Mission and Vision

We relentlessly pursue, with optimism, equitable support for all students to navigate a changing world by providing rigorous and relevant learning experiences that strengthen their capacity as

- Open-minded and invested collaborators;
- Effective and thoughtful communicators;
- Resourceful and creative problem solvers;
- Curious and analytical critical thinkers;
- Informed and compassionate community members.

EUHSD curriculum identifies what students should know and be able to do by grade level in a comprehensive, standards-based course of study. Curriculum may be updated, as needed, based on student academic achievement data, research and best practices, and input from stakeholders. The EUHSD curriculum contains the following information:

- **Course Description** – provides a description of the overarching content and goals of the course and is used in the Course Catalog.
- **Course Information** – provides information specific to length of course, course number, transcript abbreviation, credits earned.
- **Course Requirements** – provides information specific to credits, prerequisites, UC/CSU requirements, and grade level of the course.
- **Course Material(s)** – Instructional materials used in course.
- **Scope and Sequence** – provides the standards-based units of instruction including the Learning Objective and Sample Performance Tasks and Assessments.

To ensure all courses empower every student, specifically emerging multilingual students, to graduate prepared for college, career, and life, all EUHSD courses will:

- Incorporate the English Language Development state standards adopted by the CA Department of Education in 2012. Visit the following website to learn more about the new descriptors and corresponding standards: [https://www.cde.ca.gov/sp/el/er/documents/eldstdspublication14.pdf](https://www.cde.ca.gov/sp/el/er/documents/eldstdspublication14.pdf)
- Highlight specific strategies designed to meet the needs of emerging multilingual students as outlined in the 2014 CA Department of Education ELA-ELD Framework and the 2017 CA EL Roadmap. Visit the following URL to learn more about the new Frameworks: [https://www.cde.ca.gov/ci/rl/cf/documents/elaeldfwchapter11.pdf](https://www.cde.ca.gov/ci/rl/cf/documents/elaeldfwchapter11.pdf). To learn more about the CA EL Roadmap, visit the following website: [https://www.cde.ca.gov/sp/el/rm/](https://www.cde.ca.gov/sp/el/rm/)

Escondido Union High School District prohibits discrimination, harassment, intimidation, and bullying based on actual or perceived ancestry, age, color, disability, gender, gender identity, gender expression, nationality, race or ethnicity, religion, sex, sexual orientation, pregnancy, marital or parental status or association with a person or group with one or more of these actual or perceived characteristics.

Dr. Courtney Goode, Assistant Superintendent of Human Resources, Equity and Title IX Compliance Officer
302 N. Midway Drive, Escondido, CA 92027
Office: (760) 291-3281, Email: cgoode@euhsd.org
Course Description
Construction 2 is the capstone course preparing students for careers or post-secondary education in the building industry. This course is a hands-on, practical, and technical class engaging students in professional level skills utilized in the residential and commercial construction field. Students will apply knowledge and skills acquired in Construction 1 to an understanding of zoning and building codes, electrical wiring, schematics and drawings, materials, framing, green technology, measurement systems, and an introduction to sustainable building concepts. Additionally, through project-based learning, students will develop their teamwork, time management, and project management skills. Competencies in this course are aligned with the California Common Core State Standards and the California Career Technical Education Model Curriculum Standards.

Course Information
| Semester A: | Course Number: 6466 | Transcript Abbreviation: CONSTRUCTION 2 A (P) | Credits: 5 | Weighted: No |
| Semester B: | Course Number: 6467 | Transcript Abbreviation: CONSTRUCTION 2 B (P) | Credits: 5 | Weighted: No |

Course Requirements
| Length of Course: Yearlong | Course Learning Environment: Classroom Based | Type of Grade: | Letter Grade |
| Grade Level: 10-12 | Course Repeatable: No | Maximum Credits, if Repeatable: N/A |
| Course Type: College Prep | Designated College Prep/CTE: Yes | CTE Course Level: Capstone |
| Meets EUHSD Graduation Requirement: Designated College Prep/CTE or Elective Credit | Pathway: Residential and Commercial Construction |
| Meets UC/CSU Requirement: G: College-Preparatory Elective | UC Honors Designation: No |
| Required Prerequisite(s): Construction 1 |
| Recommended Prerequisite(s): None |

Course Material(s)
- This course uses Open Educational Resources (OERs) in order to access current digital libraries that are pivoting rapidly to industry needs.
- The Tippy Tap, Watershed Management Group, [http://www.tippytap.org/the-tippy-tap](http://www.tippytap.org/the-tippy-tap)
- Curriculum - Developing a Sustainable Workforce, Mississippi State University Research and Curriculum Unit, [https://www.rcu.msstate.edu/curriculum/download/](https://www.rcu.msstate.edu/curriculum/download/)

Standards
## Unit 1: The Construction Industry

### Unit Description
In this unit, students will examine the impact of technical, environmental, and labor trends on the past and future of the construction industry. Students will also examine the impact of financial trends on the industry with a focused examination on why the housing bubble of 2008 caused a crisis and what is different now. Students will understand the environmental regulations that influence residential and commercial design and review the United States Department of Labor and Bureau of Labor Statistics web resources to explore career outlooks within the construction industry.

