CTECS Masonry Curriculum

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Connecticut Technical Education and Career System
Vision of a Graduate
A CTECS Graduate is…

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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

Rev. 1-2026

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.

Masonry Philosophy

The Masonry course of studies is designed to create an appreciation of the industry and to develop entry level skills within the masonry construction trade. 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.

The Masonry course is designed to provide Level I apprenticeship theory content within the trade. Practical experience will be gained within the school, through outside production experience, and through optional Cooperative Work Experience, employed by a competent masonry contractor.

Masonry – Course Map

Grade 9 – Semester 1 & 2 DSA

- 9.1 Shop/Site Safety
- 9.2 Masonry Math
- 9.3 Basic Layout
- 9.4 Hand Tools
- 9.5 Masonry Materials
- 9.6 Basic Masonry Techniques
- 9.7 Professional Practice in Masonry

Grade 10 – Semester 1 DSA

- 10.1 Shop/Site Safety
- 10.2 Ladders, Scaffolding and Fall Protection
- 10.3 Power Tools
- 10.4 Masonry Math
- 10.5 Advanced Layout Techniques
- 10.6 Brick Construction
- 10.7 Block Construction
- 10.8 Tile
- 10.10 Professional Practice in Masonry

Grade 10 – Semester 2 DSA

- 10.1 Shop/Site Safety
- 10.2 Ladders, Scaffolding and Fall Protection
- 10.3 Power Tools
- 10.4 Masonry Math
- 10.5 Advanced Layout Techniques
- 10.6 Brick Construction
- 10.7 Block Construction
- 10.9 Pavers (ICP)
- 10.10 Professional Practice in Masonry

Grade 11 – Semester 1 DSA

- 11.1 Jobsite Safety
- 11.2 Masonry Math
- 11.3 Stair Construction
- 11.4 Concrete Construction
- 11.5 Masonry Wall Systems
- 11.9 Professional Practice in Masonry

Grade 11 – Semester 2 DSA

- 11.1 Jobsite Safety
- 11.2 Masonry Math
- 11.6 Blueprint Reading
- 11.7 Soil Prep and Drainage
- 11.8 Segmented Retaining Walls (SRW)
- 11.9 Professional Practice in Masonry

Grade 12 – Semester 1 DSA

- 12.1 Jobsite Safety
- 12.2 Masonry Estimation
- 12.3 Masonry Restoration
- 12.4 Stone Construction
- 12.5 Masonry Arch Construction
- 12.9 Professional Practice in Masonry

Grade 12 – Semester 2 DSA

- 12.1 Jobsite Safety
- 12.2 Masonry Estimation
- 12.6 Chimneys
- 12.7 Fireplaces
- 12.8 Advanced Hardscapes
- 12.9 Professional Practice in Masonry

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

9th Grade Curriculum

Priority Standard 9.1 - Shop/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?**
- **Who is ultimately responsible for a safe work environment?**
- **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** ● **Describe the purpose of OSHA** ● **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 Work Area Setup	● **Set up a masonry workstation following industry standards for tool placement, material staging, and mortar preparation.** ● **Explain why organized workstations improve safety and productivity.** ● **Maintain a clean, hazard-free workspace during and after work.**
9.1.3 Fire Safety ● **Classes of fires** ● **Fire Triangle** ● **Extinguisher Use**	● **Identify classes of fires** ● **Locate fire extinguishers and blankets in shop** ● **Identify types of extinguishers**

Students will know:	*As evidenced by: (oral, written, or performance)*
• **Fire Blankets** • **Fire Alarms / Evacuations**	• **Explain the process of extinguishing certain fires** • **100% on written safety test**
9.1.4 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** • **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-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), OSHA.gov

Priority Standard 9.2 - Masonry Math

Big Idea(s):

- **Accurate measurement is a foundational skill in masonry**
- **Understanding fractions and how to read a ruler is essential for layout, cutting, and installation**
- **Proficiency in masonry math supports effective communication with clients, coworkers, and inspectors**

Essential Question(s):

- **How do you accurately read a ruler or tape measure?**
- **Why is it important to add and subtract fractional measurements correctly?**
- **What can go wrong when measurements or calculations are inaccurate in masonry?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.2.1 Measuring	• **Identifying measurements with 1/16 accuracy**
9.2.2 Math	• **Adding measurements (fractions)** • **Subtracting measurements (fractions)** • **Finding center (division)**

Technical Vocab-

Fractions, numerator, denominator

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 9.3 - Basic Layout

Big Idea(s):

- **The foundation of any masonry project relies on accurate layout**
- **Precise measurements and techniques ensure structural integrity and quality**
- **Understanding basic layout principles is crucial for preventing errors and material waste**

Essential Question(s):

- **How does accurate layout impact the success and quality of a masonry project?**
- **What are the fundamental techniques for establishing a square and level layout?**
- **Why is it important to verify layout measurements before beginning construction?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.3.1 Layout Tools and their use	• **Identify common layout tools (e.g., tape measure, framing square, builder's level, string line, modular ruler)** • **Explain the purpose of common layout tools**
9.3.2 Establishing a Square Layout	• **Demonstrate methods for squaring a corner (e.g., 3-4-5 method)** • **Lay out a basic foundation or project footprint**
9.3.3 Basic Measuring and Transferring	• **Accurately measure and transfer dimensions**
9.3.4 Leveling and Plumb	• **Explain the concepts of level and plumb in layout** • **Evaluate projects for level and plumb**

