Knowing and Learning in Science and Mathematics Course Syllabus
NATS 3341.001
Spring 2023

Course Information

Course Number/Section(s)	NATS 3341.001
Course Title	Knowing and Learning in Science and Mathematics
Term	Spring 2023

Professor Contact Information

Professor	Prof. Floyd Dorsey
Email Address	floyd.dorsey@utdallas.edu
Office Phone	972-883-2417
Office Location	FN 3.410B
Office Hours	MW 10:00am – 11:00am. Walk-in's welcome. Also available by appointment for in-person or virtual meeting. Always available by email.

Course Modality and Expectations

Instructional Mode	Traditional – In-Person Note: If circumstances call for the university to alter instructional mode, this course will be changed to Blended/Hybrid. Notice and details of changes will be given by professor in that instance.
Course Platform	Course materials will be provided within eLearning.
Expectations	As a student in this course, you are expected to comply with Texas Administrative Code (TAC), Title 19, Part 7, Chapter 247, Rule §247.2-Code of Ethics and Standard Practices for Texas Educators and the UT Dallas Fitness to Teach Policy. http://ritter.tea.state.tx.us/sbecrules/tac/chapter247/ch247.html

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students. Please go to Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to UT Dallas Syllabus Policies webpage for these policies.

Class Participation
Regular class participation is expected regardless of course modality. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct. Asynchronous class participation will also be evaluated based upon prompt completion of the day's/week's assigned tasks.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Recording by the Teacher:

The instructor may record meetings of this course. Any recordings will be available to all students registered for this class as they are intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Class Materials

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Course Pre-requisites, Co-requisites, and/or Other Restrictions
A university grade point average (GPA) of at least 2.750, a GPA of 3.000 in UTeach Dallas coursework, and a UTD advisor consent are required pre-requisites. Either as a pre-requisite or co-requisite, students must complete Step 1 (NATS 1141 or NATS 1142).

Course Description
A goal of this course is for participants to develop a powerful tool kit of theory-driven approaches to knowing and learning in mathematics and science. The focus is primarily on issues of what it means to learn and know science and mathematics in a way that is intended to broaden our sense of what is possible in our educational practices. Some of the questions that will be addressed in the course include: What are the standards for knowing we can use? How is knowing and learning structured, and how does what we know change and develop? For science and mathematics educators, what are the tensions between general, cross-disciplinary characterizations of knowing (e.g., intelligence or the conditioning of behavior) and the specifics of coming to understand powerful ideas in mathematics and science? What are the connections between kinds of assessments and theories of knowing? How are various uses of technology associated with specific approaches to learning? A broader and, hopefully, richer sense of what is possible is to support the kind of "power in action" that helps us become ever more effective and creative science and mathematics educators.

Student Learning Objectives/Outcomes
- Students will develop mental models of knowing and learning to guide classroom practice.
- Students will articulate various standards for knowing mathematics and science and articulate the implications of these standards for assessment, especially formative assessment.
- Students will articulate what it means to know, learn, and understand relative to cognitive structures and describe how what people know changes and develops.
- Students will describe various paradigms for evaluating science and mathematics understanding.
- Students will use the clinical interview method to make sense of someone's reasoning about a topic in mathematics or science. Students will be able to evaluate science and mathematics content and apply it to the correct learning environment.
- Students will describe the links between knowing and developing in learning theory and the content and evolution of scientific ideas.
- Students will complete a Philosophy of Teaching as the first step in development of their portfolio.

Required Textbooks and Materials

Provided digital texts:
How People Learn (HPL)
http://www.nap.edu/openbook.php?record_id=6160

How Students Learn Mathematics/Science (HSL)
http://www.nap.edu/openbook.php?record_id=10126

How People Learn II (HPL)
http://www.nap.edu/openbook.php?record_id=24783

Schools for Thought (SFT)
http://cognet.mit.edu/library/books/view?isbn=0262521962

Required Materials:
Internet Access, email communication, eLearning

Suggested Course Materials
All book chapters and articles will be provided within eLearning.

Technical Requirements
In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Access and Navigation
This course can be accessed using your UT Dallas NetID account on the eLearning website.

Please see the course access and navigation section of the Getting Started with eLearning webpage for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication
This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the Student eLearning Tutorials webpage for video demonstrations on eLearning tools.

Student emails and discussion board messages will be answered within 3 working days under normal circumstances.

UT Dallas Student Resources
Students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students webpage for more information.

Server Unavailability or Other Technical Difficulties
The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

NOTE: If eLearning is unresponsive or does not allow uploading of an assignment, emailing an assignment as a file attachment directly to the professor is always an acceptable option. Assignment deadlines will still apply.

Submission preferences in order:
1. eLearning
2. Email attachment

Note: All assignments are due by 11:59 pm and submitted in eLearning, unless otherwise indicated; Calendar is subject to change at instructor's discretion.

