:50 pm

Office Hours: Virtual on Blackboard Zoom Thursdays after class meeting; By Appointment

Course Philosophy and Description:

For teachers of mathematics and science to be truly effective involves bringing together four basic components:

- A. An appreciation of the discipline of mathematics and/or science itself.
- B. An understanding of how students learn and construct ideas.
- C. An ability to design and select challenging tasks, create problem-solving environments.
- D. The ability to integrate appropriate, mathematically, and/or scientifically meaningful assessment within the teaching process.

One of the main components of teaching is helping students to “discover” mathematics or science for themselves by creating successful inquiry-based, active learning environments, a friendly atmosphere, and an “open mind” approach. The goal of teaching is not only for students to find the correct answer, but to find answers using the "best" method. Hence, a teacher needs to promote students' thinking, to encourage searching for different methods leading to the same answer. Discovery learning is enhanced with error analysis and trial and error. The role of the teacher is to integrate novelty to engage students by posing challenging problems and encourage students to invent new ways of approaching the problem without fear of making a mistake.

This course has been constructed to help you in critically examining the philosophies, theories, research, pedagogical techniques, and materials associated with effective learning and teaching in



secondary classrooms.

Course Goals and Objectives:

We will address factors that support meaningful growth and progress on an inner journey towards personal transformation. Our classroom community will develop a process that will allow us to explore “who we are, what assumptions we hold as true, how and what we teach, how we organize ourselves, and what barriers prevent us from creating authentic learning environments” (Crowell, Caine & Caine, 1998).

Students enrolled in this course will explore the methods of teaching in secondary classrooms. Emphasis is placed on the equity principle (learning for all) and development of conceptual understanding of topics, as well as project/problem-based learning. Specifically, students will become more effective in the following areas by:

- Exploring innovative learning theories and techniques of teaching and learning including problem-based and inquiry, open-ended approach.
- Studying how to apply general and content methods of teaching and learning in diverse classroom settings.
- Helping the students to create successful learning environment in teaching and learning.
- Writing and analyzing lesson plans that support the learning cycle.
- Unpacking state standards for specific content areas and developing practical and engaging use of state standards/TEKS, NCTM Standards, Next Generation Science Standards (NGSS), and Common Core State Standards (CCSS)
- Demonstrating use of educational technology within lesson plan development and mini-teaching experiences.
- Demonstrating understanding of critical reading of texts and web sites through writing and discussion.
- Demonstrating reflection about teaching and learning through writing and discussion.
- Writing and discussion to demonstrate an informed perspective about curriculum and related educational issues.
- Addressing the domain and competencies that will prepare you for state certification content exam [TeXes].

Course Structure:

Classes for this course are Synchronous and asynchronous online (UTEP Blackboard). Asynchronous classes will be a combination of PowerPoint/Video lecture, Blackboard discussion boards, individual/group course assignments, assessments, and exercises, and final exam/project development. It is expected that students will participate in all activities and components of the course.



SCED 4367 Required Texts:

Captivate, Activate, and Invigorate the Student Brain in Science and Math, Grades 6-12 by John Almarode. ISBN - 13: 9781452218021

Connecting Mathematical Ideas: Middle School Video Cases to Support Teaching and Learning by Boaler, J. Second Edition. ISBN-13: 9780325078182

SCED 4368 Required Texts:

Captivate, Activate, and Invigorate the Student Brain in Science and Math, Grades 6-12 by John Almarode. ISBN - 13: 9781452218021

Action Science: Relevant Teaching and Active Learning by Robertson, W. ISBN: 9781452256566
Robertson, W. (2014). *Action Science: Relevant Teaching and Active Learning*. Paperback ISBN 9781452256566

Optional Texts/Resources:

National Research Council. (2005). *How Students Learn Mathematics in the Classroom*. Paperback 5th Ed. ISBN13: 978-0309089494 ISBN10: 0309089492 The following is the link to this book on Amazon.com:http://www.amazon.com/dp/0309089492/?tag=mh0b-20&hvadid=7006650452&hvqmt=e&hvbmt=be&hvdev=c&ref=pd_sl_7mv6j40j4h_e

Jackson, R. R. (2009). *Never work harder than your students and other principles of great teaching*. Alexandria, VA: ASCD. ISBN- 978-1-4166-0757

Brooks, J.G., & Brooks, M.G. (1999). *In Search of Understanding: The Case for Constructivists Classrooms*. Alexandria, VA: ASCD.