### Unit Outline

<table>
<thead>
<tr>
<th>Standards</th>
<th>Learning Objectives</th>
<th>Essential Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College and Career Readiness Anchor Standards for Reading:</strong></td>
<td></td>
<td>1. Why did the housing bubble of 2008 cause a crisis?</td>
</tr>
<tr>
<td>➢ Reading Standard: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CCSS.ELA-LITERACY.RST.11-12.7)</td>
<td>Students will…</td>
<td>2. In what ways do environmental regulations influence residential and commercial design?</td>
</tr>
<tr>
<td>➢ Reading Standard: Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CCSS.ELA-LITERACY.RST.11-12.8)</td>
<td></td>
<td>3. What are potential career outlooks that might interest me within the construction industry?</td>
</tr>
<tr>
<td>➢ Reading Standard: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CCSS.ELA-LITERACY.RST.11-12.9)</td>
<td>• investigate the cost of home ownership with a focus on fluctuating markets.</td>
<td></td>
</tr>
<tr>
<td><strong>Building and Construction Trades - Knowledge and Performance Anchor Standards:</strong></td>
<td>• design a digital portfolio which will be used to house research and artifacts of learning.</td>
<td></td>
</tr>
<tr>
<td>➢ 1.0 Academics: Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Building and Construction Trades academic alignment matrix for identification of standards.</td>
<td>• demonstrate understanding of safety protocols and proper use of equipment.</td>
<td></td>
</tr>
<tr>
<td>➢ 3.0 Career Planning and Management: Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>➢ 3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>➢ 3.2 Evaluate personal character traits such as trust, respect, and responsibility and understand the impact they can have on career success.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sample Performance Tasks/Assessments

- The 2008 Housing Bubble Crisis and the Future of Home Ownership Research Paper: In this assignment, students will investigate and report on the US housing bubble of 2008, its decade-long effects on the housing and construction industry, and the future of home ownership. Students will examine key historical events, contributing factors, and the ensuing forces behind the recovery. Students will participate in selected readings, discussion questions, and internet research-based exercises prior to writing their research paper. Topics to analyze will include:
  - Median home prices in the student’s community before and after the financial crisis.
  - The loose lending requirements employed by banks in the upswing to the housing bubble.
- 3.3 Explore how information and communication technologies are used in career planning and decision making.
- 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
- 3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning.
- 3.6 Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.
- 3.7 Recognize the importance of small business in the California and global economies.
- 3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.
- 3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.
- 5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)
  - 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
  - 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
  - 5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
  - 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
- 7.0 Responsibility and Flexibility: Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Building and Construction Trades sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)
  - 7.1 Recognize how financial management impacts the economy, workforce, and community.
  - 7.2 Explain the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.
  - The subsequent delinquency rates by mortgage types.
  - Financial reform in lending practices over the past decade.
  - The short- and long-term effects felt by the construction industry.
  - The future of home ownership given the impact of today’s tight mortgage credit, skyrocketing student loan debt, and a housing shortage.
- Tech Notes and Design Blog: Tech Notes are digital notes containing research conducted by the student on topics such as occupational noise exposure, respiratory protection, and chemical hazards that are incorporated into their digital portfolio. Students will also respond to Design Blog writing prompts that are directly related to construction and design questions. This will be an ongoing digital note resource.
- Safety and Work Habits: In this assignment, students will demonstrate the basics of safe work habits and emergency procedures required in the construction industry. Students will visit a variety of websites that illustrate the specific safety procedures for working with industry grade equipment and within a lab-based workspace. Students will conduct demonstrations designed by the instructor that articulate the basics of safe work habits, emergency procedures, and causes and preventions of basic accidents and injuries. Students will review safety protocols and take a safety test to demonstrate 100% proficiency before participating in hands-on and lab related activities.
● 7.3 Understand the need to adapt to changing and varied roles and responsibilities.
● 7.4 Practice time management and efficiency to fulfill responsibilities.
● 7.5 Apply high-quality techniques to product or presentation design and development.
● 7.6 Demonstrate knowledge and practice of responsible financial management.
● 7.7 Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.
● 7.8 Explore issues of global significance and document the impact on the Building and Construction Trades sector.

Residential and Commercial Construction Pathway Standards:
● D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.
● D1.1 Understand significant historical trends in the construction industry.
● D1.2 Understand the environmental regulations that influence residential and commercial design.
● D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.
## Unit 2: Zoning and Building Codes

### Unit Description

In this unit, students will explore why municipalities establish zoning requirements, what some of these requirements are, and what typical zoning designations are clustered into. They will identify three dominant model codes of the past century and learn to use industry standard code books like those published by the International Code Council (ICC) and California Building Standards Code (CBC). Students will learn how the zoning codes and the building codes are both mandatory factors that must be followed on all construction projects. Students will focus and apply their understanding to building code standards for concrete, wood, and fasteners. Students will also explore the practice of enforcing building codes.