Technical Vocab-

Layout, square, level, plumb, tape measure, framing square, string line, 3-4-5 method, batter boards

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 9.4 - Hand Tools

Big Idea(s):

- **It is essential for masons 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)*
9.4.1 Hand Tool Identification and purpose	● **Identify common hand tools** ● **Explain hand tool uses** ● **Explain the advantage of using hand tools over power tools for certain tasks**
9.4.2 Safe 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** ● **Demonstrate safe use of hand tools** ● **100% on Written Safety Test**

Technical Vocab-

Layout, square, hammer, screwdriver, steel tape, trowel, jointer, chisel

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 9.5 - Masonry Materials

Big Idea(s):

- **The materials used in masonry affect how durable and long-lasting a structure will be**
- **Each type of masonry material has a specific purpose on the jobsite**
- **Knowing how to store and handle masonry materials helps keep them in good condition**
- **Good masonry work starts with using the right materials the right way**

Essential Question(s):

- **How do the materials we choose affect the strength and life of a masonry structure?**
- **Why do masons use different materials for different parts of a project?**
- **What can go wrong if masonry materials are not stored or handled properly?**
- **How does using the right materials help a masonry job go smoothly and turn out well?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.5.1 Types Masonry Materials	• **Identify basic materials used in the masonry trade** • **Explain the how each material is made**
9.5.2 Block and Brick Characteristics	• **Explain the basic properties of brick and block (weight, size, strength, hollow vs. solid)** • **Describe the differences in where block and brick are used in masonry.**
9.5.3 Mortar Characteristics	• **List and describe ingredients of mortar.** • **Identify and describe the different types of mortar (N, S, M, and O) and their common uses.** • **Describe how the workability of mortar affects the speed and ease of construction.**
9.5.4 Paver Types and Uses	• List common materials used to make pavers (such as concrete and clay). • Describe typical uses for different paver types (e.g., walkways, patios, driveways).

Technical Vocab-

Modular Unit, Fire Brick, Queen Brick, Oversized Brick, Extruded Brick, Molded Brick, CMU, Portland Cement, Split-Face Block, Ground-Face Block, Cells, Ears, Face Shell, Interlocking Concrete Paver.

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 9.6 - Basic Masonry Techniques

Big Idea(s):

- **Consistently applying correct techniques prevents common problems and extends the life of masonry work**
- **Attention to detail in every step of masonry work is essential to meet industry standards**
- **Proper tool use and preparation help create masonry work that is safe, strong, and professional**
- **Understanding why each technique matters helps masons build better, longer-lasting structures**

Essential Question(s):

- **How do proper masonry techniques help prevent problems and keep structures strong?**
- **Why is paying attention to detail important when working with masonry materials?**
- **How does using tools the right way improve the quality and safety of masonry work?**
- **What can understanding the purpose behind each technique do for the finished project?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
9.6.1 Cutting Masonry Material	• **Identify safe and proper techniques for cutting brick and block using a brick hammer and chisel.** • **Safely operate a masonry saw to make straight and accurate cuts.** • **Explain when and why materials need to be cut in masonry projects.**
9.6.2 Mixing Mortar	• **Identify the ingredients of a shop mortar mix** • **Demonstrate how to properly mix mortar by hand and with a mechanical mixer** • **Describe proper cleaning and safety procedures when mixing mortar**
9.6.3 Laying Masonry Units to the Line	• **Attach mason's line correctly.** • **Lay brick and block to a mason's line using proper technique.** • **Apply mortar correctly to ensure full joints.**

Students will know:	*As evidenced by: (oral, written, or performance)*
9.6.4 Basic Paver Installation	• **List the basic steps for installing pavers, including base prep, bedding material, laying pattern, and compaction.** • **Explain how proper installation techniques prevent shifting and settling.** • **Install pavers in a basic pattern with consistent spacing and alignment.**

Technical Vocab-

Level, Plumb, Range, Bond, Buttering, Lead, Line Block, Line Twig, Head of the Brick, Lipping, Set Back, Head Joint, Bed Joint, Base Material, Bedding Material, Plate Compactor, Screed Board, Screed Rail

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 9.7 - Professional Practice in Masonry

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)*
9.7.1 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**
9.7.2 Technical Skills	● **Apply core construction skills including:** ○ **Measuring and layout** ○ **Material selection and prep** ○ **Tool selection and use** ○ **Workstation setup** ○ **Installation accuracy** ● **Demonstrate safe and appropriate practices related to:**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Personal Safety** ○ **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**
9.7.3 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-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

10th Grade Curriculum

Priority Standard 10.1 - Shop/Site Safety (OSHA 10 Credentialing)

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?**
- **Who is ultimately responsible for a safe work environment?**
- **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)*
10.1.1 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**
10.1.2 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**
10.1.3 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** ● **Appropriate contact person**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **100% on written safety test**
10.1.4 Hand Tools	• **List and explain the intended use of each hand tool** • **Select proper tools for various applications**

Technical Vocab-

Hazard, Safety, Focus, Competent, Leadership, Organized, Responsible, OSHA, PPE, Demonstrate, Push stick, jig, tool guard. First Aid

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.2 - 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 protocol**
- **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)*
10.2.1 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**
10.2.2 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**

10.2.3 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-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.3 - 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)*
10.3.1 Power Tool Identification ● **Circular Saw** ● **Reciprocating 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**
10.3.2 Power Tool Safety ● **Electrical safety** ● **Maintenance and inspection.** ● **Clamping and holding materials** ● **Changing accessories:** ● **Blades** ● **Bits** ● **Sandpaper** ● 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**
10.3.3 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 manufacturer's recommendations ● Pass a safety course on the use of

