

Seymour Public Schools Curriculum

Introduction to Construction

Subject Title

Unit 1

Organization Fundamentals of the Industry

Narrative.....The construction industry is one of the biggest sectors of the American economy. According to *Engineering News Record*, a major construction news publication, one out of every six people is involved in construction in some way. The Home Builders Institute reports that home building accounts for 52% of the construction industry. There are opportunities for people to work at all levels in the construction industry, from those who handle the tools and materials on the jobsite to the senior engineers and architects who spend most of their time in offices. Few people spend their entire lives in a single occupation, and even fewer spend their lives working for one employer. Students should be aware of all the opportunities in the construction industry so that they can make career decisions in the future, even if they know what they want to do at this tie.

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Grade: 9-12	Subject:
	<p>Unit 1 - Organization and Working with-in the Industry</p> <ul style="list-style-type: none"> ❖ Organization in the industry ❖ Working with-in the industry
CSDE Standard	<p>Connecticut Introduction to Construction Course Standards</p> <ul style="list-style-type: none"> ➤ 8 Blueprints and Building Codes <p>Connecticut Standards CTSTDS <i>Revised CT TE Content Standards</i></p> <p>CONTENT STANDARD 1: The Nature & Evolution of Technology CONTENT STANDARD 2: The Impacts of Technology CONTENT STANDARD 3: The Research, Design & Engineering CONTENT STANDARD 4: The Creation & Use of Technology</p> <p>Perkins Standards CTE Standard</p> <ul style="list-style-type: none"> ➤ Standard 3 Career Awareness
Enduring Understanding	<ul style="list-style-type: none"> ➤ One out of every 6 people is involved in the construction industry in some way. By being aware of the opportunities available, students can make educated career choices and decisions for the future. ➤ History is important to the future. ➤ Effective students fully understand the necessary skills required to perform as a skilled craftsman.

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Essential Questions	<ul style="list-style-type: none"> ➤ What careers are available in the construction industries? ➤ What role does communication play in the construction industry? ➤ The ability to work as a member of a team requires what skills?
Content Standard:	<p>Connecticut Introduction to Construction Course Standards</p> <ul style="list-style-type: none"> ➤ 8 Blueprints and Building Codes <ul style="list-style-type: none"> ❖ 8.4 Building Codes and Zoning Regulations <p>Connecticut Standards CTSTDS Revised CT TE Content Standards</p> <p>CONTENT STANDARD 1: The Nature & Evolution of Technology <i>Students will understand the nature of technology, how it has evolved and its influence on its own evolution</i></p> <ul style="list-style-type: none"> k-5 a..describe business and industry as producers of products or services. k-5 b. differentiate between natural and human made items; k-5 c. acquire and apply electronically-based information; 6-8 a. describe how societies are organized to produce and distribute goods and services in a structured manner; 6-8 b. explore how people use technology to extends human capabilities, meets needs and solves problems; 9-12 a. research how, social, economic, and political forces influence innovation, invention and adaptation <p>CONTENT STANDARD 2: The Impacts of Technology <i>Students will understand the impact that technology has on the personal, social, cultural, economic, political and environmental aspects of their lives.</i></p> <ul style="list-style-type: none"> k-5 a. recognize the connections between technology and mathematics, science, language arts, social studies, the arts, physical education and other school subjects; 6-8a. describe and analyze how technological development affects careers and occupations; 6-8b. describe how differences in access to technology has positive and negative impacts 9-12 a. identify and explore career opportunities in the areas of technology;

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9-12 b. describe and evaluate how society's expectations drive technological development;

CONTENT STANDARD 3: The Research, Design & Engineering

Students will recognize that technology is the result of a creative act, and will be able to apply formal problem-solving strategies to enhance invention and innovation.

6-8 a. differentiate between human needs and wants;

6-8 b. seek relevant information in books, magazines and electronic sources of information.

CONTENT STANDARD 4: The Creation & Use of Technology

Students will know the origins, properties and processing techniques associated with the material building blocks of technology as demonstrated by effective application of the methods producing usable products and by effectively using those products.

k-5 a. identify local businesses and industries as producers of goods or services;

9-12 a. identify and describe methods used in manufacturing products;

CONTENT STANDARD 5: The Future of Technology

Students will demonstrate the ability to take known principles of technological innovation and apply them to hypothetical scenarios effectively.

k-5 a. identify and describe methods used in manufacturing products;

Perkins Standards

Standard 3 Career Awareness

➤ **Students will become aware of the world of work and its function in society, diversity, expectations, trends and requirements.**

- ❖ 3.11-12.1 - Research and identify career opportunities in the area of residential construction.
- ❖ 3.8.2 - Identify high school and post-secondary training selections necessary to prepare for particular career choice.
- ❖ 3.8.6 - Prepare a list of skills necessary to perform well in a particular career.

