ELED 558.41E: Science Curriculum for Grades 4-8
COURSE SYLLABUS: Fall, 2012

Instructor:	Gil Naizer, Professor, Department of Curriculum & Instruction with Becky Barton Sinclair, PhD., Associate Professor
Office Location:	Commerce Campus - Ed. South #224
Office Hours:	Campus Hours TBA. Also by phone or email. Meetings by appointment.
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COURSE INFORMATION

Class Enrollment Limitation:
This course is limited to Teacher Quality Grant participants via Texas A&M – Commerce and Mesquite ISD. All students must be pre-approved for course registration.

Materials – Textbooks, Readings, Supplementary Readings:
Required notebooks, supplemental readings and materials will be provided by the course instructor. Some sources of course materials include, but are not limited to:

- Texas Mining and Reclamation Association (2010). *Industrial minerals in Texas: Workshop notebook.* TMRA: Austin.
- Texas Essential Knowledge and Skills (TEKS) for Science, grades 4-8
- Mesquite ISD Science Curriculum Guide
- National Research Council (2008). *Ready, set, science! Putting research to work in K-8 science classrooms.* National Academic Press: Washington, D.C.
- Others to be determined

Course Description:
The course is designed to meet the following objectives and provide research-based practice experiences based on the 4 strands from *Ready, Set, Science!* (National Academies Press, 2008): understanding scientific explanations, generating scientific evidence, reflecting on scientific knowledge, and participating productively in science. The course content will focus on grades 4-8 earth science concepts and skills outlined in the Texas Essential Knowledge and Skills (TEKS) and best practices to incorporate this content and related science technology into the classroom and/or lab. While the focus will be on upper elementary and middle school classroom applications, the content level instruction will be at a higher level.

Primary Student Learning Outcomes:

1. Develop abilities to plan and implement effective instruction of course content and technology for <u>all</u> students. This includes pedagogy skills in inquiry-based and 5E teaching methods, best practices in teaching and assessing ELL, SPED, G/T and academically diverse learners, and classroom/lab/field management skills.
2. Increase participants' capacity for instructional leadership, collaboration and mentorship of peers and collaboration with members of scientific community.

Secondary Student Learning Outcomes:

3. Increase conceptual knowledge in earth science including: plate tectonics and results of plate motions, rocks and minerals, renewable and nonrenewable resources, weathering/erosion and deposition, historical geology timeline, identifying and manipulating patterns of change. <u>Specific TEKS listed in last pages of this syllabus.</u>
4. Increase understanding of the MISD curriculum, science TEKS (grades 4-8) and new STAAR Science instrument as pertains to above content specific areas.
5. Learn and demonstrate new technology using iPads, science "apps" and website programs, instructional video/Podcast creation and classroom teaching applications.

COURSE REQUIREMENTS

Instructional / Methods / Activities Assessments

Field Trip Participation and Activities: (20 possible points)

- This course requires participation in field locations to learn about earth science.
- Field trips to various locations may involve walking on uneven surfaces, steep slopes, high grass, rocks, hills, etc. **If you have a physical condition that might cause you difficulty, please let me know in advance.**
- While visiting field sites, you may be required to wear work/hiking boots, full length pants and shirts with long or short sleeves (no tank tops). You will also want to bring a hat with wide brim (or baseball cap), sunglasses and sunscreen. Flip flops, perfect make-up and nice clothes are not allowed on field trips! Each trip and regulations for visits will be discussed prior to the trip.
- Field Trip Supplies: bring a backpack for equipment and collected specimens, water bottle, snacks, ziplock baggies (various sizes), small notepad, sharpie and/or regular pen.

Class Participation and Activities: (40 possible points)

- During class meetings and field trips, students are expected to actively engage in various class discussions and activities, including online threaded discussions, and website investigations.
- These activities will be combined for an overall Class Participation and Activities grade.

Pre-test and Post-test Assessments: (10 possible points)
Students will complete a pre- and post-test about the course content focus. The pre-test score will not affect your course grade. However, the post-test score will count as a potential 10 points. The post-test will be a "take-home" test in which notes and readings may be referenced in your answers.

Reading Reflections: (15 possible points)
Students will complete reflections on assigned readings.

Student Project of Choice: (15 possible points)
This course requires submission of one project that reflects the Student Learning Outcomes. These projects will be created as a way to directly enhance the science learning in your classroom. Possible projects are locating children's literature to compliment a science unit of study, developing inquiry-based units for your classroom, creating a new video/PowerPoint or presentation to teach a science concept, etc. Detailed project guidelines will be provided.

