Guiding Principles for this Course

*Texas State Examination: TEXES Exam #136 Composite Science 8-12

Science Standard I:
• The science teacher manages classroom, field and laboratory activities to ensure the safety of all students and the ethical care and treatment of organisms and specimens

Science Standard II:
• The science teacher understands the correct use of tools, materials, equipment and technologies

Science Standard III:
• The science teacher understands the process of scientific inquiry and its role in science instruction

Science Standard IV:
• The science teacher has theoretical and practical knowledge about teaching science and about how students learn science

Science Standard V:
• The science teacher knows the varied and appropriate assessments and assessment practice to monitor science learning

Science Standard VI:
• The science teacher understands the history and nature of science

Science Standard VII:
• The science teacher understands how science affects the daily lives of students and how science interacts with and influences personal and societal decisions

Science Standard VIII:
• The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in physical science

Science Standard IX:
• The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in life science

Science Standard X:
• The science teacher knows and understands the science content appropriate to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]) in Earth and space science(s)

Science Standard XI:
• The science teacher knows unifying concepts and processes that are common to all Sciences
Student Learning Outcomes

<table>
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<th>Learning Outcome</th>
<th>Measureable Techniques</th>
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<td>SS I</td>
<td>Sample Lab activities, Readings, Lectures, Quizzes</td>
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<td>SS II</td>
<td>Discussions, Lesson Plans (usage), Lectures, Quizzes, Pre/Post Tests</td>
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<td>Experimentally Designed Experiments, Discussions, Lectures</td>
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<td>SS IV</td>
<td>Lesson Plans, TExES Presentation</td>
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<td>SS V</td>
<td>Daily Practice questions, Student-created questions, Readings, Lectures, TExES Presentation, Lesson Plans</td>
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<tr>
<td>SS VI</td>
<td>Lectures</td>
</tr>
<tr>
<td>SS VII</td>
<td>Lectures, Research, Readings Pre/Post Tests, Quizzes (formal and informal assessments/discussions)</td>
</tr>
<tr>
<td>SS VIII</td>
<td>Lesson Plans, Lectures</td>
</tr>
<tr>
<td>SS IX</td>
<td>Research, Readings, Lectures, Lesson Plans</td>
</tr>
<tr>
<td>SS X</td>
<td>Research, Readings, Lectures, Lesson Plans</td>
</tr>
<tr>
<td>SS XI</td>
<td>Pre/Post Tests, Quizzes, Lesson Plans</td>
</tr>
</tbody>
</table>

Additional Student Learning Outcomes

1. Distinguish between behaviorism and constructivism, understand methods for incorporating inquiry-based teaching and design two inquiry-based lesson plans.
2. Understand state mandated standards such as Texas English Language Proficiency Assessment System (TELPAS), English Language Proficiency Standards (ELPs), and Texas Essential Knowledge and Skills (TEKS) and design lesson plans based upon them.
3. Develop a clear understanding of elements required in lesson plans by local school districts.
4. Develop a clear understanding of local school populations and how school labeling systems work, such as LEP, ELL, migrant, BIP, ARD, IEP, etc.
5. Learn of proper use, storage and disposal of chemicals, lab and safety equipment.
6. Develop a presentation based upon teaching science competencies for TExES exam 136 Composite Science 8-12.
7. Student will learn about departments and resources available for UTEP students.

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. All assignments with plagiarized material will be given a grade of 0 AND automatically have 10% deducted from their overall grade at a minimum. If you use ideas or written text from other people you must cite them; self-plagiarism is not accepted.

**Required Text: will be provided as free ebook**

Author: Llewellyn  
Title: Teaching High School Science Through Inquiry  
Publisher: Sage Publications, Incorporated  
Edition: 2nd  
ISBN: 9781452244457  
*There will be handouts and free downloadable chapters made available, and below are some of the resources you may want to review on your own:

- Texas Essential Knowledge and Skills (TEKS) [http://www.tea.state.tx.us/index2.aspx?id=6148](http://www.tea.state.tx.us/index2.aspx?id=6148)  
- English Language Proficiency (ELPS) Standards: [http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4](http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4)  
- Texas Education Agency (TEA): [http://www.tea.state.tx.us/index.aspx](http://www.tea.state.tx.us/index.aspx)  
- State Board for Educator Certification (SBEC): [http://www.tea.state.tx.us/index2.aspx?id=2147489433](http://www.tea.state.tx.us/index2.aspx?id=2147489433)  
- Texas English Language Proficiency (TELPAS) Standards: [http://www.tea.state.tx.us/student.assessment/ell/telpas/](http://www.tea.state.tx.us/student.assessment/ell/telpas/)  

**Attendance/Conduct Policies**

The UTEP Teacher Education Department considers missing two weeks of class excessive. The student may be dropped for lack of attendance. If you miss two weeks of class, contact your instructor immediately. I reserve the right to drop students, and do not assume that I would have/did drop you, it is your responsibility to check if you have been dropped or not.

