

GRADE 8 MANUFACTURING/CONSTRUCTION

Description

In Manufacturing/Construction students learn how products are manufactured from design to actual assembly. Students gain knowledge of proper and safe construction as they develop and build projects of their own design individually and in teams, using hand and power tools students manufacture products using various materials including hard and soft wood and plastics.

The second part of the course is designed to offer students experiences related to the construction field and architecture. Students will work in teams to learn how structures are built by actually building scale models of various construction methods projects with appropriate tools. Students then report on their models to further the class's understanding of various construction details, methods and techniques. Hands-on practical experiences will be emphasized.

Course Overview

Course Objectives

Students should:

- differentiate between primary and secondary raw materials.
- identify methods used to convert raw & recycled materials into usable products.
- demonstrate the appropriate selection & safe operation of basic hand & power tools.
- use measuring devices accurately.
- produce projects from a variety of materials, using manual and computer-controlled devices.
- differentiate between natural and human made materials.
- identify the reasons for specific materials used in products.
- select and use correct manufacturing processes.

Essential Questions

- What is manufacturing and construction and why is it important to our economy?
- How can manufacturing and construction meet the needs of people?

Assessments

Common Assessments

- Tests and quizzes
- Evaluation rubric

Skill Assessments

- Oral & verbal safety questions
- Subject specific terms and content tests.
- Use of project specific Grading Rubrics
- Written tests
- Terminology tests and definitions
- Problem Solving tests and activities
- Student project with a rubric- based on skills and performance criteria
- Teacher and student use of grading rubrics
- Self-assessment
- Quality inspection
- Visually inspect all finishes applied to project

Content Outline

- I. [Unit 1](#) – Course Introduction
- II. [Unit 2](#) - Materials – Measurement
- III. [Unit 3](#) – Tool Use & Manipulation
- IV. [Unit 4](#) – Problem Solving

Standards

Connecticut State Technology Education standards are met in the following areas:

- ***Building Construction***
- ***Manufacturing***

Skill Objectives

Students will:

- demonstrate safety in the lab.
- identify and correctly use machines and hand tools.

V. Unit 5 – Assembly VI. Unit 6 - Finishing		<ul style="list-style-type: none"> • complete a detailed plan of a project. • select, alter and use appropriate materials to design and construct a specific project. • use correct terminology while working in the lab. • identify various methods of project and product assembly in manufacturing and construction. • choose and apply a finish to a project. • identify different finishes and the effects these finishes have on various materials.
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Pacing Guide								
Single Marking Period (1 of 4)								
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9-10
Unit 1 Course Introduction 1 week	Unit 2 Materials - Measurement 1 week	Unit 3 Problem Solving 2-3 weeks	Unit 4 Tool Use- Manipulation 2-3 weeks	Unit 5 Assembly 2 weeks	Unit 6 Finishing 1 week			

Unit 1 – Course Introduction, 1 week [top](#)

Standards

Building Construction

BC.01 Identify and appraise the impacts construction has on their future aspirations; both career based and/or as an educated consumer.

BC.01.03

BC.02 Describe and demonstrate the procedures related to workplace and job-site safety including personal protective equipment, machine safety, and material handling practices.

BC.02.04

BC.03 Identify and describe the safe and appropriate use of various types of layout, hand and power tools and machinery used for building construction.

BC.03.02 - BC.03.07

BC.04 Understand and be able to demonstrate the methods involved in turning materials into useable structures and products.

BC.04.05, BC.04.07

Manufacturing

MAN.01 Employ engineering design process to achieve desired outcomes

MAN.01.01

MAN.02 Identify and use appropriate engineering materials

MAN.02.03

Unit Objectives

Students will be able to:

- work safely in the fabrication lab.
- complete a detailed plan on a product or project.
- participate in a group research project on a current building or construction process, method or technique.

Essential Question

- What is the role of safety in manufacturing?

Focus Questions

- Why is it important to know the names of all the hand and power tools needed for a job?
- Why is safety everyone's responsibility?
- What do I need to complete to successfully move forward?

Assessments

- Machine safety test review
- Oral & verbal safety questions
- Subject specific terms and content tests
- Use of project specific Grading Rubrics

Skill Objectives

Students will:

- complete safety evaluations and have an understanding of lab safety.
- investigate project possibilities.

Unit 2 – Materials –Measurement, 1 week [top](#)

Standards

Building Construction

BC.02 Describe and demonstrate the procedures related to workplace and job-site safety including personal protective equipment, machine safety, and material handling practices.

BC.02.06

BC.04 Understand and be able to demonstrate the methods involved in turning materials into useable structures and products.

BC.04.05, BC.04.07

Manufacturing

MAN.02 Identify and use appropriate engineering materials

MAN.02.01, MAN.02.03, MAN.02.04

Unit Objectives

Students will be able to:

- use correct terminology to complete assignments.
- describe the relationship between materials and manufacturing.
- discuss information on OSHA, EPA and other safety regulations.
- explain and use fractional dimensions.

Essential Question

- What do you consider when choosing and measuring materials for a project?