### Unit Outline

<table>
<thead>
<tr>
<th>Standards</th>
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<th>Essential Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College and Career Readiness Anchor Standards for Reading:</strong></td>
<td>Students will…</td>
<td>1. How does the construction industry design for seismic activity?</td>
</tr>
<tr>
<td>● Reading Standard: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CCSS. ELA-LITERACY.RST.11-12.7)</td>
<td>● explore zoning requirements and understand how standard industry codes work.</td>
<td>2. What type of building codes are in place to ensure the safety of building inhabitants?</td>
</tr>
<tr>
<td>● Reading Standard: Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CCSS.ELA-LITERACY.RST.11-12.8)</td>
<td>● explore real-time, real-world seismic data to understand the impact of earthquakes on a variety of building materials.</td>
<td></td>
</tr>
<tr>
<td>● Reading Standard: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CCSS.ELA-LITERACY. RST.11-12.9)</td>
<td>● compare and contrast the impact of seismic waves on a variety of materials.</td>
<td></td>
</tr>
<tr>
<td><strong>Building and Construction Trades- Knowledge and Performance Anchor Standards:</strong></td>
<td></td>
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</tr>
<tr>
<td>● 4.0 Technology: Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)</td>
<td>● design a blueprint and/or sketch of a building in an earthquake prone area.</td>
<td></td>
</tr>
<tr>
<td>● 4.1 Use electronic reference materials to gather information and produce products and services.</td>
<td>● understand how key design features are used in construction to mitigate risk from seismic activity.</td>
<td></td>
</tr>
<tr>
<td>● 4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● 4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.</td>
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<td></td>
</tr>
<tr>
<td>● 4.4 Discern the quality and value of information collected using digital technologies and recognize bias and intent of the associated sources.</td>
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</tr>
</tbody>
</table>

### Sample Performance Tasks/Assessments

- In this three (3) part assignment, students will understand the importance of residential building codes by examining earthquakes and how they impact housing design. For each of the 3 parts, students will be working in pairs.
  - Part A: Exploring Earthquake Design: This assignment is designed around the Earthquakes Living Lab, a resource and online interface that uses real-time, real-world seismic data. Focusing on Southern California, students will run a variety of simulation tests to determine which
- 4.5 Research past, present, and projected technological advances as they impact a particular pathway.
- 4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.
- 5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)
- 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
- 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
- 5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
- 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
- 6.0 Health and Safety: Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Building and Construction Trades sector workplace environment. (Direct alignment with RSTS 9-10, 11-12.4)
- 6.1 Interpret policies, procedures, and regulations for the workplace environment, including employer and employee responsibilities.
- 6.2 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
- 6.3 Set up a work area, or shop, to avoid potential health concerns and safety hazards, including but not limited to electrical (shock), wires (tripping), fumes (lung health), noise (hearing loss), fire (burns), and so forth, incorporating ergonomics.
- 6.4 Practice personal safety when lifting, bending, or moving equipment and supplies.
- 6.5 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics.
- 6.6 Maintain a safe and healthful working environment.

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<table>
<thead>
<tr>
<th>Ground type</th>
<th>Least amount of damage to a building</th>
<th>Most amount of damage to a building</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Earthquake area</td>
<td>Students will determine the least amount of damage? Students will summarize their findings and then move on to the next assignment, Damage Control.</td>
<td></td>
</tr>
<tr>
<td>- Building design</td>
<td>Students will compare the impact of seismic waves on structures built on solid rock vs. softer soils and then respond in writing to the following question: If you were to design a building in an earthquake area, what factors would you consider ensuring the least amount of damage?</td>
<td></td>
</tr>
</tbody>
</table>

Part B: Damage Control: Students will read an article about the importance of design, construction materials, and location. Students will compare the impact of seismic waves on structures built on solid rock vs. softer soils and then respond in writing to the following question: If you were to design a building in an earthquake area, what factors would you consider ensuring the least amount of damage?

Part C: Designing a Building in an Earthquake Area: In part C, students will be tasked with designing a building in an earthquake prone area. Students will draw a sketch of a building that could withstand a strong earthquake and explain their key design features. Students will support their key design features by referencing the model building codes maintained by the International Code Council. Students will present their work for peer review in a multimedia format.
● 6.7 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA).
● 6.8 Report hazards found on the job site to supervisor/teacher.
● 6.9 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions.
● 6.10 Maintain proper use of safety apparel at all times, including but not limited to, eye protection, hearing protection, skin protection, head protection, footwear and protection from airborne particulate matter.
● 6.11 Comply with the safe handling, storage and disposal of chemicals, materials and adhesives in accordance with local, state, and federal safety and environmental regulations (OSHA, Environmental Protection Agency [EPA], Hazard Communication [HazCom], Material Safety Data Sheets [MSDS], etc.).
● 6.12 Demonstrate the proper care and safe use of hand, portable and stationary power tools.
● 8.0 Ethics and Legal Responsibilities: Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d)
● 8.1 Access, analyze, and implement quality assurance standards of practice.
● 8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Building and Construction Trades industry sector.
● 8.3 Demonstrate ethical and legal practices consistent with Building and Construction Trades sector workplace standards.
● 8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.
● 8.5 Analyze organizational culture and practices within the workplace environment.
● 8.6 Adhere to copyright and intellectual property laws and regulations and use and appropriately cite proprietary information.
● 8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Building and Construction Trades sector laws and practices.
● 10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6)
- 10.1 Interpret and explain terminology and practices specific to the Building and Construction Trades sector.
- 10.2 Comply with the rules, regulations, and expectations of all aspects of the Building and Construction Trades sector.
- 10.3 Construct projects and products specific to the Building and Construction Trades sector requirements and expectations.
- 10.4 Collaborate with industry experts for specific technical knowledge and skills.
- 10.5 Demonstrate the basic care, proper maintenance, and use of hand, portable, and stationary tools related to the Building and Construction trades.