Canestari and Marlow (2013). *Educational Foundations: An Anthology of Critical Readings (Third Edition)*. Sage Publications ISBN-13:978-1452216768

Ornstein, A.C., Pajak, E. F., & Ornstein, S.B. (2007). *Contemporary Issues in Curriculum (Fourth Edition)*. Pearson ISBN 0-205-48925-7

Cuban, L. (2013). *Inside the Black Box of Classroom Practice: Change Without Reform in American Education*. Harvard Education Press ISBN 978-1-61250-556-5

Wiliam, D. (2011). *Embedded Formative Assessment*. Solution Tree Press ISBN 978-1-934009-30-7

Burgess, D. (2012), *Teach Like a Pirate: Increase Student Engagement, Boost Your Creativity, and Transform Your Life as an Educator*. Dave Burgess Consulting, Inc ISBN-13: 860-1401291688; ISBN-10: 0988217600



Additional materials/resources we will be using:

Some required readings will be scanned and placed on blackboard, or you will be provided with appropriate web links:

- ❖ Texas Essential Knowledge and Skills (TEKS) for all content areas and grade levels.
<http://ritter.tea.state.tx.us/rules/tac/chapter111/index.html>
- ❖ Common Core Standards
<http://www.corestandards.org/>
- ❖ These websites provide a wide selection of virtual manipulatives for teaching mathematics:
<http://nlvm.usu.edu/en/nav/vlibrary.html>
- ❖ NASA for Educators: https://www.nasa.gov/audience/foreducators/Alpha_index.html
- ❖ NASA Commercial Crew Program for students and educators:
<https://www.nasa.gov/content/forsstudents-and-educators>
- ❖ NASA Wallops Flight Facility for Educators: <https://www.nasa.gov/centers/wallops/education/for-educators>
- ❖ Book "How Students Learn: Mathematics in the Classroom".
You can read it online at http://www.nap.edu/catalog.php?record_id=11101
- ❖ Book "How Students Learn: Science in the Classroom".
You can read it online at
<https://www.nap.edu/search/?term=How+Students+Learn%3A+Science+in+the+Classroom&x=0&y=0>

This course will integrate English Language Proficiency Standards (ELPS) for English Learners (ELs) to provide strategies for language acquisition and academic success in all content areas for students at different levels (beginning, intermediate, advanced, and advanced high) in the domains of listening, speaking, reading, and writing. You can find the ELPS standards <http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4> and presentations about ELPS and Texas English Language Proficiency Assessment System (TELPAS) at <http://www.esc4.net/users/0001/docs2/122-ELPS.pdf>

Materials:

Your Own Electronic Device, textbooks (hardback/e-book) and designated online materials/sites. PLEASE LET ME KNOW ASAP IF YOU HAVE ISSUES WITH ACCESS TO AN ELECTRONIC DEVICE. PLEASE CHECK UTEP EMAIL FOR COMPUTER LAB ACCESSIBILITY.



Student Learning Outcomes

“Talent is a dreadfully cheap commodity, cheaper than table salt. What separates the talented individual from the successful one is a lot of hard work and study.” ~Stephen King.

The course’s learning outcomes will require the student to acquire throughout the semester knowledge and skills and build upon them. The following table provides a list of the most relevant student learning outcomes for the course. The following outcomes are aligned with SBEC-approved Texas educator standards. Please, see the full standard* at http://tea.texas.gov/Texas_Educators/Preparation_and_Continuing_Education/Approved_Educator_Standards/

Table 1. Student learning outcomes and assessment Student

Learning Outcomes		Formative & Summative Assessments
<i>TeXes</i> 7-12	<i>By the end of the course, the student will be able to:</i>	<i>To evaluate these outcomes, the faculty member will use the following assessment procedures:</i>
V, VI	Develop an understanding of current issues, practices and directions in mathematics and science curriculum and the ability to inquire into these.	a. Class and online interactive, Socratic discussions b. Quizzes and Exams c. Written Reflections
V, VI	Develop knowledge and skills in educational research	a. Class and online interactive, Socratic discussions b. Lesson Plan Development c. Quizzes and Exams c. Written Reflections
V, VI	Identify and Analyze topics of importance in current mathematical and science education	a. Class and online interactive, Socratic discussions b. Electronic Databases Literature Searches c. Quizzes and Exams c. Written Reflections
ALL	Deepen their commitment to their pupils’ learning of mathematics and science	a. Pre/Post Test b. Pre/Post Survey c. Comprehensive Exams d. Written Reflections
ALL	Increase their confidence to teach mathematics and/or science	a. Mini-Teaching Exercise b. Pre/Post Survey c. Written Reflections d. Self and Peer Feedback and Ratings
V, VI	Improve their ability to manage and assess their pupils’ mathematics and science learning. Discover innovative methods of instruction to increase effectiveness and pupils’ engagement, learning, and thinking.	a. Class and online interactive, Socratic discussions b. Quizzes and Exams c. Written Reflections d. Mini-Teaching Exercise
ALL	Improve their capacity to think reflectively and creatively about their teaching of mathematics and/or science.	a. Class and online interactive, Socratic discussions b. Quizzes and Exams c. Written Reflections



