

Course Title: Manufacturing II

Board Approval Date:

Credit / Hours: .5 credit

Course Description:

Manufacturing II instructs more advanced processes in the area of metal, wood and plastics manufacturing and is offered in the Engineering, Manufacturing and Industrial Technology (EMIT) Pathway. This course is designed to allow students to produce projects using a variety of building materials.

Learning Activities / Modes of Assessment:

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

Tests and Quizzes
Checklists / Teacher Observation
Projects with Rubrics

Instructional Resources:

www.pacareerzone.com
www.discoveryeducation.com
Technology and Engineering Education Association of Pennsylvania
Online Tutorials
Technology Student Association
Project Plans

Course Pacing Guide

Course: **Manufacturing II**

| Course Unit (Topic) | Length of Instruction (Days/Periods) |
|--|---|
| 1. 1M Metalworking Careers | 3 days |
| 2. 1W Woodworking Tool Identification | 3 days |
| 3. 2M Welding and Cutting with Head | 13 days |
| 4. 2W Wood Identification | 5 days |
| 5. 3M Machining Metal | 9 days |
| 6. 3W Woodworking Production | 25 days |
| 7. 4M Forging, Casting and Heat Treating | 9 days |
| 8. 4W Plastic Casting Processes | 12 days |
| 9. 5M Problem Solving | 9 days |
| 10. 5W Woodworking Careers | 2 days |

Topic: 1M Metalworking Careers

Days: 3

Subject(s): Technology, Vocations

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

Know:

Understand:

Do:

13.1.C – Important

Explain how both traditional and nontraditional careers offer or hinder career opportunities.

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

13.1.E - Analyze the economic factors that impact employment opportunities, such as, but not limited to: Competition, Geographic location, Global influences, Job growth, Job openings, Labor supply, Potential advancement, Potential earnings, Salaries/ benefits and Unemployment.

Benifits

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

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

Understand what metalworking careers are available and the training necessary to aquire them.

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.

Access and use internet sources to look for career information.

Create a poster that explains many aspects of the career choice.

Topic: 1W Woodworking Tool Identification

Days: 3

Subject(s): Technology, Vocations

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

Know:

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.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.

Names of more advanced woodworking tools.

Job description for each advanced woodworking tool.

3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how

Understand:

The are various advanced woodworking tools that should be used for better efficiency when working on a manufactured product.

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

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

Identify all advanced woodworking handtools.

Describe all advanced woodworking handtools.

Explain how the tool is used and why it is chosen when compared to other tools.

Topic: 1W Woodworking Tool Identification

Days: 3

Subject(s): Technology, Vocations

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

Know:

Understand:

Do:

| | | |
|--|--|--|
| <p>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.</p> | | |
|--|--|--|

Topic: 2M Welding and Cutting with Heat

Days: 13

Subject(s): Technology, Vocations

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.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.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.

Tank Pressure

Line Pressure

Understand:

When performed safely, using the oxyacetylene torch, plasma cutter and welders can greatly increase a metalworker's productivity.

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.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.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.

Properly perform butt welds using the SMAW and GMAW welders.

Use the oxyacetylene torch and plasma cutter to cut metal.

Perform all welding and cutting tasks in a safe manner.

Set the equipment up properly depending on the material being processed.

Topic: 2M Welding and Cutting with Heat

Days: 13

Subject(s): Technology, Vocations

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

Know:

Understand:

Do:

| | | |
|--|--|--|
| <p>Regulator</p> <p>Electrode</p> <p>Amperage</p> <p>Shielding Gas</p> <p>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.</p> | | |
|--|--|--|

Topic: 2W Wood Identification

Days: 5

Subject(s): Technology, Vocations

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.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.

The steps of processing lumber.

The classifications of wood.

The different types of wood within each classification.

Understand:

There are many important factors to take into consideration when choosing the type of lumber.

Do:

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

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.

Identify and describe the steps of processing lumber.

Identify and describe the classifications of wood.

Identify and describe the types of wood within classification.

Topic: 3M Machining Metal

Days: 9

Subject(s): Technology, Vocations

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

Know:

Understand:

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.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.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.

The proper use of the equipment allows the student to machine a piece of metal into a usable part.

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

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.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.

Safely Use the Following Machines:

- *Bandsaw
- *Abrasive Saw
- *Lathe
- *Drill Press
- *Grinder
- *Disc Sander
- *Angle Grinder
- *Manually operate the CNC milling machine

Topic: 3M Machining Metal

Days: 9

Subject(s): Technology, Vocations

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.

Turning

Facing

Boring

Tap

Die

Treads per Inch
3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.

Use a tap and die to cut threads onto metal.

Topic: 3W Woodworking Production

Days: 25

Subject(s): Technology, Vocations

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:

When manufacturing an advanced wood product there are many necessary steps that need to be taken.

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.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.

Calculate board footage and cost for a wood product.

Topic: 3W Woodworking Production

Days: 25

Subject(s): Technology, Vocations

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.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 calculate board footage and cost for a wood product.

How to read the plans or drawings used to construct the wood product.

How to select the proper material for function and appearance of the wood product.