Focus Questions

- How do I choose the correct tools for activities?
- How can I produce materials to a specific size?
- Problem solving – “Does the shape + size fit a specific need?”
- Why is it important to personally work as safely as possible?

Assessments

- Verbal and written tests on measurement and materials
- Subject specific terminology and proficiency tests.
- Hands-on tests
- Teacher and student use of project specific Grading Rubrics

Skill Objectives

Students will:

- use fractional dimensions of measurement to the 1/16”.
- estimate materials quantities in both board feet and linear feet.
- select materials based on properties required by the project.

Unit 3 – Problem Solving- Project Development, 2-3 weeks [top](#)

Standards

Manufacturing

MAN.01 Employ engineering design process to achieve desired outcomes

MAN.01.02

MAN.02 Identify and use appropriate engineering materials

MAN.02.03, MAN.02.04

MAN.03 Demonstrate the methods involved in turning raw materials into usable products

MAN.03.02, MAN.03.03, MAN.03.06

Unit Objectives

Students will be able to:

- describe the relationship between materials and manufacturing.
- employ engineering design processes to achieve desired outcomes.

Essential Question

- How can fasteners and finishes improve a project?

Focus Questions

- How can you combine parts of a multiple piece project?
- How do you determine what size fasteners to use?

Assessments

- Visual assessments

Skill Objectives

Students will:

- produce a product, given specific criteria.
- write a material list for a product.
- use appropriate math and design skills to create a design for a product or project.

Unit 4 –Construction techniques- Tool Manipulation, 2-3 weeks [top](#)

Standards

Building Construction

BC.03 Identify and describe the safe and appropriate use of various types of layout, hand and power tools and machinery used for building construction.

BC.03.03, BC.03.05, BC.03.06

Manufacturing

MAN.03 Demonstrate the methods involved in turning raw materials into usable products

MAN.03.02, MAN.03.03

Unit Objectives

Students will be able to:

- incorporate design principles and develop a project based on students design.
- demonstrate the methods involved in turning raw materials into usable products.

Essential Question

- What is the role of product assembly in making products?

Focus Questions

- What hand and power tools you would use to construct a simple wood project?
- What are some differences and similarities in using hand power tools and stationary power tools?

Assessments

- Give students a self assessment evaluation sheet
- Visually inspect joints and all assembly parts
- Dry assemble project

Skill Objectives

Students will:

- design & build their specific project.
- identify proper use and function of hand tools.
- identify proper use and function of stationary saws.
- select and properly use tools as needed to complete project.
- describe basic concepts of construction.
- investigate types/styles of Architecture.

Unit 5 – Project Assembly, 2 weeks [top](#)

Standards

Building Construction

BC.04 Understand and be able to demonstrate the methods involved in turning materials into useable structures and products.

BC.04.08, BC.04.10, BC.04.11, BC.04.12, BC.04.13

Manufacturing

MAN.02 Identify and use appropriate engineering materials

MAN.02.02, MAN.02.04

MAN.03 Demonstrate the methods involved in turning raw materials into usable products

MAN.03.01, MAN.03.02, MAN.03.03

Unit Objectives

Students will be able to:

- demonstrate methods involved in turning materials into useable structures and products.
- describe the purpose and use woodworking fasteners and use clamping devices.
- understand various methods of project and product assembly in manufacturing and construction.

Essential Question

- How does precision in manufacturing techniques influence the outcome?

Focus Questions

- What steps will you do to assemble your project?
- What fastening materials or supplies will you use to assemble your project?

Assessments

- Written test on manufacturing terms and construction terms
- Written test on supplementary architecture terms and information and their own project assembly

Skill Objectives

Students will:

- identify, describe purpose of and use woodworking fasteners.
- identify, describe purpose of and use woodworking adhesives.
- identify, describe purpose of and use clamping devices.
- assemble a multi piece project.

Unit 6 –Finishing, 1 week [top](#)

Standards

Building Construction

BC.04 Understand and be able to demonstrate the methods involved in turning materials into useable structures and products.

BC.04.14, BC.04.15

MAN.03 Demonstrate the methods involved in turning raw materials into usable products

MAN.03.02, MAN.03.05, MAN.03.06

Unit Objectives

Students will be able to:

- describe types of finishes and the effects these finishes have on various materials.
- describe abrasive grit systems.
- demonstrate the safe and accurate secondary process to create a finished product; finishing.

Essential Question

- What decisions do you make when finishing?

Focus Questions

- What will you do to finish your project, what materials will you use and why?
- How will you correctly apply stains, paints and finishes?
- What are some of the considerations you need to be aware of when you decide on what finishes to use?
- Problem solving – “What’s the difference between stain and paint?”
- Problem solving – “What’s the difference between glossy and satin urethane finishes?”
- Are you using safe finishing techniques?

Assessments

- Student will be graded on their application of a finish, as part of a grading rubric
- Visually inspect all finishes applied to project
- Grade student project with a detailed rubric

Skill Objectives

Students will:

- choose and apply a stain or paint finish to a project.
- properly prepare a project for applying a finish.
- demonstrate the proper handling of all finishing supplies and materials observing safety procedures.