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Performance Expectations (Student outcomes)	<ul style="list-style-type: none"> ➤ Students will be able to use vocabulary referring directly to the construction industry appropriately. <ul style="list-style-type: none"> ❖ I.E. Apprentice, Contractor, Corporation, Craft, Developer, Journeyman, Laborer, Model code, partnership, Profession, Semiskilled laborer, Skilled trades, Sole proprietorship, Subcontractor, unskilled labor; Body language, Ethics, Values ➤ Students will be able to explain what is meant by the following categories of construction occupations: <ul style="list-style-type: none"> ❖ Unskilled labor and semiskilled labor ❖ Skilled trades or crafts ❖ Technicians ❖ Design and management ➤ Students will be able compare and contrast what is meant by the following forms of ownership: <ul style="list-style-type: none"> ❖ Sole proprietorship ❖ Partnership ❖ General partnership ❖ Limited liability partnership (LLP) ❖ Corporation ➤ Students will be able to explain the purpose and scope of building codes. ➤ Students will be able to explain what is a trade unions and contractors' association. ➤ Students will be able to explain what is meant by ethics and why they are important in the work place. ➤ Students will be able to explain the traits of effective teams and why they are important in the construction industry. ➤ Students will be able to list the characteristics of good communication skills. ➤ Students will be able to explain what is meant by customer service and lifelong learning.

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Strategies/Modes	Materials/Resources (examples)	Assessments (examples)
<p>➤ Class discussion to assess prior knowledge concerning the organization of the construction industry.</p> <p>“Principles for Construction” by Mark Huth</p> <p>➤ Reading assignments: Text Book</p> <ul style="list-style-type: none"> ❖ p6 - 8 - Construction personnel ❖ p8 - 11 - An overview of Design and construction ... Forms of ownership ❖ p11 - 14 Building Codes... Unions and Contractors' Association ❖ p19 - 21 Ethics and Working on a team ❖ p 21 - 22 Communications ❖ p 22 - 23 Customer Service and Lifelong learning 	<p>➤ Text book:” Principles for Construction” by Mark Huth</p> <p>➤ Supplementary materials.</p>	<p>➤ Observations and conversations with students throughout the lessons.</p> <p>➤ End of the chapter quiz.</p>

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Introduction to Construction

Subject Title

Unit 2

Elementary Fundamentals of Engineering, Design and Development, and Machine Safety

Narrative.....In this unit students learn the use of machinery and techniques necessary for material removal. In order to ensure an environment free of injuries, there is an emphasis on safety. The importance of knowing, understanding, and demonstrating safe practices is reinforced throughout the lessons. The nature and characteristics of wood are discussed so students will be able to select appropriate materials for a particular job. The unit is also designed to introduce basic engineering practices, design techniques, and simple manufacturing practices to be used throughout the year long course developing quality workforce bound persons for the trades.

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<p>Grade: 10-12</p> <p>25-30 Days</p>	<p style="text-align: right;">Subject:</p> <p>Unit 2: Engineering, Design and Manufacturing Practices</p> <ul style="list-style-type: none"> ➤ Research and Development <ul style="list-style-type: none"> ❖ Product development ➤ Computer Aided Design (Solid Works) <ul style="list-style-type: none"> ❖ Print Layout and Print Reading ❖ Measurement ❖ Material Properties ➤ Machine Usage <ul style="list-style-type: none"> ❖ Machine and Tool Safety ➤ Production Processes <ul style="list-style-type: none"> ❖ Measurements Layout ❖ Assembly Line Process ❖ Quality Control ❖ Assembly Process
<p>CSDE Standard</p>	<p>Connecticut Introduction to Construction Course Standards</p> <ul style="list-style-type: none"> ➤ Wood and Lumber ➤ Fasteners ➤ Hand Tools ➤ Portable Power Tools ➤ Stationary Power Tools ➤ Blueprints and Building Codes ➤ Temporary Work Platforms

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Perkins Standards

MATHEMATICS STANDARDS

1) EXTEND THE UNDERSTANDING OF NUMBER TO INCLUDE INTEGERS, RATIONAL NUMBERS AND REAL NUMBERS

3) DEVELOP STRATEGIES FOR COMPUTATION AND ESTIMATION USING PROPERTIES OF NUMBER SYSTEMS TO SOLVE PROBLEMS.

