CTECS Building and Civil Construction Curriculum

CTECS
CONNECTICUT TECHNICAL EDUCATION AND CAREER SYSTEM

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CTECS – Vision of Graduate

Connecticut Technical Education and Career System Vision of a Graduate

A CTECS Graduate is…

A Problem Solver

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An Effective Communicator

The Vision of a Graduate (VoG) at the Connecticut Technical Education and Career System (CTECS) embodies our commitment to preparing students for success in Connecticut's workforce.

Developed in collaboration with students, parents, staff, and employers, the VoG ensures that CTECS students are not only job-ready but also equipped to lead, innovate, and adapt in a dynamic world.

As educators, we are dedicated to developing these qualities by providing a comprehensive education that empowers our students to achieve their fullest potential and make meaningful contributions to society.

A Problem Solver	Work Ready
Problem solvers tackle challenges by identifying root causes of issues, brainstorming solutions, implementing effective strategies, and demonstrating adaptability. ➔ Engage students with open-ended, creative thinking tasks that require both conventional and innovative solutions. ➔ Facilitate group discussions and collaborative projects. ➔ Use real-world scenarios and hands-on activities. ➔ Highlight the importance of effort, persistence, and continuous learning. ➔ Provide regular feedback and encourage reflection.	*To be work-ready includes a combination of technical expertise, soft skills, and personal qualities that ensure a graduate can effectively contribute to the workplace from day one.* ➔ Set high standards for punctuality, responsibility, professionalism, and task completion. ➔ Use project-based learning and collaborative assignments. ➔ Emphasize clear written and verbal communication. ➔ Offer practical exercises like mock interviews and resume workshops. ➔ Integrate technology and teach digital literacy.

Respectful	Skilled Socially
Graduates who embody respectfulness emphasize the importance of treating others with dignity, valuing diversity, and fostering an inclusive and positive environment, both personally and professionally. ➔ Demonstrate personal, interpersonal, and professional skills. ➔ Show respect for diversity. ➔ Model respect through active listening and empathy. ➔ Set clear expectations for respectful interactions. ➔ Promote collaboration and group discussions. ➔ Celebrate respectful behavior. ➔ Address disrespect promptly and constructively.	*Graduates who are skilled socially are equipped to navigate social environments, build relationships, and contribute positively to their communities and workplaces.* ➔ Show awareness of global responsibility to others and the environment. ➔ Participate in community involvement. ➔ Design cooperative group projects and team activities ➔ Set expectations for respect and give regular feedback. ➔ Facilitate discussions on inclusivity, kindness, and respect. ➔ Model positive interactions and recognize strong social skills.
A Critical Thinker	**An Effective Communicator**
Critical thinkers approach problems systematically by analyzing, evaluating, and synthesizing information to make well-informed decisions and contribute to innovative solutions. ➔ Encourage critical thinking individually and collaboratively. ➔ Design lessons that challenge assumptions and explore diverse viewpoints. ➔ Use open-ended questions, rigorous activities, and cross-curricular projects. ➔ Integrate project-based learning and real-world problem-solving. ➔ Offer reflective opportunities like journaling and discussions. ➔ Cultivate an environment that values curiosity and inquiry.	*Effective communicators convey ideas, information, and emotions accurately and persuasively, fostering understanding and collaboration.* ➔ Communicate effectively using oral, written, visual, artistic, and technical modes. ➔ Include group discussions, presentations, and peer reviews. ➔ Promote active listening and thoughtful responses. ➔ Offer clear guidelines and constructive feedback. ➔ Stress clear, respectful, and purposeful communication.

CTECS Instructional Model

CTECS uses the Marzano Compendium to guide research-based instructional strategies that differentiate learning and promote access, engagement, and success for all students. Teachers apply these strategies to support diverse learners (including multilingual learners, students with disabilities, and students with varied academic or technical backgrounds) through scaffolds, modeling, guided practice, and multiple ways to participate and show understanding. This approach ensures every student can work toward proficiency in the Priority Standards and the competencies outlined in the CTECS Vision of a Graduate.

Marzano Compendium

Feedback

Providing and Communicating Clear Learning Goals

1. Providing scales and rubrics
2. Tracking student progress
3. Celebrating success

Using Assessments

4. Using informal assessments of the whole class
5. Using formal assessments of individual students

Content

Conducting Direct Instruction Lessons

6. Chunking content
7. Processing content
8. Recording and representing content

Conducting Practicing and Deepening Lessons

9. Using structured practice sessions
10. Examining similarities and differences
11. Examining errors in reasoning

Conducting Knowledge Application Lessons

12. Engaging students in cognitively complex tasks
13. Providing resources and guidance
14. Generating and defending claims

Using Strategies That Appear in All Types of Lessons

15. Previewing strategies
16. Highlighting critical information
17. Reviewing content
18. Revising knowledge
19. Reflecting on learning
20. Assigning purposeful homework
21. Elaborating on information
22. Organizing students to interact

Context

Using Engagement Strategies

23. Noticing and reacting when students are not engaged
24. Increasing response rates
25. Using physical movement
26. Maintaining a lively pace
27. Demonstrating intensity and enthusiasm
28. Presenting unusual information
29. Using friendly controversy
30. Using academic games
31. Providing opportunities for students to talk about themselves
32. Motivating and inspiring students

Implementing Rules and Procedures

33. Establishing rules and procedures
34. Organizing the physical layout of the classroom
35. Demonstrating withitness
36. Acknowledging adherence to rules and procedures
37. Acknowledging lack of adherence to rules and procedures

Building Relationships

38. Using verbal and nonverbal behaviors that indicate affection for students
39. Understanding students' backgrounds and interests
40. Displaying objectivity and control

Communicating High Expectations

41. Demonstrating value and respect for reluctant learners
42. Asking in-depth questions of reluctant learners
43. Probing incorrect answers with reluctant learner

Curriculum Introduction

This curriculum document outlines the essential learning for this trade program and provides a clear structure for planning, instruction, and assessment. It includes the components required by NEASC Standard 2.2a, along with elements that reflect the unique nature of CTECS technical programs. The curriculum is organized to show what students learn in each course, how learning progresses across grade levels, and how instruction supports both technical skill development and the CTECS Vision of a Graduate.

Teachers should use this document to:

- Understand the overall structure and expectations of the course sequence
- Reference the Course Map to see the scope and sequence of Priority Standards and the alignment to District Summative Assessments (DSAs)
- Use the Priority Standards and Units of Study to guide daily, weekly, and cycle-based planning
- Integrate Big Ideas, Essential Questions, Skills/Learning Outcomes, vocabulary, and resources during lesson design
- Identify required safety, industry, and technical content expectations
- Plan and implement formative assessments to monitor progress and guide instruction
- Prepare students for the District Summative Assessments, ensuring alignment with the Course Map
- Maintain consistency of technical and professional practice instruction across campuses while adapting to student needs and industry-based opportunities

Curriculum Components

Course Map

A Course Map serves as the scope and sequence for this course by outlining the progression of instructional units and the standards that guide teaching and assessment. While each campus will have individual student needs, cycle schedules, and industry-based opportunities, all instructors are expected to teach the standards outlined in the Course Map. Using the Course Map below, teachers will intentionally plan learning experiences that prepare students to meet the identified standards within the designated assessment windows.

Priority Standards (Units of Study)

Priority Standards identify the most essential learning in the trade program. They reflect the core technical competencies, safety practices, and industry-aligned skills that require the greatest instructional focus and appear on program assessments. In CTE programs, each Priority Standard also functions as a Unit of Study, because it includes the required components such as big ideas, essential questions, content topics, and skills/learning outcomes aligned to assessments.

Vertical Alignment

Vertical alignment shows how Priority Standards and instructional expectations progress from grade to grade within the trade program. It provides a clear pathway of skill development, increasing complexity, and technical proficiency across the four-year sequence.

Learning Outcomes

Learning outcomes are what students will know (Concepts) and be able to do (Skills). Concepts identify the major content topics within the Priority Standard (Unit of Study). They appear in the left column of the Learning Outcomes table and follow a similar coding structure as the Priority Standard.

Skills are learning objectives that describe the measurable actions students must be able to perform to demonstrate proficiency. They appear in the right column of the Learning Outcomes table and show the progression of learning evidence in the Priority Standard.

Vocabulary

Essential vocabulary includes the technical and academic terms students must understand and use accurately to engage in trade-specific learning and demonstrate proficiency on assessments. Vocabulary is foundational to safety, technical precision, and industry communication, and should be a primary initial focus within each unit and taught explicitly through modeling, demonstration, and repeated application.

Resources

Resources include the tools, equipment, texts, materials, and digital tools that support learning within each unit and reflect industry standards.

Assessment Practices

Teachers use ongoing formative assessments—such as questioning, checks for understanding, performance demonstrations, reflections, and teacher observation—to monitor progress, guide instruction, and support all learners in mastering the Priority Standards.

Each program also includes District Summative Assessments (DSAs), which measure proficiency on the Priority Standards identified in the Course Map. DSAs provide consistent evidence of student learning across campuses and ensure alignment to industry expectations, safety requirements, and program outcomes. Teachers should reference the Course Map and Units of Study when planning instruction to ensure students have opportunities to practice and demonstrate the skills and knowledge assessed on the DSA.

Building and Civil Construction Philosophy

The Building and Civil Construction (BCC) course of studies is designed to create an appreciation of the industry and to develop entry-level skills within the Residential, Commercial and Civil Construction trades. Opportunities to develop skills for personal use and to make a successful transition from school to the workplace or post-secondary institutions will be presented to students enrolled in this course. Practical experience will be gained within the school, through outside production experience, and through optional Work Based Learning.

Building and Civil Construction – Course Map

Grade 9 – Semester 1 & 2 DSA

- 9.1 Job Site Safety
- 9.2 Career Readiness
- 9.3 Hand Tools
- 9.4 Power Tools
- 9.5 Measuring, Math and Layout
- 9.6 Materials and Fasteners
- 9.7 Intro to Construction Methods
- 9.8 Professional Practice in Construction

Grade 10 – Semester 1 DSA

- 10.1 Job Site Safety
- 10.2 Power Tools
- 10.3 Ladder, Scaffolding, and Fall Protection
- 10.4 Commercial Blueprint Reading
- 10.5 Advanced Math
- 10.6 Commercial Layout Techniques
- 10.7 Commercial Framing
- 10.11 Professional Practice in Construction

Grade 10 – Semester 2 DSA

- 10.1 Job Site Safety
- 10.6 Commercial Layout Techniques
- 10.8 Interior Systems
- 10.9 Suspended Ceilings
- 10.10 Commercial Hardware
- 10.11 Professional Practice in Construction

Grade 11 – Semester 1 DSA

- 11.1 Job Site Safety
- 11.2 Power Tools
- 11.3 Residential Blueprint Reading and Math
- 11.4 Residential Structural Systems
- 11.5 Residential Framing
- 11.9 Professional Practice in Construction

Grade 11 – Semester 2 DSA

- 11.1 Job Site Safety
- 11.5 Residential Framing
- 11.6 Stair Construction
- 11.7 Exterior Finish (Residential)
- 11.8 Insulation
- 11.9 Professional Practice in Construction

Grade 12 – Semester 1 DSA

- 12.1 Job Site Safety
- 12.2 Civil Construction Safety
- 12.3 Civil BPR and Layout Techniques
- 12.4 Introduction to Quality Control
- 12.5 Concrete Construction
- 12.8 Professional Practice in Construction