Week #	Mon	Tues	Wed	Thur	Fri	Sat	Sun
1	1/16 **No Class- MLK Day**	1/17	1/18	1/19	1/20	1/21	1/22 **Week 1 Reading Quiz**
2	1/23	1/24	1/25	1/26	1/27	1/28	1/29 **Week 2 Reading Quiz**
3	1/30	1/31	2/1	2/2	2/3	2/4	2/5 **Week 3 Reading Quiz**
4	2/6 **Schedule Clinical Interviews, if not done already**	2/7	2/8	2/9	2/10	2/11	2/12 **Week 4 Reading Quiz**
5	2/13	2/14	2/15	2/16	2/17	2/18	2/19 **Week 5 Reading Quiz** **Pre-Approval: Clinical Interview Q's**
6	2/20	2/21	2/22	2/23	2/24	2/25	2/26 **Week 6 Reading Quiz**
7	2/27	2/28	3/1	3/2	3/3	3/4	3/5 **Mid-Term Exam**
8	3/6	3/7	3/8	3/9	3/10	3/11	3/12 **Week 8 Reading Quiz**
	3/13	3/14	3/15	3/16	3/17	3/18	3/19
	UTD – Spring Break						
9	3/20	3/21	3/22	3/23	3/24	3/25	3/26 **Clinical Interview Project**
10	3/27	3/28	3/29	3/30	3/31	4/1	4/2 **Week 10 Reading Quiz**
11	4/3	4/4	4/5	4/6	4/7	4/8	4/9 **Week 11 Reading Quiz**
12	4/10	4/11	4/12 **Teaching Philosophy – 1st Attempt**	4/13	4/14	4/15	4/16 **Week 12 Reading Quiz**
13	4/17	4/18	4/19 **Teaching Philosophy – Final Attempt**	4/20	4/21	4/22	4/23 **Week 13 Reading Quiz**
14	4/24	4/25	4/26	4/27	4/28	4/29	4/30
15	5/1	5/2	5/3 **Final Exam &** **TEA Dyslexia Training**				

Academic Calendar

Date	Topic	Objectives/Activities	Assigned Readings	Standards
1/18 Week 1	US Math and Science Education in Context	Introductions Course Overview Project Due Dates Reading Quiz Rubric Introduce Reading Strategies in: McGuire (2015). *Teach Students How to Learn,* pp. 45-49. Sylus Publishing. Introduce Accountable Talk Strategies in: Goldman (2014). Why the institute for learning focuses on accountable talk practices. Institute for Learning, University of Pennsylvania. Review and Discuss PISA and NAEP	Bruer (1993). *Schools for Thought,* Ch. 1. MIT Press. Stigler & Heibert (2009). *The Teaching Gap - Updated*, Ch. 1, pp. 1-11. The Free Press. Accountable Talk Strategies in: Goldman (2014). Why the institute for learning focuses on accountable talk practices. Institute for Learning, University of Pennsylvania. Week 1 Reading Quiz - Due 1/22 at 11:59 pm	Class Activities: PPR - 3.9k, 1.31k, 1.28s, 1.29s TTS – 2A, 2B, 2C, 4A Readings PPR - 3.4s, 3.6s, 3.4k, 3.5k, 4.12k, 1.11k, 1.20k TTS – 2A, 2B, 2C, 4A, 4D
1/23, 1/25 Week 2a	Context, Culture, and Environment	Introduce Clinical Interview Requirements and Examples Culture: Overview of classroom culture and learning environments.	Donovan (2005). *How Students Learn: History, Mathematics and Science in the Classroom*, pp. 1-26 *How People Learn II*: Contexts and Cultures, pp. 21-34	Class Activities: PPR - 2.1k, 2.1s, 2.2s TTS – 2A, 2B, 2C, 4A, 4D Readings: PPR - 1.3k, 1.5k, 1.5s, 2.1k, 2.2k, 2.2s, 2.3k, 2.3s, 2.4k TTS – 2A, 2B, 2C, 4A, 4D
Week 2b	Learning Trajectory with an Eye on the Big Idea	Teaching to the Big Ideas: Identify strands for math and science proficiency and impact on teaching MATH: Learning Trajectories for Mathematics, SCIENCE: See Atlas for Science Literacy progressions What are the big concepts in math and science? MATH: See Common Core Mathematics (See Strands by Domain) SCIENCE: K-12 Science Framework and NGSS Appendix E	ALL: Wiggins, G. (2010). What is a big idea? Retrieved from *Authentic Education* eJournal MATH: NRC (2001) *Adding it Up*, (pp. 115-155). National Academies Press. SCIENCE: Michaels (2008). *Ready, Set, Science*, Ch. 2, (pp. 18-21). National Academies Press. Week 2 Reading Quiz – Due 1/29 at 11:59 pm	Class Activities: PPR - 2.1k, 2.1s, 2.2s TTS – 2A, 2B, 2C, 4A, 4D Readings: PPR - 1.3k, 1.5k, 1.5s, 2.1k, 2.2k, 2.2s, 2.3k, 2.3s, 2.4k TTS – 2A, 2B, 2C, 4A, 4D