READING STANDARDS

6) MAKE CONNECTIONS BETWEEN THE TEXT AND OUTSIDE EXPERIENCES AND KNOWLEDGE

Technology Education

PERFORMANCE STANDARDS AND COMPETENCIES

A. Materials and Processes: Define the origins, properties and processing techniques associated with the material building blocks of technology.

B. Technology and the Economy: Understand the link between technology and the economy.

C. Technological Impacts: Understand the impact that technology has on the social, cultural and environmental aspects of life.

D. Career Awareness and Teambuilding: Become aware of the world of work and its function in social diversity, expectations, trends and requirements; identify and develop leadership attributes and apply them in team situations.

E. Problem Solving/Research and Development: Apply disciplined problem solving strategies to enhance invention and innovation including the

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	<p>engineering design process to achieve desired outcomes across all technology content areas.</p> <p>Connecticut Standards CTSTDS <i>Revised CT TE Content Standards</i></p> <p>CONTENT STANDARD 1: The Nature & Evolution of Technology CONTENT STANDARD 2: The Impacts of Technology CONTENT STANDARD 3: The Research, Design & Engineering CONTENT STANDARD 4: The Creation & Use of Technology</p>
<p>Enduring Understanding</p>	<ul style="list-style-type: none"> ➤ Ideas require action to become a reality. ➤ Effective problem solving works to understand the problem before attempting a solution. ➤ Proper research techniques can be used to solve any problem and create design intent of any product. ➤ Decisions about what to use and how to use it, affects the end result and process to arrive at an end result. ➤ Development practices and different materials usage require different processes and safety considerations. ➤ During the design and development process attention to detail can make ordinary work extraordinary. ➤ Quality management is critical to prototype development and success.
<p>Essential Questions</p>	<ul style="list-style-type: none"> ➤ What is the problem and what is needed to solve it? ➤ How are human products created? ➤ What is the correct process or processes to complete the job? ➤ What role does communication play in product development and in world development? ➤ How is home and work place safety regulated?

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Content Standard:	<p>Connecticut Construction Standards</p> <p>Wood and Lumber</p> <ul style="list-style-type: none">1.1 Hardwood and Softwood Properties1.2 Moisture Content1.3 Grade and Size of Lumber1.4 Type and Species of Lumber <p>Fasteners</p> <ul style="list-style-type: none">4.1 Nails, Screws, Bolts and Staples4.3 Adhesives <p>Hand Tools</p> <ul style="list-style-type: none">5.1 Measuring and Marking Tools5.2 Leveling & Layout5.3 Boring Tools <p>Portable Power Tools</p> <ul style="list-style-type: none">6.1 Saws Drills & Drivers6.2 Planes, Routers and Sanders <p>Stationary Power Tools</p> <ul style="list-style-type: none">7.1 Miter and Chop Saw7.2 Table saw7.3 Band Saw7.4 Sanders7.6 Jointer/Planer7.7 Drill Press

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Blueprints and Building Codes

8.2 Building Plans (Floor, section, elevations...)

Temporary Work Platforms

17.4 Safely set-up and use Saw Horses

17.5 Build a Sawhorse & other Construction Aids

Technology Education

Perkins Standards

MATHEMATICS STANDARDS

1) EXTEND THE UNDERSTANDING OF NUMBER TO INCLUDE INTEGERS, RATIONAL NUMBERS AND REAL NUMBERS

- Compare, locate, label and order real numbers on number lines, scales, coordinate grids and measurement tools
- Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational) to solve practical problems involving order, magnitude, measures, labels, locations and scales.

3) DEVELOP STRATEGIES FOR COMPUTATION AND ESTIMATION USING PROPERTIES OF NUMBER SYSTEMS TO SOLVE PROBLEMS.