**Residential and Commercial Construction Pathway Standards:**

- D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.
- D1.1 Understand significant historical trends in the construction industry.
- D1.2 Understand the environmental regulations that influence residential and commercial design.
- D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.
- D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
- D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
- D3.3 Interpret technical drawings specifications.
- D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
- D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
- D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
- D3.7 Understand the sequencing and phases of residential and commercial construction projects.
- D4.0 Demonstrate techniques for proper site preparation.
- D4.1 Use leveling devices to check for elevation, level, and plumb.
- D4.2 Demonstrate how to establish grades using survey instruments.
● D4.3 Install batter boards.
● D4.4 Check site layout for square using the diagonal method.
● D4.5 Describe excavation and backfill methods.
● D4.6 Identify different methods and equipment used for compaction.
● D4.7 Identify types of backfill materials and how they are used.
● D5.0 Demonstrate foundation layout techniques to include setting forms, placing reinforcements, and placing concrete according to construction drawings, specifications, and building codes.
● D5.1 Describe the sequencing procedures for placing large and small slabs.
● D5.2 Demonstrate how to establish elevations for concrete structures.
● D5.3 Lay out location and elevation of concrete/masonry structures based on construction drawings.
● D5.4 Develop a material take-off in accordance with construction drawings and specifications.
● D5.5 Lay out location for reinforcements, expansion joints, openings, and embedded items based on construction drawings, specifications, and building codes.
● D5.6 Construct, place, and brace forms for concrete as detailed in construction drawings for footings, slab, and raised floors.
● D5.7 Place and secure reinforcement as detailed by construction drawings, building codes, and industry standards.
● D5.8 Place secure embedded hardware as detailed on construction drawings.
● D5.9 Demonstrate proper removal and care of concrete forms.
● D5.10 Use appropriate tools and techniques for placing, compacting, screeding, and finishing consolidating concrete in slabs and footings.

**Standards for Mathematical Practice:**

2. **Reason abstractly and quantitatively:** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a
coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

- **Model with mathematics:** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an additional equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
**Unit 3: Schematics and Drawings**

**Unit Description**
In this unit, students will interpret and apply information from technical drawings, schedules, and specifications used in the construction trades. Students will study a variety of building schematics and drawings, including plumbing and electrical. From the schematics and drawings, students will determine dimensions and understand symbols, layout of floors, walls, and roof framing components. Student activities will include accurately measuring the construction technology classroom and include the dimensions of the floor space, windows, doors, furniture, lighting fixtures, tables, chairs, and floor and wall cabinets. Students will draw their own blueprint to scale (¼” to 1 foot) utilizing industry standard symbols identifying building components and their sizes.

**Unit Outline**

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<tbody>
<tr>
<td><strong>College and Career Readiness Anchor Standards for Reading:</strong></td>
<td>Students will…</td>
<td>1. Why is it important for a blueprint to be to scale?</td>
</tr>
<tr>
<td><a href="https://ccss.ela-literacy.rst.11-12.7">Reading Standard</a></td>
<td>interpret and apply information from schematics and industry drawings.</td>
<td>2. In what ways do the components in different structure types vary?</td>
</tr>
<tr>
<td><a href="https://ccss.ela-literacy.rst.11-12.8">Reading Standard</a></td>
<td>differentiate between the various elements required for different types of structures.</td>
<td>3. What role does mathematics play in construction?</td>
</tr>
<tr>
<td><a href="https://ccss.ela-literacy.rst.11-12.9">Reading Standard</a></td>
<td>use mathematical processes to create accurate 2D and 3D models of structures.</td>
<td></td>
</tr>
</tbody>
</table>

**Building and Construction Trades- Knowledge and Performance Anchor Standards:**

- **4.0 Technology:** Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)
- **4.1 Use** electronic reference materials to gather information and produce products and services.
- **4.2 Employ** Web-based communications responsibly and effectively to explore complex systems and issues.
- **4.3 Use** information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.
- **4.4 Discern** the quality and value of information collected using digital technologies and recognize bias and intent of the associated sources.

**Sample Performance Tasks/Assessments**

- **Design Brief:** In this assignment, students will choose from a selection of design briefs, complete a number of tasks, and present their work to their peers using a multimedia presentation. Sample design briefs include:
  - Plan the construction of and prepare drawings for a detached garage to a domestic property.
  - Plan the construction of and prepare drawings for a walled garden with a patio area and tool shed.
  - Plan the construction of and prepare drawings for a small conservatory/greenhouse.

- For each assignment brief, students will use research to determine the scope of the work and materials needed. Students will be required to complete mathematical processes in measurement, decimal conversions, fractions, geometry, and algebra when creating their drawings. Students will prepare drawings using a 3D modeling computer program, as well as a document listing materials, measurements, and...
- 4.5 Research past, present, and projected technological advances as they impact a particular pathway.
- 4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.
- 5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)
- 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
- 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
- 5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
- 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
- 10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6)
- 10.1 Interpret and explain terminology and practices specific to the Building and Construction Trades sector.
- 10.2 Comply with the rules, regulations, and expectations of all aspects of the Building and Construction Trades sector.
- 10.3 Construct projects and products specific to the Building and Construction Trades sector requirements and expectations.
- 10.4 Collaborate with industry experts for specific technical knowledge and skills.
- 10.5 Demonstrate the basic care, proper maintenance, and use of hand, portable, and stationary tools related to the Building and Construction trades.