Students will know:	*As evidenced by: (oral, written, or performance)*
	powder –actuated tools

Technical Vocab-

Angle Grinder, Diamond Blade, Hammer Drill, circular saw, reciprocating saw, collet, drill, abrasive, arbor, chuck, powder-actuated tool

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.4 - Masonry Math

Big Idea(s):

- **Basic geometry helps masons measure space and plan projects**
- **Unit conversions are necessary for material planning and purchasing**

Essential Question(s):

- **How do you calculate area and perimeter for masonry projects?**
- **Why is it important to convert between inches and feet?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.4.1 Measuring	• **Identifying measurements with 1/16 accuracy**
10.4.2 Masonry Math	• **Convert inches to feet and feet to inches** • **Find perimeter and area of squares and rectangles** • **Apply these concepts to tasks such as measuring walls, floors, and foundations**

Technical Vocab –

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

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.5 - Advanced Layout Techniques

Big Idea(s):

- **Advanced layout tools help masons work faster and with greater accuracy**
- **Understanding the modular grid and using layout rulers ensures correct spacing and alignment**
- **Using a level correctly is essential for building plumb and level masonry walls**

Essential Question(s):

- **How do advanced layout tools improve accuracy and efficiency on the job site?**
- **Why is understanding the modular grid important when laying masonry units?**
- **How does proper use of a level contribute to the structural quality of a masonry wall?**
- **In what ways do layout and spacing tools ensure consistency in masonry construction?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.5.1 Modular Grid Systems	• **Explain the principles and benefits of modular grid layout** • **Lay out a project using a modular ruler** • **Identify the markings on a modular ruler**
10.5.2 Using a Level	• **Demonstrate how to use a level to check for plumb and level surfaces** • **Interpret level readings and adjust work accordingly**
10.5.3 Brick Spacing Ruler	• **Describe the function of a brick spacing ruler** • **Lay out and construct a masonry project using various joint spacings with a brick spacing ruler**
10.5.4 Verifying Layout Accuracy	• **Cross-check diagonal measurements to verify square layout (e.g., 3-4-5 method, Pythagorean Theorem)** • **Confirming level, plumb, and square before beginning unit placement** • **Identify and correct layout errors before material installation**

Technical Vocab-

Modular grid, laser level, transit, range, height, plumb bob, offset

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.6 - Brick Construction

Big Idea(s):

- **Proper bricklaying technique ensures both structural soundness and visual appeal**
- **Understanding brick joint styles and unit positioning is essential for consistent quality**
- **Leads serve as the foundation for straight, level, and plumb wall construction**

Essential Question(s):

- **How do different brick joints affect the appearance and function of a masonry wall?**
- **In what situations would you use different brick positions during construction?**
- **What role do leads play in maintaining alignment and quality in brickwork?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.6.1 Brick Joints	• **Identify common brick joint types (e.g., concave, V-joint, weathered, struck, flush)** • **Describe the function and appearance of each joint type** • **Tool various joint finishes properly for a uniform and professional finish**
10.6.2 Brick Positions	• **Identify the six brick positions** • Explain the use of each brick position application
10.6.3 Brick Bonds	• **Identify common brick bonds (e.g., running bond, stack bond, Flemish bond, English bond)** • **Explain the purpose and characteristics of each bond type** • **Lay out and construct sample walls demonstrating proper bonding patterns**
10.6.4 Building Brick Leads	• **Explain the purpose of building leads in masonry construction** • **Lay out and construct corner leads that are level, plumb, and to height** • **Use string lines to carry height and alignment from lead to lead**

Technical Vocab-

Mortar, brick bond, course, bed joint, head joint, reinforcement, rowlock, stretcher, soldier, shiner, header, sailor

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.7 - Block Construction

Big Idea (s):

- **Concrete masonry unit (CMU) construction involves specific techniques for handling, laying, and reinforcing blocks to create strong and stable structures**
- **Understanding different block sizes, characteristics, and bond patterns is essential for effective and efficient block construction**

Essential Question (s):

- **How does the selection of block sizes and bond patterns impact the structural integrity and design of a masonry wall?**
- **What are the critical steps in laying blocks to the line to ensure accuracy and strength?**
- **Why is proper mortar application and reinforcement vital for durable block construction?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.7.1 Block Sizes	• **Identify common concrete masonry unit (CMU) sizes** • **Explain how different block sizes are used in various applications (e.g., foundation walls, partitions, veneers)**
10.7.2 Constructing Leads with Various Block Sizes	• **Construct a plumb, level corner lead using various CMU sizes** • **Calculate and make the required cut for each block size to maintain the running bond pattern**

Technical Vocab-

CMU (Concrete Masonry Unit), cell, ears, face shell spreading, non-load bearing walls

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.8 – Tile

Big Idea(s):

- **Tile is a versatile finish material used for both function and design across residential and commercial projects**
- **Understanding tile types, surfaces, and the installation process is essential for professional-quality results**
- **Proper grouting completes and protects the tile installation.**

Essential Question(s):

- **What factors influence the selection of different tile types for a project?**
- **What are the key steps in the tile installation process?**
- **How does grout contribute to both the appearance and durability of a tile job?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.8.1 Surface Preparation	• **Identify appropriate surfaces for tile installation** • **Describe steps needed to prepare surface for tile installation**