- Select and use appropriate methods for computing to solve problem in a variety of contexts

READING STANDARDS

6) MAKE CONNECTIONS BETWEEN THE TEXT AND OUTSIDE EXPERIENCES AND KNOWLEDGE

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- Students communicate with others to create interpretations of written, oral and visual texts
- Students select and apply strategies to facilitate word recognition and develop vocabulary in order to comprehend text

Technology Education

CONTENT AREA—

PERFORMANCE STANDARDS AND COMPETENCIES

A. Materials and Processes: Define the origins, properties and processing techniques associated with the material building blocks of technology.

1. Describe physical objects as geometric entities.
2. Use mechanical and electronic measuring devices accurately as required by the design intent.
3. Understand manufacturing processes.
4. Understand architectural processes as required by the design intent.
5. Understand and be able to effectively apply and demonstrate physical, graphic and electronic communication techniques in processing, transmitting, receiving and organizing information.
6. Demonstrate graphic communication skills through sketching.
7. Evaluate and select appropriate methods of communication for a given problem.
8. Send and access information through a network.
9. Express a design of an object as a 3D model.
10. Export and import images/files in a variety of file formats.
12. Define and apply dimensioning standards.
13. Apply material attributes to the model for analysis.
14. Evaluate choice and placement of dimensions, notes and annotations to clearly communicate design intent.
15. Revise a design and update finished drawings appropriately.
17. Identify basic geometric elements (i.e. line, circle, rectangle, sphere, cube, i.e.)
18. Apply basic geometric concepts to building 3D models (i.e. tangent, parallel,

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concentric, etc.).

B. Technology and the Economy: Understand the link between technology and the economy.

- 19. Identify current global, social and economic trends.
- 20. Describe the evolution of technological enterprise and its economy, culture, society and environment.
- 23. Define and use quality control.

C. Technological Impacts: Understand the impact that technology has on the social, cultural and environmental aspects of life.

- 25. Employ the input-process-output feedback system model in evaluating technological impacts.
- 27. Discuss societal and industrial responsibilities for using proper hazardous waste disposal and recycling techniques.

D. Career Awareness and Teambuilding: Become aware of the world of work and its function in social diversity, expectations, trends and requirements; identify and develop leadership attributes and apply them in team situations.

- 28. Identify and explore career opportunities.
- 30. Exhibit and take responsibility for behaviors in both school and work situations.
- 31. Define and demonstrate a personal work ethic.
- 33. Apply organizational and time management skills to classroom and laboratory activities.
- 34. Present information in a clear, concise and appropriate manner.

E. Problem Solving/Research and Development: Apply disciplined problem solving strategies to enhance invention and innovation including the engineering design process to achieve desired outcomes across all technology

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content areas.

- 35. Use research techniques to support design development.
- 37. Develop alternative design solutions to the same problem.
- 38. Use a communication technology to visualize a design idea.
- 40. Present a design idea using multimedia technology.
- 42. Fabricate a prototype to support a chosen design.

Connecticut Standards

CTSTDS

Revised CT TE Content Standards

CONTENT STANDARD 1: The Nature & Evolution of Technology

Students will understand the nature of technology, how it has evolved and its influence on its own evolution

- 6-8 b. explore how people use technology to extends human capabilities, meets needs and solves problems;

CONTENT STANDARD 2: The Impacts of Technology

Students will understand the impact that technology has on the personal, social, cultural, economic, political and environmental aspects of their lives.

- 6-8 c. Use appropriate tools and techniques to gather, analyze and interpret data.

CONTENT STANDARD 3: The Research, Design & Engineering

Students will recognize that technology is the result of a creative act, and will be able to apply formal problem-solving strategies to enhance invention and innovation.

- k-5 a. Identify, and investigate a problem;
- k-5 b. apply formal strategies for technological problem solving and design
- k-5 c. Recognize the importance of diverse view points in technological problem solving
- 6-8 c. demonstrate effective organizational and time management skills;