**Residential and Commercial Construction Pathway Standards:**
- D2.0 Apply the appropriate mathematical calculations used in the construction trades.

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Finally, students will incorporate each into a multimedia presentation.
• D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.
• D2.2 Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
• D2.3 Estimate the materials needed to complete a specific task.
• D2.4 Determine the total developed length of the water supply piping system.
• D2.5 Calculate the residual pressure at the highest outlet per the requirements of the Plumbing Code.
• D2.6 Calculate the total fixture unit demand from the fixtures indicated on the construction drawings using the tables of the plumbing code.
• D2.7 Calculate the proper slope for drain, waste and vent (DWV) piping.
• D2.8 Apply Ohm's Law to calculate resistance, current flow, and voltage in series, parallel, and combination circuits.
• D2.9 Calculate the load on an electrical system from general lighting and small and large appliances.
• D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
• D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
• D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
• D3.3 Interpret technical drawings specifications.
• D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
• D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
• D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
• D3.7 Understand the sequencing and phases of residential and commercial construction projects.
• D5.0 Demonstrate foundation layout techniques to include setting forms, placing reinforcements, and placing concrete according to construction drawings, specifications, and building codes.
• D5.1 Describe the sequencing procedures for placing large and small slabs.
• D5.2 Demonstrate how to establish elevations for concrete structures.
• D5.3 Lay out location and elevation of concrete/masonry structures based on construction drawings.
● D5.4 Develop a material take-off in accordance with construction drawings and specifications.
● D5.5 Lay out location for reinforcements, expansion joints, openings, and embedded items based on construction drawings, specifications, and building codes.

Standards for Mathematical Practice:

● 2. **Reason abstractly and quantitatively:** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

● 4. **Model with mathematics:** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an additional equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
### Unit 4: Materials and Estimation

**Unit Description**

In this unit, students will learn materials estimation for lumber, fasteners, and concrete. They will explore and compare the various types of lumber, fasteners, and concrete used in construction as a function of their specific use. Students will engage in a variety of projects requiring them to calculate specific quantities and costs of materials and supplies (to include the current tax rate) and a dimensional cut list. They will write estimates which include sketches and generate parts lists. Additionally, students will explore the various types of lumber, lumber grading, engineered lumber, adhesives, and materials handling procedures.

**Unit Outline**

<table>
<thead>
<tr>
<th>Standards</th>
<th>Learning Objectives</th>
<th>Essential Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College and Career Readiness Anchor Standards for Reading:</strong></td>
<td>Students will…</td>
<td>1. What considerations are included in cost estimation of materials?</td>
</tr>
<tr>
<td>• Reading Standard: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CCSS.ELA-LITERACY.RST.11-12.7)</td>
<td>• understand how to estimate the cost of materials (lumber, fasteners, concrete, etc.) for a project and conduct associated real-time calculations.</td>
<td>2. What types of documentation are needed to support the process of bids and cost estimation in this industry?</td>
</tr>
<tr>
<td>• Reading Standard: Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CCSS.ELA-LITERACY.RST.11-12.8)</td>
<td>• generate industry-standard documentation including estimates, bids, and parts lists.</td>
<td>3. Under what circumstances would certain graded materials be more appropriate than others?</td>
</tr>
<tr>
<td>• Reading Standard: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CCSS.ELA-LITERACY.RST.11-12.9)</td>
<td>• identify necessary materials to complete a specific task.</td>
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</tr>
<tr>
<td><strong>Building and Construction Trades- Knowledge and Performance Anchor Standards:</strong></td>
<td>• use communication skills effectively to engage in an industry business transaction.</td>
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<tr>
<td>• 2.0 Communications: Acquire and accurately use Building and Construction Trades sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)</td>
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<tr>
<td>• 2.1 Recognize the elements of communication using a sender–receiver model.</td>
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<td>• 2.2 Identify barriers to accurate and appropriate communication.</td>
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<td>• 2.3 Interpret verbal and nonverbal communications and respond appropriately.</td>
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<tr>
<td>• 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.</td>
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</table>

**Sample Performance Tasks/Assessments**

- **Materials Cost:** In this assignment, students will be required to estimate cost for (also known as “cost out”) a variety of construction tasks including the amount of gravel rock and retaining blocks required to build a retaining wall, the amount of engineered wood flooring required for a home renovation, and the amount of sheetrock required for a new home construction. Students will work in pairs and research the cost of the various types of building materials used, as well as identify the hand and power tools needed for each given task. They will be required to research costs on line and by calling lumber stores/suppliers, and apply formulas to determine area and volume, and lineal, board, and square feet of required materials.