Grade 12 – Semester 2 DSA

- 12.1 Job Site Safety
- 12.2 Civil Construction Safety
- 12.3 Civil BPR and Layout Techniques
- 12.5 Concrete Construction
- 12.6 Rebar Construction
- 12.7 Welding and Metal Cutting Basics
- 12.8 Professional Practice in Construction

*** See District Summative Assessment (DSA) exam outline for specific breakdown by substandard and learning objectives.**

9th Grade Curriculum

Priority Standard 9.1 - Job Site Safety

Big Idea(s):

- Safety is the responsibility of everyone in the shop
- Safety needs to be a habit and a consideration throughout daily living as well as in the work environment
- Training and awareness can prevent injuries

Essential Question(s):

- How can hazard awareness prevent accidents?
- What are some of the benefits of safe work practices?
- How does one worker's action affect the other workers on a jobsite?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.1.1 Safe Work Habits ● **PPE** ● **Shop Rules** ○ **Horseplay** ○ **Dress code** ● **Housekeeping** ○ **Material Handling and Storage** ● **SDS** ● **Emergency Shut-off** ● **Electrical Safety** ○ **GFCI**	● **Identify Personal Protective Equipment** ● **Demonstrate appropriate PPE use** ● **Explain the importance of SDS in the shop** ● **Follow shop safety rules** ● **Maintain a clean work area/shop** ● **Locate Emergency shut-offs in shop** ● **Explain the importance of a GFCI** ● **100% on written safety test**
9.1.2 Fire Safety ● **Classes of fires** ● **Fire Triangle** ● **Extinguisher Use** ● **Fire Blankets** ● **Fire Alarms / Evacuations**	● **Identify classes of fires** ● **Locate fire extinguishers and blankets in shop** ● **Identify types of extinguishers** ● **Explain the process of extinguishing certain fires** ● **100% on written safety test**
9.1.3 First Aid ● **Injury Protocols** ● **AED/First Aid locations** ● **Eye Wash Station** ● **Bloodborne Pathogens**	● **Describe procedures for dealing with various injuries.** ● **Explain the dangers bloodborne pathogens**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Appropriate contact person** • **100% on written safety test**

Technical Vocab-

PPE, Dress Code, SDS, Fire Extinguisher. Fire Triangle, Bloodborne Pathogens, AED, Eye Wash Station, Emergency Shut-off, GFCI

Resources-

Modern Carpentry (GW), OSHA.gov

Priority Standard 9.2 - Career Readiness

Big Idea:

Employability skills are just as important, if not more, than technical skills.

Essential Question(s):

- What are the essential personal and professional skills needed to be successful in construction?
- How can employability skills help to increase the likelihood of success?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.2.1 Job Opportunities ○ **Skills needed** ○ **Current job trends**	● **Research job opportunities in Residential, Commercial and Civil construction** ● **List job requirements for entry-level employment**
9.2.2 Employability Skills ○ **Readiness** ○ **Organization/Housekeeping** ○ **Reliability**	● **Demonstrate good attendance** ● **Adhering to shop rules** ● **Demonstrate Professionalism** ○ **Dress code** ○ **Readiness** ○ **Hygiene**

Technical Vocab-

Professionalism, Organization, Critical thinking, communication skills, motivation.

Resources-

Modern Carpentry (GW), https://www.realityworks.com

Priority Standard 9.3 - Hand Tools

Big Idea(s):

- It is essential for carpenters to be able to identify, select and safely use the appropriate tool for different jobs to be successful
- Using hand tools can be just as dangerous as power tools
- Using the appropriate tool can increase the quality of work

Essential Question(s):

- Why should you use the right tool for the job?
- What are possible repercussions of using the wrong tool for a job and using a tool incorrectly?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.3.1 Hand Tool Identification ● **Measuring/Marking Tools** ● **Saws** ● **Chisels and Planes** ● **Striking and Fastening Tools** ● **Clamps**	● **Identify common hand tools** ● **Explain hand tool uses** ● **Explain the advantage of using hand tools over power tools for certain tasks**
9.3.2 Hand Tool Use ● **Hand Tool selection** ● **Inspection, Maintenance and Handling** ○ Inspecting ○ Sharpening ○ Care ● **Securing work pieces**	● **Explain the importance of the appropriate tool for the job** ● **Explain the dangers of using a damaged tool** ● **Explain the importance of keeping tools sharp and clean** ● Sharpen an edge tool ● **Demonstrate safe use of hand tools** ● **100% on Written Safety Test**

Technical Vocab-

Layout, square, crosscut, rip, kerf, coping saw, crosscut saw, file, hammer, nail set, rasp, screwdriver, sliding t-bevel, speed square, steel tape

Resources-

Modern Carpentry (GW)

Priority Standard 9.4 - Power Tools

Big Idea(s):

- It is essential to know how to select, safely use, and maintain the proper power tool for completion of the task at hand
- Power tools enable the workers to do more work in less time and with less effort

Essential Question(s):

- What factors contribute to selecting power tools?
- How can portable power tools affect time and quality on a project?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.4.1 Portable Power Tool Safety ● **Electrical safety** ● **Maintenance and inspection.** ● **Clamping and holding materials** ● **Changing accessories:** ○ **Blades** ○ **Bits** ○ **Sandpaper** ○ Other	● **Demonstrate the safe operating techniques according to manufacturer's instructions.** ● **Safely change blades, bits, sandpaper, etc.** ● **List general safety rules that apply to portable power tools** ● **Demonstrate lock out/tag out procedures** ● **Demonstrate the use of clamping devices to hold material and other cut station setup methods**
9.4.2 Portable Power Tool Identification ● **Reciprocating saw** ● **Sliding compound miter saw** ● **Drill** ● **Circular saw** ● Other	● **List and explain the intended use of each portable power tool** ● **Select proper blades and accessories for various applications**
9.4.3 Review safe and appropriate use of Stationary Machines ● Margin of safety ● Main purpose ● Steps for use ● Make adjustments to machines ● Changing of blades, bits, sandpaper, ECT.	● Evaluate the safety condition of equipment before using ● Demonstrate safe use of stationary equipment ● Demonstrate lock out/tag out procedures ● **Score 100% on a written and performance safety test (for applicable stationary power tools)**

Technical Vocab –

arbor, chuck, circular saw, collet, drill, orbital sander, pneumatic tool, powder actuated tool, reciprocating saw, router, saber saw, carbide, tungsten, combination blade

Resources –

Modern Carpentry (GW)

Priority Standard 9.5 - Measuring, Math and Layout

Big Idea(s):

- Being able to measure is an essential skill for an apprentice
- Accurate measuring and layout are vital to the quality of a project

Essential Question(s):

- How can measuring and math skills help to promote a Carpenter in a workplace?
- How can performing math operations improperly affect the outcome of a customer's materials?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.5.1 Measuring	● **Identifying measurements with 1/16 accuracy** ● **Convert Inches into Feet/Inches**
9.5.2 Math	● **Adding measurements (fractions)** ● **Subtracting measurements (fractions)** ● **Finding center (division)** ● Calculate perimeter and area of regular and irregularly shaped rooms ● Calculate the volume of a variety of shapes ● Convert measurements (Fractions to Decimals)
9.5.3 Layout	● Distinguish between marking for hand or power tool operations. ● **Demonstrate accurate layout through shop projects** ● Analyze layout for errors
9.5.4 Drawing and Sketching ● **Rough Sketch and Dimension Project(s)**	● **Identify line types from shop drawings** ○ **Object** ○ **Dimension** ○ **Hidden** ● **List common views found in a set of construction prints** ● Describe information provided by each blueprint view ● Locate specific information needed for construction using a set of construction drawings

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Create a rough sketch of a project with dimensions**

Technical Vocab-

Fractions, perimeter, converting, right angle, square, linear foot, dimension, sketch, scale, yield, cutlist

Resources-

Modern Carpentry (GW)

Priority Standard 9.6 - Materials and Fasteners

Big Idea(s):

- Building material must be handled, cut, and fastened properly to achieve a safe and desirable end result
- Engineered lumber reduces manufacturing waste and improves the strength of wood products
- It is important for carpenters to know how to properly select the most appropriate fastener for various materials under different conditions

Essential Question(s):

- What factors impact material selection?
- How has engineered lumber changed the building industry?
- What would be the outcome of selecting the improper fastener?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.6.1 Dimensional Lumber ● **common sizes,** ● grade stamps, ● **defects** ● spans ● other	● **Recognize and identify lumber** ● Discuss how various factors of lumber affect overall construction ● **List nominal vs. actual sizes of framing material**
9.6.2 Sheet Goods ● species ● grade stamps ● **common sizes** ● traditional sheet goods ● engineered sheet goods ● **installation techniques**	● **Recognize and identify various types of sheet goods** ● Discuss how weather conditions affect construction ● **Explain proper installation techniques**
9.6.3 Engineered Lumber ● LVL (Laminated Veneer Lumber) ● I-Joist (Engineered Truss) ● Glulam ● PSL (Parallel Strand Lumber) ● LSL (Laminated Strand Lumber) ● SIPS (Structural Insulated Panel System) ● Other	● Recognize and identify engineered lumber ● Discuss how engineered lumber is made ● Compare and contrast conventional lumber and engineered lumber
9.6.4 Common Fasteners ● **Nails** ● **Screws** ● **Carriage bolts**	● **Identify types, sizes, and uses of fasteners** ● **Select proper fasteners for materials and conditions**

Students will know:	*As evidenced by: (oral, written, or performance)*
● **Hangers** ● **Adhesives** ● Other	● **Select proper adhesives for materials and conditions**

Technical Vocab –

anchors, box nail, carriage bolts, common nails, duplex nail, finish nail, glulam, hangers, lag screws, LSL, LVL, masonry nails, PSL, roofing nails, wood I-beams

Resources –

Modern Carpentry (GW)

Priority Standard 9.7 - Intro to Construction Methods

Big Idea(s):

- Layout and install floor framing to ensure the building performs as expected
- Structural wall framing practices ensure that a house can withstand everyday elements and support other framing members

Essential Question(s):

- How can the framing affect the house's strength and efficiency?
- How can wall framing affect the house's strength and efficiency?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.7.1 Identification of Building Types ● **balloon frame** ● **platform frame** ● **post-and-beam**	● **Identify of characteristics of each building type** ● **Explain uses for each building type** ● **Identify limitation and hazards associated with each building type**
9.7.2 Concrete Structural Components	● **Identify the ingredients found in concrete** ● Describe ways to mix cement ● **Identify different types of concrete pours (piers, footings, walls, and slabs)**
9.7.3 Framing Members and Terms ● **on center** ● **girder** ● **lally column** ● **sill plate** ● **floor joists** ● **bridging** ● **span** ● **subfloor** ● **studs** ● **trimmer/jack** ● **header** ● **cripples** ● **rough sill** ● **plates** ● **ceiling joists** ● **ridge** ● **common rafters** ● **collar ties** ● **gable studs** ● **fascia**	● **Identify various framing members used in residential framing** ● **Define common terminology used in residential framing** ● **Explain the purpose of framing members used in residential framing**
9.7.4 Floor Framing Processes	● **Layout a band joist according to a given floor plan** ● **Discuss how appropriate dimensions for floor joists are determined** ● **Describe framing around stairwells and floor openings**

Students will know:	*As evidenced by: (oral, written, or performance)*
	● Identify purposes of bridging ● **Explain the installation of the subfloor** ● Compare and contrast how framing with engineered lumber differs from conventional framing
9.7.5 Wall and Ceiling Framing Processes	● **Layout wall plates** ● **Discuss framing around openings, at corners, etc.** ● Describe a typical wall section ● **Explain squaring and erection of wall sections** ● Describe ceiling joist installation methods ● **Explain wall sheathing installation**

Technical Vocab-

anchor bolt, band/rim joist, bridging, floor joist, girder, lally columns, on center, subfloor, sill, sill sealer, tail joist, trimmer joist, ceiling joist, common stud, cripple stud, header, jack stud, king stud, load bearing, on center, plate, rough sill, sheathing, ridge, rafter, fascia, collar tie.