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	<p>6-8 d. develop organizational skills through practical experiences; 6-8 e. Seek relevant information in books, magazines and electronic sources of information. 9-12 a. investigate multiple solutions to a design problem; 9-12 b. use a communication technologies to visualize a design idea; 9-12 c. select appropriate technical processes and fabricate a prototype;</p> <p>CONTENT STANDARD 4: The Creation & Use of Technology <i>Students will know the origins, properties and processing techniques associated with the material building blocks of technology as demonstrated by effective application of the methods producing usable products and by effectively using those products.</i></p> <p>k-5 b. use measuring devices accurately; 6-8 a. produce models from a variety of materials, using manual and computer-controlled devices. 9-12 a. identify and describe methods used in manufacturing products;</p> <p style="text-align: center;">(refer to frameworks)</p>
<p>Performance Expectations (Student outcomes)</p>	<ul style="list-style-type: none"> ➤ Each student will use the Web to research possible designs of a construction work platform I.E. a portable saw horse and evaluate the information to determine the best design. <ul style="list-style-type: none"> ❖ Web research techniques ➤ Each student will use a computer aided design program to complete a 2D blue print for the construction and development of a prototype(s) to be used in the class. <ul style="list-style-type: none"> ❖ Design practices and techniques ➤ Each student will prove to be efficient on machine safety and usage. <ul style="list-style-type: none"> ❖ Machine safety practices ❖ Machine Safe Usage; Table Saw, Radial Arm Saw, Chop Saw, Planer, Jointer, Drill Press and Band Saw ➤ Each student will be required to perform simple manufacturing processes in the development of the prototype. <ul style="list-style-type: none"> ❖ Assembly line practices and machine usage. ➤ Each student will determine the appropriate raw materials to be used in the prototype development. <ul style="list-style-type: none"> ❖ Understand and Identify raw material processes. ❖ Determine the best possible material to be used for the process.

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- Each student will perform assembly techniques basic to construction practices in the development of the prototype.
 - ❖ Hands on assembly practices
 - ❖ Portable Hand Tools Safe Usage

- Each student will prove to be efficient on portable machine safety and usage.
 - ❖ Machine safety practices
 - ❖ Machine Safe Usage; Router, Cordless/Electric Drills, Jig Saw and Router.
- Each student will prove to be efficient on hand tool safety and usage.
 - ❖ Machine safety practices
 - ❖ Hand Tool Safe Usage; Wrecking Bar, Screw Driver, Pliers, Hammers, Chisels and Files.
 - ❖ Students will be able to check “level” and plumb using a 24” level
- Each Student will perform quality control checks on each part of the prototype in development.
 - ❖ Basic measurement techniques within a sixteenth of an inch.
 - ❖ Use of measuring tools.
- Students will be able to identify at least three species of hard wood and soft wood.
- Students will be able to identify where softwoods and hardwoods are used in the home.
- Students will be able to describe three types of screws.
- Students will be able to show the parts of a wood screw and the types of holes needed before using wood screws.
- Students will be able to describe the types and proper application of various nails common to construction.

- **Students will be score an 80% or above and/or demonstrate proficient safety standards on power machines used in the trades.**

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Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
<ul style="list-style-type: none"> ➤ Classroom discussion to generate a problem and formulate a basic knowledge of the process. ➤ Internet Research to find appropriate design to fit criteria. ➤ Computer Aid Design and refinement of product in a 2D working drawing. ➤ Evaluation of design and completion of material lists and manufacturing process. ➤ Prototype development and quality control check. <ul style="list-style-type: none"> ❖ Push Stick <p>Properties of wood</p> <ul style="list-style-type: none"> ➤ Classroom discussion about the trees and how to recognize the difference between them. ➤ Show examples of some hard and soft woods. <p>Measurement</p> <ul style="list-style-type: none"> ➤ Break down the inch into sixteenths and allow students to show where to measure to a sixteenth of an inch. ➤ Provide a variety of objects that students can use a ruler to measure specified distances. 	<p>Design</p> <ul style="list-style-type: none"> ➤ Product Samples ➤ Internet ➤ CAD Program ➤ Information Sheet (handouts) <p>Measurement</p> <ul style="list-style-type: none"> ➤ White Board Demonstration ➤ Paper with segments of an inch drawn progressively from a half inch to sixteenths of an inch. ➤ Rulers ➤ Blocks of wood to measure. ➤ Various objects in the room to measure. <p>Fasteners</p> <ul style="list-style-type: none"> ➤ Various screws, nails, drill bits, the drill press and hand drills. <p>Power Tools</p> <ul style="list-style-type: none"> ➤ Radial Arm Saw, Table Saw, Band Saw, Chop Saw, Drill Press, Portable Electric Drill (corded), Jig Saw, Portable Electric Drill (cordless), Planer, and Jointer ➤ Information sheets (handouts) ➤ Various pieces of pine. 	<ul style="list-style-type: none"> ➤ Ongoing observation of students while working. ➤ CFA to assess prior knowledge ➤ Unit Exam ➤ Prototype evaluations ➤ Questioning and answer techniques ➤ Section and unit exams. ➤ Evaluation of the techniques and procedures while students are working. ➤ Unit exam on the use of screws and nails.