10.8.2. Tile Types and Uses.	• **Explain the qualities and uses of common types of tile**
	  ○ **Ceramic**
	  ○ **Porcelain**
	  ○ **Terrazzo**
	  ○ **Stone**
	• **Explain difference in floor and wall tiles**

10.8.3 Tiling Process	• **Identify types of adhesives used to fasten tile** • **Explain the process of applying adhesives** • **Explain the process of setting tile**
10.8.4 Grout	• **Identify the common ingredients for grout** • **Identify different grout used for various tile** • **Explain admixtures and their uses** • **Install grout properly**

Technical Vocab-

Notched Trowel, Rubber Float, Tile Spacers, Thinset Mortar, Tile Grout, Ceramic Tile, Porcelain Tile, Stone Tile, Cement Board

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 10.9 - Pavers (ICP)

Big Idea(s):

- **Interlocking concrete pavers provide durable, flexible solutions for hardscape applications**
- **Proper base preparation is critical for long-lasting performance and drainage**
- **Installing pavers requires precise layout, leveling, and cutting techniques for a professional finish**

Essential Question(s):

- **How do different paver types and characteristics affect the design and function of a hardscape?**
- **Why is proper base preparation essential to the success of a paver installation?**
- **How do masons ensure accuracy, strength, and appearance when installing pavers?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
10.9.1 Paver Types and Characteristics	• **Identify different types of interlocking concrete pavers** • **Explain the applications and benefits of ICP**
10.9.2 Base Preparation and System Components	• **Explain the purpose of excavation, geotextile fabric, sub-base, base, and bedding layer** • **Identify proper base materials and compaction techniques** • **Describe drainage considerations including slope and edge restraints**
10.9.3 – Paver Construction Techniques	• **Use a transit laser to set consistent grade and elevation** • **Use a saw to make accurate, clean paver cuts** • **Demonstrate common laying patterns (e.g., running bond, herringbone)** • **Follow industry standards to perform a complete paver installation, including proper spacing, alignment, edge restraint, and compaction**

Technical Vocab –

Pavers, interlocking concrete pavers (ICP), sub-base, bedding layer, edge restraint, joint sand, compaction, permeable pavers

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 10.10 - Professional Practice in Masonry

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)*
10.10.1 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**

10.10.2 Technical Skills	• **Apply core construction skills including:**
	  ○ **Measuring and layout**
	  ○ **Material selection and prep**
	  ○ **Tool selection and use**
	  ○ **Workstation setup**
	  ○ **Installation accuracy**
	• **Demonstrate safe and appropriate practices related to:**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Personal Safety** ○ **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**
10.10.3 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-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

11th Grade Curriculum

Priority Standard 11.1- Jobsite Safety

Big Idea(s):

- **Safety is a shared responsibility that requires proactive planning and consistent execution in every phase of construction**
- **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)*
11.1.1 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**
11.1.2 Power Tool Safety ● **Circular Saw** ● **Reciprocating saw** ● **Drill/Impact Driver** ● **Chop saw** ● **Portable grinder** ● Other	● **Identify power tools used in masonry 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 (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**

11.1.3 Hand Tools Safety	• **Identify hand tools used in masonry construction and the safety measures associated with each tool** • **Inspect tools before use to ensure they are in safe working condition** • **Select proper tools for various applications**
11.1.4 Ladder, Scaffold and Fall Protection • **Step ladders** • **Extension ladders** • **Pipe staging** • Roof Brackets • Other	• **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**
11.1.5 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**

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 –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.2 - Masonry Math

Big Idea(s):

- **Estimating material quantities is a critical skill in the trade**
- **Understanding volume is essential for tasks like calculating concrete and other material**

Essential Question(s):

- **How can measuring and math skills help to promote a Mason in a workplace?**
- **Why is volume an important measurement in masonry?**
- **How can accurate material estimating affect project outcomes and costs?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.2.1 Measuring	• **Identifying measurements with 1/16 accuracy** • **Use formulas to calculate volume in cubic feet and convert to cubic yards**
11.2.2 Masonry Math	• **Perform basic material estimates (e.g., number of blocks or bricks for a given area)** • **Estimate cubic yards of material for simple projects** • **Convert fractions to decimals and decimals to fractions**

Technical Vocab –

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

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 11.3 - Stair Construction

Big Idea(s):

- **Proper stair layout ensures safe, functional, and code-compliant access in masonry projects**
- **Accurate stair calculations are essential for consistent riser height and tread depth**
- **Forming and building stairs requires attention to structural support and finish quality**

Essential Question(s):

- **Why is stair calculation critical for safety and code compliance?**
- **How do layout and formwork affect the outcome of concrete or brick steps?**
- **What are the key differences between building concrete stairs and brick steps?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.3.1 – Stair Calculation	• **Define key stair terms: rise, run, tread, riser, stringer, total rise, total run** • **Measure and calculate total rise and total run of a stair layout** • **Use the rule of 25 (riser height x2 + tread depth = 25) to determine step dimensions** • **Determine the number of risers and treads needed based on total rise and run** • **Create a layout drawing or sketch of a stair design based on field conditions**
11.3.2 – Forming Concrete Steps	• Identify materials and tools used for concrete stair formwork (form boards, stakes, string line, level, etc.) • Assemble stair forms to match the calculated rise/run using stakes and bracing • Check forms for correct alignment: level, plumb, square, and consistent step height • Safely prepare forms for pouring concrete (including reinforcement if needed)
11.3.3 – Building Brick Steps	• **Identify base and footing requirements for brick step construction** • **Lay out and construct brick risers and treads to match stair calculations**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Use consistent mortar joints to maintain proper rise, run, and aesthetics** • **Keep courses level and plumb, and maintain alignment through string lines or levels** • **Tool and clean joints for a finished, professional appearance**
11.3.4 – Stair Building Codes and Standards	• **Identify common building code requirements related to stairs (e.g., max riser height, min tread depth, consistent rise/run, railing regulations)** • **Explain why stair codes are important for safety and compliance** • **Evaluate a stair design or finished stair for code compliance** • **Reference local or national building codes during the planning and building process**

Technical Vocab –

rise, run, pitch, stoop, porch, tread, riser, stringer, total rise, total run.