Resources-

Modern Carpentry (GW)

Priority Standard 9.8 - Professional Practice in Construction

Big Idea(s):

- Professional and technical skills are demonstrated through the process and product of hands-on construction work
- Construction projects provide opportunities to apply core competencies in real-world settings
- Employability attributes such as communication, problem-solving, and professionalism are critical to success in the trades
- Reflection and portfolio documentation are essential for tracking growth and preparing for career opportunities

Essential Question(s):

- How do professional behaviors and employability skills impact success on the jobsite?
- What construction practices lead to high-quality workmanship?
- How can reflecting on our work help us improve and prepare for future opportunities?
- Why is documenting work experiences important for career readiness?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.8.1 Professionalism and Employability	• **Identify work-ready skills that reflect professionalism on a jobsite or in a workshop** • **Describe how attributes of the CTECS Vision of a Graduate relate to the construction industry** • **Demonstrate respectful behavior, effective communication, social skills, and work readiness while working in team and individual settings** • **Apply critical thinking and problem-solving skills to complete tasks and resolve challenges in a professional setting**

9.8.2 Technical Skills	• **Apply core construction skills including:**
	  ○ **Measuring and layout**
	  ○ **Material selection and prep**
	  ○ **Tool selection and use**
	  ○ **Fastening and assembly**
	• **Demonstrate safe and appropriate practices related to:**
	  ○ **Personal Safety**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Hand and power tools** ○ **Ladders and scaffold** ○ **Various shop equipment** ● **Evaluate quality of work based on project specifications and industry standards** ● **Follow organized processes to complete tasks efficiently and accurately**
9.8.3 Portfolio and Reflection	● **Identify key components of a professional portfolio (e.g., photos, checklists, reflections, resume artifacts)** ● **Upload documentation and evidence of proficiency for each project completed** ● **Update personal competency checklist to reflect current skill levels and progress** ● **Reflect on personal growth in both technical and employability skills**

Technical Vocab –

Workmanship, competency, portfolio, resume, reflection, jobsite, professionalism, proficiency.

Resources –

Modern Carpentry (GW)

10th Grade Curriculum

Priority Standard 10.1 - Job Site Safety

Big Idea(s):

- Safety is a foundational and non-negotiable aspect of every commercial jobsite, contributing to the overall success and well-being of workers
- Safety is the responsibility of everyone in the shop
- Proper selection, use, and maintenance of PPE are critical elements in ensuring the safety of workers on a commercial jobsite
- The safe use of tools and equipment is contingent on proper training, maintenance, and regular inspection to prevent accidents

Essential Question(s):

- How can hazard awareness prevent accidents?
- Who is ultimately responsible for a safe work environment?
- How does one worker's action affect the other workers on a jobsite?
- Why is the proper use of PPE essential for workers on a commercial jobsite?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.1.1 Safety Fundamentals: ● **Hand Tools,** ● **Personal Safety** ● **Job-Site Safety** ● **SDS** ● Other	● **Demonstrate safe practices** ● **Evaluate construction site work areas for potential hazards** ● **Explain the consequences of unsafe working conditions in construction** ● **Demonstrate the safe handling of hand tools** ● **Advocate for your personal safety** ● **Score 100% on the written Safety Test and hands-on assessment as new tools and equipment are introduced**
10.1.2 Fire Safety Procedures	● Identify fire alarms, fire extinguishers, eye wash stations, and power shut-offs ● Identify types of fires ● Describe the fire triangle ● Explain the protocol for extinguishing fires ● **Score 100% on the written safety test**
10.1.3 First Aid Awareness	● **Identify appropriate practices for administering first aid**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Explain the procedures for dealing with various injuries on outside production** • Explain the dangers of blood borne pathogens
10.1.4 Personal Protective Equipment • **Hard hat** • **Safety glasses** • **Hearing protection** • **Respirators/Dust Masks** • **Safety shoes** • **Gloves** • Other	• **Identify common types of PPE and their uses** • **Select appropriate PPE for specific hazards** • **Demonstrate appropriate use of PPE**

10.1.5 Risk Assessment and Management	• **Identify common hazards present on a commercial jobsite**
	  • **Environment**
	  • **Equipment**
	  • **Materials**
	  • **Work processes**
	• **Define the term Hierarchy of Controls.**
	  • **Elimination**
	  • **Substitution**
	  • **Engineering Controls**
	  • **Administrative Controls**
	  • **Personal Protective Equipment**
	• **Identify solutions to remove or minimize hazards**

10.1.6 Material Handling and Ergonomics	• Identify safe lifting practices
	• **Demonstrate safe lifting practices**
	• **Identify common ergonomic risk factors**
	  • **Force**
	  • **Repetition**
	  • **Posture**
	• **Identify common solutions to ergonomic risk factors**

Technical Vocab –

competent person, OSHA, PPE, SDS, engineered controls, administrative controls

Resources –

Modern Carpentry (GW)

Priority Standard 10.2 - Power Tools

Big Idea(s):

- It is essential to know how to select, safely use, and maintain the proper power tool for completion of the task at hand
- Skillful operation of power tools is essential for achieving precision in measurements, cuts, and tasks, contributing to the overall quality of construction projects
- Routine maintenance and inspection contribute to the longevity and reliability of power tools, ensuring their continued effectiveness on the job site

Essential Question(s):

- Why is it important for construction professionals to be able to identify and differentiate between different types of power tools?
- Why is routine maintenance and pre-use inspection crucial for the safe and effective use of power tools?
- How does the choice of power tools vary when working with different materials such as wood, metal, or concrete?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.2.1 Portable Power Tool Identification ● **Circular Saw** ● **Reciprocating saw** ● **Sliding compound miter saw** ● **Drill/Impact Driver** ● **Chop saw (abrasive wheel)** ● **Portable grinder** ● Other	● **List and explain the intended use of each portable power tool** ● **Select proper blades and accessories for various applications**
10.2.2 Portable Power Tool Safety ● **Electrical safety** ● **Maintenance and inspection.** ● **Clamping and holding materials** ● **Changing accessories:** o **Blades** o **Bits** o **Sandpaper** o Other	● **Inspect tool to assess appropriate working conditions** ● **Demonstrate the safe operating techniques according to manufacturer's instructions** ● **Safely change blades, bits, sandpaper, etc.** ● **Demonstrate lock out/tag out procedures**
10.2.3 Powder-Actuated Tools Safety	● **List appropriate PPE and security measures needed for safe operation** ● **Select proper load and fastener for the intended use** ● **Demonstrate the safe use of powder actuated tools according to the**

Students will know:	*As evidenced by: (oral, written, or performance)*
	manufacturer's recommendations ● **Pass a safety course on the use of powder –actuated tools**
10.2.4 Pneumatic/Gas Tool Safety	● List safety rules that apply to pneumatic/gas tool safety ● Demonstrate the safe use of pneumatic/gas tools according to the manufacturer's recommendations ● Identify appropriate tool maintenance procedures ● Score 100% on a written and performance safety test

Technical Vocab –

arbor, chuck, circular saw, collet, drill, abrasive, chop saw, pneumatic tool, gas-powered nailer, powder-actuated tool, reciprocating saw, router, saber saw, carbide, combination blade

Resources –

Modern Carpentry (GW)

Priority Standard 10.3 - Ladders, Scaffolding and Fall Protection

Big Idea(s):

- Safety is a fundamental and non-negotiable aspect of working with ladders, scaffolding, and fall protection, requiring a comprehensive understanding of best practices and protocols
- Keeping everyone safe while working at heights means taking proactive steps including carefully looking for possible hazards, finding potential solutions, and ensuring the correct methods are used to prevent injury/death
- It is essential to know how to select, safely use, and maintain ladders, scaffolds, and fall protection equipment for completion of the task at hand
- Falls are the number one cause of injury and death in construction

Essential Question(s):

- How can using the appropriate ladder or scaffold increase safety and efficiency?
- How do different types of scaffolding systems contribute to safe and efficient construction practices?
- What factors should be considered when choosing ladders and scaffolds for a specific task?
- How can workers conduct a comprehensive risk assessment before using ladders, scaffolding, or fall protection systems?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.3.1 Ladder Safety and Use ● **Step ladders** ● Extension ladders ● **Fixed/Straight ladders** ● **Platform ladders** ● **Multi-Position ladders** ● Other	● **Identify common types of ladders** ● **Inspect equipment for damage or defects** ● **Set-up ladders in the school setting and on the job site safely** ● **Appropriately utilize safe practices while using equipment** ● **100% on written and performance safety tests**
10.3.2 Scaffold Safety and Use ● **Mobile (baker) scaffolding** ● **Tubular frame scaffolding** ○ **Masonry scaffolding** ● **System scaffolding** ● Suspended (swing) scaffolding ● **Mobile Elevated Work Platforms (MEWP)** ○ **Scissor lift** ○ **Boom (snorkel) lift** ● Other	● **Identify common types of scaffolds and their uses** ● **Inspect equipment for damage or defects** ● **Set-up scaffolding in the school setting and on the job site safely** ● **Appropriately utilize safe practices while using equipment** ● **100% on written and performance safety tests**

10.3.3 Fall Protection Systems ● **Personal fall arrest system** ○ **connector** ○ **5-point harness** ○ **anchor point** ● **Retractable lifelines** ● **Guard rails** ● **Safety rope/lines** ● **Safety nets**	● **Identify components of each fall protection system** ● **Describe the process of setting up fall protection systems** ● **Setup and use a personal fall arrest system**

Technical Vocab –

competent person, scaffold user, scaffold erector, extension ladder, step ladder, baker scaffolding, tubular frame scaffolding, systems scaffolding, aerial lifts, scissor lift, boom/snorkel lift, fall protection, 5-point harness, retractable lifeline, anchor point, guard rails

Resources –

Modern Carpentry (GW)

Priority Standard 10.4 - Commercial Blueprint Reading

Big Idea (s):

- Proficiency in reading and interpreting construction blueprints is fundamental for effective communication and collaboration in commercial construction
- Carpenters must be able to interpret critical information from construction drawings
- Fireproofing is a critical aspect of commercial construction, safeguarding structures and occupants by preventing or delaying the spread of fire, enhancing overall safety
- Information from scaled drawings must be obtained in order to ensure project accuracy and obtain proper permits throughout the construction process

Essential Question (s):