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<p>➤ Show multiple places on a ruler to measure various distances.</p> <p>Fasteners</p> <p>➤ Class conversations explaining use and nature of screws and nails.</p> <p>➤ Prototype and product assembly.</p>		
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Unit 3 - Model Development and Testing

Narrative.....In this unit, students will discover various stress playing a part in catastrophic structure failures throughout the world. They will be introduced to material and structural testing using various models designs and data collection practices necessary for the fields of construction. Aspects such as zoning regulations, building codes, inspections, building permit process and stress testing and structure design

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techniques will be covered. The order of operations for residential home building for platform construction will also be stressed while building a scaled home model. Students will work in teams of to construct various scale model made out of balsa wood and other materials.

Grade: 9-12	Unit 4 - Wall Construction/Model Development	Subject:
CSDE Standard	Connecticut Standards CTSTDS	

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	<p>Revised CT TE Content Standards</p> <p>CONTENT STANDARD 1: The Nature & Evolution of Technology CONTENT STANDARD 2: The Impacts of Technology CONTENT STANDARD 3: The Research, Design & Engineering CONTENT STANDARD 4: The Creation & Use of Technology</p> <p>CT Construction course standards</p> <p>8. Blueprints and Building Codes 12. Framing Systems 14. Wall Framing with Wood 16. Ceiling Framing 19. Roof Framing</p>
<p>Enduring Understanding</p>	<ul style="list-style-type: none"> ➤ Ideas require research and action to become a reality. ➤ Effective problem solving works to understand the problem before attempting a solution. ➤ Proper research techniques can be used to solve any problem and create design intent of any product. ➤ Decisions about what to use and how to use it, affects the end result and process to arrive at an end result. ➤ Development practices and different materials usage require different processes and safety considerations. ➤ During the design and development process attention to detail can make ordinary work extraordinary. ➤ Quality management is critical to prototype development and success. ➤ Understanding different structural stresses is critical to prototype assembly. ➤ Design briefs are a pathway to understanding.
<p>Essential Questions</p>	<ul style="list-style-type: none"> ➤ What is the function of Design brief development? ➤ How can catastrophic structural collapse be avoided through understanding of structural stresses?

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	<ul style="list-style-type: none"> ➤ How can testing compression, tension, and torque enlighten student understanding for safe design? ➤ What materials and techniques are involved in the framing of a house? ➤ What is meant by a load bearing or partition walls? ➤ What is the process involved in the construction of a house? ➤ Why is it important to start with a design or plan? ➤ How is safe structural development affected by the construction process followed?
<p>Content Standard:</p>	<p>Connecticut Standards CTSTDS <i>Revised CT TE Content Standards</i></p> <p>CONTENT STANDARD 1: The Nature & Evolution of Technology <i>Students will understand the nature of technology, how it has evolved and its influence on its own evolution</i> 6-9 b. explore how people use technology to extends human capabilities, meets needs and solves problems;</p> <p>CONTENT STANDARD 2: The Impacts of Technology <i>Students will understand the impact that technology has on the personal, social, cultural, economic, political and environmental aspects of their lives.</i> 6-8 c. Use appropriate tools and techniques to gather, analyze, and interpret data.</p> <p>CONTENT STANDARD 3: The Research, Design & Engineering <i>Students will recognize that technology is the result of a creative act, and will be able to apply formal problem-solving strategies to enhance invention and innovation.</i> k-5 a. Identify, and investigate a problem; k-5 b. apply formal strategies for technological problem solving and design k-5 c. Recognize the importance of diverse view points in technological problem solving 6-8 c. demonstrate effective organizational and time management skills; 6-8 d. develop organizational skills through practical experiences; 6-8 e. Seek relevant information in books, magazines and electronic sources of information.</p>

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- 9-12 a. investigate multiple solutions to a design problem;
- 9-12 b. use a communication technologies to visualize a design idea;
- 9-12 c. select appropriate technical processes and fabricate a prototype;

CONTENT STANDARD 4: The Creation & Use of Technology

Students will know the origins, properties and processing techniques associated with the material building blocks of technology as demonstrated by effective application of the methods producing usable products and by effectively using those products.