- **Bid Proposal:** In this assignment, students will calculate the cost of constructing a concrete slab and present a bid proposal to a customer (class). Calculations will include the required amount and cost of concrete.
● 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
● 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
● 4.0 Technology: Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)
● 4.1 Use electronic reference materials to gather information and produce products and services.
● 4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.
● 4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.
● 4.4 Discern the quality and value of information collected using digital technologies and recognize bias and intent of the associated sources.
● 4.5 Research past, present, and projected technological advances as they impact a particular pathway.
● 4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.
● 5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)
● 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
● 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

and rebar, forming and set costs, labor costs, profit, and overhead. Students will include the specifications and dimensions on a plan sheet, organize the data in a proposal form, and make an oral presentation to their prospective customer (the class).
| 5.3 | Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment. |
| 5.4 | Interpret information and draw conclusions, based on the best analysis, to make informed decisions. |
| 10.0 | Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6) |
| 10.1 | Interpret and explain terminology and practices specific to the Building and Construction Trades sector. |
| 10.2 | Comply with the rules, regulations, and expectations of all aspects of the Building and Construction Trades sector. |
| 10.3 | Construct projects and products specific to the Building and Construction Trades sector requirements and expectations. |
| 10.4 | Collaborate with industry experts for specific technical knowledge and skills. |
| 10.5 | Demonstrate the basic care, proper maintenance, and use of hand, portable, and stationary tools related to the Building and Construction trades. |
| 11.0 | Demonstration and Application: Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations. |
| 11.1 | Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Building and Construction Trades sector program of study. |
| 11.2 | Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level. |
| 11.3 | Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures. |
| 11.4 | Employ entrepreneurial practices and behaviors appropriate to Building and Construction Trades sector opportunities. |
- 11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

**Residential and Commercial Construction Pathway Standards:**

- D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.
- D1.1 Understand significant historical trends in the construction industry.
- D1.2 Understand the environmental regulations that influence residential and commercial design.
- D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.
- D2.0 Apply the appropriate mathematical calculations used in the construction trades.
- D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.
- D2.7 Calculate the proper slope for drain, waste and vent (DWV) piping.
- D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
- D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
- D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
- D3.3 Interpret technical drawings specifications.
- D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
- D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
- D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
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|   | *D3.7 Understand the sequencing and phases of residential and commercial construction projects.*  
|   | *D4.0 Demonstrate techniques for proper site preparation.*  
|   | *D4.1 Use leveling devices to check for elevation, level, and plumb.*  
|   | *D4.2 Demonstrate how to establish grades using survey instruments.*  
|   | *D4.3 Install batter boards.*  
|   | *D4.4 Check site layout for square using the diagonal method.*  
|   | *D4.5 Describe excavation and backfill methods.*  
|   | *D4.6 Identify different methods and equipment used for compaction.*  
|   | *D4.7 Identify types of backfill materials and how they are used.*  
|   | *D5.0 Demonstrate foundation layout techniques to include setting forms, placing reinforcements, and placing concrete according to construction drawings, specifications, and building codes.*  
|   | *D5.1 Describe the sequencing procedures for placing large and small slabs.*  
|   | *D5.2 Demonstrate how to establish elevations for concrete structures.*  
|   | *D5.3 Lay out location and elevation of concrete/masonry structures based on construction drawings.*  
|   | *D5.4 Develop a material take-off in accordance with construction drawings and specifications.*  
|   | *D5.5 Lay out location for reinforcements, expansion joints, openings, and embedded items based on construction drawings, specifications, and building codes.*  
|   | *D5.6 Construct, place, and brace forms for concrete as detailed in construction drawings for footings, slab, and raised floors.*  
|   | *D5.7 Place and secure reinforcement as detailed by construction drawings, building codes, and industry standards.*  
|   | *D5.8 Place secure embedded hardware as detailed on construction drawings.*  
|   | *D5.9 Demonstrate proper removal and care of concrete forms.*  
|   | *D5.10 Use appropriate tools and techniques for placing, compacting, screeding, and finishing consolidating concrete in slabs and footings.*  

Standards for Mathematical Practice:

- 2. **Reason abstractly and quantitatively:** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

- 4. **Model with mathematics:** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an additional equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
Unit 5: Electrical Wiring

Unit Description

In this unit, students will learn and apply the skills necessary to complete an electrical system in a single-family residence in accordance with accepted industry standards. Student learning activities will include determining whether or not an electrical circuit is “live,” investigating the concept of “grounding,” and applying grounding techniques for electrical boxes. Students will perform a rough electrical installation and circuit installation, applying their understanding of how adding additional resistors affects the voltage, current, and effective resistance of that particular circuit configuration. Students will also learn the effects of overloading a circuit, as well as apply their understanding of how to detect and prevent this scenario.

Unit Outline

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<td><strong>College and Career Readiness Anchor Standards for Reading:</strong></td>
<td>Students will…</td>
<td>1. How is electricity conducted?</td>
</tr>
<tr>
<td>• Reading Standard: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (CCSS.ELA-LITERACY.RST.11-12.7)</td>
<td>• understand how electricity is conducted.</td>
<td>2. What are the key safety considerations that must be considered when designing an electrical wiring plan?</td>
</tr>
<tr>
<td>• Reading Standard: Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CCSS.ELA-LITERACY.RST.11-12.8)</td>
<td>• design a model electrical wiring plan which includes circuit configuration and appropriate industry symbols.</td>
<td>3. What plans can be created to support the appropriate amperage availability in key areas of a structure?</td>
</tr>
<tr>
<td>• Reading Standard: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CCSS.ELA-LITERACY.RST.11-12.9)</td>
<td>• consider the maximum load formula in the design and planning of all construction projects.</td>
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</tr>
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<td><strong>Building and Construction Trades- Knowledge and Performance Anchor Standards:</strong></td>
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<td>• 4.0 Technology: Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)</td>
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<td>• 4.1 Use electronic reference materials to gather information and produce products and services.</td>
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<tr>
<td><strong>Sample Performance Tasks/Assessments</strong></td>
<td>Design a Kitchen Electrical Wiring Plan: In this assignment, students will apply their understanding of circuits and circuit configuration by designing a kitchen electrical wiring plan to industry standards using appropriate electrical symbols. The wiring plan will include three main types of circuits: general lighting, small appliance, and permanent (or large) appliance. The size of the kitchen will be 16’ x 12’ and contain 3 walls: one exterior wall with a window and 2 interior walls, one of which contains an interior door. When planning the kitchen wiring, students will take into account these appliances: built-in double electric oven, electric stovetop, refrigerator, microwave, dishwasher, garbage disposal, garbage compactor, recessed ceiling lighting, outlets for two small appliances, and 3 extra outlets. Students will research the electrical specifications for each appliance and light fixture, determine the appropriate amperage for each of the circuits, the load for each circuit, and include GFCI protection where required. Students will use the maximum load formula to determine the maximum “continuous” load that each circuit can handle.</td>
<td></td>
</tr>
</tbody>
</table>
4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.