It is EXTREMELY important that you attend class regularly and on time!

Point Procedure on not attending class:
• You have ONE FREE day to miss class; after one missed day, eight points will be subtracted from your OVERALL grade for every missed class
• If you are more than 20 minutes late to class, it will be counted as an absence
• After three tardies, three points will be subtracted from your OVERALL grade, and additional point for every tardy beyond that
• The instructor reserves the right to drop you from the course; for example but not limited to conduct detrimental to the instructor, the class, or the individual, excessive absences, etc; this conduct also refers to public forums and private emails

**UTEP Teacher Education Department Policy on Course Absences**
The UTEP Teacher Education Department considers missing two weeks of class excessive. The student may be dropped for lack of attendance. If you miss two weeks of class, contact your instructor immediately. I reserve the right to drop students, and do not assume that I would have/did drop you, it is your responsibility to check if you have been dropped or not.

**Late Assignments**
A maximum of one late assignment will be accepted, with 20% deducted for every day that assignment is late; a second late assignment will not be accepted.

**Grading Policy/Breakdown**
All students will be graded on their prompt arrival to class, attendance, lack of frequent class disruptions, and participation in class. Disruptions can include (but are not limited to) frequently talking and/or disrupting class, answering cell phone/texting, habitual tardiness, and/or laptop use for unprofessional activities during class. Any of these deviations from professionalism will be documented and can adversely affect your grade.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive final examination</td>
<td>1(15)</td>
<td>15%</td>
</tr>
<tr>
<td>Experimental Design</td>
<td>1(10)</td>
<td>10%</td>
</tr>
<tr>
<td>Team Teaching</td>
<td>1(10)</td>
<td>10%</td>
</tr>
<tr>
<td>TExES #136 competency presentation</td>
<td>1(10)</td>
<td>10%</td>
</tr>
<tr>
<td>Three quizzes</td>
<td>3(5)</td>
<td>15%</td>
</tr>
<tr>
<td>Lesson Plan</td>
<td>1(10)</td>
<td>10%</td>
</tr>
<tr>
<td>Science Articles</td>
<td>2(5)</td>
<td>10%</td>
</tr>
<tr>
<td>Class Assignments/Homework</td>
<td></td>
<td>20%</td>
</tr>
</tbody>
</table>

100 points total

**Grade Distribution of Point total**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point total</td>
<td>100-91</td>
<td>90-80</td>
<td>79-75</td>
<td>74-70</td>
<td>69-0</td>
</tr>
</tbody>
</table>
Students with Disabilities Statement:
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). The Disabled Student Services Office can also be reached in the following ways: Web: http://www.utep.edu/dsso Phone: (915) 747-5148 voice or TTY Fax: (915) 747-8712

Course Schedule and/or Assignment Changes
The course instructor reserves the right to adjust the course syllabus or change assignments as needed. While every effort will be made to adhere to the calendar and the course outlines, there will without a doubt be changes due to unexpected situations or pacing that may arise during the semester. Every attempt will be made for advance ‘warning.’ These modifications will be based on the specific needs of all the students in the course, but not to exceed difficulty or the due dates of the originally proposed assignment.

The schedule of assignments and classroom discussions may also change over the course of the semester. Any changes to the syllabus will be announced in class. Every student is responsible for these changes whether or not she/he is present in class.

Technology Requirements
You must have access to UTEP email prior to the beginning of the second class meeting. If you do not have one yet, you may apply for your UTEP email account, login, and password from a form available online at: https://newaccount.utep.edu