- k-5 b.* use measuring devices accurately;
- 6-8 a. produce models from a variety of materials, using manual and computer-controlled devices.
- 9-12 a. identify and describe methods used in manufacturing products;

Blueprints and Building Codes

- 8.2 Building Plans – floor plans
- 8.4 Building Codes and Zoning Regulations

Framing Systems

- 12.1 Balloon Frame Construction
- 12.2 Platform Frame Construction

Wall Framing with Wood

- 14.1 Identify load-and non-load-bearing walls and partitions
- 14.2 Layout walls on floor deck or foundation
- 14.3 Layout Detail on wall plates
- 14.4 Cut wall plates
- 14.6 Cut studs, headers, jacks, rough sills and cripples
- 14.7 Assemble header, corner and tee posts
- 14.8 Frame door opening
- 14.9 Frame window opening

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	<p>14.10 Assemble wall section 14.14 Install top plate (cap plate)</p> <p>16 Ceiling Framing in Wood 16.1 Lay out ceiling framing detail on top wall plate 16.2 Cut ceiling joists 16.3 Install ceiling joists</p> <p>19 Roof Framing 19.1 Lay out roof framing detail on cap plate & ridge 19.3 Lay out & cut hip & valley rafters & jacks 19.6 Frame/install hips & valleys 19.7 Install rafter support & bracing 19.9 Install sub-fascia 19.10 Frame gable end 19.11 Frame gable end overhang 19.13 Install roof sheathing (incl. nailing zones)</p>	
Performance Expectations (Student outcomes)	<ul style="list-style-type: none"> ➤ Students will be able to identify stresses on various structures designed and modeled. ➤ Students test and record data for compression and tension stresses on a structure. ➤ Students will solve given problems using the design brief techniques. ➤ Students will identify and describe the purpose of the various members of the wall frame. ➤ Students will be able to construct a model of a 3 bedroom house working in a team setting. ➤ Students will be able to read and interpret architectural drawings of a floor and framing plan for a house. 	
Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
	➤ Design Brief Sheets	➤ Design Briefs

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<ul style="list-style-type: none">➤ Design Brief development techniques and strategies.➤ Scaled model of a bridge, tower, truss and three bed room home.➤ Class research and discussion on structural stresses.➤ Class discussion dealing blueprint reading.➤ Research, Classroom discussion and scaled model development.➤ Testing and data collection dealing with structural testing.➤ Multiple class discussions and research problems dealing with platform construction of a residential home.➤ Keep tabs on the time required to build each structure. Time schedule used to keep students on task.	<ul style="list-style-type: none">❖ Bridges, towers, and trusses<ul style="list-style-type: none">➤ House model kits➤ Hot glue guns and glue➤ Scales and rulers➤ Various hand-outs concerning materials and framing techniques	<ul style="list-style-type: none">➤ Tests will be given periodically to assess understanding.➤ Observation of students working in their groups with teacher feedback.
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Unit 4 – Planning, Design, Manufacturing, and Sales

Narrative.....Planning is a general term and may be as simple as determining activities for a day or as complicated as planning a house or other building. It means thinking through an activity before it is performed. In the construction industry, planning is one of the chief functions of the engineering and architectural department. It includes such divisions as product selection and design, methods of fabrication, time schedules, structure layout, and materials and equipment selection. Careful planning can save time, materials, and energy. It also insures a good product and a profitable operation.

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Grade: 9-12	Subject: Unit 4 – Planning, Design, Manufacturing, and Sales
CSDE Standard	<p>Connecticut Standards CTSTDS <i>Revised CT TE Content Standards</i></p> <p>CONTENT STANDARD 5: The Future of Technology CONTENT STANDARD 3: The Research, Design & Engineering CONTENT STANDARD 4: The Creation & Use of Technology</p> <p>09.0.4 Problem Solving/Research and Development - Students will recognize technology as the result of a creative act, and will be able to apply disciplined problem-solving strategies to enhance invention and innovation.</p>
Enduring Understanding	<ul style="list-style-type: none"> ➤ All products begin as an idea. ➤ Ideas are studied, visualized, analyzed and finally either discarded or incorporated into the design. ➤ A product must go through the design process before they can be constructed. ➤ Prototype development is critical to the design process.