4.4 Discern the quality and value of information collected using digital technologies and recognize bias and intent of the associated sources.

4.5 Research past, present, and projected technological advances as they impact a particular pathway.

4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

6.0 Health and Safety: Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Building and Construction Trades sector workplace environment. (Direct alignment with RSTS 9-10, 11-12.4)

6.1 Interpret policies, procedures, and regulations for the workplace environment, including employer and employee responsibilities.
● 6.2 Use health and safety practices for storing, cleaning, and maintaining tools, equipment, and supplies.
● 6.3 Set up a work area, or shop, to avoid potential health concerns and safety hazards, including but not limited to electrical (shock), wires (tripping), fumes (lung health), noise (hearing loss), fire (burns), and so forth, incorporating ergonomics.
● 6.4 Practice personal safety when lifting, bending, or moving equipment and supplies.
● 6.5 Demonstrate how to prevent and respond to work-related accidents or injuries; this includes demonstrating an understanding of ergonomics.
● 6.6 Maintain a safe and healthful working environment.
● 6.7 Be informed of laws/acts pertaining to the Occupational Safety and Health Administration (OSHA).
● 6.8 Report hazards found on the job site to supervisor/teacher.
● 6.9 Locate, and adhere to, Material Safety Data Sheet (MSDS) instructions.
● 6.10 Maintain proper use of safety apparel at all times, including but not limited to, eye protection, hearing protection, skin protection, head protection, footwear and protection from airborne particulate matter.
● 6.11 Comply with the safe handling, storage and disposal of chemicals, materials and adhesives in accordance with local, state, and federal safety and environmental regulations (OSHA, Environmental Protection Agency [EPA], Hazard Communication [HazCom], Material Safety Data Sheets [MSDS], etc.).
● 6.12 Demonstrate the proper care and safe use of hand, portable and stationary power tools.
● 10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6)
● 10.1 Interpret and explain terminology and practices specific to the Building and Construction Trades sector.
● 10.2 Comply with the rules, regulations, and expectations of all aspects of the Building and Construction Trades sector.
• 10.3 Construct projects and products specific to the Building and Construction Trades sector requirements and expectations.
• 10.4 Collaborate with industry experts for specific technical knowledge and skills.
• 10.5 Demonstrate the basic care, proper maintenance, and use of hand, portable, and stationary tools related to the Building and Construction trades.
• 11.0 Demonstration and Application: Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.
• 11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Building and Construction Trades sector program of study.
• 11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.
• 11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.
• 11.4 Employ entrepreneurial practices and behaviors appropriate to Building and Construction Trades sector opportunities.
• 11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

**Residential and Commercial Construction Pathway Standards:**

• D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.
• D1.1 Understand significant historical trends in the construction industry.
• D1.2 Understand the environmental regulations that influence residential and commercial design.
• D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.
• D2.0 Apply the appropriate mathematical calculations used in the construction trades.
• D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.
• D2.2 Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
• D2.3 Estimate the materials needed to complete a specific task.
• D2.8 Apply Ohm’s Law to calculate resistance, current flow, and voltage in series, parallel, and combination circuits.
• D2.9 Calculate the load on an electrical system from general lighting and small and large appliances.
• D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.
• D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
• D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
• D3.3 Interpret technical drawings specifications.
• D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
• D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
• D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
• D3.7 Understand the sequencing and phases of residential and commercial construction projects.
• D9.0 Understand, integrate, and employ sustainable construction practices in the building trades.
• D9.1 Identify design and energy solutions for improving building energy efficiency.
• D9.2 Identify materials used in building construction to increase energy efficiency and sustainability.
● D9.3 Calculate energy requirements and loads for buildings and structures.
● D9.4 Demonstrate the application of constructing materials intended to improve building efficiency and sustainability.
● D9.5 Analyze and evaluate buildings for energy efficiency and performance.
● D9.6 Develop solutions to improve building energy performance and efficiency.