- How do construction blueprints communicate the design and layout of commercial structures?
- Why is precision in spatial planning critical in commercial construction layout?
- Why are there different views in a set of construction drawings?
- Why is ensuring safety and code compliance essential in commercial construction layout?
- Why are building codes and the permitting process important to the safety and wellbeing of the general public?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.4.1 Blueprint Fundamentals	● **Identify common lines and symbols used in blueprint reading** ● **Select appropriate lines and symbols for their specific use** ● **Identify and interpret scale on a drawing** ● **Locate key components of a drawing.** ○ **Title block** ○ **Scale** ○ **Drawing type** ○ **Drawing location**
10.4.2 Construction Plans ● **Architectural Drawings** ○ **Floor plans** ○ **Elevations** ○ **Sections** ● Structural plans and details ● Mechanical Drawings (MEP) ○ Electrical ○ HVAC ○ Plumbing ● Specifications	● **Identify differences between sections of construction drawings** ● **List common views found in a set of construction prints** ● **Describe information provided by each blueprint view** ● **Locate specific information needed for construction using a set of construction drawings**

Students will know:	*As evidenced by: (oral, written, or performance)*
10.4.3 Field Measuring and Sketching	● **Identify measurements needed for construction** ● Obtain and record accurate field dimensions ● Sketch 2D and 3D representations of a construction project, accurately and neatly
10.4.4 Scaled Drawings	● **Interpret written and sketched information needed to draw blueprint views to industry standards** ● **Produce a basic scaled floor plan with appropriate lines, symbols, dimensions and other appropriate criteria**
10.4.5 Commercial Codes	● **Identify principles of fire safety, including the importance of fire prevention and containment in commercial construction** ● **Identify passive fire protection measures that meet International Building Code (IBC) and National Fire Protection Association (NFPA) standards** ○ **Egress** ○ **Fire-resistant materials** ○ **Compartmentation** ■ **Drywall layering** ■ **Fire wool/caulk** ○ **Doors and windows** ■ **Fireproofing** ■ **Egress hardware** ● **Identify common ADA and accessibility regulations in commercial construction**
10.4.6 Permitting Process	● **Identify documentation required for building projects** ● Describe local procedures needed for building process ▪ Permits ▪ Inspections ▪ Certificate of Occupancy

Technical Vocab –

architects scale, details, elevations, floor plan, ceiling plan, furniture plan, site plan, scale, symbols, fire resistance, compartmentation, egress

Resources –

Modern Carpentry (GW)

Priority Standard 10.5 - Advanced Math

Big Idea(s):

- A solid understanding of mathematical concepts, including geometry and trigonometry, enables practical problem-solving and effective layout in commercial construction
- Math is an essential component of carpentry in order to figure amounts of materials and calculate sizes of building components
- Being able to measure is an essential skill for an apprentice
- Accurate measuring and layout are vital to the quality of a project
- Effective planning is crucial to a project's success

Essential Question(s):

- How does understanding and applying measurement units contribute to accurate material estimation and project planning in commercial construction?
- How do geometry and trigonometry support interpreting plans, estimating materials, and solving problems in commercial construction?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.5.1 Measuring	• **Identifying measurements with 1/16 accuracy** • **Convert measurements (Fractions to Decimals)** • **Convert measurements (Inches to Feet)**
10.5.2 Math	• **Adding measurements (fractions)** • **Subtracting measurements (fractions)** • **Finding center (division)** • **Calculate perimeter and area of regular and irregularly shaped rooms** • Calculate the volume of a variety of shapes • **Convert measurements (Fractions to Decimals)**

Technical Vocab –

Fractions, perimeter, area, converting, right angle, square, linear foot

Resources –

Modern Carpentry (GW)

Priority Standard 10.6 - Commercial Layout Techniques

Big Idea(s):

- The establishment of reliable grid systems and control points, including benchmarks and reference points, is foundational for accuracy and consistency in commercial construction layout
- Accuracy in layout allows for smooth transitions from one phase of construction to another, saving time, effort, and money
- Layout skills are applied in real-world scenarios, requiring problem-solving and critical thinking to address unexpected challenges in commercial construction

Essential Question(s):

- What considerations are crucial when planning the layout of structural elements in commercial construction?
- How do horizontal and vertical layout techniques differ in the context of commercial construction?
- Why are grid systems and control points essential for achieving accuracy and consistency in layout?
- How do benchmarks and reference points contribute to the establishment of reliable control points?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*

10.6.1 Laser Level	• **Identify and describe the parts of a laser level**
	  ○ **Tripod**
	  ○ **Wall angle bracket**
	  ○ Other
	• **Setup and operate a laser level**
	• Assess the accuracy of a laser level through a systematic check

10.6.2 Grid Systems and Control Points • **Benchmark** • **Control line** • **Horizontal layout** • **Vertical layout**	• **Explain how benchmarks and control lines can be used to increase accuracy in commercial layout** • **Demonstrate how to utilize a benchmark to identify elevations** • **Demonstrate how to utilize a control line to transfer layout lines**
10.6.3 Layout Processes	• **Identify and interpret needed information on a blueprint for layout out construction components**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Horizontal layout** ○ **Vertical layout** ● **Identify methods to account for obstructions/issues in the layout process** ○ **Benchmark** ○ **Control line** ● **Layout wall lines based on blueprint information for a commercial space** ● **Set heights for various components in a commercial space (doors, windows, ceilings, etc.)**

Technical Vocab –

control line, self-leveling, benchmark, elevation, height of instrument, laser level, leveling rod, leveling screw, tripod, wall angle bracket

Resources –

Modern Carpentry (GW)

Priority Standard 10.7 - Commercial Framing

Big Idea(s):

- Light gauge metal framing offers versatility and efficiency in commercial construction, providing a durable and adaptable solution for various structural and architectural needs
- Proper installation and construction methods are crucial for achieving precision and quality in light gauge metal framing projects

Essential Question(s):

- How is metal framing better suited for commercial construction?
- Why would using a Chicago grid system be more efficient than traditional framing methods?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.7.1 Light Gauge Framing Material ● **Studs** ● **Track** ● **Hat track** ● **Gauges and Sizes** ● **Coatings and finished** ● **Integrated Fire Suppression** ○ **Intumescent Strip** ● other	● **Identify various framing material types used in light-gauge framing and their uses** ● **Identify common gauges and sizes of materials used in light-gauge framing** ● **Distinguish between different coatings and finishes used on metal framing**
10.7.2 Light Gauge Framing Installation	● **Cut various light gauge components precisely and efficiently** ● **Identify methods of fastening track and hat track to various surfaces** ● **Layout O.C. framing members** ● **Identify methods of fastening studs and other framing components together** ● **Identify methods of framing around openings in walls** ○ **Rough Openings** ○ **Headers** ○ **Cripple Studs**
10.7.3 Chicago Grid ● **Main runners** ● **Cross tees** ● **Perimeter channel** ● **Hangers**	● **Identify key components of a Chicago grid system** ● **Measure, mark, and lay out the Chicago grid system components on surfaces, ensuring proper alignment and spacing according to the design** ● **Cut and install components of a Chicago grid system**

Technical Vocab –

track, stud, slam stud, header, gauge, galvanized, hat track, Chicago grid system, main runner, cross tees, perimeter channel, hangers, seismic bracing

Resources –

Modern Carpentry (GW)

Priority Standard 10.8 - Interior Systems

Big Idea(s):

- Drywall plays a pivotal role in shaping the aesthetics, acoustics, and fire resistance of commercial spaces
- Achieving precision in measuring, cutting, and installing drywall requires craftsmanship
- Fireproofing is a critical aspect of commercial construction, safeguarding structures and occupants by preventing or delaying the spread of fire, enhancing overall safety
- Achieving high-quality millwork installations requires precision, meticulous attention to detail, and a thorough understanding of design plans to create a polished and cohesive appearance

Essential Question(s):

- How does the level of craftsmanship in measuring, cutting, and installing drywall impact the overall quality and appearance of commercial interiors?
- How do commercial drywall installers ensure adherence to building codes and standards, and why is it essential for the safety, structural integrity, and compliance of the constructed space?
- How does millwork serve both functional and aesthetic purposes in commercial spaces?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.8.1 Drywall ● **Regular** ● **Water resistant** ● **Type-X** ● **High abuse** ● **Cement board** ● **Shaft liner**	● **Identify common types of drywall and their uses** ● **Discuss advantages and disadvantages of various materials** ● Describe safe practices for lifting and holding ● **Describe the procedure for installing drywall** ● **Demonstrate communication skills needed to relay measurements for drywall penetrations**
10.8.2 Taping	● **Identify common tools used to conceal the seams in drywall** ● **Describe the steps to conceal drywall seams with joint compound** ● **Describe the steps for skim coating** ● Demonstrate concealing drywall seams and skim coating with joint compound
10.8.3 Fireproofing Techniques ● **Rock wool** ● **Fire caulking** ● **Shaft wall**	● **Identify common materials used for fireproofing holes and penetrations in commercial construction** ● **Identify common techniques for installing fireproofing materials**

Students will know:	*As evidenced by: (oral, written, or performance)*
10.8.4 Walling covering	● **Identify common wall covering materials and associated trim pieces** ○ **Fiberglass reinforced plastic (FPR)** ○ **Plastic wall panels** ○ **Decorative panels** ● **Identify adhesive methods for installing wall covering materials** ● **Installation of cove base trim**
10.8.5 Millwork Installation	● **Identify common types of millwork used in commercial construction** ● Trim out typical door or window applications ● **Demonstrate cutting with precision, including square edge, mitered edge, and coped edge** ● **Describe the steps of installing upper and lower cabinets** ● Demonstrate the installation of upper and lower cabinets

Technical Vocab –

gypsum board, moisture resistant gypsum board, type X gypsum board, shaft liner, joint compound, joint reinforcing tape, corner bead, skim coat, millwork, apron, base board, casing, scribe, cope, miter

Resources –

Modern Carpentry (GW)

Priority Standard 10.9 - Suspended Ceilings

Big Idea(s):

- Suspended ceilings offer versatility in design and functionality, enhancing aesthetics, acoustics, and access to building systems
- Suspended ceilings play a key role in achieving acoustic comfort within commercial spaces

Essential Question(s):

- Why would solid ceilings, used in residential construction, be problematic in a commercial space?
- How are planning and layout critical roles in suspended ceiling installation?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.9.1 Suspended Ceiling Tools ● **Rotary laser** ● **Jet line** ● **Ceiling grid punch** ● **Rivet gun** ● **Grid clamps** ● **Powder-actuated fastener**	● **Identify common tools used in the installation of suspended ceilings** ● **Demonstrate proper use of the common tools associated with the installation of suspended ceilings**
10.9.2 Suspended Ceiling Components ● **Main runner** ● **Cross tee (4’ & 2’)** ● **Wall angle** ● **Hanger wire** ● **Seismic bracing** ● **Rivets**	● **Identify common components used in the installation of suspended ceilings** ● **Distinguish between fire rated and non-fire rated components**
10.9.3 Installation techniques	● **Set up rotary laser for desired ceiling height** ● **Describe the steps of laying out a suspended ceiling** ● **Demonstrate laying out a suspended ceiling to industry standards** ● **Demonstrate cutting ceiling components to appropriate sizes** ● **Install suspended ceiling components** ○ **Main runner** ○ **Cross tee (4’ & 2’)** ○ **Wall angle** ○ **Hanger wire** ○ **Seismic bracing** ○ **Rivets**

Students will know:	*As evidenced by: (oral, written, or performance)*
10.9.4 Acoustical ceiling tiles/panels	• **Identify common types of ceiling tiles and panels** • **Cut ceiling tiles/panels to appropriate size** • **Cut appropriate reveal for lay-in panels**

Technical Vocab –

Rotary laser, jet line, ceiling grid punch, rivet gun, grid clamps, powder-actuated fastener, main runner, cross tee (4’ & 2’), wall angle, hanger wire, seismic bracing, rivets, acoustical ceiling tile, acoustical ceiling panel, reveal

Resources –

Modern Carpentry (GW)

Priority Standard 10.10 - Commercial Hardware

Big Idea(s):

- Commercial door installation plays a critical role in addressing fire safety requirements and implementing security measures to protect occupants and assets
- The precision and expertise applied during door installation impact the long-term performance, security, and appearance of commercial doors

Essential Question(s):

- How do door hardware and accessories contribute to the overall performance and security of commercial doors?
- How do requirements for doors differ between residential and commercial construction?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.10.1 Door Jamb ● **Welded jamb** ● **Knock-down jamb** ● **Pre-hung Interior Door (residential)**	● **Identify the 2 common types of door jambs used in commercial construction** ● **Describe appropriate uses for each door jamb type** ● **Describe the installation steps for each door jamb type**
10.10.2 Door Slab	● **Identify the correct swing type for each door** ○ **Right hand** ○ **Left hand** ○ **Reverse swings** ● **Mortise hinges on a door slab in the correct location and depth** ● **Describe steps of installing a door slab** ● **Describe methods of adjusting door slab for a consistent reveal**
10.10.3 Hardware Type ● **Cylindrical lever locks** ● **Mortise locks** ● **Panic bar** ● **Door closers** ● **Astragals**	● **Identify common hardware used in commercial construction** ● **Describe installation steps for each common type of hardware used in commercial construction** ● **Demonstrate the appropriate use of a tap and dye**

Technical Vocab –

welded jamb, knock-down jamb, jamb leg, jamb head, door slab, swing type (left hand, right hand, reverse swing), mortise, cylindrical lever locks, mortise locks, panic bar, door closers, astragal

Resources –

Modern Carpentry (GW)

Priority Standard 10.11 - Professional Practice in Construction

Big Idea(s):

- Professional and technical skills are demonstrated through the process and product of hands-on construction work
- Construction projects provide opportunities to apply core competencies in real-world settings
- Employability attributes such as communication, problem-solving, and professionalism are critical to success in the trades
- Reflection and portfolio documentation are essential for tracking growth and preparing for career opportunities

Essential Question(s):

- How do professional behaviors and employability skills impact success on the jobsite?
- What construction practices lead to high-quality workmanship?
- How can reflecting on our work help us improve and prepare for future opportunities?
- Why is documenting work experiences important for career readiness?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.11.1 Professionalism and Employability	• **Identify work-ready skills that reflect professionalism on a jobsite or in a workshop** • **Describe how attributes of the CTECS Vision of a Graduate relate to the construction industry** • **Demonstrate respectful behavior, effective communication, social skills, and work readiness while working in team and individual settings** • **Apply critical thinking and problem-solving skills to complete tasks and resolve challenges in a professional setting**

10.11.2 Technical Skills	• **Apply core construction skills including:**
	  ○ **Measuring and layout**
	  ○ **Material selection and prep**
	  ○ **Tool selection and use**
	  ○ **Fastening and assembly**
	• **Demonstrate safe and appropriate practices related to:**
	  ○ **Personal Safety**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Hand and power tools** ○ **Ladders and scaffold** ○ **Various shop equipment** ● **Evaluate quality of work based on project specifications and industry standards** ● **Follow organized processes to complete tasks efficiently and accurately**
10.11.3 Portfolio and Reflection	● **Identify key components of a professional portfolio (e.g., photos, checklists, reflections, resume artifacts)** ● **Upload documentation and evidence of proficiency for each project completed** ● **Update personal competency checklist to reflect current skill levels and progress** ● **Reflect on personal growth in both technical and employability skills**

Technical Vocab –

Workmanship, competency, portfolio, resume, reflection, jobsite, professionalism, proficiency.

Resources –

Modern Carpentry (GW)

11th Grade Curriculum

Priority Standard 11.1 - Jobsite Safety

Big Idea(s):

- Safety is the responsibility of everyone in the shop
- Safety needs to be a habit and a consideration throughout daily living as well as in the work environment
- Training and awareness can prevent injuries

Essential Question(s):

- How can hazard awareness prevent accidents?
- How does one worker's action affect the other workers on a jobsite?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.1.1 Review of safe work habits: ● **hand tools,** ● **Personal Safety** ● **Job-Site Safety** ● **SDS** ● Other	● **Demonstrate safe practices** ● **Evaluate construction site work areas for potential hazards** ● **Explain the consequences of unsafe working conditions in construction** ● **Demonstrate the safe handling of hand tools** ● **Advocate for your personal safety** ● **Score 100% on the written Safety Test and hands-on assessment as new tools and equipment are introduced**
11.1.2 Review of Fire Safety Procedures Locate: ● Fire alarms ● Fire extinguishers ● Eye wash stations ● Power shut offs ● Fire exits ● Other	● Identify fire alarms, fire extinguishers, eye wash stations, and power shut-offs ● Identify types of fires ● Describe the fire triangle ● Explain the protocol for extinguishing fires ● **Score 100% on the written safety test**
11.1.3 First Aid Awareness	● **Identify appropriate practices for administering first aid.** ● **Explain the procedures for dealing with various injuries on outside production.** ● Explain the dangers of blood borne pathogens.

Students will know:	*As evidenced by: (oral, written, or performance)*
11.1.4 Personal Protective Equipment ● **Hard hat** ● **Safety glasses** ● **Hearing protection** ● **Respirators/Dust Masks** ● **Safety shoes** ● **Gloves** ● Other	● **Identify common types of PPE** ● **Select appropriate PPE** ● **Demonstrate appropriate use of PPE**
11.1.5 Ladder and Scaffold Safety ● **Step ladders** ● **Extension ladders** ● Pipe staging ● Ladder jacks ● **Pump jacks** ● Wall brackets ● **Roof Brackets** ● Other	● **Identify common types of ladders and scaffolds** ● **Inspect equipment for damage or defects** ● **Set-up ladders and scaffolding in the school setting and on the job site safely** ● **Appropriately utilize safe practices while using equipment** ● **100% on written and performance safety tests**
11.1.6 Fall Protection Systems ● **Personal fall arrest system** ○ **connector** ○ **5-point harness** ○ **anchor point** ● **Guard rails** ● **Safety nets**	● **Identify components of each fall protection system** ● **Describe the process of setting up fall protection systems** ● **Setup and use a personal fall arrest system**
11.1.7 Material Handling and Ergonomics	● Identify safe lifting practices ● **Demonstrate safe lifting practices** ● **Identify common ergonomic risk factors** ● **Force** ● **Repetition** ● **Posture** ● **Identify common solutions to ergonomic risk factors**

Technical Vocab –

braces, competent person, extension ladder, fall protection, guard rails, ladder jacks, mud sill, OSHA, pipe staging, PPE, pump jack, roofing brackets, sawhorses, scaffolds, staging planks, step ladder, wall brackets

Resources –

Modern Carpentry (GW), osha.gov

Priority Standard 11.2 - Power Tools

Big Idea(s):

- It is essential to know how to select, safely use, and maintain the proper power tool for completion of the task at hand
- Power tools enable the carpenter to do more work in less time and with less effort

Essential Question:

What factors should be considered when choosing power tools for a specific task?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.2.1 Portable Power Tool Safety ● **Electrical safety** ● **Maintenance and inspection.** ● **Clamping and holding materials** ● **Changing accessories:** o **Blades** o **Bits** o **Sandpaper** o Other	● **Demonstrate the safe operating techniques according to manufacturer's instructions** ● **Safely change blades, bits, sandpaper, etc.** ● **List general safety rules that apply to portable power tools** ● **Demonstrate lock out/tag out procedures** ● **Demonstrate the use of clamping devices to hold material**
11.2.2 Portable Power Tool Identification ● **Reciprocating saw** ● **Sliding compound miter saw** ● **Drill** ● **Circular saw** ● Other	● **List and explain the intended use of each portable power tool** ● **Select proper blades and accessories for various applications**
11.2.3 Powder actuated tool safety	● **Pass a safety course on the use of powder –actuated tools** ● List appropriate PPE and security measures needed for safe operation ● Select proper load and fastener for the intended use ● Demonstrate the safe use of powder actuated tools according to the manufacturer's recommendations
11.2.4 Pneumatic tool safety	● **List safety rules that apply to pneumatic tool safety**

	● **Demonstrate the safe use of pneumatic tools according to the manufacturer's recommendations** ● **Score 100% on a written and performance safety test**
11.2.5 Stationary Machines Review ● Margin of safety ● Main purpose ● Steps for use ● Make adjustments to machines ● Changing of blades, bits, sandpaper, ECT.	● Evaluate the safety condition of equipment before using ● Demonstrate safe use of stationary equipment ● Demonstrate lock out/tag out procedures ● **Score 100% on a written and performance safety test (for applicable stationary power tools)**

Technical Vocab –

belt sander, bits, blades, carbide-tipped, chamfers, circular saw, dovetails, drill, hammer drills, orbital sander, pneumatic, powder-actuated drivers, reciprocating saw, router, saber saw, sandpaper, taper, templates

Resources –

Modern Carpentry (GW)

Priority Standard 11.3 - Residential Blueprint Reading and Math

Big Idea (s):

- Carpenters must be able to interpret critical information from construction drawings
- Accurate field measuring and sketching are vital in creating scaled drawings
- Information from scaled drawings must be obtained in order to ensure project accuracy and obtain proper permits throughout the construction process

Essential Question (s):

- Why are there different views in a set of construction drawings?
- Why are building codes and the permitting process important to the safety and wellbeing of homeowners?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.3.1 Math Review	• **Adding measurements (fractions)** • **Subtracting measurements (fractions)** • **Finding center (division)** • **Calculate perimeter and area of regular and irregularly shaped rooms** • **Calculate the volume of a variety of shapes** • **Convert measurements (Fractions to Decimals)** • **Convert measurements (Inches to Feet)**
11.3.2 Blueprint Lines and Symbols	• **Identify common lines and symbols used in blueprint reading** • **Select appropriate lines and symbols for their specific use**
11.3.3 Blueprint Views • **Plans** • **Plot** • Foundation • Framing • **Floor** • **Elevation** • Sections • Details • **Schedules**	• Identify differences between orthographic and pictorial • **List common views found in a set of construction prints** • **Describe information provided by each blueprint view** • **Locate specific information needed for construction using a set of construction drawings**
11.3.4 Scaling	• **Interpret measurements on scaled**

Students will know:	*As evidenced by: (oral, written, or performance)*
	drawings using an architect's scale ● **Convert between actual and scaled measurements** ● **Draw a scaled drawing using an architect's scale**
11.3.5 Permitting Process	● **Identify documentation required for building projects** ● Describe local procedures needed for building process ▪ Permits ▪ Inspections ▪ Certificate of Occupancy

Technical Vocab –

architects scale, details, elevations, floor plan, foundation plan, framing plan, plot plan, scale, symbols

Resources –

Modern Carpentry (GW)

Priority Standard 11.4 - Residential Structural Systems

Big Idea(s):

- The first step in construction is locating where the building will be laid on the lot
- Accuracy in layout allows for smooth transitions from one phase of construction to another, saving time, effort, and money

Essential Question(s):