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	<ul style="list-style-type: none"> ➤ The Manufacturing process needs to be articulated to produce a sellable product. ➤ Advertisement is critical to product marketing and sales. ➤ Advertisement aimed at a demographic group, whether global or local, must meet specific needs.
<p>Essential Questions</p>	<ul style="list-style-type: none"> ➤ How does an idea first get communicated? ➤ Once an idea is visualized what are the steps of the design process? ➤ Is the prototype a final product or a stepping stone in the design process? ➤ Why is quality control essential in manufacturing, marketing and sales of a product? ➤ Why does need drive advertisement and marketing?
<p>Content Standard:</p>	<p>Connecticut Standards CTSTDS Revised CT TE Content Standards</p> <p>CONTENT STANDARD 3: The Research, Design & Engineering <i>Students will recognize that technology is the result of a creative act, and will be able to apply formal problem-solving strategies to enhance invention and innovation.</i></p> <p>9-12 a. use research techniques to support design development; 9-12 b. investigate multiple solutions to a design problem; 9-12 c. use a communication technologies to visualize a design idea; 9-12 e. document a design to facilitate replication; 9-12 f. select appropriate technical processes and fabricate a prototype; 6-8 a. differentiate between human needs and wants; 6-8 b. identify and apply research methods, materials and techniques;</p>

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CONTENT STANDARD 4: The Creation & Use of Technology

Students will know the origins, properties and processing techniques associated with the material building blocks of technology as demonstrated by effective application of the methods producing usable products and by effectively using those products.

. create a product demonstrating the application of technological processes;

. use tools and procedures safely;

9-12 f. select appropriate tools and procedures for a given task;

9-12 g. identify and describe methods used in manufacturing products;

6-8 d. demonstrate the appropriate selection and safe operation of basic hand and power tools;

6-8 g. identify how the development and production of products and services are dependent on the transformation of available resources;

CONTENT STANDARD 5: The Future of Technology

Students will demonstrate the ability to take known principles of technological innovation and apply them to hypothetical scenarios effectively.

. explore future labor market trends and educational needs.

09.0.4 Problem Solving/Research and Development - Students will recognize technology as the result of a creative act, and will be able to apply disciplined problem-solving strategies to enhance invention and innovation.

4.0.1 Identify and define a problem

4.0.4 Gather, record, and organize data based on observations

4.0.6 evaluate a solution o a problem

4.5.6 Apply cooperative techniques while engaging in group problem solving activities

4.9.3 Develop several alternative solutions to the same problem

4.9.4 Use communication technology to visualize a design idea

4.9.7 Prepare and document a design brief

4.9.8 Select appropriate technical processes and fabricate a prototype

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	(refer to frameworks)		
Performance Expectations (Student outcomes)	<ul style="list-style-type: none"> ➤ Students will be able to complete the planning steps required before constructing a prototype. ➤ Students will be able to explain the steps involved in designing, sketching, developing procedures, listing materials and estimating costs. ➤ Students will have an in-depth understanding of the manufacturing process pertaining to product development. ➤ Students will produce a marketing brochure and distribute for sales of the designed product. ➤ Students will schedule arrangements for the distribution of the finished products. 		
Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)	
<ul style="list-style-type: none"> ➤ Classroom discussions and lecture with note taking to formulate a basic knowledge of the design process. ➤ Internet research to find appropriate designs that fits the criteria outlined. ➤ Analysis, evaluate and finalize designs within small students groups. ➤ Development of construction procedures in a group situation. ➤ Development of material list and cost estimate for product. 	<ul style="list-style-type: none"> ➤ Text book resources. ➤ Computers and internet resources. ➤ Drawing supplies. <ul style="list-style-type: none"> ❖ Media ❖ Tools ➤ Information sheets (handouts). <ul style="list-style-type: none"> ❖ Materials sheet ❖ Blank materials sheet ➤ Sample product design. <ul style="list-style-type: none"> ❖ Adirondack Chair ➤ Sample Sales brochure. 	<ul style="list-style-type: none"> ➤ CFAs to assess prior knowledge ➤ Ongoing observation while students are working. ➤ Section and unit exams. ➤ Product quality control ➤ Evaluation of the finished project. ➤ Sales and distribution outcome. 	

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<ul style="list-style-type: none">➤ Create a marketing team and develop sales strategies.➤ Develop and organize a distribution system.		
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