1/30, 2/1 Week 3a	Importance of Prior Knowledge and Teaching for Conceptual Understanding	Discuss the importance of uncovering students' prior knowledge. Read: Bonita's Problem Group work review of: ● MATH: Rose, C. M., & Arline, C. B. (2009). Uncovering student thinking in (Cookie Crumbles) pp.61-65. ● SCIENCE: Keeley & Tugel (2009). Uncovering Student Ideas in Science, (Gumballs in a Jar) pp. 7-10. Take the assessment probe and review with your group. See teacher notes pages. EdTPA Connection: Rubric 8 - Deeper Student Learning	ALL: Settlage, J., & Southerland, S. (2007). *Teaching science to every child*: Using culture as a starting point. Routledge. ("Conceptual Change Approach to Science Teaching", pp. 183-187). SCIENCE: Minstrell, J. (1989). Teaching science for understanding, pp. 139-159 MATH: Philipp (2000). Unpacking a conceptual lesson: The case of dividing fractions.	Class Activities: PPR - 1.25k, 1.29k, 2.2k, 3.8k, 3.10s, 3.13s, 3.12k, 3.13k, 3.14k. 3.15k, 3.16k, 3.19s TTS – 2A, 2B, 2C, 4A, 4D, 5A Reading: PPR - 1.8k, 1.20k,1.25k, 3.8k, 3.13s, 3.14k TTS – 2A, 2B, 2C, 4A, 4D, 5A
Week 3b	Use of Models for Thinking and Understanding	View "A Private Universe" Review use of formative assessment to bring out student prior knowledge and how to use this to inform instruction. Review slides on the use of models for understanding See Atlas for Science Literacy "Models" Share Moon Phases Model Activity See KL Models Video Read: Expectations for Clinical Interview 1.	Ritchhart (2008). Making thinking visible: Thinking routines in the classroom. From Project Zero, Harvard School of Education. Models in science, in Genesis Search for Origins, pp. 1-5. Speake, J. (2018). Modeling with mathematics: What it is and how it aligns with the standards-driven classroom. Retrieved from Learning Sciences International Leahy, S., Lyon, C., Thompson, M., & William, D. (2005). Classroom assessment: Minute by minute, day by day. *Educational Leadership, 63*(3), 19-24. Week 3 Reading Quiz - Due 2/5 at 11:59 pm	Class Activities and Readings: PPR - 1.2k, 1.16k, 1.20k, 1.25k, 3.5k, 3.8k, 3.12k, 3.15k TTS - 2A, 2B, 2C, 4A, 4D, 5A
2/6, 2/8 Week 4a	Making Thinking Visible: Concept Mapping	Review Expectations for Clinical Interview Project Theoretical Origins of Concept Maps - See work of Novak In Groups: Practice mapping Concepts in math or science state standards using big ideas from Common Core or K-12 Framework	Schedule Clinical Interview Project Interviews, if not done already MATH: Baroody, A. J., & Bartels, B. H. (2000). Using concept maps to link mathematical ideas. *Mathematics Teaching in the Middle School*, 5(9), 604-609. SCIENCE: Vanides, J. Y., & Ruiz-	Class Activities; PPR - 1.20k, 3.5k, 3.7k, 3.8k, 3.9k, TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 1.20k, 2.1k, 3.5k,