Read the plans or drawings used to construct the wood product.

Select the proper material for function and appearance of the wood product.

Incorporate complex joinery within the wood product.

Construct the product safely and efficiently using the advanced handtools and machines in the shop.

Incorporate advanced finishing techniques into the wood product.

Topic: 3W Woodworking Production

Days: 25

Subject(s): Technology, Vocations

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

Know:

Understand:

Do:

| | | |
|---|--|--|
| <p>How to incorporate complex joinery within the wood product.</p> <p>How to construct the product safely and efficiently using the advanced handtools and machines in the shop.</p> <p>How to incorporate advanced finishing techniques into the wood product.</p> <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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Topic: 4M Forging, Casting and Heat Treating

Days: 9

Subject(s): Technology, Vocations

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

Know:

Understand:

Do:

| | | |
|--|---|--|
| <p>3.4.12.A3. – Essential TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).</p> <p>3.4.12.A1. – Important CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.</p> <p>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.</p> <p>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.</p> | <p>Proper use of the forge and foundry allows the user to manipulate the shape and properties of metal.</p> | <p>3.4.12.A3. – Essential TECHNOLOGY CONNECTIONS - Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).</p> <p>3.4.12.A1. – Important CHARACTERISTICS OF TECHNOLOGY - Compare and contrast the rate of technological development over time.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Safely use the gas forge for forging and heat treating steel.</p> <p>Correctly cast aluminum using oil bonded sand and a pattern.</p> |
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Topic: 4M Forging, Casting and Heat Treating

Days: 9

Subject(s): Technology, Vocations

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.

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.

Hardening

Annealing

Tempering

Quenching

Topic: 4W Plastic Casting Processes

Days: 12

Subject(s): Technology

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

| Know: | Understand: | Do: |
|---|--|--|
| <p>3.4.12.A2. – Essential CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.</p> <p>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.</p> <p>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.</p> <p>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.</p> | <p>Casting plastics have a wide variety of uses and many benefits in industry.</p> | <p>3.4.12.A2. – Essential CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Identify and describe the materials used in casting processes.</p> <p>Describe the uses of each type of casting.</p> <p>Explain the advantages and disadvantages of casting.</p> <p>Manufacture several products using casting processes.</p> <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.C2. - ENGINEERING DESIGN - Apply the concept that engineering design is influenced by</p> |

Topic: 4W Plastic Casting Processes

Days: 12

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.

What is casting?

Types of Casting

Casting Processes

Advantages & Disadvantages of Casting

3.4.12.C2. - 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. - 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. - USING AND MAINTAINING TECHNOLOGICAL

personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.
 3.4.12.C3. - 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. - 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. - MANUFACTURING TECHNOLOGIES - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.

Topic: 4W Plastic Casting Processes

Days: 12

Subject(s): Technology

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

Know:

Understand:

Do:

| | | |
|---|--|--|
| <p>SYSTEMS - Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.</p> <p>3.4.12.E6. - MANUFACTURING TECHNOLOGIES - Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world.</p> <p>3.4.12.A2. - CORE CONCEPTS OF TECHNOLOGY - Describe how management is the process of planning, organizing, and controlling work.</p> | | |
|---|--|--|

Topic: 5M Problem Solving

Days: 9

Subject(s): Technology, Vocations

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

Know:

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.

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.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:

Design, problem solving and working well within a group are all good qualities to offer a future employer.

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.

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.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.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.

Develop a full size drawing of the solution to the given problem.

Use the drawing as a pattern to create an actual solution to the problem.

Test the strength of the solution using weights

Topic: 5M Problem Solving

Days: 9

Subject(s): Technology, Vocations

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.

Design and manufacturing skills both play an important role in the development of a quality product.

Topic: 5W Woodworking Careers

Days: 2

Subject(s): Technology, Vocations

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.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.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.

Understand:

There many high priority career opportunities available in the areas of woodworking and plastics manufacturing technologies.

Do:

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

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.E2. – Essential AGRICULTURAL AND RELATED BIOTECHNOLOGIES - Compare and contrast the technologies of biotechnology, conservation, bio-fuels, and ecosystems as they relate to managing Earth's resources effectively.

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.

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: 5W Woodworking Careers

Days: 2

Subject(s): Technology, Vocations

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

Know:

3.4.12.E1. – Compact MEDICAL TECHNOLOGIES - Compare and contrast the emerging technologies of telemedicine, nanotechnology, prosthetics, and biochemistry as they relate to improving human health.

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.

The careers that are available in the areas of manufacturing that incorporate woodworking or plastics technology.

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.

Research at least 2 different careers that are available in manufacturing of wood or plastic products using career focused software or websites.

Select the one career that they are more likely to choose for their life.

Create a large format poster to promote the career including many points of updated information and photos or renderings about the career.

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.

3.4.12.E1. - MEDICAL TECHNOLOGIES - Compare and contrast the emerging technologies of telemedicine, nanotechnology, prosthetics, and biochemistry as they relate to improving human health.

Topic: 5W Woodworking Careers

Days: 2

Subject(s): Technology, Vocations

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

Know:

Understand:

Do:

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