- What must be considered when locating a home on a building lot?
- What would the end result be if errors were made in the layout process?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.4.1 Foundation Systems ● **Slab-on grade** ● **Crawlspace/full height** ● **Components** ○ **Footings** ○ **Walls** ○ **Piers** ○ **Slabs/walkways**	● **Identify common foundation systems** ● **Identify common foundation system components** ● **Explain the function(s) of each component**
11.4.2 Residential Framing Systems ● **Timber/Post and Beam** ● **Balloon** ● **Platform**	● **Identify past and present framing methods** ● **Describe each method of framing**
11.4.3 Residential Framing Materials	● **Identify common lumber used in framing** ● **List nominal vs. actual sizes of framing material** ● **Recognize and identify various types of sheet goods** ● Discuss how various factors affect materials in construction ● **Explain proper installation techniques**
11.4.4 Engineered Lumber ● **LVL (Laminated Veneer Lumber)** ● **I-Joist (Engineered Truss)** ● **Glulam** ● **PSL (Parallel Strand Lumber)** ● **LSL (Laminated Strand Lumber)** ● **SIPS (Structural Insulated Panel System)** ● Other	● **Recognize and identify engineered lumber** ● Discuss how engineered lumber is made ● **Compare and contrast conventional lumber and engineered lumber**

11.4.5 Common Fasteners ● **Nails** ● **Screws** ● **Carriage bolts** ● **Hangers** ● **Adhesives** ● Other	● **Identify types, sizes, and uses of fasteners** ● **Select proper fasteners for materials and conditions** ● **Select proper adhesives for materials and conditions**

Technical Vocab –

slab-on grade construction, footing, foundation wall, pier, slab, walkway, frost line, sonotube, post and beam construction, balloon framing, platform framing

Resources –

Modern Carpentry (GW)

Priority Standard 11.5 - Residential Framing

Big Idea(s):

- Layout and install floor framing to ensure the building performs as expected
- Structural wall framing practices ensure that a house can withstand everyday elements and support other framing members
- Roof framing offers the carpenter the opportunity to demonstrate a superior understanding of framing

Essential Question(s):

- How can the framing affect the house's strength and efficiency?
- How can wall framing affect the house's strength and efficiency?
- What skills would a carpenter need to successfully frame a roof?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.5.1 Framing Member/Terms ● **on center** ● **girder** ● **lally column** ● **sill plate** ● **floor joists** ● **bridging** ● **span** ● **subfloor** ● **studs** ● **trimmer/jack** ● **header** ● **cripples** ● **rough sill** ● **plates** ● **ceiling joists** ● **ridge** ● **common rafters** ● **collar ties** ● **gable studs** ● **fascia**	● **Identify various framing members used in residential framing** ● **Define common terminology used in residential framing** ● **Explain the purpose of framing members used in residential framing**
11.5.2 Framing Layout	● **Calculate lengths of various framing members** ● **Layout various framing members according to a given blueprint** ○ **Band/rim board** ○ **Wall plates** ○ **Ceiling joists** ○ **Rafter (position only)**
11.5.3 Common Roof Framing Terms: ● **Unit run** ● **Total span** ● **Unit rise** ● **Total run**	● **Define common roof framing terms.** ● **Identify common roof members and parts of a rafter**

Students will know:	*As evidenced by: (oral, written, or performance)*
• **Total rise** • **Line length** • **Pitch** • **Slope** • **Bird's mouth** • **Plumb line** • **Level line** • **Ridge** • **Common rafters** • **Hip rafters** • **Valley rafters** • **Jack rafters** • **Collar ties** • **Gable studs** • Other	
11.5.4 Common Rafter Length Calculations	• **Calculate the line lengths of common rafters**
11.5.5 Common Rafter Layout	• **Demonstrate the use of a framing square** • **Layout common rafters** • Construct a gable roof
10.5.6 Hip rafter length calculations and layout	• Calculate the line length of hip rafters • Layout a simple hip rafter
10.5.7 Trusses and their components.	• Describe and identify parts of a truss

Technical Vocab –

bird's mouth, butterfly roof, collar ties, common rafter, dormer, gable roof, gable studs, gambrel roof, hip rafter, hip roof, intersecting roof, jack rafter, level line, line length, mansard roof, pitch, plumb line, ridge, shed roof, slope, span, total rise, total run, unit length, unit rise, unit run, valley rafter

Resources –

Modern Carpentry (GW)

Priority Standard 11.6 - Stair Construction

Big Idea:

Stairs must be carefully designed and laid out to ensure safe passage and ease of use.

Essential Question:

What important safety rules and codes must be considered when laying out stairs?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.6.1 Stair construction terms: ● **unit rise** ● **unit run** ● **total rise** ● **total run** ● **tread** ● **riser** ● **headroom** ● **nosing** ● **handrail** ● **baluster** ● **stringer** ● other	● **Identify common parts of a staircase** ● **Define stair construction terms and the purpose of common staircase parts**
11.6.2 Stair stringer calculation and layout.	● **Determine riser height and tread run** ● **Layout a stair stringer** ● Discuss appropriate angles for stairways and headroom
11.6.3 Handrail and balustrade requirements.	● Identify code requirements for handrails and balustrades

Technical vocab –

baluster, balustrade, closed stairway, handrail, headroom, housed stringer, landing, newel post, nosing, open stairway, riser, stair carriage, stairwell, stringer, total rise, total run, tread, unit rise, unit run

Resources –

Modern Carpentry (GW)

Priority Standard 11.7 - Exterior Finish (Residential)

Big Idea(s):

- There are many materials and techniques to weatherize a home
- Successfully install all components to an asphalt shingle roof according to climate, purpose, and desired appearance
- Successful weather tight installation of windows and doors saves energy by reducing fuel costs, minimizes maintenance, and makes installing exterior siding easier
- Successfully install exterior wall finish components to climate, purpose, and desired appearance

Essential Question(s):

- What would be the outcome of an improperly installed roof?
- What are the defining qualities of a properly installed door or window?
- What are some of the ways exterior finishes enhance the home's appearance and function?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.7.1 Roofing Terms and Materials ● **Asphalt shingles (three tab versus architectural)** ● Metal sheet roofing ● **Courses** ● **Coverage** ● **Ice & water shield** ● **Drip edge** ● **Exposure** ● **Felt flashing** ● **Lap** ● Low slopes ● **Ridge cap** ● **Roofing cement** ● **Ridge vent** ● **Roof vent** ● Other	● **Identify and Define common terms used in roofing applications** ● **Identify common materials used in roofing** ● **List common applications for each material**
11.7.2 Asphalt Shingle installation	● Describe safe handling of roofing materials ● **Demonstrate how to shingle a roof with three-tab shingles and architectural shingles**
11.7.3 Door Types and Installation ● **head jamb** ● **side jambs**	● **Identify and describe door types** ● **Identify and describe the parts of exterior/interior doors and door**

Students will know:	*As evidenced by: (oral, written, or performance)*
• **sill** • **threshold** • **stops** • **pre-hung** • **sizing** • **hardware** • **swing/handing** • **pocket doors** • other	**frames** • **Describe proper exterior door installation** • **Describe the process of installing flashing for an exterior door**
11.7.4 Window Types and Installation • **sash** • **head jamb** • **side jambs** • **sill** • **blind stops** • **double-hung window** • **casement window** • **awning window** • **bay/bow window** • other	• **Identify and describe window types.** • **Identify and describe the parts of windows and window frames.** • **Describe proper window installation.** • **Describe the process of installing flashing for a window**
11.7.5 Siding Terms and Materials • **Flashing** • **Vinyl siding** • **Wood siding** • **Fiber cement (Hardie Plank)** • **Exterior plastic trim (AZEK)** • **Cornices** • **Corner boards/post** • Water table • Frieze board • **Fascia** • **Soffits** • **Rakes/eaves** • other	• **Identify and describe common exterior finishing materials** • Discuss advantages and disadvantages of various materials • **Describe the installation of common exterior finishing materials** • **Identify and describe common exterior trim components**
11.7.6 Gutters and Downspouts	• Identify and describe common gutter components

Technical vocab –

architectural shingles, asphalt felt, asphalt shingles, courses, coverage, cricket, drip edge, end lap, exposure, flashing, head lap, ice and water shield, metal roofing, ridge cap, ridge vent, roofing cement, saddle, square, starter course, three-tab shingles, top lap, head jamb, side jamb, sill, threshold, stops, swing, hardware, lockset, sash, lights, stiles, rails, drip cap, flashing, double-hung window, casement window, awning window, clapboard, coil

stock, cornice, downspout, flush door, frieze, gutter, house wrap, j-channel, rake, starter strip, undersill trim, siding, soffit, fascia

Resources –

Modern Carpentry (GW)

Priority Standard 11.8 - Insulation

Big Idea:

Insulation prevents the loss of heat in cold seasons and resists the passage of heat into air-conditioned areas in the hot seasons.

Essential Question(s):

- How does climate and location affect how a structure is insulated?
- Why is it important for a house to have thermal efficiency?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.8.1 Weatherization Terminology ● Heat Transfer ● **Conduction** ● **Convection** ● **Radiation** ● **Thermal** ● **Acoustical** ● Greenhouse Effect ● **R-value (thermal resistance)** ● Composite R-value ● U-factor (thermal transmittance) ● Other	● **Describe terms used in insulation installation**
11.8.2 Insulation ● **Flexible (Fiberglass batts)** ● **Cellulose (Loose fill & dense pack)** ● **Rigid Board (Polyisocyanurate with or without foil)** ● **Closed and open cell foam** ● Pipe Sleeves ● Rockwool/Mineral Wool ● Vermiculite (Asbestos Concern!)	● **Identify common types of insulation** ● Describe safe handling ● Describe the importance of proper installation techniques
11.8.3 Building Envelope Characteristics (Green Step) ● Stack effect ● Wind effect ● Mechanical effect ● First and Second Law of Thermodynamics ● Conditioned versus Unconditioned living space ● Infiltration/Exfiltration	● Discuss the effects on a house during the winter/summer ● Illustrate differences between boundaries ● List possible types of building ventilation

Students will know:	*As evidenced by: (oral, written, or performance)*
● Thermal Boundary ● Air Boundary ● Vapor Boundary ● Ventilation ● Mechanical Ventilation ● Supply Only ● Exhaust Only	
11.8.4 Attic ventilation ● **Ridge vent** ● **Soffit vent** ● **Gable vent** ● **Roof vent** ● Baffles (Wind wash)	● **Determine the location of attic ventilation required**
11.8.5 Home efficiency ● home auditing ● materials ● products	● Set up a blower door

Technical Vocab –

composite R-value, condensation, conditioned living space, conduction, convection, exfiltration, greenhouse effect, heat transfer, infiltration, insulation, Law of Thermodynamics, mechanical effect, R-value, radiation, stack effect, thermal envelope, U-factor, unconditioned living space, vapor retarder, ventilation, wind effect, BTU

Resources –

Modern Carpentry (GW)

Priority Standard 11.9 - Professional Practice in Construction

Big Idea(s):

- Professional and technical skills are demonstrated through the process and product of hands-on construction work
- Construction projects provide opportunities to apply core competencies in real-world settings
- Employability attributes such as communication, problem-solving, and professionalism are critical to success in the trades
- Reflection and portfolio documentation are essential for tracking growth and preparing for career opportunities

Essential Question(s):

- How do professional behaviors and employability skills impact success on the jobsite?
- What construction practices lead to high-quality workmanship?
- How can reflecting on our work help us improve and prepare for future opportunities?
- Why is documenting work experiences important for career readiness?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.9.1 Professionalism and Employability	• **Identify work-ready skills that reflect professionalism on a jobsite or in a workshop** • **Describe how attributes of the CTECS Vision of a Graduate relate to the construction industry** • **Demonstrate respectful behavior, effective communication, social skills, and work readiness while working in team and individual settings** • **Apply critical thinking and problem-solving skills to complete tasks and resolve challenges in a professional setting**

11.9.2 Technical Skills	• **Apply core construction skills including:**
	  ○ **Measuring and layout**
	  ○ **Material selection and prep**
	  ○ **Tool selection and use**
	  ○ **Fastening and assembly**
	• **Demonstrate safe and appropriate practices related to:**
	  ○ **Personal Safety**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Hand and power tools** ○ **Ladders and scaffold** ○ **Various shop equipment** ● **Evaluate quality of work based on project specifications and industry standards** ● **Follow organized processes to complete tasks efficiently and accurately**
11.9.3 Portfolio and Reflection	● **Identify key components of a professional portfolio (e.g., photos, checklists, reflections, resume artifacts)** ● **Upload documentation and evidence of proficiency for each project completed** ● **Update personal competency checklist to reflect current skill levels and progress** ● **Reflect on personal growth in both technical and employability skills**

Technical Vocab –

Workmanship, competency, portfolio, resume, reflection, jobsite, professionalism, proficiency.