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.4 - Concrete Construction

Big Idea(s):

- **Understanding the properties and composition of concrete is essential for quality workmanship**
- **The right tools, forms, reinforcement, and finishing techniques ensure strong, durable concrete installations**
- **Every phase of the concrete process — from mixing to finishing — impacts the final result**

Essential Question(s):

- **What makes concrete strong and durable?**
- **Why is it important to follow the correct steps when placing and finishing concrete?**
- **How do different finishing techniques affect the appearance and function of concrete surfaces?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.4.1 – Concrete Properties and Mixing	• **Identify the primary ingredients of concrete (cement, water, aggregate) and their roles** • **Explain how water-cement ratio affects strength and workability** • **Define common admixtures (e.g., plasticizers, accelerators, retarders) and their uses** • **Describe different concrete strengths and their applications** • **Demonstrate how to properly mix concrete by hand and with a mixer, following correct proportions**
11.4.2 – Concrete Forming	• **Identify tools and materials used for forming concrete (form boards, stakes, ties, etc.)** • **Build simple concrete forms that are level, square, and properly braced** • **Apply form release agents and check alignment before pouring** • **Explain how forming impacts the finish and dimensions of a concrete structure**
11.4.3 – Concrete Reinforcement	• **Identify types of reinforcement used in masonry (rebar, wire mesh, fiber additives)** • **Explain the purpose of reinforcement**

Students will know:	*As evidenced by: (oral, written, or performance)*
	in concrete construction • **Place reinforcement properly within forms, ensuring correct coverage and spacing** • **Tie rebar securely using wire ties**
11.4.4 – Concrete Tools	• **Identify common concrete tools (e.g., bull float, edger, magnesium float, trowel, groover)** • **Describe the purpose of each tool and when it's used during the finishing process** • **Clean and maintain concrete tools for safe and effective us**
11.4.5 – Pouring and Placing Concrete	• **Outline the step-by-step process for placing concrete, from preparation to finishing** • **Demonstrate safe practices during concrete placement** • **Properly strike off concrete using screeds and levels** • **Recognize and prevent issues such as segregation, cold joints, or overworking**
11.4.6 – Concrete Finishes	• **Identify different concrete finishes (e.g., broom, trowel, exposed aggregate, stamped)** • **Demonstrate how to apply a broom finish for slip resistance** • **Compare the appearance, purpose, and process of various finishes** • **Select an appropriate finish based on function, location, and customer preference**

Technical Vocab –

float, screed, edger, groover, aggregate, step footing.

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.5 - Masonry Wall Systems

Big Idea(s):

- **Cavity walls improve insulation, moisture control, and structural performance in masonry construction**
- **Each component of a cavity wall system serves a specific purpose to ensure durability and weather resistance**
- **Proper installation of wall systems prevents water intrusion, energy loss, and structural damage**
- **Lintels and reinforcements are essential to safely support walls, openings and distribute loads**

Essential Question(s):

- **What are the benefits of building a cavity wall instead of a solid masonry wall?**
- **How does each component of a cavity wall contribute to the performance of the system?**
- **What could happen if components like flashing, wall ties, or lintels are installed incorrectly?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.5.1 – Cavity Wall Design and Function	• **Define a cavity wall and explain how it differs from other masonry wall types** • **Identify the advantages of cavity wall construction (e.g., insulation, moisture drainage)** • **Label and describe the layers/components of a typical cavity wall** • **Interpret cavity wall diagrams and apply to layout or mockup construction**
11.5.2 – Moisture Control Components	• **Describe the function of flashing and weep holes in preventing water damage** • **Explain how mortar net works to keep weep holes functional** • **Demonstrate correct placement and installation of flashing and weep systems** • **Identify consequences of poor or missing moisture control systems**
11.5.3 – Thermal and Structural Components	• **Identify types of insulation used in cavity walls and their R-values** • **Explain the role of wall ties in**

Students will know:	*As evidenced by: (oral, written, or performance)*
	anchoring wythes and maintaining stability ● **Describe reinforcement options used within masonry wall systems and their function** ● **Identify common lintel types (e.g., steel, precast) and explain their purpose in spanning openings** ● **Demonstrate proper installation of wall ties, reinforcement, insulation, and lintels within a cavity wall system**

Technical Vocab-

Cavity wall, Wythe, Mortar net, Flashing, Weep hole, Wall tie, Reinforcement, Insulation, R-value, Lintel, Vapor barrier, Air gap, Drainage plane, Thermal bridging Load-bearing, Shelf angle

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.6 - Blueprint Reading

Big Idea(s):

- **Masons 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):

- **What information can be found in a set of construction drawings?**
- **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)*
11.6.1 Construction Drawings	• **Identify common lines and symbols used in blueprint reading** • **Select appropriate lines and symbols for their specific use**
11.6.2 Blueprint Views	• 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**
11.6.3 Scaling	• **Interpret measurements on scaled drawings using an architect's scale** • **Convert between actual and scaled measurements** • Draw a scaled drawing using an architect's scale

