

**Course Title:** Structural Engineering

**Board Approval Date:**

**Credit / Hours:** .5 credit

**Course Description:**

Structural Engineering will focus on problem solving activities in the area of structural design, as well as architecture. Students will be challenged with a number of assignments dealing with problem solving. Students will utilize various 3D CAD software packages to aid them in their project designs.

**Learning Activities / Modes of Assessment:**

Large group / Individual instruction  
Worksheets Participation & Clean Up  
Individual / Group Work  
Computer Aided Design  
Computer Numeric Controlled Equipment

Tests and Quizzes  
Checklists / Teacher Observation  
Projects w/ Rubrics

**Instructional Resources:**

[www.discoveryeducation.com](http://www.discoveryeducation.com)  
Technology Student Association  
Learning Focused Schools  
Online Tutorials  
2D and 3D Architectural Software Programs

## Course Pacing Guide

Course: **Structural Engineering**

<b>Course Unit (Topic)</b>	<b>Length of Instruction (Days/Periods)</b>
1. 1C Using SolidWorks to Design Structural Products	10 days
2. 1E Geometric Shapes Project	5 days
3. 2C 3D Modeling Structural Analysis	15 days
4. 2E Beam Project	5 days
5. 3C Architectural Design	20 days
6. 3E Balsa Tower Project	15 days
7. 4E Balsa Roof Truss Project	15 days

Topic: 1C - Using SolidWorks to Design Structural Products

Days: 10

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.E4. – Compact**  
INFORMATION AND COMMUNICATION TECHNOLOGIES - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Understand:

3 Dimensional modeling programs allow engineers to draw and design a project.

Do:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

**3.4.12.E6. – Essential**  
MANUFACTURING TECHNOLOGIES - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.

Create structural projects using SolidWorks.

3.4.12.E4. - INFORMATION AND COMMUNICATION TECHNOLOGIES - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.

Topic: 1C - Using SolidWorks to Design Structural Products

Days: 10

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.E6. – Essential MANUFACTURING TECHNOLOGIES - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.**

Reference Geometry

Patterns

Mirror

Swept Boss/Cut

Lofted Boss/Cut

Structural Member

Topic: 1E Geometric Shapes Project

Days: 5

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

Understand:

Civil Engineers identify and apply the strongest shapes for the structure they are building.

Do:

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important**  
USING AND MAINTAINING TECHNOLOGICAL SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Work with partners to brainstorm, design, construct, and test a geometric shaped tower.

Brainstorm ideas for the design of the solution.

Create sketches of the solution.

Decide which solution is going to be chosen.

Topic: 1E Geometric Shapes Project

Days: 5

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.D2. – Important USING AND MAINTAINING TECHNOLOGICAL SYSTEMS** - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E4. – Compact INFORMATION AND COMMUNICATION TECHNOLOGIES** - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.

**3.4.12.E7. – Important CONSTRUCTION TECHNOLOGIES** - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

How to use the technological problem solving method when given a problem.

Managing resources is important when designing and constructing.

Differents shapes are more effective for compression strength then

Build the device using the sketches.

Test the device against other groups in the class.  
**3.4.12.E4. - INFORMATION AND COMMUNICATION TECHNOLOGIES** - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.

Topic: 1E Geometric Shapes Project

Days: 5

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

<p>others. 3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.</p>		
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Topic: 2C - 3D Modeling Structural Analysis

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

Understand:

Structural analysis within SolidWorks allows the user to virtually test the structural integrity of a design.

Do:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important**  
USING AND MAINTAINING TECHNOLOGICAL SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E6. – Essential**  
MANUFACTURING TECHNOLOGIES - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Topic: 2C - 3D Modeling Structural Analysis

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.C3. – Essential RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING**  
 - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important USING AND MAINTAINING TECHNOLOGICAL SYSTEMS** - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E6. – Essential MANUFACTURING TECHNOLOGIES** - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.

**3.4.12.E7. – Important CONSTRUCTION TECHNOLOGIES** - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Material Yield Strength

Design, develop and analyse solutions to products that could include a truss, tower and cantilever.

Topic: 2C - 3D Modeling Structural Analysis

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

Density		
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Topic: 2E Beam Project

Days: 5

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

Understand:

Civil Engineers design and construct structural beams using specific materials based on the function.

Do:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.B1. – Essential**  
EFFECTS OF TECHNOLOGY - Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies.

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important**  
USING AND MAINTAINING TECHNOLOGICAL SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Topic: 2E Beam Project

Days: 5

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.C3. – Essential RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING**  
 - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important USING AND MAINTAINING TECHNOLOGICAL SYSTEMS** - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important CONSTRUCTION TECHNOLOGIES** - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Use the technology design loop to solve the given problem.

Use tools, machines, and materials efficiently to solve the problem.

Structural beams can be design and constructed in a variety of ways.

Brainstorm ideas for the design of the beam.

Create sketches of the beam.

Decide which solution is going to be chosen.

Build the chosen beam using the sketches.

Test the beam against other groups in the class.

Topic: 2E Beam Project

Days: 5

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

<p>3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.</p> <p>3.4.12.B1. - EFFECTS OF TECHNOLOGY - Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies.</p>		
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Topic: 3C - Architectural Design

Days: 20

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

Understand:

Architects can use a CAD program as a tool to help them design and develop different types of structures.

Do:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.B1. – Essential**  
EFFECTS OF TECHNOLOGY - Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies.

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important**  
USING AND MAINTAINING TECHNOLOGICAL SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E6. – Essential**  
MANUFACTURING TECHNOLOGIES - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.

Topic: 3C - Architectural Design

Days: 20

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.C3. – Essential RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING**  
- Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important USING AND MAINTAINING TECHNOLOGICAL SYSTEMS** - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E4. – Compact INFORMATION AND COMMUNICATION TECHNOLOGIES** - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.

**3.4.12.E6. – Essential MANUFACTURING TECHNOLOGIES** - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.

Develop a set of architectural plans that meet a given set of building codes.

**3.4.12.E4. - INFORMATION AND COMMUNICATION TECHNOLOGIES** - Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age.

Topic: 3C - Architectural Design

Days: 20

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

Floor Plan Elevation Roof Plan Foundation Plan Plot Plan Building Code Flow		
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Topic: 3E Balsa Tower Project

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

Understand:

An Engineer will design a structure so it is functional, safe, and efficient.

Do:

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important**  
USING AND MAINTAINING TECHNOLOGICAL SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Brainstorm ideas for the design and construction of a tower structure.

Create sketches of multiple tower structures.

Decide which solution is going to be chosen.

Build the tower using the sketches.

Topic: 3E Balsa Tower Project

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.D2. – Important USING AND MAINTAINING TECHNOLOGICAL SYSTEMS** - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important CONSTRUCTION TECHNOLOGIES** - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

How to use the technological problem solving method when given a problem.

How to design a tower structure incorporating strength to weight ratio.

**3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY** -

Describe how management is the process of planning, organizing, and controlling work.

Test the tower against other groups in the class.

Topic: 4E Balsa Roof Truss Project

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

Understand:

An Engineer will design a truss system so it is functional, safe, and efficient.

Do:

**3.4.12.A1. – Important**  
CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.

**3.4.12.A2. – Essential**  
CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

**3.4.12.A3. – Essential**  
TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).

**3.4.12.C2. – Essential**  
ENGINEERING DESIGN - Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.C3. – Essential**  
RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important**  
USING AND MAINTAINING TECHNOLOGICAL SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important**  
CONSTRUCTION TECHNOLOGIES - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

Work with partners to brainstorm, design, construct, and test a balsa wood truss system.

Brainstorm ideas for the design of the solution.

Create sketches of the solution.

Topic: 4E Balsa Roof Truss Project

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

**3.4.12.C3. – Essential RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING**  
 - Apply the concept that many technological problems require a multi-disciplinary approach.

**3.4.12.D2. – Important USING AND MAINTAINING TECHNOLOGICAL SYSTEMS** - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.

**3.4.12.E7. – Important CONSTRUCTION TECHNOLOGIES** - Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern world.

How to use the technological problem solving method when given a problem.

How to design a truss system structure incorporating strength to weight ratio.

Decide which solution is going to be chosen.

Build the device using the sketches.

Test the device against other groups in the class.

Topic: 4E Balsa Roof Truss Project

Days: 15

Subject(s): Technology

Grade(s): 9th, 10th, 11th, 12th

Know:

Understand:

Do:

<p>3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.</p>		
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