			Primo, M. A. (2005). Using concept maps in science classrooms. *Science Scope* 28(8), 27-31. Reminder: Clinical Interview Project - Due 3/26 at 11:59 pm	3.6k, 3.7k. 3.8k, 3.9k, 3.10k, 3.11k TTS - 2A, 2B, 2C, 4A, 4D
Week 4b	Formative Assessment and Quality Questioning Strategies	View presentation slides on Formative Assessment and on Quality Questioning. Examine the interplay between student-centered instruction and classroom assessment. Examine the use of classroom assessment to inform instruction. EdTPA Connection: Rubric 5 - Planning Assessments to Monitor and Support Student Learning	Heritage (2007). Formative assessment: What do teachers need to know and do? Chappuis, J. (2007/2008), The best value in formative assessment. Black & Wiliam (1998). Inside the black box: Raising standards through classroom assessment. Week 4 Reading Quiz: Due 2/12 at 11:59 pm	Class Activities: PPR - 1.11k, 1.20k, 1.25k, 1.26k, 3.12k, 3.13k, 3.14k TTS - 2A, 2B, 2C, 4A, 4D, 5A Reading: PPR - 3.12k, 3.13k, 3.14k, 3.4k TTS - 2A, 2B, 2C, 4A, 4D, 5A
2/13, 2/15 Week 5a	Preparing for Clinical 1 Interview: Experts vs. Novices	Review Expectations and Rubric for Clinical Interview Work on completing Interview, Transcriptions, and Final Paper Watch Video of Interview with Expert and Novice about Dinosaurs or this Video about the Beatles *White Album* Review the Big Ideas, Proficiencies and Practices for Math and Science to develop Clinical 1 Interview Questions.	Ginsburg (1997). Not a cookbook: Guidelines for conducting clinical interviews (Ch.4). Schedule Clinical Interviews ASAP (Already to the halfway point of completed project window)	Class Activities: PPR - 4.12k, 1.24k, 1.20k TTS - 2A, 2B, 2C Reading: PPR - 1.3k, 1.25k, 3.8k TTS - 2A, 2B, 2C
Week 5b	Experts vs. Novices	Be able to explain how prior knowledge influences our perception, using ideas drawn from theories and models of memory processing. Recognize there are fundamental differences in the way experts and novices organize and apply their knowledge.	Bransford, et al (1999). *How People Learn*: Ch. 2 Experts vs. Novices (pp. 31-50) Bruer (1993), *Schools for Thought,* Ch. 2 (pp. 23-29) Week 5 Reading Quiz – Due 2/19 at 11:59 pm. Pre-Approval: Clinical Interview Questions - Due 2/19 at 11:59 pm.	Class Activities: PPR - 4.12k, 1.24k, 1.20k TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 1.3k, 1.25k, 3.8k TTS - 2A, 2B, 2C, 4A, 4D

2/20, 2/22 Week 6	The Cognitive Revolution and Understanding Memory	Become familiar with the field of cognitive science and organizations that foster this field of inquiry. Recognize and begin to apply the central tenets of theories about memory acquisition, storage, and retrieval. Review Various Cognitive Development Theorists (Piaget, Vygotsky, Kolb, Erikson) - Complete Comparative Chart or Note Taking Guide Reading Assignment: o Vygotsky's Sociocultural Perspective, by Saul McCleod o Piaget, o Kolb - Learning Styles, by Saul McLeod o Erik Erikson's Stages of Psychosocial Development, by Kendra Cherry	Woolfolk, (2007). Educational psychology, pp. 248-268 *How People Learn II*: Chapter 3, pp. 35-55, Types of Learning and the Brain Read about Retrieval Practice: Keep Working on Clinical Interview Project (Due date approaching quickly) Week 6 Reading Quiz - Due 2/26 at 11:59 pm (Located in Week 6a folder this week)	Class Activities; PPR - 3.8k. 1.1k, 1.2k, 1.3k, 1.4k TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 3.8k. 3.8s, 1.1k, 1.2k TTS - 2A, 2B, 2C, 4A, 4D
2/27, 3/1 Week 7a	Understanding Learning Needs, Brain Based Learning, and Differentiation	Review of article, Learning to Learn Presentation slides on brain-based learning Read article from Education Week Reading from NGSS Appendix D Case Study Overview of Differentiated Instruction EdTPA Connection: Rubric 2 - Supporting Varied Learning Needs	Human Memory Atkinson-Shiffron Model Sousa (2017). The primacy/recency effect. In How the brain learns. National Association of Science, Engineering, and Mathematics (2018). *How People Learn II: Learners, Contexts and Cultures*, Ch. 3 pp. 55-68	Class Activities; PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.5k,1.3s, 1.4s, 1.5s TTS - 2A, 2B, 2C, 4A, 4D, 5A Reading: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.5k TTS - 2A, 2B, 2C, 4A, 4D, 5A
Week 7b	Learning and Transfer	Read and consider the Circumference of the Earth Activity Explore the implications of the difficulty humans experience in transferring knowledge, particularly science and mathematics knowledge learned in school. Explore implications for structuring teaching to overcome this difficulty.	Bransford, et al (1999). How People Learn (Ch. 3, Learning and Transfer, pp. 51-78. Midterm Exam is due 3/5 at 11:59 pm	Class Activities and Readings: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.5k,1.3s, 1.4s, 1.5s TTS - 2A, 2B, 2C, 4A, 4D

3/6, 3/8 Week 8a	Learning Theory I - Behaviorism	Pavlov and Skinner Discussion Become familiar with behaviorist theory. Distinguish between effective and ineffective applications of behaviorism in mathematics and science instruction.	Erlwanger, S. H. (1973). Benny's conception of rules and answers in IPI mathematics pp. 7-26. Feynman, R. (1985). *Surely you're joking, Mr. Feynman*, pp. 210-219.	Class Activities; PPR - 1,4K, 1.10k, 1.20k, 2.6k, 2.13k, 2.18k, 3.5k, 3.6k, 3.8k, 3.10k TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 1.4k, 1.10k, 1.20k, 3.6k, e,8k, 3.10k TTS - 2A, 2B, 2C, 4A, 4D
Week 8b	Learning Theory II - Constructivism	Examine the central tenets of constructivist theory of Jean Piaget. Apply the central tenets of constructivist theory to teaching and learning mathematics and science. Examine Jerome Bruner's education theory (personal constructivism) and its implications for teaching. Read: Eilkind, D. (1972). Piaget and science education. Read: Jerome Bruner's Education Theory	Woolfolk, A. (2007). *Educational psychology* (10th ed., pp. 24-38). Boston: Allyn and Bacon. DiPrima, M. B. & Hickson, M. (2006). *Discover Jerome Bruner*. Week 8 Reading Quiz: Due 3/12 at 11:59 pm	Class Activities and Readings: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.1s, 1.2s, 1.3s, 1.4s, 1.11k, 1.11s, 1.20k, 1.21k TTS - 2A, 2B, 2C, 4A, 4D
UTD HOLIDAY– SPRING BREAK				
3/20, 3/22 Week 9a	Learning Theory III - Ausebel and Meaningful Learning (Cognitivism)	Be able to articulate the reason that instructional design must account for learners' prior knowledge. Describe Ausubel's idea of "meaningful learning" and relate it to other theories of learning as well as to instructional design.	All: Bruer (1993). Schools For Thought, Ch.5, pp. 127 – 130 and 162-171. SCIENCE: Duschl, R., Schweingruber, H., & Shouse, A. (2007). Knowledge and understanding of the natural world. (Chapter 4, pp. 93-128). MATH: Donovan, S., & Bransford, J. (2005). Mathematical understanding: An introduction. (Chapter 5, pp. 217-246).	Class Activities; PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.1s, 1.2s, 1.3s, 1.4s, 1.11k, 1.11s, 1.20k, 1.21k,1.25k TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.1s, 1.2s, 1.3s, 1.4s, 1.11k, 1.11s, 1.20k,

				1.21k TTS - 2A, 2B, 2C, 4A, 4D
Week 9b	Vygotsky's Social Constructivism And Model Eliciting Activities (MEA)	Engage in a model-eliciting activity (MEA) Examine the structure of MEAs in terms of Vygostky's theory of social constructivism.	Bodrova, E., & Leong, D. J. (2007). Tools of the mind: The Vygotskian approach to early childhood education (2nd ed.) Woolfolk, A. (2007). *Educational psychology* (10th ed.). Boston: Allyn and Bacon. (pp. 43-49) Chamberlin, S. A. & Coxbill, E. (2012). Using model-eliciting activities to introduce upper elementary students to statistical reasoning and mathematical modeling. Clinical Interview Project: Due 3/26 at 11:59 pm	Class Activities and Readings: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.1s, 1.2s, 1.3s, 1.4s, 1.11k, 1.11s, 1.20k, 1.21k TTS - 2A, 2B, 2C, 4A, 4D
3/27, 3/29 Week 10a	Learning Theory IV - Connectivism Culturally Relevant Pedagogy	Discuss Connectivism Read: Siemens, G. (2004). Connectivism: A learning theory for the digital age. Retrieved from http://www.elearnspace.org/Articles/connectivism.htm Discuss Culturally Relevant Pedagogy Introduce and discuss Teaching Philosophy Assignment - Due 11/9 by 11:59 pm	Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into Practice*, 34(3), 159-165. Jackson, K. (2009). The social construction of youth and mathematics: The case of a fifth grade classroom. (pp. 175-199).	Class Activities; PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.1s, 1.2s, 1.3s, 1.4s, 1.11k, 1.11s, 1.20k, 1.21k, 1.5k, 1.5s TTS - 2A, 2B, 2C, 4A Reading: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.1s, 1.2s, 1.3s, 1.4s, 1.11k, 1.11s, 1.20k, 1.21k, 1.5k, 1.5s TTS - 2A, 2B, 2C, 4A

Week 10b	Reading Instruction: Literacy Instruction in Mathematics Literacy Instruction in Science	MATH: What is Math Literacy? Activity: One Grain of Rice Analyze math word problems and determine where students might need text support. SCIENCE: Science Literacy - what is it and why is it important? What does our current national context tell us about the importance of science literacy? Science Literacy through Citizen Science https://www.youtube.com/watch?v=J2-yi3qJ8NU Citizen Math Website https://staging.citizenmath.com/	MATH: Kenney, J., Hancewicz, E., Heuer, L., Metsisto, D. & Tuttle, C. (2005). Literacy strategies for improving mathematics instruction. (Ch. 2) Alexandria, VA: ASCD. MATH: Fello, S. E., & Paquette, K. R. (2009). Talking and writing in the classroom. *Mathematics Teaching in the Middle School*, 14(7), 410-414. MATH: Manouchehri, A. (2007). Inquiry-discourse mathematics instruction. Mathematics Teacher, 101(4), 290-300. SCIENCE: Licata, K. P. (1999). Narrative lab reports. *The Science Teacher*, 66(3), 20-22. SCIENCE: Grant, M. & Lapp, D. (2011). What students need to learn: Teaching science literacy. *Educational Leadership*, 68(6). SCIENCE: Grymonpre, K., Cohn, A. & Solomon, S. (2012). Getting past "just because": Teaching writing in science class. Science Scope 35(5)24-31. Week 10 Reading Quiz due 4/2 at 11:59 pm.	**Reading Instruction** Class Activities and Readings: PPR - 1.1k, 1.1s, 1.2k, 1.2s, 1.3k, 1.3s, 1.4k, 1.4s, 1.5k, 1.5s, 1.6k, 1.6s TTS - 2A, 2B, 2C, 4A, 4D, 5A
4/3, 4/5 Week 11a	Mathematics Instruction Science Instruction	MATH: Watch Dan Meyer Ted Talk Video (in eLearning) Watch video on Anchored Instruction SCIENCE: Read the Overview of Three-Dimensional Learning by Joe Krajcik	MATH: National Council of Teachers of Mathematics (2008). Promoting a conceptual understanding of mathematics. *Mathematics Teaching in the Middle School*, 24(1), 36-43. MATH: Bottge, B., Toland, M. & Gassaway, L. (2015). *Impact of enhanced anchored instruction in inclusive mathematics classrooms*. Council for Exceptional Children, 81(2)158-175. Read pp. 158-160 and pp. 172-173. SCIENCE: Settlage, J., & Southerland, S. (2007). *Teaching*	Class Activities; PPR - 1.7k, 1.7s, 1.8k, 1.8s,1.9k, 1.9s, 1.11k, 1.11s TTS - 2A, 2B, 2C, 4A, 4D, 5A Reading: PPR - 1.1k, 1.1s, 1.2k, 1.2s, 1.3k, 1.3s, 1.4k, 1.4s, 1.5k, 1.5s, 1.6k, 1.6s, 1.7k,

			science to every child: Using culture as a starting point. New York: Routledge. Read Ch. 8, Varied Approaches to Science Teaching (pp. 173-204)	1.7s, 1.8k, 1.8s,1.9k, 1.9s, 1.11k, 1.11s TTS - 2A, 2B, 2C, 4A, 4D, 5A
Week 11b	Problem Solving/ Teaching Through Inquiry	Dan Finkel Ted Talk "Why Normalizing Struggle can Create a Better Math Experience for Kids" Read the article and watch the embedded video. Read: Polya, G. (1957). How to solve it. Garden City, NY: Doubleday Anchor Books. Read: National Research Council (2012). A Framework for K–12 Science Education. Washington, DC: National Academies Press. (Chapter 3) EdTPA Connection: Rubric 1 - Planning for Mathematical and Scientific Understandings	MATH: Carmona, G. & Greenstein, S. (2010). Investigating the relationship between the problem and the solver: Who decides what math gets used? SCIENCE: Minner et al. (2010). Inquiry-based science instruction—what is it and does it matter? Week 11 Reading Quiz: Due 4/9 at 11:59 pm	Class Activities: PPR - 1.7k, 1.7s, 1.8k, 1.8s,1.9k, 1.9s, 1.11k, 1.11s TTS - 2A, 2B, 2C, 4A, 4D, 5A Reading: PPR - 1.1k, 1.1s, 1.2k, 1.2s, 1.3k, 1.3s, 1.4k, 1.4s, 1.5k, 1.5s, 1.6k, 1.6s, 1.7k, 1.7s, 1.8k, 1.8s,1.9k, 1.9s, 1.11k, 1.11s TTS - 2A, 2B, 2C, 4A, 4D, 5A
4/10, 4/12 Week 12a	Motivation	Become familiar with the role of students' intelligence beliefs on their motivation and achievement. Begin to distinguish between effective and ineffective applications of motivation in mathematics and science instruction.	Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84(3), 261-271. Dweck, C. (2007). The perils and promises of praise. *Educational Leadership*, 65(2), 34-39. Almarode J. & Almarode D. (2008). Energizing students. *The Science Teacher*, 75(9), 32-35. Teaching Philosophy Paper – 1st Attempt: Due 4/12 at 11:59 pm	Class Activities: PPR - 1.4k, 1.4s, 1.18k, 1.18s, 2.2k, 2.2s, 2.3k, 2.3s, 2.4k, 2.4s TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 1.4k, 1.4s, 1.18k, 1.18s, 2.2k, 2.2s, 2.3k, 2.3s, 2.23k TTS - 2A, 2B, 2C, 4A, 4B, 4C, 4D

Week 12b	Identity Theory	Explore the implications students' identity can play in shaping their participation in mathematics and science classrooms. Describe how the participation of non-mainstream students (e.g., students of color, working class/working poor) can be influenced by social identity demands. Describe how instruction can be structured to effectively encourage the participation of all students.	ALL: Noguera ,P. A. (2002). "Joaquin's Dilemma": Understanding the link between racial identity and school-related behaviors. *In Motion Magazine*. MATH: Boaler, J., Wiliam, D., & Zevenbergen, R. (2000). The construction of identity in secondary mathematics education. SCIENCE: Brown, B. (2006) "It isn't no slang that can be said about this stuff": Language, identity, and appropriating science discourse, pp. 96-101 and pp. 121-122. Week 12 Reading Quiz: Due 4/16 at 11:59 pm	Class Activities and Readings: PPR - 1.4k, 1.4s, 1.18k, 1.18s, 2.2k, 2.2s, 2.3k, 2.3s, 2.23k TTS - 2A, 2B, 2C, 4A, 4D
4/17, 4/19 Week 13a	Argument Driven Inquiry	Describe the structure and intent of the Argument-Driven Inquiry instructional model. Identify the disciplinary practices of science employed in this instructional design and how this relates to the Next Generation Science Standards. Explain how instruction that supports students' participation in disciplinary practices is particularly effective in supporting the science learning of students traditionally underperforming in science. EdTPA Connection: Rubric 7 - Engaging Students in Learning	MATH: Choppin, J. M. (2007). *Teacher-orchestrated classroom arguments*. 306-310. SCIENCE: Sampson, V., Grooms, J., & Walker, J. (2009). Argument-driven inquiry: A way to promote learning during laboratory activities. *The Science Teacher*, 76(8), 42-47. Teaching Philosophy Paper – Final Attempt: Due 4/19 at 11:59 pm	Class Activities; PPR - 1.1k, 1.1s, 1.2k, 1.2s, 1.3k, 1.3s, 1.4k, 1.4s, 1.5k, 1.5s, 1.6k, 1.6s, 1.7k, 1.7s, 1.8k, 1.8s,1.9k, 1.9s, 1.11k, 1.11s TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.5k, 1.6k, 1.7k, 1.8k, 1.9k, 1.11k TTS - 2A, 2B, 2C, 4A, 4D
Week 13b	Predict Observe Explain	Explain the effects of air pressure on the candle, water, and a beaker system. Explain the effectiveness of this approach in terms of student learning. Describe how instruction might be structured to facilitate a POE.	MATH: Kim, O., & Kasmer, L. (2007). Using "prediction" to promote mathematical reasoning. 294-299. SCIENCE: Dial, K., Riddley, D., Williams, K., & Sampson, V. (2009). Addressing misconceptions: A demonstration to help students	Class Activities and Readings: PPR - 1.1k, 1.1s, 1.2k, 1.2s, 1.3k, 1.3s, 1.4k, 1.4s, 1.5k, 1.5s, 1.6k, 1.6s, 1.7k,

			understand the law of conservation of mass. *Science Teacher*, 76(7), 54-57. Week 13 Reading Quiz: Due 4/23 at 11:59 pm	1.7s, 1.8k, 1.8s,1.9k, 1.9s, 1.11k, 1.11s TTS - 2A, 2B, 2C, 4A
4/24, 4/26 Week 14a	The Opportunity Gap, Nature vs. Nurture, The Pedagogy of Poverty	Who needs to Be Proficient in Science and Mathematics Recognize that current teaching practices have maintained achievement gaps. Identify the possible causes of the achievement gaps that are under a teacher's control. Nature vs Nurture in Intelligence The Pedagogy of Poverty EdTPA Connection: Rubric 6 - Learning Environment	Haberman, M. (1995). Pedagogy of poverty versus good teaching. Phi Delta Kappan, 92(2): 45-52.	Class Activities; PPR - 2.21k, 2.21s, 2.19k, 2.20s, 2.23k TTS - 2A, 2B, 2C, 4A, 4D Reading: PPR - 2.21k, 2.21s, 2.19k, 2.20s, 2.23k TTS - 2A, 2B, 2C, 4A, 4D
Week 14b	Social-Emotional Learning	Why is it important to attend to the social/emotional needs of students? What resources and strategies are beneficial for supporting the social and emotional needs of both students and teachers?	Assignment: Final Exam: Due 5/3 at 11:59 pm Assignment: TEA Dyslexia Course: Certificate due by email by 5/3 at 11:59pm	Class Activities and Readings: PPR - 1.3k, 1.3s, 1.4k, 1.4s, 1.5k, 1.5s, 1.6k, 1.6s, 2.1k, 2.1s, 2.2k, 2.2s, 2.3k, 2.3s, 2.4k, 2.4s TTS - 2A, 2B, 2C, 4A
5/1, 5/3 Week 15a	Dyslexia Instruction	Complete TEA Dyslexia Course EdTPA Connection: Rubric 3 -Using Knowledge of Student to Inform Teaching and Learning	Shaywitz, S. (1996) Dyslexia. *Scientific American, 275*(5), 98-104. TEA Dyslexia Course: Certificate due by email by 5/3 at 11:59pm TEA Dyslexia Training – See Learning Module for registration instructions: https://register.tealearn.com/courses/tea-dyslexia	**Dyslexia** Training & readings: PPR - 1.1k, 1.2k, 1.3k, 1.4k, 1.5k TTS - 2A, 2B, 2C, 4A
Week 15b	Final Exam		Final Exam: Due 5/3 at 11:59 pm	

Course Policies

Grading Policy

- **Reading Quizzes – 30 points total (Drop lowest quiz score)**
  Quizzes will be completed through the link within each week's folder in eLearning and will need to be completed by 11:59 pm on Sunday of that week (See schedule above & calendar for dates).
- **Class Participation – 5 points**
- **Clinical Interview Project – 20 points**
  To be completed utilizing the guidelines provided.
- **Teaching Philosophy Paper – 15 points**
- **Mid-Term Exam – 15 points**
  Analysis and application of concepts presented up to this point.
- **Final Exam – 15 points**
  Analysis and application of concepts presented during the entire semester.

The semester grade will be determined by total number of points accrued in each category. An overall percentage will be calculated with the following grades applied:

97-100% A+	87-89% B+	77-79% C+
94-96% A	84-86% B	74-76% C
90-93% A-	80-83% B-	70-73% C-

Any Grades calculated below 70% will be considered failing.

Make-up exams will only be allowed under extreme circumstances. Students must contact the instructor prior to the exam to qualify.

Late work will be accepted with approximately a 10-50% deduction in the grade each day after assignment is due.

Class Attendance/Online Participation is required. You will be allowed three absences of any kind without penalty. **Your final course grade will be lowered a full letter grade for each class meeting missed for any reason after three (3).**

Example: If final course grade* = A+:
4 absences = B+,
5 absences = C+,
6 absences = F.
**Results will vary based on final course grade*.

Attendance for Asynchronous portions is determined by timely completion of assignments or other assigned tasks. In-person participation is determined by participation in group discussions and activities as well as attendance for the in-person class meeting.

Citizenship/Professionalism - Students are expected to present themselves as professionals and work in a cooperative learning environment. Cell phones, laptops, other devices, etc. will not be utilized during class time for calls, texting/messaging, gaming, web surfing, and/or social media.

UTeach Dallas Policy on Retaking Classes to Improve GPA - Field work and many other aspects of our courses are supported by generous grant funding by corporate and foundation sponsors. While courses with grades of C or below may be retaken to meet UTD teacher certification GPA requirements, we will not allow students with grades of B to retake courses due to unnecessary costs which deplete limited grant funding.

Accommodations - It is the policy and practice of The University of Texas at Dallas to make reasonable accommodations for students with properly documented disabilities. However, written notification from the Office of Student AccessAbility (OSA) is required. If you are eligible to receive an accommodation and would like to request it for this course, please discuss it with me and allow one-week advance notice. Students who have questions about receiving accommodations, or those who have, or think they may

have, a disability (mobility, sensory, health, psychological, learning, etc.) are invited to contact the Office of Student AccessAbility for a confidential discussion. OSA is located in the Student Services Building, suite 3.200. They can be reached by phone at (972) 883-2098, or by email at studentaccess@utdallas.edu.
UTeach Dallas Complaints Procedure You have the right to raise a concern or lodge a complaint and to seek redress in areas where you feel that the program did not fulfill requirements for certification or for actions that you feel are wrong. To raise a concern or file a complaint: 1. Contact UTeach Dallas Associate Director, Katie Donaldson, with your complaint at kate.donaldson@utdallas.eduor 972-883-6427. 2. If your concern is not resolved to your satisfaction and you want to speak with someone else, contact UTeach Dallas Co-Director, Dr. Mary Urquhart, at urquhart@utdallas.edu or 972-883-6485 to schedule an appointment. **All conferences are confidential.** The University of Texas at Dallas Student Complaint Resources page is also a resource and may be found at https://catalog.utdallas.edu/now/undergraduate/resources/student-complaints You also have the right to file a complaint about UTeach Dallas directly to the Texas Education Agency (TEA) at www.tea.texas.gov.
Campus Carry - The University's concealed handgun policy is posted on the campus carry website: http://www.utdallas.edu/campuscarry/

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

The information contained in the following link lists the University's academic support resources for all students. Please go to Academic Support Resources webpage for these policies.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to UT Dallas Syllabus Policies webpage for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.