		d. Mini-Teaching Exercise
ALL	Increase their capacity to become an agent of change in the field of mathematics and/or science education through effective teaching and communication.	a. Class and online interactive, Socratic discussions b. Lesson Plan Development c. Electronic Databases Literature Searches c. Written Reflections d. Pre/Post Survey
ALL	Develop knowledge and strategies to design curriculum at classroom and school levels.	a. Class and online interactive, Socratic discussions b. Lesson Plan Development c. Electronic Databases Literature Searches c. Written Reflections

POLICIES:

A. Grading Scale

Excellent	Above Average	Average	Below Average	Failing
A = 90 – 100%	B = 80 – 89%	C = 70 – 79%	D = 60 – 69%	F = 59% and below

Each assignment will be worth “x” number of points and averaged at the end of the semester. Some assignments are weighted more heavily than others. Descriptions of major assignment criteria/expectations are provided in the syllabus. **Estimated Total Possible Points [not inclusive of Extra Credit] = 400 to 600 Points**

B. Submission of Assignments

My main course goal is student success. Assignments are to be submitted through Blackboard Assignment on the date indicated by 11:59 PM. LATE ASSIGNMENTS WILL NOT BE ACCEPTED. This coursework is as important as all your coursework and should be given the same priority. Exceptions are only granted in extreme situations. In extenuating circumstances, LATE ASSIGNMENTS WILL BE ACCEPTED with a grace period of 72 hours and a point deduction of 30%.

C. Standards of Academic Integrity

Students are expected to uphold the highest standards of academic integrity. Any form of scholastic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are not attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the Handbook of Operating Procedures (HOP) and available in the Office of



the Dean of Students, may result in sanctions ranging from disciplinary probation, to failing grades on the work in question, to failing grades in the course, to suspension or dismissal among others.

D. Students with Disabilities

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

E. 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

Learning happens only when we feel respected as a whole human being. My top 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. That you experience this in our classroom 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 is welcome in our 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.

F. Professionalism

Course expectations:

Consistent punctuality, collegiality, supportive critique, and professionalism will be expected. Virtually attend meetings when you are scheduled to attend meetings (virtual meetings with peers, instructor, whole class, etc.).

Be prepared to raise, share, discuss and attempt to solve any individual or collective problems you may have with your colleagues and/or your instructor in constructive ways that allows us all to maintain our dignity and continue to function effectively as a community.

Demonstrate an understanding that while we can, and will probably, disagree, we need to do so within a community of respect.

Provide your classmates with supportive critique and constructive feedback.

G. Extra Credit:

An opportunity for Extra Credit is offered as part of this course. Students are invited to attend 1-hour STEM Education Research Seminars (STEMERS); dates, times and virtual links will be provided on Blackboard Announcements. Extra Credit Points (20 per seminar) will be assigned based on virtual attendance record.

H. Assignments in SCED4367/SCED4368:

Introductory Video Description/Grading Rubric (25 points)

- (1) Prepare a 2-3-minute video introducing yourself. In the video include 3 things about yourself - 2 that are true and 1 thing that is false. Do not state what is true and what is false.
- (2) Post link to the video/or the video on Blackboard
- (3) Review your classmates' videos and post which thing you thought was a lie about them.
- (4) Respond to answers given by your classmates with the correct answer. Think about how many inaccurate assumptions were made! Ponder: How can we avoid making assumptions and stereotyping students before we get to really know them?

Weekly Assignments

You will be asked to complete weekly assignments. These assignments will be diverse and may include solving or analyzing tasks, watching a video, analyzing student work, or preparing activities. Completing these assignments is a critical part of your coursework.



