

TEA STEM Instructional Planning Guide

Texas Essential Knowledge and Skills (TEKS)

What are the TEKS that align with this unit? Identify all subject-area TEKS that relate.

Student Learning Outcomes

What should students be able to know and do by the end of this unit? Identify student learning goals aligned with the identified TEKS.

Essential Questions

What overarching essential questions will focus the goals, stimulate conversation, and guide instruction?

Vocabulary**Student Knowledge/Skills**

Prior Concepts

Future Applications of Concepts

Common Misconceptions

What are the common misconceptions students might have about the concepts in this unit?

Assessment Evidence (Performance tasks could be formative or summative)

Formative(s) How will learning be measured as it occurs?

Summative What evidence of learning will demonstrate that a student has met the learning goals?

Resources and Materials

Engage

Explore

Explain

Elaborate

Evaluate

Safety

Think broadly when considering safety. What must be in place to ensure student safety, the safe disposal of materials, use of sharp objects, open flames, etc.?

Additional notes about this unit

INSTRUCTIONAL PLAN		
Considerations: Anticipatory Set, Input and Instruction, Practice, Checks for Understanding, Assessments, Closure, Approximate Timings, Student groupings, etc.		
Before/Into - Set a purpose - Make a plan - Make learning personal - Demonstrate the process - Anticipate final performances - Establish criteria for success	During/Through - The 5 Es - Evaluate students' performance - Connect ideas to self, world, other lessons - Extend and challenge thinking - Identify and support struggling students - Assess effectiveness of tools and techniques - Adjust instruction to achieve success	After/Beyond - Pause and reflect on performance - Review, reread, revise, reteach - Identify and remember key ideas - Assess degree of progress and success
Advanced Preparation		

5 Es: Engage, Explore, Explain, Elaborate, Evaluate		
ENGAGE Suggested Duration Day 1: 15-20 minutes	This portion of the 5E instructional plan should contain an activity(s) which is mentally challenging for students. The students should be so engaged with what they are seeing/doing so that they automatically begin asking questions and wanting to know more. When developing this part of the unit, keep in mind to address questions including: How will you activate student interest? How will you determine what your students already know about the topic? (formative assessment) What can be done at this point to identify and address misconceptions? Where can connections be made to the real world?	
	LITERACY CONNECTIONS: Use books or other media that help generate questions. (Fries-Gaither & Shiverdecker, 2013, p.29).	
	TEACHER	STUDENTS
	What is the TEACHER doing?	What are the STUDENTS doing?
	Teacher and Student Materials:	
EXPLORE Suggested Duration Day 1: 20-40 minutes Day 2: 40-60 minutes	This portion of the 5E instructional plan is student-centered and allows the students to explore the concepts more in depth. When developing this part of the unit, keep in mind to address questions including: How will the concept be developed? How is this relevant to students' lives? What can be done at this point to identify and address misconceptions?	
	INQUIRY can be use as a tool for exploration. Inquiry is an approach to	

