

Unit 2: Engineering - Structures

Unit #: APSDO-00103960
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Grade(s): 7
Subject(s): Technology
Course(s): GR. 7 - TECHNOLOGY EDUCATION

Unit Focus

In this unit, student groups will create a scale model structure. Students will apply their learning by researching, designing, building, and testing a balsa truss bridge with the purpose of achieving the highest structural efficiency. Primary instructional materials include, but are not limited to, access to the internet, engineering computer-aided design software (e.g., AutoCAD, Westpoint Bridge Designer), as well as the necessary physical materials and tools.

Stage 1: Desired Results

Established Goals	Transfer		
<p>Standards</p> <ul style="list-style-type: none"> • ISTE Standards (2016) <ul style="list-style-type: none"> ◦ <i>ISTE Standards for Students</i> <ul style="list-style-type: none"> ▪ Global Collaborator - Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally. (7) ▪ Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal. (7.c) • Connecticut Goals and Standards <ul style="list-style-type: none"> ◦ <i>Technology Education: 7-12</i> <ul style="list-style-type: none"> ▪ ENGINEERING TECHNOLOGY <ul style="list-style-type: none"> ▪ ENG101 Use the design process to solve problems by creating and refining prototypes. ▪ ENG104 Works collaboratively in engineering teams throughout the design process. 	<p><i>What kinds of long-term, independent accomplishments are desired? Students will be able to independently use their learning to...</i></p> <p>T1 (T1) Explore and evaluate the use of technology in personal interests, aspirations, and/or employment opportunities.</p> <p>T2 (T2) Communicate effectively based on purpose, task, and audience using industry standard vocabulary and medium.</p> <p>T3 (T5) Effectively collaborate with others toward(s) a common goal in the development of design and implementation.</p>		
	Meaning		
	Understanding(s)	Essential Question(s)	
	<p><i>What specifically do you want students to understand? What inferences should they make? Students will understand that...</i></p> <p>U1 (U100) Exploration and use of technology, embedded in our lives, increases likelihood of personal and professional success.</p> <p>U2 (U300) When presented with a challenge, the Design Process is an effective, iterative sequence that values information gained from both successes and failures to develop an innovative solution.</p> <p>U3 (U500) Effective collaborators work to achieve the best possible outcome through constructive and interdependent conversations and actions.</p>		<p><i>What thought-provoking questions will foster inquiry, meaning making, and transfer? Students will keep considering...</i></p> <p>Q1 (Q300) Input: What problem/need am I trying to solve (now)?</p> <p>Q2 (Q306) Output: To what extent did the solution address the identified problem/need?</p> <p>Q3 (Q307) Feedback: What do the results reveal?</p> <p>Q4 (Q500) How are we working together to get the job done? To what extent is it effective? What might need to be changed going forward?</p>
	Acquisition		
	Knowledge	Skill(s)	

	<i>What facts and basic concepts should students know and be able to recall? Students will know...</i>	<i>What discrete skills and processes should students be able to use? Students will be skilled at...</i>
	<p>K1 The different types of bridges, the forces that act on them, and the design and engineering principles to counteract those forces</p> <p>K2 The concept of trade-offs and how to apply when making design choice with purpose of achieving the stated goal</p> <p>K3 What structural efficiency is and how to apply to the design and build</p>	<p>S1 Utilizing various software to design (and virtually test the design) prior to construction</p> <p>S2 Selecting and utilizing the appropriate tools and techniques to build a successful model structure based on the selected design</p> <p>S3 Using presentation software when collaborating with peers to create and present an end of a project</p>