

Texas A&M University-San Antonio
College of Education and Human Development
Curriculum & Instruction Department
EDCI 4356: Science Methods: Middle and High School Levels

A. MAJOR COURSE REQUIREMENTS:

- **Tests**
One multiple-choice tests will be administered during the semester
- **Individual Unit Plan**
A 5-E lesson plan is to be completed individually by each student for a 4th – 6th grade science content TEK
- **Science Lesson Presentation with Mini Teach**
This Presentation includes a PowerPoint or Prezi presentation to provide the science content/background information about your assigned science topic, in addition to doing a mini-teach of the student activities mentioned in the lesson plan. This lesson is to be aligned to the grade level standards.

B. LEARNING OBJECTIVES:

Upon completion of this course, the student will:

1. Understand the current goals and standards in science education, including *National Science Education Standards* (NRC, 1996) and State Science Standards (TEKS) for the EC-6 teachers.
2. Have developed knowledge of how elementary students learn science.
3. Have gained an appropriate level of science content knowledge in life science, physical science, and earth and space science.
4. Understand the nature of science and some important consensus views of the nature of science that science researchers presented.
5. Understand the science process skills and materials that can be used in the elementary science classroom.
6. Design and implement science lessons and activities that promote inquiry and scientific literacy in meeting the diverse needs of elementary school students.
7. Use and create a variety of assessments to evaluate students' progress.
8. Integrate other subject areas into the instructional process to enhance science teaching strategies.
9. Use technology to establish science teaching resources and communicate reflections for expanding learning and teaching ideas in the classroom.

B. C. STANDARDS: Teaching Standards for Grades 4-8 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. (SLO 5, 6, 7)
- **Standard II.** The science teacher understands the correct use of tools, materials, equipment, and technologies. (SLO 5, 9)
- **Standard III.** The science teacher understands the process of scientific inquiry and its role in science instruction. (SLO 6)
- **Standard IV.** The science teacher has theoretical and practical knowledge about teaching science and about how students learn science. (SLO 2, 4)
- **Standard V.** The science teacher knows the varied and appropriate assessments and assessment practices to monitor science learning. (SLO 7)
- **Standard VI.** The science teacher understands the history and nature of science. (SLO 4)
- **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. (SLO 4)

- **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. (SLO 3)
- **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. (SLO 3)
- **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. (SLO 3)
- **Standard XI.** The science teacher knows unifying concepts and processes that are common to all sciences. (SLO 3)

*These standards also align to the 7-12 Biology or 7-12 Chemistry TExES exam standards, with a few exceptions which can be addressed individually for students taking these assessments.

C. REQUIRED and RECOMMENDED READINGS

Required Textbooks:

1. National Academies of Sciences, Engineering, and Medicine. (2017). *Seeing Students Learn Science: Integrating Assessment and Instruction in the Classroom*. Washington, DC: The National Academies Press.
2. TExES Study Guide. You may select any of the existing study guides for your particular TExES exam: 211 (4-8 Generalist), 238 (7-12 Life Science), or 240 (7-12 Chemistry).

Recommended:

1. National Research Council. (2013). *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.
2. National Academies of Sciences, Engineering, and Medicine. (2018). *English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives*. Washington, DC: The National Academies Press.