Technical Vocab –

Scale, object line, dimension line, hidden line, floor plan, elevation plan, plot plan

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.7 - Soil Prep and Drainage

Big Idea(s):

- **Understanding soil characteristics and effective drainage systems is fundamental to ensuring the stability, longevity, and structural integrity of masonry and hardscape projects**
- **Improper soil preparation and drainage can lead to structural failure and costly repairs**

Essential Question(s):

- **How do different soil types impact the foundation and drainage requirements for masonry construction?**
- **Why is proper site grading and drainage critical for preventing water damage and structural issues?**
- **What methods are used to prepare soil for load-bearing masonry structures and hardscapes?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.7.1 – Soil Types and Properties	• **Identify common soil types (e.g., sand, clay, loam)** • **Explain how soil characteristics (compaction, bearing capacity, permeability) affect construction**
11.7.2 Site Preparation and Compaction	• **Demonstrate techniques for excavating, grading, and compacting soil to industry standards**
11.7.3 Drainage Systems and Erosion Control	• **Identify different types of drainage systems (e.g., French drains, perimeter drains, subsurface drains)** • **Explain the principles of proper site drainage and water management around masonry structures** • **Describe methods for controlling erosion on construction site.**

Technical Vocab –

Soil compaction, bearing capacity, permeability, grading, subgrade, French drain, perimeter drain, weep hole, erosion, geotextile

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.8 - Segmented Retaining Walls (SRW)

Big Idea(s):

- **Segmented retaining walls (SRW) are engineered to manage changes in elevation and control erosion, requiring specific design and construction principles**
- **Proper foundation, drainage, and geogrid reinforcement are essential for the structural integrity and stability of SRWs**

Essential Question(s):

- **How do segmented retaining walls effectively manage slopes and prevent soil erosion?**
- **What are the critical considerations for designing and building a stable SRW foundation?**
- **Why is proper drainage and the use of geogrid reinforcement vital for the long-term performance of a retaining wall?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
11.8.1 – SRW Components and Functions	• **Identify common types of SRW blocks and their applications** • **Describe the function of capstones, drainage aggregate, and geogrid** • **Explain how each component contributes to wall stability and erosion control**
11.8.2 – Site Prep and Foundation Construction	• **Perform proper excavation and leveling pad preparation** • **Install and compact base material to specification** • **Establish grade and layout using string line or laser level**
11.8.3 – SRW Installation and Reinforcement Techniques	• **Lay SRW blocks in level, staggered courses with correct batter** • **Backfill in lifts using drainage stone and filter fabric** • **Install geogrid at correct elevations and depths based on design requirements**

Technical Vocab –

Segmented retaining wall (SRW), geogrid, batter, leveling pad, capstone, drainage aggregate, backfill, deadman anchor

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 11.9 - Professional Practice in Masonry

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 setting** • **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**
	  ○ **Workstation setup**
	  ○ **Installation accuracy**

Students will know:	*As evidenced by: (oral, written, or performance)*
	● **Demonstrate safe and appropriate practices related to:** ○ **Personal Safety** ○ **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-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

12th Grade Curriculum

Priority Standard 12.1 - Jobsite Safety

Big Idea(s):

- **Safety is a shared responsibility that requires proactive planning and consistent execution in every phase of construction**
- **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** ● **Drill/Impact Driver** ● **Chop saw (abrasive wheel)** ● **Portable grinder** ● Other	● **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 (e.g., checking for frayed cords, damaged parts)** ● **Explain the purpose of GFCI (Ground Fault Circuit Interrupter) protection**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **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 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**
12.1.6 Working Around Heavy Machinery and Equipment	• **Identify common machines used in construction (e.g., bulldozers, excavators, cranes) and associated hazards** • **Explain the role of flaggers, signal**

Students will know:	*As evidenced by: (oral, written, or performance)*
	persons, and safety spotters in a construction zone ● **Identify appropriate PPE needed when working around machines, and their purpose** ○ **reflective vests** ○ **hard hats** ○ **hearing protection** ○ **boots** ● **Describe safety protocols for safely working around and interacting with machinery and equipment**

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, Trenching, Excavation, Soil Types, Cave-ins, Shoring, Trench Boxes, OSHA Guidelines, Hazard Recognition, Emergency Response, Site Setup, Public Safety, Barricades

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.2 - Masonry Estimation

Big Idea(s):

- **Accurate estimation is critical to planning and executing successful masonry projects**
- **Cost and material calculations are essential for budgeting, ordering, and bidding**
- **Real-world estimation integrates measurement, volume, area, and unit conversions**

Essential Question(s):

- **How does accurate estimation impact the success of a masonry job?**
- **Why is it important to apply measurement and conversion skills to real project scenarios?**
- **How can estimating errors affect material use, labor, and cost?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.2.1 – Advanced Estimation for Masonry Projects	• **Identify key components required for a masonry estimate, including block, brick, mortar, and reinforcement** • **Demonstrate how to calculate material needs based on blueprints, measurements, and layout** • **Convert between feet, inches, decimals, and fractions to ensure precise estimates** • **Describe how to estimate volume, area, and unit counts for complex masonry structures** • **Explain how to prepare a basic cost estimate using material quantities and unit pricing** • **Demonstrate how to adjust estimates based on waste factors and project complexity**

Technical Vocab –

Estimate, blueprint, takeoff, volume, area, unit pricing, waste factor, conversion, cost projection, linear feet, square feet, cubic feet, reinforcement