GRADING
All assignments are graded on a scale of from 5 (highest grade) to 0 (lowest grade) based on the following criteria:

5 - Exceptional – Exceeds Minimum Expectations in All Areas Addressed. Well above average in thought, language structure, and word choice; extremely well organized; shows thorough understanding and assimilation of concepts; excellent sense of unity; polished transition between concepts or thoughts; frequent sentence variation which adds to flow and unity of paper; quality word choice that may be unusually striking, vivid, or creative; virtually free of errors.

4 - Above Average – Meets Minimum Expectations in the Majority of Areas Addressed and Exceed Expectations in Some Areas. In general command of thought, sentence structure, and word choice; organized; shows some understanding of concepts; good sense of unity; good transition between concepts or thoughts; some sentence variation which adds to flow and unity of paper; good word choice that may be vivid or striking; writing that demonstrates a level of maturity expected of graduate students; few if any errors.

3 - Average - Adequate In some Areas and Inadequate in Others. Problems in some of the following areas: depth of thought; ability to elaborate and provide sufficient detail; sentence structure, word choice, grammar, and spelling; organized and formatted appropriately; good unity, sequence, and transitions; writing that demonstrates a level of maturity expected of graduate students; in need of instruction.

2 – Below Average -- Inadequate in Several Areas. Problems in several of the following areas: depth of thought; ability to elaborate and provide sufficient detail; sentence structure, word choice, grammar, and spelling; organization and formatting; unity, sequencing, and transitions; writing that demonstrates a level of maturity expected of graduate students; in need of instruction.

1 – Unacceptable -- Inadequate in Many Areas. Problems in many of the following areas: depth of thought; ability to elaborate and provide sufficient detail; sentence structure, word choice, grammar, and spelling; organization and

formatting; unity, sequencing, and transitions; writing that demonstrates a level of maturity expected of graduate students; in need of instruction.

0 - Not Submitted or Not Accepted By Instructor.

FINAL GRADE IN THE COURSE
Your final grade in this course is based on your performance on all of the requirements and expectations for the class. Some assignments carry more weight than others. Once the final grade is calculated, it is then adjusted by absence(s). Averages will be based on 100 points: 90-100 = A, 80-89 = B, 70-79 = C, 60-69 = D, below 60 = F.

TECHNOLOGY REQUIREMENTS

Participants need to bring the following equipment to class: iPad, a laptop computer, 1 "memory stick". Please be familiar with your personal equipment use before class.

COURSE AND UNIVERSITY PROCEDURES/POLICIES

University Specific Procedures:
ADA Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamu-commerce.edu
Student Disability Resources & Services

Student Conduct
All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook).* Due to additional safety regulations of the field locations, the instructor (and field location staff) reserves the right to deny or remove any student from specific locations and/or activities at any time to ensure the safety and security of the student(s) and field location.

TENATIVE COURSE OUTLINE / CALENDAR

Basic Overview for Class
Meeting Schedule: (Dates, Times and Locations subject to change.)

Date	Topic	Location	Instructor
August	What are the "4 strands" supporting good science teaching? *Ready, Set, Science!* Book. Managing Science Labs & Supplies, Lab Safety Cooperative Lab Groups & Team Building Class Starters & Early Finishers Lesson Content & Activities: Structure of the Earth: • What is Geology? TEKS? STAAR? • Layers of the Earth • Plate Tectonics & Driving Forces	MPLX 9:00-4:00	Sinclair & Naizer