Exit Tickets, Engaging Professional Development Tasks, Stop-n-Think Activities (Embedded in Multiple Assignments)			
Category	Exceeds Standard	Meets Standard	Does Not Meet Standard
Points	20-15	14-7	6-0
Prompt(s) are addressed Shows consideration of the topic(s) Mechanics	The piece is thoughtful, engaging, and clearly written. The piece shows careful consideration of the topic at hand. It responds directly to the question or prompts and makes meaningful connections with the readings and course content. The piece has been proofread.	Shows adequate reflection along with some level of thoughtfulness and may or may not have responded directly to the question or prompt. It may contain grammatical or sentence structure errors that disrupt the flow of the narrative.	Does not adequately address the question or prompt and shows limited thoughtfulness

Game Development/Collaboration (25 points)

Based on the description of professional develop task #2, *Captivate, Activate, and Invigorate*, collaboratively develop a game to teach a high school Texas Essential Knowledge & Skills (TEKS) standards mathematics/science concepts <https://tea.texas.gov/academics/curriculum-standards/teks/texas-essential-knowledge-and-skills> (50% of game development grade).

Review/Play two (2) other students’ games and provide specific feedback by answering these questions (50% of game development grade):

- How did you feel about the game as a teaching strategy?
- Were you engaged?
- How would you modify/improve the game?
- What evidence supports your answers?

Final Exam (200 points)

Goals of the assignment

The goal of the final exam is to measure student knowledge of active learning, learning theories that connect the mathematics and science concepts to concrete and/or real-world examples/activities, as well as the importance of collaboration in problem solving and solution finding.

Part I of the exam will consist of multiple-choice questions.

Part II of the exam will be the lesson plan prepared and taught to your class peers virtually by Cross-curricular teams based on a “Big Idea” and agreed supporting content topics that demonstrate cross-curricular connections.

Lesson plan template is on the Blackboard for reference.

Assignment directions:

Part 1: Each team will consult virtually (using Blackboard Break-out sessions/Group discussion) to determine the ‘Big Idea’/topic of lesson plan.



Part 2: Each team will virtually prepare a 10-minute lesson that includes active learning lesson materials. Assignment of student cooperative learning roles is essential to ensure active participation of all students in the group. Pacing and time management are critical to the success of the learning centers functionality.

Part 3: Coinciding with your final exam submission, Each team member must complete the “Group Members Evaluation Form” located in Blackboard and in Rubrics <https://drive.google.com/file/d/1GHcjKVb-X9Jwh3jwHQa1qv9UvhO24OwR/view?usp=sharing>

Part 4: You must also evaluate your own contribution in completing this assignment (reflection).

Part 5: submit lesson plan and samples of hands-on activities on Blackboard.

Final Exam Lesson Plan – Part II			
Category	Exceeds Standard	Meets Standard	Does Not Meet Standard
<i>Structure (Tools)</i>	Lesson Plan format is concise and includes Cross-Curricular/Real-world Connections. Tools address types of learners: kinesthetic, visual, and auditory.	Lesson Plan format is somewhat concise and includes most Cross-Curricular/ Real-world Connections. Tools address types of learners: kinesthetic, visual, and auditory.	Lesson Plan format is not concise and does not include Cross-Curricular/Real-world Connections. Tools do not address types of learners: kinesthetic, visual, and auditory.
<i>Content (Tasks)</i>	Texas Essential Knowledge and Skills and Learning objective are stated, and learning processes are clear and concise.	Texas Essential Knowledge and Skills and Learning objective are stated, and learning processes are somewhat clear and concise.	Texas Essential Knowledge and Skills and Learning objective are not stated, and learning processes are not clear and concise.
<i>Lesson Delivery (Strategies)</i>	Strategies for lesson delivery include interactive, hands-on approaches and differentiated instruction. Technology & Inquiry-Based/Active learning is embedded in lesson delivery.	Strategies for lesson delivery include some interactive, hands-on approaches and differentiated instruction. Technology & Inquiry-Based/Active learning is somewhat embedded in lesson delivery.	Strategies for lesson delivery does not include interactive, hands-on approaches and differentiated instruction. Technology & Inquiry-Based/Active learning is not embedded in lesson delivery.

