Enduring Understandings / Big Ideas: Structures are designed to provide solutions to a human need. Engineers must understand Science, Technology, Engineering, and Mathematics (STEM) to create structure to meet code, safety specifications, and budget constraints. Designers, Scientist, and Engineers use scale models and prototypes to test design theories.

Essential Questions: Why do engineers using Computer Aided Design Software to create solutions to structural design problems? What are the benefits of using a virtual simulations and modeling to test engineering structures designs? How do engineers use applied mathematics and scientific principles to create solutions to structural design challenges?
Grade: 7  Subject: Technology Education  
Unit: Engineering Structures  
Time frame for Completion: 10-12 - 43 minute classes

12/23/2011

use digital photography for a technical report.

Students will record specific technical data, use applied mathematics to make conversions, and calculate engineering efficiency.

Students will complete a technical report document, save to a network drive, and upload to a hand-in folder for evaluation.

Students will complete a career exploration activity and be able to identify careers related to structural engineering.

Students will understand the development of a structure and complete a timeline activity.

Students will successfully pass a post-test upon completing the Engineering Structures Module.

Students will be able to self evaluate their work, progress,

### Design Challenges
Students will complete structural engineering design challenges utilizing virtual software applications and a scale model.
- Truss Design Challenge
- Concrete Beam Design Challenge

### Digital Photo Shoots
Students will complete before and after structural testing digital photo shoots for technical documentation.

### Technical Report
Students will complete and submit electronically a technical report that will include applied mathematics, technical data, and a written summary of the design challenge.

### Career Exploration
Students will review, reflect, and write about careers related to structural engineering.

### Historical Structures
Students will complete a timeline explaining the development of a famous structure.

### Journal entries will be evaluated and assessed.

- Wida Access Placement Test (W-APT)

### Summative:
- Students will complete Computer Aided Design Assignments for final evaluation.
- Students will complete the construction and testing of a structure for final evaluation.
- Students will complete a technical report for final evaluation.
- Students will complete a post-test for final evaluation.

### Supplemental Resources:
- ESL staff
- Bilingual dictionaries

### Mathematics
- 2.2.8.A
- 2.3.5.A
- 2.3.5.B
- 2.8.8.D

### Reading, Writing, Speaking
- 1.1.8.F
- 1.2.8.A
- 1.2.8.B
- 1.5.8.A
- 1.5.8.B
- 1.6.8.A
- 1.6.8.C
- 1.6.8.D
- 1.8.8.B

### Career Education
- 13.1.8.A
- 13.1.8.D

### Common Core Standards
- RST.6-8.3
- RST.6-8.4
- RST.6-8.7
- RST.6-8.9
- WHST.6-8.1
- WHST.6-8.2
- WHST.6-8.4
- WHST.6-8.6
- SL.7.1
- SL.7.4
- SL.7.5

### Every Teacher Teaches ESL
ELP Standard 1: English Language Learners communicate in English for social and instructional purposes within the
and understanding of the concepts taught in the Engineer Structures Module.

**Electronic Test**
Students will complete an electronic post-test.

**Self Evaluation**
Students will complete a self-evaluation form at the end of the module.

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<td><strong>ELP Standard 2</strong>: English Language Learners communicate information, ideas, and concepts necessary for academic success in the content area of Language Arts.</td>
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