September	Science Technology for Classrooms Resources and Uses: Google Earth, earth science websites and Apps, videos/Podcasts Teaching with Stream Tables School Yard Field Trips for Earth Science Content Lesson Content & Activities: Constructive & Destructive Forces that Change the Earth's Surface: • Plate Tectonics, Motion & Results • Weathering, Erosion & Deposition • Laws of Geology (Superposition)	MPLX 9:00-4:00	Sinclair, Naizer & MISD Staff
October	Teaching Science with Interactive Notebooks Encouraging Thinking: • *The Private Eye* book & Activities • More Class Starters & Early Finishers • Assessments & Differentiated Learning	MPLX 9:00-4:00	Sinclair, Naizer & MISD Staff
November	Science Classroom Management Skills (Rules, Procedures & Consequences) Lesson Content & Activities: Rocks, Minerals & Fossils: • Rock Cycle & Classification • Physical & Chemical Structure of Minerals & Rocks • Earth's Resources (Renewable & Nonrenewable) • What are Industrial Minerals?	MPLX 9:00-4:00	Sinclair, Naizer & MISD Staff
December	Great Ideas Sharing & Presentations (Participants present favorite ideas learned at the Conference for the Advancement of Science Teaching)	MPLX 9:00-4:00	Sinclair & Naizer
January	Assessment & Data • Rubrics, Different Type of Assessment & Tools • Data Interpretation (TAKS & CBAs) • Ways to Prepare and Tutor for Tests Teacher Leadership • Practices of effective leaders • Being a Science Teacher Mentor	MPLX 9:00-4:00	Sinclair, Naizer & MISD Staff
February	Techniques for Teaching & Assessing Diverse Learners in Science Labs & Classrooms • ELLs and SIOP Model • SPED Inclusion • Gifted & Talented • Reluctant Learners	MPLX 9:00-4:00	Sinclair, Naizer & MISD Staff
March	Arlington Archosaur – Field Trip (Month subject to change dependent on weather and environmental factors.)	Arlington 9:00-4:00	Sinclair, Naizer & Derek Main

April	Sulfur River Fossil Hunt – Field Trip (Month subject to change dependent on weather and environmental factors.)	Commerce 9:00-4:00	Sinclair, Naizer & Fox

Earth Science Content Focus for Course/Grant
Texas Essential Knowledge and Skills - Grades 4-8

§112.15. Science, Grade 4, Beginning with School Year 2010-2011.
(a)(4)(A) Within the natural environment, students know that earth materials have properties that are constantly changing due to Earth's forces. The students learn that the natural world consists of resources, including renewable and nonrenewable, and their responsibility to conserve our natural resources for future generations.
(b)(3)(C) represent the natural world using models such as rivers, stream tables, or fossils and identify their limitations, including accuracy and size; and
(b)(7) Earth and space. The students know that Earth consists of useful resources and its surface is constantly changing. The student is expected to:
(B) observe and identify slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice; and
(C) identify and classify Earth's renewable resources, including air, plants, water, and animals; and nonrenewable resources, including coal, oil, and natural gas; and the importance of conservation.

§112.16. Science, Grade 5, Beginning with School Year 2010-2011.
(a)(4)(B) Within the natural environment, students learn how changes occur on Earth's surface. Students learn that the natural world consists of resources, including nonrenewable, renewable.
(b)(7) Earth and space. The student knows Earth's surface is constantly changing and consists of useful resources. The student is expected to:
(A) explore the processes that led to the formation of sedimentary rocks and fossil fuels;
(B) recognize how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, and ice;
(D) identify fossils as evidence of past living organisms and the nature of the environments at the time using models.

§112.18. Science, Grade 6, Beginning with School Year 2010-2011.
(a)(4)(D) Earth and space. The focus of this strand is on introducing Earth's processes.
(b)(10) Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The student is expected to:
(A) build a model to illustrate the structural layers of Earth, including the inner core, outer core, mantle, crust, asthenosphere, and lithosphere;
(B) classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation;
(C) identify the major tectonic plates, including Eurasian, African, Indo-Australian, Pacific, North American, and South American; and
(D) describe how plate tectonics causes major geological events such as ocean basins, earthquakes, volcanic eruptions, and mountain building.

§112.19. Science, Grade 7, Beginning with School Year 2010-2011.
(a)(4)(C) Force, motion, and energy. Force, motion, and energy are observed in living systems and the environment in several ways. Weathering, erosion, and deposition occur in environments due to the forces of gravity, wind, ice, and water.
(a)(4)(D) Earth and space. Earth and space phenomena can be observed in a variety of settings. Both natural events and human activities can impact Earth systems.
(b)(8) Earth and space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:
(A) predict and describe how different types of catastrophic events impact ecosystems such as floods, hurricanes, or tornadoes;
(B) analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas

§112.20. Science, Grade 8, Beginning with School Year 2010-2011.
(a)(4)(D) Earth and space. Students identify the role of natural events in altering Earth systems. Students will illustrate how Earth features change over time by plate tectonics. They will interpret land and erosional features on topographic maps.
(b)(9) Earth and space. The student knows that natural events can impact Earth systems. The student is expected to:
(A) describe the historical development of evidence that supports plate tectonic theory;
(B) relate plate tectonics to the formation of crustal features; and
(C) interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be reshaped by weathering.