Technical Assistance
The University of Texas at El Paso offers complete technical information and help desk support at: http://issweb.utep.edu/techsupport/
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings and Assignments are to be completed before class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 26 F2F</td>
<td>Definition of science, syllabus, Dropbox intro, safety, lab responsibilities, MSDS, NFPA</td>
<td></td>
</tr>
<tr>
<td>Sept 2 F2F</td>
<td>Pedagogical techniques, behaviorism vs. constructivism, traditional vs. inquiry-based, Piaget/Vygotsky</td>
<td></td>
</tr>
</tbody>
</table>
| Sept 9     | Begin non-negotiables; Lesson Plan Essentials: LEP, ESL, migrant, TELPAS, IEP, classroom management, BIP, ARD | *Science Article I selected  
*Topics Selected for TExES Competency Presentations |
| Sept 16    | Lesson Plan Essentials (aka non-negotiables)  
Lesson plan rubric | Read Ch.3 |
| Sept 23 F2F | Intro to grade-based technology, sample lesson plans, modeling, reinforcement, reteaching, Dewey | TExES Competency Presentation |
| Sept 30 F2F | Assessments, backward design, spiraling, project-based learning, problem based learning, Earth science concepts | Read Ch.4  
Quiz #1  
Science Article II selected |
| Oct 7      | Lesson Plan #1 Reflections  
Experimental Design (ExD), Chomsky/Gardner, Learning Styles Learning Styles Inventory | Lesson Plan  
(Based on TExES Competency)  
Reviewed Science Article (#1) |
| Oct 14     | Sample lab hands-on science activities/method ideas; UTEP as a resource: library resources, writing center, Puentes | Read Ch. 5 |
| Oct 21 F2F | Review ExD; impromptu class presentations  
Biology concepts | Quiz #2 (6-24)  
*Experiment selected |
| Oct 28     | Interventions, PDAS, PLC, TEKS, TEA, NGSS, teaching organizations, RTI | Read Ch. 9 |
| Nov 4      | Inquiry-based laboratory suggestions, lab equipment, Assessments (cont.), spiraling, scaffolding, | Read Ch. 11 |
| Nov 11 F2F | 10 min. class presentation discussing your experiment | Read Ch. 12  
Experimental Design |
| Nov 18     | Inquiry-based laboratory suggestions, lab equipment, Assessments (cont.), spiraling, scaffolding, | Reviewed Science Articles (#2) |
| Nov 25 F2F | Teaching philosophy, classroom approach, pedagogy, Bloom’s Taxonomy (higher-order thinking)/Krashen | Team Teaching Assignment  
Quiz #3 |
| Dec 2      | Reflections and Team Teaching reviews | Reflections |
| Dec 9 F2F  | Final Exam | Comprehensive Final |
Competency 033 (Assessments in Science Learning): *The teacher knows the varied and appropriate assessments and assessment practices for monitoring science learning in laboratory, field and classroom settings.*

The beginning teacher:

A. Understands the relationships between a science curriculum, assessment and instruction and bases instruction on information gathered through assessment of students' strengths and needs.

B. Understands the importance of monitoring and assessing students' understanding of science concepts and skills on an ongoing basis, including how to use formal and informal assessments of student performance and how to use products (e.g., projects, lab journals, rubrics, portfolios, student profiles, checklists) to evaluate students' understanding of and participation in the inquiry process.

C. Selects — or designs — and administers a variety of appropriate assessment methods (e.g., performance assessment, self-assessment, formative/summative assessment) to monitor students' understanding and progress and to plan for instruction.

D. Understands the importance of communicating evaluation criteria and assessment results to students.

Competency 034 (Physical Science): *The teacher understands forces and motion and their relationships.*

The beginning teacher:

A. Demonstrates an understanding of the properties of universal forces (e.g., gravitational, electrical, magnetic).

B. Understands how to measure, graph and describe changes in motion by using concepts of position, direction of motion and speed.

C. Analyzes the ways unbalanced forces acting on an object cause changes in the position or motion of the object.

D. Analyzes the relationship between force and motion in a variety of situations (e.g., simple machines, geologic processes).
Competency 035 (Physical Science): The teacher understands the physical and chemical properties of and changes in matter.

The beginning teacher:

A. Describes the physical and chemical properties of substances (e.g., size, shape, temperature, magnetism, hardness, mass, conduction, density).
B. Describes the physical properties of solids, liquids and gases.
C. Distinguishes between physical and chemical changes in matter.
D. Applies knowledge of physical and chemical properties of and changes in matter to processes and situations that occur in life science and in Earth and space science.
E. Distinguishes between mixtures and solutions and describes their properties.
F. Explains the importance of a variety of chemical reactions that occur in daily life (e.g., rusting, burning of fossil fuels, photosynthesis, cell respiration, chemical batteries, digestion of food).

Competency 036 (Physical Science): The teacher understands energy and interactions between matter and energy.

The beginning teacher:

A. Understands conservation of energy and energy transformations and analyzes how energy is transformed from one form to another (e.g., mechanical, sound, heat, light, chemical, electrical) in a variety of everyday situations.
B. Understands the basic concepts of heat energy and related processes (e.g., melting, evaporation, boiling, condensation).
C. Understands the principles of electricity and magnetism and their applications (e.g., electric circuits, motors, audio speakers, lightning).
D. Applies knowledge of properties of light (e.g., reflection, refraction) to describe the functioning of optical systems and phenomena (e.g., camera, microscope, rainbow, eye).
E. Demonstrates an understanding of the properties, production and transmission of sound.
Competency 037 (Physical Science): The teacher understands energy transformations and the conservation of matter and energy.