Resources –

Modern Carpentry (GW)

12th Grade Curriculum

Priority Standard 12.1 - Job Site Safety (OSHA 30)

Big Idea(s):

- Safety is a shared responsibility that requires proactive planning and consistent execution in every phase of a civil construction project
- Civil construction introduces new environmental, equipment, and public interface risks that demand higher-level hazard identification and control strategies
- Safety leadership includes the ability to assess, plan, and implement safety protocols for both workers and the surrounding community

Essential Question(s):

- How can hazard awareness prevent accidents on the jobsite?
- Why is it important to establish safe work habits from the start of every project?
- How does proper use of tools and equipment impact overall jobsite safety?
- How does the responsibility for safety extend to every worker on a site?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.1.1 Review of Safe Work Habits: ● **PPE selection and inspection** ● **SDS and emergency response** ● **Fire safety and first aid** ● **Hand Tool Safety** ● **Material handling and ergonomics**	● **Identify common job site hazards** ● **Select appropriate PPE for various site conditions** ● **Demonstrate the correct use of common forms of PPE** ● **Identify common hand tools and their uses** ● **Demonstrate safe handling and proper maintenance of hand tools** ● **Discuss how safe work habits prevent accidents and ensure personal safety (PPE, fire safety, electrical, SDS, Emergency Response)** ● **Score 100% on the written Safety Test and hands-on assessment as new tools and equipment are introduced**
12.1.2 Power Tool Safety ● **Circular Saw** ● **Reciprocating saw** ● **Sliding compound miter saw** ● **Drill/Impact Driver** ● **Rebar cutter** ● **Rebar bender**	● **Identify power tools used in civil construction and the safety measures associated with each tool** ● **Demonstrate safe operation of power tools in controlled environments** ● **Inspect tools before use to ensure they are in safe working condition**

Students will know:	*As evidenced by: (oral, written, or performance)*
● **Chop saw (abrasive wheel)** ● **Portable grinder** ● Other	**(e.g., checking for frayed cords, damaged parts)** ● **Explain the purpose of GFCI (Ground Fault Circuit Interrupter) protection** ● **Demonstrate the correct use of GFCI outlets on the jobsite**
12.1.3 Ladder, Scaffold and Fall Protection	● **Identify different types of ladders and scaffolds, and their safe usage** ● **Explain the inspection procedures for ladders and scaffolds** ● **Set up scaffolding and ladders following industry standards** ● **Demonstrate proper use of fall protection systems (e.g., harnesses, guardrails) when working at height** ● **Explain the role of fall protection in preventing injuries and fatalities on the jobsite**
12.1.4 Basic First Aid Awareness	● **Identify appropriate practices for administering basic first aid in a construction environment** ● **Explain the procedures for dealing with various injuries, including cuts, burns, and sprains** ● **Demonstrate the proper response to a bleeding injury, including the use of bandages or tourniquets** ● **Identify the dangers of bloodborne pathogens and describe protective measures to avoid contamination**

12.1.5 Risk Assessment and Management	● **Identify common hazards present on a jobsite**
	  ● **Environment**
	  ● **Equipment**
	  ● **Materials**
	  ● **Work processes**
	● **Define the term Hierarchy of Controls.**
	  ● **Elimination**
	  ● **Substitution**
	  ● **Engineering Controls**
	  ● **Administrative Controls**
	  ● **Personal Protective Equipment**
	● **Evaluate construction site work areas for potential hazards and appropriate**

Students will know:	*As evidenced by: (oral, written, or performance)*
	preventative measures (PPE, fire safety, electrical, SDS, Emergency Response)

Technical Vocab –

PPE (Personal Protective Equipment), SDS (Safety Data Sheets), GFCI (Ground Fault Circuit Interrupter), Hand Tools, Power Tools, Ladders, Scaffolds, Fall Protection, Fire Extinguisher, Fire Safety, First Aid, Bloodborne Pathogens, Personal Safety, Electrical Safety.

Resources –

Modern Carpentry (GW), OSHA.gov, NUCA Trench Safety resources

Priority Standard 12.2 - Civil Construction Safety (OSHA 30)

Big Idea(s):

- Civil construction safety involves unique protocols that protect workers from the dangers of excavation, trenching, and working around heavy machinery
- Understanding how to work safely around heavy equipment, using proper PPE, and maintaining clear communication on the jobsite are key components of this specialized safety training

Essential Question(s):

- How do hazards on a civil construction site differ from a residential or commercial site?
- How can workers stay safe when working around heavy machinery and large equipment on civil construction sites?
- How do soil conditions guide safety protocols when trenching and excavating?
- How do workers ensure the safety of the public during civil construction projects?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.2.1 Trenching and Excavation Safety	• **Identify hazards related to trenching and excavation** • **Identify 4 types of soil and their implications on trench stability** • **Describe the procedures for safe trenching, including protective systems (e.g., trench boxes, shoring, benching)** • **Follow OSHA guidelines for trenching safety, including hazard recognition and emergency response**

12.2.2 Site Setup and Public Safety	• **Identify the necessary steps for securing a job site from the public and workers**
	  ◦ **Signage**
	  ◦ **Barricades**
	  ◦ **Perimeter control techniques**
	• **Identify traffic management requirements and pedestrian safety precautions around the site**
	• **Evaluate site for hazards and appropriate preventative measures (proper site fencing, equipment staging, and worker access zones) to ensure safety**

Students will know:	*As evidenced by: (oral, written, or performance)*
12.2.3 Working Around Heavy Machinery and Equipment	• **Identify common civil machinery used in construction (e.g., bulldozers, excavators, cranes) and associated hazards** • **Explain the role of flaggers, signal persons, and safety spotters in a construction zone** • **Describe safety protocols for safely working around and interacting with machinery and equipment**

12.2.4 Civil Personal Protective Equipment	• **Identify civil-specific PPE and their purpose**
	  ○ **reflective vests**
	  ○ **hard hats**
	  ○ **hearing protection**
	  ○ **boots**
	• **Select appropriate PPE based on environmental conditions and tasks**
	• **Demonstrate the correct usage of PPE in civil construction settings**

12.2.5 Working Around Cranes and Rigging Equipment	• **Identify various types of cranes used on civil construction sites (e.g., mobile cranes, tower cranes)** • **Identify basic rigging components (slings, hooks, and shackles), and their uses in lifting and moving material** • **Describe the process for securing a load (weight limits and proper balance)** • Demonstrate proper hand signals for crane operators during lifting operations • **Explain safety zone protocols related to working around cranes**

Technical Vocab –

Trenching, Excavation, Soil Types, Cave-ins, Shoring, Trench Boxes, OSHA Guidelines, Hazard Recognition, Emergency Response, Site Setup, Public Safety, Barricades, Traffic Management, Pedestrian Safety, Heavy Machinery, PPE, Reflective Vests, Hard Hats, Hearing Protection, Crane, Rigging, Sling, Hook, Shackle, Load Capacity, Load Securement, Hand Signals, Lifting Zone, Crane Operator, Signalman, Boom.

Resources –

Modern Carpentry (GW), CBYD Certification

Priority Standard 12.3 - Civil Blueprint Reading (BPR) & Layout Techniques

Big Idea(s):

- Civil construction blueprint reading and layout techniques form the foundation for understanding how a project will come to life
- Interpreting technical drawings and using accurate layout tools to transfer those designs to the jobsite ensures precision in the construction process
- A solid understanding of math and measurements is critical to correctly executing the plans

Essential Question(s):

- How do you interpret and apply information from a civil blueprint for construction?
- Why is it important to understand blueprint scaling and measurements in civil construction?
- How do layout techniques impact the accuracy and efficiency of civil projects?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.3.1 Blueprint Reading Review	• **Identify the types of lines, views, and symbols commonly used in civil blueprints** • **Understand the purpose and application of different views (plan, elevation, section, detail)** • **Demonstrate the use of scales to interpret measurements on blueprints**
12.3.2 Interpreting Civil Blueprints	• **Interpret key elements of civil blueprints, such as grading plans, site plans, and utility placement** • **Identify dimensions and elevations on a blueprint and how they translate to the actual site** • **Understand contour lines, drainage systems, and earthwork symbols on civil blueprints** • **Read and interpret notes and specifications for construction processes, materials, and safety requirements**
12.3.3 Tools for Civil Layout	• **Identify and demonstrate the use of tools required for civil layout, such as transit levels, theodolites, laser levels, and measuring tapes** • **Understand the proper setup and calibration of layout tools**

Students will know:	*As evidenced by: (oral, written, or performance)*
12.3.4 Civil Layout Techniques	• **Demonstrate how to layout grading lines, building corners, and infrastructure placements (roads, utilities, foundations) using blueprint measurements** • **Implement leveling, measuring, and staking techniques for site layouts** • **Interpret and apply civil construction drawings to ensure proper placement and alignment of construction elements**
12.3.5 Math Skills for Layout	• **Use basic math skills for scaling measurements from blueprints to real-world applications** • **Perform calculations for distances, areas, slopes, and elevations as needed for layout tasks** • **Apply geometry, algebra, and trigonometry for measuring angles, distances, and determining elevations**

Technical Vocab –

Blueprints, Civil Blueprints, Lines, Views, Symbols, Scales, Plan View, Elevation View, Section View, Detail View, Grading Plans, Site Plans, Utility Placement, Contour Lines, Drainage Systems, Earthwork Symbols, Dimensions, Elevations, Transit Level, Theodolite, Laser Level, Measuring Tape, Layout Tools, Staking, Math, Geometry, Algebra, Trigonometry, Scaling, Measurement, Slope, Elevation Calculations.