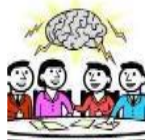
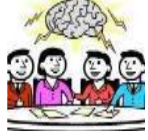


Tentative Schedule



Spring 2021

SCED4367/4368 Secondary Mathematics/Science ONLINE (Synchronous/Asynchronous)



NOTE: All topics, assignments, and due dates are subject to change at the instructor's discretion

Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
Module 01: Introduction, Constructivism, Pedagogical Framework, & Educational Design Tools					
Week 1: January 20 F2F 	Orientation to course: Syllabus & Schedule Partner Introductions Course structure: Discussion Introduce TPACK/Tools, Tasks & Strategies: "What Is Technological Pedagogical Content Knowledge?" Recipe for Learning as a Framework 5-E Lesson Components	<ul style="list-style-type: none"> Blackboard Assignments Cross-Curricular Partner Assignments Review <i>Captivate, Activate & Invigorate the Student Brain</i> reading process: Stop-n-Think Boxes, Professional Development Tasks, Chapter Exit Tickets, and online discussions 	<ul style="list-style-type: none"> Cross-Curricular Team Introductions (Break-out Rooms) TPaCK Venn Diagram 	<ul style="list-style-type: none"> Science Read: Chapter 1 and 2 in <i>Action Science</i>, pp 1-19 Preface & Chapter 1 in <i>Captivate, Activate & Invigorate the Student Brain</i> Submit Chapter 1: 3-2-1 Exit Ticket on Blackboard by January 26th at 11:59 pm (15 points) 	<ul style="list-style-type: none"> Math Read Intro & Chapter 1 <i>Connecting Mathematical Ideas: Middle School Video Cases to Support Teaching and Learning</i> Preface & Chapter 1 in <i>Captivate, Activate & Invigorate the Student Brain</i> Submit Chapter 1: 3-2-1 Exit Ticket on Blackboard by January 26th at 11:59 pm (15 points)
Week 2: January 27 F2F 	<p>Review Components of Recipe for Learning in Chapter 1 in <i>Captivate, Activate & Invigorate the Student Brain</i>.</p> <p>Review NASA 5-E cross-curricular Lesson Plan https://nasaclips.arc.nasa.gov/teachertoolbox/the5e and e-clips using: https://nasaclips.arc.nasa.gov/video/launchpad/launchpad-solar-eclipses</p> <p>Using the posted NASA lesson plan, identify components of Recipe for Learning in Chapter 1 in <i>Captivate, Activate & Invigorate the Student Brain</i>.</p> <p>Review Assignment with your Cross-</p>		<ul style="list-style-type: none"> NASA Resource Review Peer Collaboration 	Complete NASA Lesson Plan/ Professional Development Task #2 (page 16) in <i>Captivate, Activate & Invigorate the Student Brain</i> Science Sample https://drive.google.com/file/d/1QtW5Q2KtICXS_8Uz8L-CofwjT5LAyB8J/view?usp=sharing	Complete NASA Lesson Plan/ Professional Development Task #2 (page 16) in <i>Captivate, Activate & Invigorate the Student Brain</i> Math Sample https://drive.google.com/file/d/16sHba-1SMqTgtIHIZyIQrae_xLqy3yvie/view?usp=sharing





Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
	curricular partner and complete Professional Development Task #2 (page 16) in <i>Captivate, Activate & Invigorate the Student Brain</i> as a team for each lesson plan on linked Google Document.			Submit on Blackboard by February 2nd at 11:59 pm (20 points)	Submit on Blackboard by February 2nd at 11:59 pm (20 points)
January 28 th Extra Credit 5-6 PM 	STEMERS Seminar: Victor Lee, PhD Associate Professor, Graduate School of Education Stanford University Learning Sciences, Computer Science Education, Data Mining Through his research, he asks what STEM knowledge, tools, and practices are important to know to enable active participation and critical engagement with our increasingly digitally-infused lives. He then uses the tools of educational design to create examples for how we could get there.		Scholarly STEM discussion	extra credit based on attendance record	extra credit based on attendance record
Module 2: Learning through Discovery –Vocabulary, Models & Background Knowledge					
Week 3 February 3 Online 	Building Background Knowledge Using Models Academic Content Vocabulary	Science Read: Chapter 2 <i>Captivate, Activate & Invigorate the Student Brain</i> Chapter 6 in <i>Action Science</i> Math Read: Chapter 2 <i>Captivate, Activate & Invigorate the Student Brain</i> Chapter 3: <i>Number Operations</i> in Small & Lin Book	Cross-Curricular Break out Rooms Peer-to-Peer Teaching Tools, Tasks & Strategies Development	In-Class and on Blackboard With your cross-curricular partner(s), prepare a 5-7-minute mini-hands-on lesson of your assigned vocabulary strategy (see Blackboard) illustrating applications for Science and Mathematics. Submit on Blackboard by February 9 th at 11:59 pm (10 points)	In-Class and on Blackboard With your cross-curricular partner(s), prepare a 5-7-minute mini-hands-on lesson of your assigned vocabulary strategy (see Blackboard) illustrating applications for Science and Mathematics. Submit on Blackboard by February 9 th at 11:59 pm (10 points)






Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
Week 4: February 10 F2F 	Engaging Students with Vocabulary Mini-Lessons (Cross-curricular teams' teaching). Assessing Background Knowledge Inquiry-Based/Collaborative/Cooperative/Active Learning Elements of Curriculum/Lesson Planning: Standards Introduction to Depth of Knowledge/Blooms Revised Taxonomy Lesson Cycle Critical Thinking Skills	<ul style="list-style-type: none"> Review Texas Essential Knowledge and Skills (TEKS) for individual content areas http://ritter.tea.state.tx.us/rules/tac/chapter111/index.html Select a TEKS and Student Expectation (Task) and analyze Depth of Knowledge Science may review Next Generation Science Standards (NGSS) https://www.nextgenscience.org/	Ch 2 Concept Development Exit Ticket (10 points). P. 40 Captivate, Activate & Invigorate the Student Brain Engaging Professional Development Task #1 (modified) (10 points) P. 41 Captivate, Activate & Invigorate the Student Brain Submit on Blackboard by February 16th at 11:59 PM (10 points each assignment)	Science Read: Chapter 4 "Linking Pedagogy and Science Content in Practice" in Action Science, pp 31-40 Chapter 5 Why Do We Need to Know This? Captivate, Activate & Invigorate the Student Brain	Math Read: Chapter 2 Connecting Mathematical Ideas , and view video case - (Building on Student Ideas, The Border Problem Part I): watch and analyze Chapter 5 Why Do We Need to Know This? Captivate, Activate & Invigorate the Student Brain
Week 5: February 17 F2F 	Educative (Formative) Assessment Summative Assessment Effective Questioning	Cross-Curricular Team Development of tools and strategies for formative assessment Develop tools and strategies for effective questioning	Peer Collaboration Questioning as closing peer-to-peer activity	Science Read: Chapter 6 "Unlocking Resources for Active Learning" in Action Science, pp 51-60 Submit Chapter 5: Exit Ticket on Blackboard (5 points) Due February 23rd at 11:59 pm	Math Read: Chapter 3 Connecting Mathematical Ideas , and view video case - (Building Understanding of Algebraic Representation, The Border Problem Part II): watch and analyze Submit Chapter 5: Exit Ticket on Blackboard (5 points) Due February 23rd at 11:59 pm
Module 3: Assessment, Questioning, Active Learning & Constructionism					






Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
Week 6: February 24th F2F 	Educative (Formative) Assessment: Formative Assessment Effective Questioning Active Learning Addressing the needs of diverse learners including English Language Learners Introduction to Learning Centers	Peer Collaboration Break-out Rooms Peer Discussion/ Feedback	Engaging Professional Development Task #2 (modified) P. 121 <i>Captivate, Activate & Invigorate the Student Brain</i> Submit on Blackboard by March 2nd at 11:59 PM (10 points each assignment)	Science Read: “Action Science Classroom Activities”, Chapter 8, in <i>Action Science</i> , pp 69-124. Chapter 3, Prime the brain: Activate Prior knowledge <i>Captivate, Activate & Invigorate the Student Brain</i>	Math Read: <i>Connecting Mathematical Ideas</i> , Chapter 5, and view video case - (Defending Reasonableness: Notion of Proof Part I) Chapter 3, Prime the brain: Activate Prior knowledge <i>Captivate, Activate & Invigorate the Student Brain</i>
February 25 th Extra Credit 5-6 PM 	STEMERS Seminar: Yasmin Kafai Ed D Lori and Michael Milken President's Distinguished Professor in the Graduate School of Education at the University of Pennsylvania Constructionism: Yasmin B. Kafai is a learning scientist and designer of online tools and communities to promote coding, crafting, and creativity across grades K–16. Her work empowers students to use computer programming to design games, sew electronic textiles, and grow applications in biology with the goal of supporting creative expression, building social connections, and broadening participation in computing.		Scholarly STEM discussion	extra credit based on attendance record	extra credit based on attendance record
Module 4: Active/Inquiry-Based Learning, Engaging Students, Strategies					




Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
Week 7: March 3 F2F 	<ul style="list-style-type: none"> Active Learning Inquiry-Based Learning Problem/Project-Based Learning Learning Styles 	<ul style="list-style-type: none"> Peer Discussion/Feedback 	PBL/PrBL Compare & Contrast Learning Styles Survey	<ul style="list-style-type: none"> Chapter 4, Captivate with Novelty <i>Captivate, Activate & Invigorate the Student Brain</i> 	<ul style="list-style-type: none"> Chapter 4, Captivate with Novelty <i>Captivate, Activate & Invigorate the Student Brain</i>
Week 8: March 10 F2F 	<ul style="list-style-type: none"> Novelty: Thinking Outside the Box Collaboration/Cooperative Learning Emotionally Charged Events Introduce Learning Centers 	<ul style="list-style-type: none"> Peer Collaboration 	Entrance Ticket: Stop-n-Think Box 4.1, p. 68 <i>Captivate, Activate & Invigorate the Student Brain</i> Stop-n-Think Box 4.7, p. 88 <i>Captivate, Activate & Invigorate the Student Brain</i> Submit on Blackboard by March 23rd at 11:59 PM (5 points each assignment)	Using NASA lesson from Week 2, https://drive.google.com/file/d/1Qtw5Q2KtjCXS_8Uz8L-CofwjT5LAyB8J/view?usp=sharing Complete Engaging Professional Development Task #1 (Modified – 1 st 4 bullet points only), p. 90 <i>Captivate, Activate & Invigorate the Student Brain</i> Submit on Blackboard Due: March 23rd by 11:59 pm	Using NASA lesson from Week 2, https://drive.google.com/file/d/16sHba-1SMqTgtlHiZyIQraeXLqy3yvie/view?usp=sharing Complete Engaging Professional Development Task #1 (Modified – 1 st 4 bullet points only), p. 90 <i>Captivate, Activate & Invigorate the Student Brain</i> Submit on Blackboard Due: March 23rd by 11:59 pm
Spring Break March 14-18					
Week 9: March 24 F2F 	Review Chapter 6, Too Much, Too Fast: Maintaining an Engaging Pace, <i>Captivate, Activate & Invigorate the Student Brain</i> Other Strategies Too!	Critical/ Creative Thinking	Active Learning Practice of Strategies Implementation	Complete Chapter 6 Exit Ticket (p. 147-8) and video yourself teaching the strategy (no more than 3-5 minutes). Post link to video on Blackboard Discussion Board. <i>Captivate, Activate & Invigorate the Student Brain</i> Submit on Blackboard Due: March 30th by	Read: <i>Connecting Mathematical Ideas</i> , Chapter 6, and view video case - (Defending Reasonableness: Notion of Proof Part II) Complete Chapter 6 Exit Ticket (p. 147-8) and video yourself teaching the strategy (no more than 3-5








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				11:59 pm	minutes). Post link to video on Blackboard Discussion Board. <i>Captivate, Activate & Invigorate the Student Brain</i> Submit on Blackboard Due: March 30 th by 11:59 pm
Week 10: March 31 Online 	Review your collaborative team's teaching videos in Blackboard Discussion Board. Submit 2-3 sentences of constructive feedback Review 2-3 video observation links provided and documenting on log (posted in Blackboard Assignments). Prepare reflection using prompts and directions.		Peer Review	Submit feedback for teaching videos to collaborative team members (only) via Blackboard Discussion. Complete Video Observation Reflections Due: April 6 th at 11:59 PM	Submit feedback for teaching videos to collaborative team members (only) via Blackboard Discussion. Complete Video Observation Reflections Due: April 6 th at 11:59 PM
April 1 st Extra Credit 5-6 PM 	STEMERS Seminar: Arelly Paredes-Chi, PhD Universidad Nacional Autónoma de México UNAM · Facultad de Ciencias Participatory Research Approach with Rural Elementary Educators in Mexico		Scholarly STEM discussion	extra credit based on attendance record	extra credit based on attendance record
Module 5: Final Exam Components					
Week 11: April 7 F2F 	Review the following links: Mathematics and Science: https://gettingnerdywithmelanderdy.com/using-steam-science-lab-stations/ Mathematics - https://www.youtube.com/watch?v=YmjfZ76fQPs https://www.youtube.com/watch?v=SvmdJrJFdUQ https://www.youtube.com/watch?v=_ay4JE5sLcl Science:	Break-out rooms With your Learning Center Cross-curricular teams: <ul style="list-style-type: none">• Begin Developing a lesson plan/road map for a hands-on learning center to present cross-curricular concepts• Prepare Active Learning Activities, Assessment,	Peer / PLC Collaboration	Continue developing lesson plan for next class	Continue developing lesson plan for next class



Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
	<p>https://www.keslerscience.com/the-complete-guide-to-setting-up-effective-science-stations/</p> <p>https://www.edutopia.org/blog/learning-centers-in-secondary-classroom-ted-malefyt</p> <ul style="list-style-type: none"> • 	<p>Instructions, Take photos of materials and hands-on activities</p> <ul style="list-style-type: none"> • Lesson should integrate pedagogy reviewed during the course including technology apps • Be explicit in written directions and materials creation/ manipulation. • Completion of the task in the learning center should take approximately 10 minutes. 			
<p>Week 12: April 14</p> 	<p>(Continue): With your Learning Center Cross-curricular teams:</p> <ul style="list-style-type: none"> • Developing a lesson plan/road map for a hands-on learning center to present cross-curricular concepts <p>Resource links about learning centers:</p> <p>Mathematics and Science: https://gettingnerdywithmelandgerdy.com/using-steam-science-lab-stations/</p> <p>Mathematics - https://www.youtube.com/watch?v=YmjfZ76fQPs https://www.youtube.com/watch?v=SvmdJrJFdUQ https://www.youtube.com/watch?v=_ay4JESsLcl</p> <p>Science: https://www.keslerscience.com/the-complete-guide-to-setting-up-effective-science-stations/</p> <p>https://www.edutopia.org/blog/learning-centers-in-secondary-classroom-ted-malefyt</p>	<ul style="list-style-type: none"> • Prepare Active Learning Activities, Assessment, Instructions, Take photos of materials and hands-on activities • Lesson should integrate pedagogy reviewed during the course including technology apps • Be explicit in written directions and materials creation/ manipulation. <p>Completion of the task in the learning center should take approximately 10 minutes</p>	Peer / PLC Collaboration	<ul style="list-style-type: none"> • Prepare Mini-Lesson Class Presentation Due April 21st at 11:59 PM As Part II of the Final Exam 	<ul style="list-style-type: none"> • Prepare Mini-Lesson Class Presentation Due April 21st at 11:59 PM • As Part II of the Final Exam
Final Project Implementation: Active Learning with Learning Centers					



Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
Week 13: April 21 	<ul style="list-style-type: none"> 4 Learning Center Class Presentations (100 Points) 		Participate in and Evaluate Learning Centers	<ul style="list-style-type: none"> Finalized Mini-Lesson Submit on Blackboard Due April 27th at 11:59 PM As Part II of the Final Exam 	<ul style="list-style-type: none"> Finalized Mini-Lesson Submit on Blackboard Due April 27th at 11:59 PM As Part II of the Final Exam
Week 14: April 28 	4 Learning Center Class Presentations (100 Points)		Participate in and Evaluate Learning Centers	<ul style="list-style-type: none"> Finalized Mini-Lesson Submit on Blackboard Due April 27th at 11:59 PM As Part II of the Final Exam 	<ul style="list-style-type: none"> Finalized Mini-Lesson Submit on Blackboard Due April 27th at 11:59 PM As Part II of the Final Exam
April 29th Extra Credit 5-6 PM 	STEMERS Seminar: Marcela Gatica-Andrades, PhD Universidad de la Serena, Chile. Facultad de Ciencias Science Literacy		Scholarly STEM discussion	extra credit based on attendance record	extra credit based on attendance record
Week 15: May 5 	Part I of Final Exam: (100 points) The Final Exam will be on Blackboard Assignments. It will be open April 30th at 4:30 pm to May 7th at 7:00 pm It must be completed in a single seating however (you cannot start it at one time and go back to it) Be sure to hit submit and save. Be sure to use compatible browser such as Chrome or Mozilla.		Summative Assessment	Final Exam on Blackboard May submit any time between April 30th – May 7th	Final Exam on Blackboard May submit any time between April 30th – May 7th
Week 16 May 12 Online 	Course Evaluation Group Members Evaluation		Reflective Feedback	Complete Course Evaluation (Optional) Submit email (rllynch@utep.edu) documenting course evaluation completion (5 points extra) Complete the "Group Members Evaluation Form"	Complete Course Evaluation (Optional) Submit email (rllynch@utep.edu) documenting course evaluation completion (5 points extra) Complete the "Group Members Evaluation Form"



Class/ Date VIRTUAL F2F or ONLINE	Topics	Weekly Activities	F2F Active Learning Activities	Science Assignments Due	Math Assignments Due
				and submit on Blackboard Due May 12 th	and submit on Blackboard Due May 12 th

Final Word: I reserve the right to adjust the course syllabus or change assignments as needed.