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.3 - Masonry Restoration

Big Idea(s):

- **Masonry restoration preserves the structural integrity, appearance, and historical value of buildings**
- **Careful removal and replacement of deteriorated mortar ensures long-lasting repairs**
- **Proper cleaning and repair techniques extend the life of masonry without causing damage**

Essential Question(s):

- **How does proper restoration protect the life and appearance of masonry structures?**
- **Why is it important to match original materials and methods during restoration?**
- **How can poor cleaning or repointing practices damage masonry?**

Students will know:	*As evidenced by: (oral, written, or performance)*
12.3.1 – Joint Removal and Repointing Techniques	• **Identify signs of mortar joint failure and explain when repointing is needed** • **Demonstrate safe and effective techniques for removing deteriorated mortar using a grinder or hand tools** • **Describe the characteristics of appropriate replacement mortar (e.g., strength, color, type)** • **Demonstrate how to repoint joints with consistent depth, width, and finish using proper tools** • **Explain how improper repointing can harm masonry walls**
12.3.2 – Masonry Cleaning Procedures	• **Identify common causes of masonry staining or buildup (e.g., efflorescence, biological growth, pollution)** • **Describe and compare cleaning methods such as pressure washing, chemical cleaning, and hand scrubbing** • **Demonstrate safe and effective cleaning techniques that avoid damaging masonry surfaces**

	• **Explain safety precautions when using masonry cleaners, including PPE and environmental considerations**
12.3.3 – Masonry Repair and Patching	• **Identify common forms of damage in masonry units (e.g., cracking, spalling, loose units)** • **Explain appropriate repair techniques based on type and location of damage** • **Demonstrate how to remove and replace individual damaged bricks or blocks** • **Describe the importance of matching size, color, and texture in visible repairs**

Technical Vocab-

Repointing, tuckpointing, grinder, efflorescence, spalling, patching, pressure washing, chemical cleaning, historic preservation, masonry cleaner, PPE, masonry stainnext

Resources-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)

Priority Standard 12.4 - Stone Construction

Big Idea(s):

- **Stone masonry requires precision, craftsmanship, and an understanding of natural materials**
- **Different patterns, finishes, and installation techniques create distinct looks and structural behavior**
- **Tools, cutting methods, and material choices affect both aesthetics and performance**

Essential Question(s):

- **How do stone patterns and finishes affect the appearance and structural function of a wall?**
- **Why is it important to understand the differences between natural, thin, and manufactured stone?**
- **How do stone cutting and shaping techniques influence the quality and fit of stone masonry?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.4.1 – Stone Patterns and Layout	• **Identify common stone masonry patterns: ashlar, random (mosaic), square and rectangular** • **Describe how pattern selection affects visual design and wall bonding** • **Demonstrate proper layout techniques when starting and maintaining pattern consistency**
12.4.2 - Thin Stone and Manufactured Veneer Installation	• **Identify the characteristics and applications of thin stone and manufactured stone veneer** • **Describe the differences in installation between full-bed stone and thin veneer systems** • **Demonstrate how to prepare a substrate and apply stone veneer using proper adhesives and joint finishes** • **Explain the importance of drainage planes and weep systems in veneer installation**
12.4.3 – Dry Laid Stone Wall Construction	• **Describe the purpose and structure of a dry laid stone wall** • **Identify materials used for base, drainage, and stone selection**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Demonstrate how to stack stone for stability without mortar using proper bonding techniques** • **Explain how to incorporate batter and tie stones to reinforce wall strength**
12.4.4 – Stone Fabrication and Finishing Techniques	• **Identify types of stone chisels and hammers and describe their use in shaping stone** • **Demonstrate basic stone shaping techniques using chisels, hammers, and saws** • **Describe different stone finishes including sawn, polished, natural cleft, chiseled, and flamed** • **Explain how fabrication and finish selection affect both aesthetics and usability**

Technical Vocab –

Ashlar, random pattern, mosaic, square and rectangular pattern, thin stone, full-bed stone, dry laid, manufactured stone veneer, drainage plane, bonding, substrate, batter, tie stone, stone chisel, pitching tool, point chisel, saw cut, sawn finish, polished finish, natural cleft, chiseled finish, flamed finish, veneer mortar, stone adhesive

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.5 - Masonry Arch Construction

Big Idea(s):

- **Arches are both structural and decorative features that rely on precise geometry and craftsmanship**
- **Accurate form construction is essential for supporting masonry units during arch assembly**
- **Each component of an arch plays a specific role in transferring loads and maintaining stability**

Essential Question(s):

- **How does the design of a masonry arch support the weight above it?**
- **Why is precise formwork critical in arch construction?**
- **How do the components of an arch work together to maintain structural integrity?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.5.1 – Arch Components and Geometry	• **Identify key components of an arch: voussoir, keystone, springer, intrados, extrados, span, and rise.** • **Describe the function of each component in a masonry arch** • **Explain how load forces are transferred through an arch structure** • **Demonstrate how to lay out the geometry of an arch using center points and radius**
12.5.2 – Arch Form Construction	• **Identify materials used to build arch forms** • **Describe the steps for constructing a temporary form to support masonry during arch building** • **Demonstrate how to build a wood form to accurate dimensions based on arch layout** • **Explain how to secure and brace the form to ensure stability during construction**
12.5.3 – Arch Construction Techniques	• **Demonstrate how to set masonry units in an arch using a consistent bond and spacing** • **Explain how to build evenly from both sides of the arch to ensure balance and proper fit at the keystone**

Students will know:	*As evidenced by: (oral, written, or performance)*
	• **Demonstrate how to properly support and finish the arch before and after form removal**

Technical Vocab –

span, voussoir, keystone, jack arch, segmental arch, skewback, semicircular arch, camber

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.6 – Chimneys

Big Idea(s):

- **Chimneys must be constructed to strict codes to ensure safety, durability, and function**
- **Proper flashing prevents water infiltration at vulnerable roof transitions**
- **A well-built chimney requires attention to layout, reinforcement, and fire-rated components**

Essential Question(s):

- **How do building codes ensure the safety and performance of a chimney?**
- **Why is flashing critical where a chimney meets the roof?**
- **How does construction technique affect the long-term durability and function of a chimney?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.6.1 – Chimney Codes and Clearances	● **Identify key code requirements for chimney construction including minimum footing size, height, and clearance to combustibles** ● **Describe the function and required placement of a cleanout, thimble, and flue liner** ● **Explain the purpose of required setbacks and termination height above the roofline** ● **Reference applicable codes or standards when reviewing chimney designs or installations**
12.6.2 – Chimney Flashing Installation	● **Identify different types of chimney flashing (base, step, counter)** ● **Explain how flashing works to direct water away from the chimney-roof intersection** ● **Demonstrate how to install chimney flashing using appropriate techniques** ● **Describe how improper flashing can lead to water infiltration and masonry damage**
12.6.3 – Chimney Construction Techniques	● **Demonstrate how to lay out and construct a chimney using proper bond and alignment** ● **Describe how to install flue liners with appropriate spacing and mortar joints** ● **Demonstrate how to integrate cleanouts and thimbles into chimney construction**

Technical vocab –

Footing, clearance, thimble, cleanout, flue liner, fireclay, flashing, base flashing, step flashing, counter flashing, crown, cap

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.7 – Fireplaces

Big Idea(s):

- **Fireplace construction must follow strict codes to ensure safe operation and proper draft**
- **Each part of a fireplace serves a specific function in directing smoke, containing heat, and protecting surrounding structures**
- **Craftsmanship and precision are critical when building a functional and attractive masonry fireplace**

Essential Question(s):

- **How do building codes help ensure that fireplaces are safe and efficient?**
- **Why is it important to understand the function of each fireplace component during construction?**
- **How does proper construction technique impact the performance and durability of a fireplace?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.7.1 – Fireplace Components and Codes	• **Identify major parts of a fireplace, including firebox, throat, smoke shelf, smoke chamber, flue, and damper** • **Describe the function of each component in promoting proper airflow and containment** • **Reference common building codes related to firebox dimensions, hearth extension, clearances, and firebrick use** • **Explain how incorrect dimensions or materials can create fire or draft hazards**
12.7.2 – Fireplace Construction Techniques	• **Demonstrate how to lay out and build a fireplace using proper bond and fire-rated materials** • **Describe how to construct the firebox with firebrick and appropriate mortar** • **Explain how to shape the smoke chamber and throat to guide gases into the flue** • **Demonstrate proper integration of the damper and flue liner into the fireplace structure**

Technical vocab –

Firebox, hearth, damper, flue, throat, smoke shelf, smoke chamber, firebrick, clearance, firestop, fireclay mortar, combustion air, ash dump, lintel

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.8 - Advanced Hardscapes

Big Idea(s):

- **Outdoor fireplaces can enhance a backyard if constructed correctly**
- **Outside elements must be considered when constructing an outdoor fireplace**
- **Effective planning and site preparation are critical to structural integrity and long-term performance**
- **Advanced hardscape installations require problem-solving, adaptability, and technical precision**

Essential Question(s):

- **How do design choices impact the function, durability, and aesthetics of a hardscape project?**
- **How do the construction methods of interior and exterior fireplace differ?**
- **How does the weather affect the design of an outdoor fireplace?**
- **Why is material selection critical to the success of advanced hardscape features?**

Learning Outcomes

Students will know:	*As evidenced by: (oral, written, or performance)*
12.8.1 Outdoor Fireplace Construction	• **Identify key components of an outdoor fireplace** • **Demonstrate how to lay out and build an outdoor fireplace using correct construction techniques** • **Explain how to accommodate ventilation, expansion, and water drainage in outdoor fireplace construction**
12.8.2 – Custom Hardscape Masonry Features	• **Identify common custom features in advanced hardscape projects (e.g., seating walls, fire pits, outdoor kitchens, pizza ovens)** • **Describe design considerations including height, scale, use, and materials** • **Demonstrate how to lay out and construct custom hardscape features to match site plans and client specifications**

Technical Vocab –

Outdoor fireplace, fire pit, firebox, flue, hearth, chimney, outdoor kitchen, seating wall, bond, weatherproofing, firebrick, refractory mortar, veneer, base preparation.

Resources –

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW), Masonry Skills by Krreh (Cengage)

Priority Standard 12.9 - Professional Practice in Masonry

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)*
12.9.1 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**
12.9.2 Technical Skills	● **Apply core construction skills including:** ○ **Measuring and layout** ○ **Material selection and prep** ○ **Tool selection and use** ○ **Workstation setup** ○ **Installation accuracy** ● **Demonstrate safe and appropriate practices related to:**

Students will know:	*As evidenced by: (oral, written, or performance)*
	○ **Personal Safety** ○ **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**
12.9.3 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-

RCA Masonry Brick and Block Construction by Ham (Cengage), Modern Masonry by Kickligher/Andera (GW)