The beginning teacher:

A. Describes sources of electrical energy and processes of energy transformation for human uses (e.g., fossil fuels, solar panels, hydroelectric plants).

B. Applies knowledge of transfer of energy in a variety of situations (e.g., the production of heat, light, sound and magnetic effects by electrical energy; the process of photosynthesis; weather processes; food webs; food and energy pyramids).

C. Understands applications of energy transformations and the conservation of matter and energy in life science and in Earth and space science.

Competency 038 (Life Science): The teacher understands the structure and function of living things.

The beginning teacher:

A. Understands that living systems have different structures that perform different functions.

B. Understands and describes stages in the life cycles of common plants and animals.

C. Understands that organisms have basic needs.

D. Analyzes how structure complements function in cells, tissues, organs, organ systems and organisms.

E. Identifies human body systems and describes their functions.
Competency 039 (Life Science): *The teacher understands reproduction and the mechanisms of heredity.*

The beginning teacher:

A. Describes the processes by which plants and animals reproduce and explains how hereditary information is passed from one generation to the next.

B. Compares and contrasts inherited traits and learned characteristics.

C. Understands the organization of hereditary material and how an inherited trait can be determined by one or many genes and how more than one trait can be influenced by a single gene.

D. Distinguishes between dominant and recessive traits and predicts the probable outcomes of genetic combinations.

E. Evaluates the influence of environmental and genetic factors on the traits of an organism.

Competency 040 (Life Science): *The teacher understands adaptations of organisms and the theory of evolution.*

The beginning teacher:

A. Demonstrates knowledge of adaptive characteristics and explains how adaptations influence the survival of populations or species.

B. Describes how populations and species change through time.

C. Describes processes that enable traits to change through time, including selective breeding, mutation and other natural occurrences.
Competency 041 (Life Science): The teacher understands the relationship between organisms and the environment.

The beginning teacher:

A. Understands that organisms respond to internal or external stimuli and analyzes the role of internal and external stimuli in the behavior of organisms.

B. Understands relationships between organisms and the environment and describes ways that living organisms depend on one another and on the environment to meet their basic needs.

C. Identifies organisms, populations or species with similar needs and analyzes how they compete with one another for resources.

D. Analyzes the interrelationships and interdependence among producers, consumers and decomposers in an ecosystem (e.g., food webs, food chains, competition, predation).

E. Identifies factors that influence the size and growth of populations in an ecosystem.

F. Analyzes adaptive characteristics that result in a population’s or species’ unique niche in an ecosystem.

G. Knows how populations and species modify and affect ecosystems.

Competency 042 (Earth and Space Science): The teacher understands the structure and function of Earth systems.

The beginning teacher:

A. Understands the structure of Earth and analyzes constructive and destructive processes that produce geologic change.

B. Understands the form and function of surface water and groundwater.

C. Applies knowledge of the composition and structure of the atmosphere and its properties.

D. Applies knowledge of how human activity and natural processes, both gradual and catastrophic, can alter Earth systems.
Competency 043 (Earth and Space Science): The teacher understands cycles in Earth systems.

The beginning teacher:

A. Understands the rock cycle and how rocks, minerals and soils are formed.
B. Understands the water cycle and its relationship to weather processes.
C. Understands the nutrient (e.g., carbon, nitrogen) cycle and its relationship to Earth systems.
D. Applies knowledge of how human and natural processes affect Earth systems.
E. Understands and describes the properties and uses of Earth materials (e.g., rocks, soils, water, atmospheric gases).

Competency 044 (Earth and Space Science): The teacher understands the role of energy in weather and climate.

The beginning teacher:

A. Understands the elements of weather (e.g., humidity, wind speed, pressure, temperature) and the tools used for measurement.
B. Compares and contrasts weather and climate.
C. Analyzes weather charts and data to make weather predictions.
D. Applies knowledge of how transfers of energy between Earth systems affect weather and climate.
E. Analyzes how Earth’s position, orientation and surface features affect weather and climate.

Competency 045 (Earth and Space Science): The teacher understands the characteristics of the solar system and the universe.

The beginning teacher:

A. Understands the properties and characteristics of objects in the sky.
B. Applies knowledge of the Earth-Moon-Sun system and the interactions between them (e.g., seasons, lunar phases, eclipses).
C. Identifies properties of the components of the solar system.