

GRADE 7 TECHNOLOGY EDUCATION

Description

The seventh grade Technology Education course is designed to give each seventh grade student an educational experience and understanding of manufacturing, construction, production, communication, and transportation technologies related but not limited to: design, tool manipulation, measurement, use of math skills, proper and safe use of tools, problem solving abilities and a creative experience. Students leave this part of their course with completed projects in each area of technology, which reflects their abilities and newly attained technological and hands-on knowledge. Students will engineer, evaluate, and modify rigorous specific projects based on STEM standards. This is a hands-on collaborative environment that incorporates project based learning in conjunction with National Standards in math science and technology.

Course Overview

Course Objectives

Students should:

- work safely in the fabrication lab.
- identify power machines, tools & lab safety.
- complete a basic plan on a project that will be completed in a specific time frame.
- identify and describe the project variables.
- describe production, measure materials, aspects of design and problem solving.
- demonstrate correct and safe use of both hand and power tools.
- use tools successfully and productively in your everyday lives.
- identify and safely use various hand and power tools.
- select, alter and use appropriate materials to design and construct a specific project.
- use correct terminology to complete assignments in construction, printing and transportation units.
- select materials, incorporate design principles and develop a project based on student's design.
- use measurement tools, hand and power tools to construct a project.
- incorporate safe construction techniques to construct a student designed project.

Essential Questions

- Why is it important to work safely in a Technology Education and Engineering lab?
- Why should you be successful at designing, measuring, problem solving, and building a basic project?
- Why is it important to successfully use basic hand and power tools?
- What types of data would you use to improve a vehicle?
- How does a vehicle function affect its form?
- What advantages do common methods of communication give society?
- How do the elements of a design relate to a communication technology's success?

Assessments

Common Assessments

- Tests and Quizzes
- Performance Assessments
- Evaluation Rubric

Skill Assessments

- Problem Solving
- Writing Prompts/Written evaluations
- Students will review and complete hand tool and machine safety tests
- Subject specific terms and content tests
- Use of project specific grading rubrics
- Grading rubrics with performance criteria
- Verbal and written assignments and activities on measurement and materials
- Student self-assessment evaluation
- Teacher observation and feedback
- Student demonstration of basic skills to design transportation, communication, manufacturing, and construction projects

<ul style="list-style-type: none"> • successfully assemble their project. • self-evaluate student project. • design and create a communications project. • incorporate various multimedia skills using available software. • manipulate an image in several ways. • use appropriate tools and machines to produce a communications project of student’s choice. Machines include DMP, digital duplicator and paper cutters. • design, and build a transportation project. • reflect upon real world applications and uses and how they would relate to each lab experiment. 		
<p><u>Content Outline</u></p> <p>I. Unit 1 – Construction Introduction</p> <p>II. Unit 2 - Construction Project</p> <p>III. Unit 3– Communications Introduction</p> <p>IV. Unit 4 – Communications Project</p> <p>V. Unit 5 – Transportation Introduction</p>	<p><u>Standards</u></p> <p>Connecticut State Technology Education standards are met in the following areas:</p> <ul style="list-style-type: none"> • <i>Building Construction</i> • <i>Computer Aided Drafting and Design (CADD)</i> • <i>Manufacturing</i> • <i>Transportation Technology</i> • <i>Wood Technology</i> 	<p><u>Grade Level Skills</u></p> <p>Students will:</p> <ul style="list-style-type: none"> • identify and describe how individual technological innovations may be combined to create new technologies. • explore 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 simple products from a variety of materials, using manual and computer-controlled devices. • differentiate between natural and human made materials. • identify how the development and production of products& services are dependent on the transformation of available resources.

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	Unit 2			Unit 3		Unit 4		Unit 5
<u>Construction Introduction</u>	<u>Construction Project</u>			<u>Communications Introduction</u>		<u>Communications Project</u>		<u>Transportation Introduction</u>
1 week	2-4 weeks			1-2 weeks		1 week		2 weeks

Unit 1 – Construction Introduction, 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.02.04

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.03.01, BC.03.02 - BC.03.07, BC.03.11

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

BC.04.01, BC.04.02, BC.04.05, BC.04.07, BC.04.11 - BC.04.14

Manufacturing

MAN.02 Identify and use appropriate engineering materials

MAN.02.03

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

MAN.03.02

Unit Objectives

Students will be able to:

- have an understanding of historic connections to tools, machines and items created in the manufacturing/ construction lab.
- understand safety in the manufacturing/ construction lab.
- complete an orthographic plan of a product or project.
- calculate project material needs and costs.

Essential Questions

- What does it mean to be safe or practice safety?
- Why are drawings the preferred method of communication?

Focus Questions

- Can I name hand and power tools I will need to complete a project?
- Have I modified my materials to the specific size I need?
- Problem solving – “Does the shape and size fit a specific need?”
- Am I working as safely as possible?
- What do I need to complete today to successfully move forward?
- Am I using the proper hand and/or power tool for the indicated task?

Assessments

- Hand and power tool safety tests
- Observation of student performance
- Performance Assessment
- Grading rubric
- Writing Prompts
- Written/verbal assessments
- Self-Assessment

Skills Objectives

Students will:

- complete a review safety test and practice lab safety.
- develop project proposal.
- design and construct projects according to plan.
- utilize rubrics for project evaluation.
- develop Bill of Materials.
- writing prompts.