	learning that involves a process of exploring the natural or material world and involves asking and answering questions and making discoveries. TYPES OF EXPLORATION and INQUIRY Guided Discovery The teacher provides students with a situation, procedure, manipulatives, examples, models, or demonstration. Students make discoveries through experiencing, observing and analyzing, and begin to develop their own conceptions and background knowledge. It is important to pay attention to and address any misconceptions. Research-based Inquiry Students engage in the inquiry process by gathering relevant information from multiple print, digital, or authentic sources, while assessing the credibility and accuracy of each source, and integrating the information while avoiding plagiarism. Guided Scientific Inquiry Teacher-guided scientific inquiry builds background knowledge around a concept(s) before allowing students to develop their own inquiry. With guided inquiry teachers provide an overall guiding question by which students then develop and conduct the scientific inquiry process. Teachers know what they want their students to understand beforehand, and what the outcome of the inquiry will be. Student-Driven Scientific Inquiry Students investigate their own questions that they would like to explore further. Students formulate their own problem or question to investigate and design their own procedures for testing. LITERACY CONNECTIONS: Use books that pose readily testable questions. Narrative expository and poetry are often perfectly suited to pique student interest. How to books help students plan the investigations they will carry out, and field guides help them identify and classify organisms and objects. Reference and explanation books also are essential as they provide a source of information with which students can compare their own findings. (Fries-Gaither & Shiverdecker, 2013). <table border="1" data-bbox="573 1129 1521 1283"> <tr> <th data-bbox="573 1129 1052 1192">TEACHER</th><th data-bbox="1052 1129 1521 1192">STUDENTS</th></tr> <tr> <td data-bbox="573 1192 1052 1283">What is the TEACHER doing?</td><td data-bbox="1052 1192 1521 1283">What are the STUDENTS doing?</td></tr> </table> Teacher and Student Materials:	TEACHER	STUDENTS	What is the TEACHER doing?	What are the STUDENTS doing?
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EXPLAIN Suggested Duration Day 3: 40-60 minutes	This portion of the 5E instructional plan is when students have an opportunity to clarify and modify their thinking. The teacher provides for the first time, the explanation and terms for what the students are studying. Teachers are encouraged to present material in a variety of ways in order to help students make connections between concepts, representations, and vocabulary. When developing this part of the unit, keep in mind to address questions including: How will you meaningfully connect the explaining activity to the findings from the exploring activity? What products could the students develop and share? How will students share what they have learned? What can be done at this point to identify and address misconceptions? LITERACY CONNECTIONS: Use books that address the learning objectives, sometimes reading only the pertinent parts. Non-fiction genres can serve as mentor texts – examples of format and writing style after which students can pattern their own work. (Fries-Gaither & Shiverdecker, 2013, p.29). <table border="1" data-bbox="573 1913 1521 1969"> <tr> <th data-bbox="573 1913 1052 1969">TEACHER</th><th data-bbox="1052 1913 1521 1969">STUDENTS</th></tr> </table>	TEACHER	STUDENTS		
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ELABORATE Suggested Duration Day 4: 40-60 minutes Day 5: 40-60 minutes	This portion of the 5E instructional plan provides students an opportunity for students to transfer/apply new knowledge with continued support through participation in the Engineering Design Process. Through this process, students construct a deeper understanding of the concepts. Student interaction and collaboration is integral to this phase. When developing this part of the plan please keep in mind to address questions including: How will the new knowledge be reinforced, transferred to new and unique situations, and integrated with related concepts?	
	LITERACY CONNECTIONS: Use books that help students make real-world connections or connect to other concepts. (Fries-Gaither & Shiverdecker, 2013, p.29).	
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	What is the TEACHER doing?	What are the STUDENTS doing?
	Teacher and Student Materials:	
EVALUATE Suggested Duration On-going and Day 6: 15-20 minutes	This portion of the 5E lesson has a dual purpose. It is designed for the students to continue to elaborate on their understanding and to evaluate what they know now and what they have yet to figure out. Evaluation of student understanding should take place throughout all phases of the instructional model. The evaluation stage, however, is when the teacher determines the extent to which students have developed a meaningful understanding of the concepts. When developing this part of the plan, keep in mind to address questions including: What opportunities will students have to express their thinking? When will students reflect on what they have learned? How will you measure learning as it occurs? What evidence of student learning will you be looking for and/or collecting?	
	Formative(s) How will you measure learning as it occurs?	Summative(s) What evidence of learning will demonstrate to you that a student has met the learning goals?
	Teacher and Student Materials:	

Additional Considerations	
DIFFERENTIATION	<i>How will you ensure that all students have access to this learning opportunity?</i> Accommodations/Modifications ELL students; students with a visual impairment, hearing impairment, orientation/mobility challenges, other specific abilities/challenges.
ADDITIONAL RESOURCES	What additional resources might be useful to teachers and/or students? Literature: Websites for students: Websites for teachers: Video Clips: Technology Apps/Tools: