Course Title: Engineering and Design
Board Approval Date:
Credit / Hours: .5 credit

Course Description:

Engineering and Design is one of the two foundation courses offered in the Engineering, Manufacturing and Industrial Technology (EMIT) Pathway. This course focuses on the principles of design and problem solving activities.

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 Observations
Projects w/ Rubrics

Instructional Resources:

www.discoveryeducation.com
Technology Student Association
Learning Focused Schools
Online Tutorials
2D and 3D Architectural Software Programs

Course Pacing Guide

Course: **Engineering and Design**

Course Unit (Topic)	**Length of Instruction (Days/Periods)**
1. 1C Introduction to CAD	10 days
2. 1E General Lab Tool and Machine Safety	7 days
3. 2C Reading a Drawing	10 days
4. 2E Technology Design Loop	5 days
5. 3C Orthographic Projections	5 days
6. 3E Cantilever Project	14 days
7. 4C SolidWorks Part Basics	10 days
8. 4E Fixed Route Transportation Project	6 days
9. 5C SolidWorks Assembly Drawings	10 days
10. 5E Parachute Egg Drop Project	12 days

Topic: 1C - Introduction to CAD
Days: 10
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:

Computer Aided Design (CAD) is a a useful tool in the design and production of products.

Do:

13.1.A – Essential
Relate careers to individual interests, abilities, and aptitudes.

13.1.B – Essential
Relate careers to personal interests, abilities and aptitudes.

13.1.D – Important
Explain the relationship of career training programs to employment opportunities.

13.1.F – Essential
Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.

13.1.H – Essential
Choose personal electives and extra curricular activities based upon personal career interests, abilities and academic strengths.

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.

Topic: 1C - Introduction to CAD
Days: 10
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
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. Toolbars Menu Bar Command Line 13.1.A - Relate careers to individual interests, abilities, and aptitudes. 13.1.B - Relate careers to personal interests, abilities and aptitudes. 13.1.D - Explain the relationship of career training programs to employment opportunities. 13.1.F - Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation. 13.1.H - Choose personal electives and extra curricular activities based upon personal career interests, abilities and academic strengths.		Research a possible career choice in an area that would use CAD as a tool. Create several basic drawings in CAD to understand the tools which are available. 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 General Lab Tool and Machine Safety
Days: 7
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	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. Tool Names and Uses Machine Names and Uses Lab Safety Rules and Procedures 3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.	Engineers must be safe when working in a technology lab.	**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. Identify, describe. and use all hand tools. Identify, describe, and use all machines.

Topic: 2C - Reading a Drawing
Days: 10
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	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.C3. – Essential** RESEARCH & DEVELOPMENT, INVENTION & INNOVATION, EXPERIMENTATION/ PROBLEM SOLVING AND TROUBLESHOOTING - Apply the concept that many technological problems require a multi-disciplinary approach. Plans are developed so that a products can be made. Symbols Notes Ream Tolerance Bore Drill	Notes, symbols and dimensions identify information about a drawing to the reader.	**3.4.12.A2. – Essential** CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work. **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. Use all the information found on a given drawing to reproduce that drawing using AutoCAD

Topic: 2E Technology Design Loop
Days: 5
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	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.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.	Engineers use the Technological Design Process to solve all problems.	**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.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. Identify all the steps to the technology design loop. Explain each step of the technology design loop. Apply each step of the technology design loop to a sample problem. 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: 2E Technology Design Loop
Days: 5
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
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. The steps to the technology design loop. How to apply each step to a real world situation. 3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.		

Topic: 3C - Orthographic Projections
Days: 5
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	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.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.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.	Orthographic projections show a view or views of an object with no distortion to its shape.	**3.4.12.A2. – Essential** CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work. **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. Produce the necessary orthographic projections of the given objects 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 - Orthographic Projections
Days: 5
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
What are the 3 most common views used in orthographic drawings What is the proper layout of the 6 views of orthographic projections		

Topic: 3E Cantilever Project
Days: 14
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:

A cantilever is a unique structure used by Engineers for a variety of applications.

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: 3E Cantilever Project
Days: 14
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.		**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 of the solution. Create sketches of the solution. Decide which solution is going to be chosen. Build the device using the sketches. Test the device against other groups in the class. 3.4.12.B2. - TECHNOLOGY AND ENVIRONMENT - Illustrate how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision making. 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: 3E Cantilever Project
Days: 14
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
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. Research is an important part of the design process. How to design an efficient cantilever. 3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work. 3.4.12.B1. - EFFECTS OF TECHNOLOGY - Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies. 3.4.12.B2. -		

Topic: 3E Cantilever Project
Days: 14
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
TECHNOLOGY AND ENVIRONMENT - Illustrate how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision making.		

Topic: 4C - SolidWorks Part Basics
Days: 10
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	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.	SolidWorks can be an efficient way to produce 3 dimensional drawings.	**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. Use SolidWorks to produce the given projects. 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: 4C - SolidWorks Part Basics
Days: 10
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.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. How to use the basic functions of SolidWorks Extrude Revolve Boss Cut Sketch Dimension		

Topic: 4E Fixed Route Transportation Project
Days: 6
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:

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.

Understand:

A fixed route transportation vehicle needs to be engineered for the specific track system.

Do:

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.E3. – Essential
ENERGY AND POWER TECHNOLOGIES - Compare and contrast energy and power systems as they relate to pollution, renewable and non-renewable resources, and conservation.

3.4.12.E5. – Important
TRANSPORTATION TECHNOLOGIES - Explain how the design of intelligent and non-intelligent transportation systems depends on many processes and innovative techniques.

Brainstorm ideas for the design of the solution.

Create sketches of the solution.

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 Fixed Route Transportation Project
Days: 6
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
3.4.12.E5. – Important TRANSPORTATION TECHNOLOGIES - Explain how the design of intelligent and non-intelligent transportation systems depends on many processes and innovative techniques. The difference between a fixed route and random route transportation system. How to utilize the technology design loop to solve the problem. How to use the tools, machines, and materials efficiently to solve the problem.		

Topic: 5C - SolidWorks Assembly Drawings
Days: 10
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	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 dimensional parts can be virtually assembled to create a complete product within SolidWorks.	**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. Create part drawings then put them together within an assembly drawing 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: 5C - SolidWorks Assembly Drawings
Days: 10
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
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. Assembly drawings allow the user to put parts together. Insert Part Mate Coincident Concentric		

Topic: 5E Parachute Egg Drop Project
Days: 12
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.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.

Understand:

A parachute can be designed many different ways and still work properly.

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.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.E5. – Important
TRANSPORTATION TECHNOLOGIES - Explain how the design of intelligent and non-intelligent transportation systems depends on many processes and innovative techniques.

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.

Brainstorm ideas for the design of the solution.

Create sketches of the solution.

Decide which solution is going to be chosen.

Topic: 5E Parachute Egg Drop Project
Days: 12
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
3.4.12.E5. – Important TRANSPORTATION TECHNOLOGIES - Explain how the design of intelligent and non-intelligent transportation systems depends on many processes and innovative techniques. **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. How to use the technological problem solving method when given a problem. How to design a parachute. The parts of a parachute. How to use the tools, machines, and materials efficiently to solve the problem. 3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY -		Build the device using the sketches. Test the device against other groups in the class.

Topic: 5E Parachute Egg Drop Project
Days: 12
Subject(s): Technology
Grade(s): 9th, 10th, 11th, 12th

Know:	Understand:	Do:
Describe how management is the process of planning, organizing, and controlling work.		