Unit 2 – Construction Project, 2-4 weeks [top](#)

Standards

Wood Technology

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

WM.03 Identify and describe the safe and appropriate use of various types of hand and power tools and machinery used for building.

WM.04 Explain and be able to demonstrate the methods involved in turning raw materials into useable products.

WM.05 Identify and assemble wood joinery and install mechanical fasteners.

WM.06 Identify and demonstrate sanding and gluing techniques.

WM.10 Identify types, finishes, and mechanisms of hardware

Unit Objectives

Students will be able to:

- identify and use various hand and power tools.
- name specific safety considerations for hand and power tools.
- use correct terminology to complete assignments.
- produce a project made of student’s own design, specifications and construction abilities.

Essential Questions

- What does it mean to be safe or practice safety?
- What should you consider when selecting hand and power tools?
- How do you determine which is the best material for a particular product?
- What describes a finished product?

Focus Questions

- Use correct tool for the activity you are doing.
- Student will modify materials to a specific size and shape as specified in their plan
- Problem solving – “Does the shape + size fit a specific need?”
- Are you working as safely as possible?
- Have you thought out a specific approach to today’s goal or objective?

Assessments

- Performance Assessment
- Grading rubric
- Writing Prompts
- Written/verbal assessments
- Performance and Proficiency tests
- Self-Assessment

Skill Objectives

Students will:

- complete an orthographic drawing.
- measure, select and use appropriate materials.
- correctly use hand & power tools.
- build a project to specifications.
- finish a product to standards.

Unit 3 – Communications Introduction, 1-2 weeks [top](#)

Standards

Computer Aided Drafting and Design

CADD.02 Analyze the use of current CADD design technology.

CADD.02.01, CADD.02.08, CADD.02.09, CADD.02.10

CADD.03 Utilize measurement and annotation systems as they apply to CADD technology design.

CADD.03.04, CADD.03.06

CADD.04 Identify, describe, and utilize the basic hardware and operating systems used in CADD.

CADD.04.05, CADD.04.06

CADD.05 Utilize Proper projection techniques to develop orthographic and pictorial drawings.

CADD.05.02, CADD.05.06, CADD.05.15, CADD.05.16, CADD.05.17

Unit Objectives

Students will be able to:

- recognize developments over time with communication technology.
- select materials, incorporate design principles and develop a communications project based on students design.
- utilize software and machines as needed to complete a project.
- create a student designed project.
- demonstrate basic concepts of design and project development related to communications.

Essential Questions

- What does it mean to be safe or practice safety?
- What basics skills are needed to design media projects?

Focus Questions

- Can you successfully import an image?
- Can you alter an image in more than one way?
- Why must you develop a sketch and plan for your communications project?
- What is the Thermal or Heat Press?
- What does a duplicating machine do? And how does it work?
- Why is it important to manipulate materials (paper) in the communications lab?

Assessments

- Performance Assessment
- Grading rubric
- Writing Prompts
- Written/verbal assessments
- Self-Assessment

Skills Objectives

Students will:

- design & create a communications project.
- use software and measurement tools and operations to create a communication project.
- describe a basic understanding of communications, software, hardware and industrial applications.

Unit 4 – Communications Project, 1 week [top](#)

Standards

Manufacturing

MAN.01 Employ engineering design process to achieve desired outcomes

MAN.02 Identify and use appropriate engineering materials

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

Unit Objectives

Students will be able to:

- use elements of design and incorporate these elements into their designs.
- use and Explain a Design Brief.

Essential Questions

- What does it mean to be safe or practice safety?
- What should you consider when writing a design brief to address a problem?

Focus Questions

- Explain the differences between a problem statement and a design brief.
- Name the five elements of design.
- What is a problem statement?
- Can you write a design brief based on the problem statement provided?

Assessments

- Performance Assessment
- Grading rubric
- Writing Prompts
- Written/verbal assessments
- Self-Assessment

Skill Objective

Students will:

- choose a design based on a specific design brief to solve a given problem.

Unit 5 – Transportation Introduction, 2 weeks [top](#)

Standards

Transportation Technology

TRAN.01 Identify historical, social, economic, environmental, and government regulations impact transportation technology.

TRAN.01.01, TRAN.01.04

TRAN.02 Define transportation technology systems.

TRAN.02.08, TRAN.02.09

Unit Objectives

Students will be able to:

- identify specifications of design.
- research design ideas.
- design and construct a model vehicle describe evolution of transportation.
- identify specifications of design.
- choose materials.
- connect learning to real world applications.

Essential Questions

- What does it mean to be safe or practice safety?
- How do you use data to improve a vehicle?

Focus Questions

- What are the four modes of Transportation?
- What are the forces acting upon a vehicle?
- How do you collect data on a vehicle?
- How are models used in vehicle development?
- How does construction quality effect performance?

Assessments

- Performance Assessment
- Grading rubric
- Writing Prompts
- Written/verbal assessments
- Self-Assessment

Skill Objectives

Students will:

- list historic developments of vehicle.
- identify specifications of design.
- research design ideas.
- design and construct a model vehicle.
- test and modify the vehicle.
- demonstrate safe tool use.
- explain the forces acting upon a vehicle.