Resources –

Modern Carpentry (GW)

Priority Standard 12.4 - Introduction to Quality Control

Big Idea (s):

- Quality control is integral to ensuring that the materials and work meet the specifications required for a civil construction project
- Different materials, from soils to concrete, require specific testing methods, and learning how to apply these tests prepares students to maintain high-quality standards on the jobsite
- Quality control directly impacts the longevity and safety of the structures being built and can prevent structural failures

Essential Question (s):

- How do material properties influence the stability and safety of civil structures?
- Why is testing essential for maintaining quality standards in construction materials?
- In what ways do math and measurement underpin effective quality control in construction?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.4.1 Quality Control Math	• **Apply basic math principles, such as ratios, proportions, and averages, to interpret test results for materials** • **Calculate and convert measurements, such as volume, weight, and density, for materials like concrete, soil, and asphalt** • **Perform mathematical operations to understand and interpret quality control test results**
12.4.2 Soils	• **Identify key properties of soil (e.g., grain size, moisture content, compaction)** • **Categorize different soil types (e.g., clay, silt, sand) based on their characteristics** • **Describe the basic soil testing methods, including compaction and moisture content tests** • **Explain how soil test results impact construction site preparation**
12.4.3 Concrete	• **Identify the components of concrete (e.g., cement, aggregate, water, admixtures) and their ratios** • **Explain the mixing process and importance of proportions**

	● **Perform and interpret a slump test** ● Describe the compressive strength test and its importance
12.4.4 Asphalt	● **Identify asphalt components and quality factors** ● **Explain asphalt testing basics (compaction, density)** ● **Describe the importance of maintaining proper temperature and compaction during the application**

Technical Vocab –

Quality Control, Slump Test, Compressive Strength Test, Proportions, Ratios, Averages, Moisture Content, Compaction, Density, Aggregate, Admixtures, Binder Content, Cement, Asphalt, Soil Types (Clay, Silt, Sand), Grain Size, Workability, Moisture Content Test, Compaction Test, Mix Design, Concrete Mix Ratio

Resources –

Modern Carpentry (GW), Tilcon Quality Control Manual, International Material Testing Laboratories

Priority Standard 12.5 - Concrete Construction

Big Idea(s):

- Concrete is the backbone of many civil construction projects, and understanding its components, form types, and finishing techniques is essential for success
- Concrete is used to create strong and durable foundations, footings, and piers
- Proper safety practices and quality control during concrete forming, placement, and finishing are essential to producing durable, safe structures

Essential Question(s):

- How does concrete contribute to the strength and longevity of civil infrastructure?
- Why do forming techniques affect the performance of concrete structures?
- How do planning and execution impact the success of concrete placement and finishing?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.5.1 Concrete Components and Applications	• **Identify common concrete elements in civil construction (footings, grade beams, piers, slabs)** • **Describe the purpose and application of each element** • **Distinguish between structural and non-structural concrete components**
12.5.2 Concrete Form Types	• **Identify different types of forms used in civil construction (slab forms, pier forms, footing forms, curb and gutter forms)** • **Explain the advantages and limitations of wood, metal, and reusable formwork systems** • **Select appropriate forms based on the project requirements**
12.5.3 Form Construction and Preparation	• **Demonstrate proper layout and assembly of formwork based on project drawings** • **Install form bracing and support to ensure structural integrity** • **Apply form release agents as needed and check for proper alignment and level**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Evaluate formwork stability and alignment prior to concrete placement**
12.5.4 Concrete Placement and Finishing	• **Demonstrate safe and correct techniques for concrete placement.** • **Identify appropriate tools used for finishing (floats, trowels, screeds)** • **Perform basic finishing tasks such as screeding, floating, edging, and jointing** • **Describe curing practices for newly placed concrete**
Technical Vocab - footing, pier, grade beam, slab, formwork, screed, float, trowel, edging, jointing, bracing, curing, concrete vibrator, form release agent, slump, concrete placement, structural concrete	
Resources - Modern Carpentry (GW), EFCO, Symons Concrete Forms, Advance Concrete Forms	

Technical Vocab –

footing, pier, grade beam, slab, formwork, screed, float, trowel, edging, jointing, bracing, curing, concrete vibrator, form release agent, slump, concrete placement, structural concrete

Resources –

Modern Carpentry (GW), EFCO, Symons Concrete Forms, Advance Concrete Forms

Priority Standard 12.6 - Rebar Construction

Big Idea(s):

- Rebar plays a vital role in reinforcing concrete, providing the necessary structural integrity for large-scale projects
- Learning the proper techniques for cutting, bending, and placing rebar ensures that concrete structures can withstand the stresses and loads they will endure
- A solid understanding of rebar placement is critical for constructing reliable and safe infrastructure

Essential Question(s):

- Why is rebar reinforcement critical to the durability and safety of civil structures?
- How do different tools and techniques influence the effectiveness of rebar cutting and bending?
- What factors must be considered to ensure proper rebar placement and secure tying in construction projects?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.6.1 Rebar Types **.**	• **Identify standard rebar sizes and grades** • **Explain the purpose of different types of rebar coatings (e.g., epoxy-coated, galvanized)** • **Match rebar types to specific civil construction applications**
12.6.2 Rebar Cutting and Bending	• **Identify tools used for cutting and bending rebar (manual cutter, power cutter, hand bender, table bender)** • **Demonstrate safe and accurate cutting of rebar to specified lengths** • **Use appropriate bending techniques to match project drawings or templates** • Evaluate cutting quality and bending accuracy to meet project specifications

12.6.3 Rebar Placement and Tying	• **Demonstrate safe rebar handling and placement practices**
	  ○ **PPE**
	  ○ **Lifting/handling practice**
	  ○ **Exposed rebar protection**
	• **Interpret structural drawings to determine rebar placement**

	• **Describe proper use of spacers, chairs, and ties** • **Tie rebar using industry-standard methods (e.g., saddle tie, wrap tie) with hand tools or tie guns** • **Check placement for correct spacing, alignment, and coverage**
12.6.4 Reading Rebar Plans and Schedules	• **Locate and interpret rebar callouts and symbols on civil construction blueprints** • **Identify rebar placement based on structural detail sheets and bar bending schedules** • Cross-reference rebar types, sizes, and spacing with written specifications • **Explain how rebar drawings relate to on-site layout and installation**

Technical Vocab –

rebar, #3 rebar, #4 rebar, epoxy-coated, cutting shear, hand bender, stirrup, chair, tie wire, saddle tie, wrap tie, spacing, lap splice, cover, bar mark, cut length, rebar schedule, structural drawing, plan view, section view

Resources –

Modern Carpentry (GW)

Priority Standard 12.7 - Welding and Metal Cutting Basics

Big Idea(s):

- Welding and cutting are essential metalworking processes in civil construction, used to fabricate and modify steel components for structural applications
- Safe and effective use of welding and cutting tools is fundamental to ensuring quality workmanship and job site safety
- Foundational skills in welding and cutting prepare students for advanced training and on-the-job applications

Essential Question(s):

- How do proper safety practices impact the quality and success of welding and metal cutting tasks?
- Why is it important to understand the different welding and cutting processes before beginning a project?
- How can the choice of equipment and setup affect both safety and efficiency on a construction site?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.7.1 Welding/Metal Cutting Personal Safety	● **Identify common hazards associated with welding and cutting environments** ○ **fire hazards** ○ **UV/IR exposure** ○ **electrical shock** ○ **flying sparks** ○ **hot metal** ○ **confined spaces** ○ **poor ventilation.** ● **Identify personal protective equipment (PPE) required for specific tasks** ● **Select and properly use appropriate PPE for welding and cutting** ● **Describe basic safety practices to mitigate hazards** ○ **fire watch** ○ **spark containment** ○ **clear workspace** ○ **ventilation practices**
12.7.2 Welding/Metal Cutting Equipment ● **Welding machines** ○ **Leads**	● **Identify basic equipment used to weld and cut metal** ● **Describe the function and purpose of**

Students will know:	*As evidenced by: (oral, written, or performance)*
○ **electrode holder** ○ **ground clamp** ● **Grinder** ● **Oxy-acetylene torch** ○ **gas tanks** ○ **Regulators** ○ **hoses**	**basic welding and cutting equipment** ● **Identify common hazards associated with welding and cutting equipment** ● **Demonstrate proper inspection and setup procedures for basic welding and cutting equipment**
12.7.3 Welding Processes	● **Define welding as a process for joining metal using heat and/or filler material** ● **Identify common types of welding (e.g., stick, MIG, TIG, oxy-acetylene) and their typical applications** ● **Describe basic welding setup requirements** ○ **Surface prep** ○ **Grounding** ○ **Selecting electrode or filler** ○ **Fire prevention** ○ **Safety checks** ● Demonstrate basic stick welding process concepts physically or in a simulated environment
12.7.4 Metal Cutting Processes	● **Describe basic metal cutting methods (oxy-acetylene torch, grinder with cut-off wheel)** ● **Describe safe cutting setup procedures, including:** ○ **Checking gas connections or tool condition** ○ **Ensuring clear spark/slag path** ○ **Setting up material supports and layout lines** ○ **Fire prevention and area prep** ● **Demonstrate basic metal cutting techniques using a torch and grinder:** ○ **Perform a straight cut with the torch on mild steel** ○ **Use a grinder to cut or finish edges** ○ **Show control of flame or wheel, spark direction, and safe body positioning**

Technical Vocab –

Arc, electrode, electrode holder, filler material, fire-resistant clothing, flame cutting, grinding wheel, ground clamp, heat-affected zone (HAZ), metal cutting, MIG welding (Metal Inert Gas), oxy-acetylene torch, overhead weld, personal protective equipment (PPE), plasma cutter, portable welding machine, safety checks, slag, stick welding (Shielded Metal Arc Welding, SMAW), TIG welding (Tungsten Inert Gas), ventilation, weld bead, weld joint, welding hood, welding lead, welding positions (flat, horizontal, vertical, overhead)

Resources –

https://multimedia.3m.com/mws/media/2116669O/rebar-and-reinforced-steel-work-in-construction-sales-training.pdf

Priority Standard 12.8 - Professional Practice in Construction

Big Idea(s):

- Professional and technical skills are demonstrated through the process and product of hands-on construction work
- Construction projects provide opportunities to apply core competencies in real-world settings.
- Employability attributes such as communication, problem-solving, and professionalism are critical to success in the trades
- Reflection and portfolio documentation are essential for tracking growth and preparing for career opportunities

Essential Question(s):

- How do professional behaviors and employability skills impact success on the jobsite?
- What construction practices lead to high-quality workmanship?
- How can reflecting on our work help us improve and prepare for future opportunities?
- Why is documenting work experiences important for career readiness?

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.8.1 Professionalism and Employability	• **Identify work-ready skills that reflect professionalism on a jobsite or in a workshop** • **Describe how attributes of the CTECS Vision of a Graduate relate to the construction industry** • **Demonstrate respectful behavior, effective communication, social skills, and work readiness while working in team and individual settings** • **Apply critical thinking and problem-solving skills to complete tasks and resolve challenges in a professional setting**

12.8.2 Technical Skills	• **Apply core construction skills including:**
	  ○ **Measuring and layout**
	  ○ **Material selection and prep**
	  ○ **Tool selection and use**
	  ○ **Fastening and assembly**
	• **Demonstrate safe and appropriate practices related to:**
	  ○ **Personal Safety**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Hand and power tools** ○ **Ladders and scaffold** ○ **Various shop equipment** ● **Evaluate quality of work based on project specifications and industry standards** ● **Follow organized processes to complete tasks efficiently and accurately**
12.8.3 Portfolio and Reflection	● **Identify key components of a professional portfolio (e.g., photos, checklists, reflections, resume artifacts)** ● **Upload documentation and evidence of proficiency for each project completed** ● **Update personal competency checklist to reflect current skill levels and progress** ● **Reflect on personal growth in both technical and employability skills**

Technical Vocab –

Workmanship, competency, portfolio, resume, reflection, jobsite, professionalism, proficiency.

Resources –

Modern Carpentry (GW)