● D11.0 Demonstrate skills necessary to complete an electrical system in a single-family residence in accordance with accepted industry standards.
  ● D11.1 Determine whether or not an electrical circuit is “live.”
  ● D11.2 Prepare rough framing for the installation of electrical cables and conduit.
  ● D11.3 Lay out components to the tolerances indicated on the construction drawings, specifications, and government codes.
  ● D11.4 Install typical devices, junction boxes, and panels.
  ● D11.5 Install lighting and ceiling fan support boxes according to the National Electrical Code (NEC).
  ● D11.6 Install conduit typical of residential construction and pull conductors through conduit as required by the NEC.
  ● D11.7 Splice and tap conductors for the installation of fixtures and devices.
  ● D11.8 Install low voltage control and communication cables.
  ● D11.9 Demonstrate grounding techniques for all electrical boxes, cabinets, and enclosures.
  ● D11.10 Terminate electrical connections to receptacles, switches, lighting fixtures, large appliances, and other devices.
  ● D11.11 Select receptacles and switches based on load requirements.
  ● D11.12 Terminate equipment grounding and neutral conductor at the electrical service.
  ● D11.13 Terminate communication and control wiring.

**Standards for Mathematical Practice:**
● 2. Reason abstractly and quantitatively: Mathematically proficient students make sense of quantities and their relationships in
problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

4. **Model with mathematics**: Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an additional equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
### Unit Description

In this unit, students will learn the fundamentals of roof design and construction. Students will identify roof styles and cut and install roof rafters for several roof systems. They will define common roof framing terms, solve roof framing problems using the framing square, explore ventilation, and determine rafter length calculations, material estimations, and span calculations.

### Unit Outline

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- Reading Standard: Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. ([CCSS.ELA-LITERACY.RST.11-12.7](https://www.corestandards.org/))  
- Reading Standard: Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. ([CCSS.ELA-LITERACY.RST.11-12.8](https://www.corestandards.org/))  
- Reading Standard: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. ([CCSS.ELA-LITERACY.RST.11-12.9](https://www.corestandards.org/)) | Students will…  
- demonstrate their understanding of building phases and techniques.  
- follow the parameters dictated by a blueprint.  
- use mathematical skills to recommend slope for a roof.  
- identify the appropriate materials and costs needed in order to complete an industry project.  
- demonstrate use of trade tools to lay out and cut rafters and assemble a structure. | 1. What phases are involved in roof and ceiling framing?  
2. In what ways can the slope of a roof impact the structural integrity of a structure?  
3. What considerations can help to ensure the appropriate purchase of materials and minimal waste in the roofing process? |
| **Building and Construction Trades- Knowledge and Performance Anchor Standards:**  
- 4.0 Technology: Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)  
- 4.1 Use electronic reference materials to gather information and produce products and services.  
- 4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.  
- 4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources. | **Sample Performance Tasks/Assessments**  
- Construct a Waterproof Roof Structure for a Wood-Frame Building: In this assignment, students will demonstrate their understanding of building phases and techniques while constructing a roof structure. Students will be given the specifications for a roof and using a roof pitch chart as reference, will determine the roof slope by using the run/rise ratio and the Pythagorean theorem. Students will also calculate rafter length using the Pythagorean theorem. Students will then create a spreadsheet detailing all materials, dimensions, weight, and costs associated with building the roof. Next, students will create a blueprint of the given roof at $\frac{1}{4}" = 1'$ scale using the appropriate industry standard symbols. Finally, students will divide into work groups, lay out and cut the rafters using portable power tools, and then assemble the structure according to building code. |
4.4 Discern the quality and value of information collected using digital technologies and recognize bias and intent of the associated sources.

4.5 Research past, present, and projected technological advances as they impact a particular pathway.

4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the Building and Construction Trades sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6)

10.1 Interpret and explain terminology and practices specific to the Building and Construction Trades sector.

10.2 Comply with the rules, regulations, and expectations of all aspects of the Building and Construction Trades sector.

10.3 Construct projects and products specific to the Building and Construction Trades sector requirements and expectations.
• 10.4 Collaborate with industry experts for specific technical knowledge and skills.
• 10.5 Demonstrate the basic care, proper maintenance, and use of hand, portable, and stationary tools related to the Building and Construction trades.
• 11.0 Demonstration and Application: Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.
• 11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Building and Construction Trades sector program of study.
• 11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.
• 11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.
• 11.4 Employ entrepreneurial practices and behaviors appropriate to Building and Construction Trades sector opportunities.
• 11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

Residential and Commercial Construction Pathway Standards:
• D2.0 Apply the appropriate mathematical calculations used in the construction trades.
• D2.1 Apply formulas to determine area, volume, lineal, board, and square feet.
• D2.2 Apply the Pythagorean Theorem to calculate pipe offsets, roof slope, and check for square.
• D2.3 Estimate the materials needed to complete a specific task.
• D2.4 Determine the total developed length of the water supply piping system.
<p>| | |</p>
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<tr>
<td>D2.5 Calculate the residual pressure at the highest outlet per the requirements of the Plumbing Code.</td>
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<td>D2.6 Calculate the total fixture unit demand from the fixtures indicated on the construction drawings using the tables of the plumbing code.</td>
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<tr>
<td>D2.7 Calculate the proper slope for drain, waste and vent (DWV) piping.</td>
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<td>D3.0 Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.</td>
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<td>D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.</td>
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<td>D3.7 Understand the sequencing and phases of residential and commercial construction projects.</td>
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<tr>
<td>D6.0 Demonstrate carpentry techniques for the construction of a single-family residence.</td>
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<tr>
<td>D6.1 Properly place a moisture barrier and pest control guard on a foundation.</td>
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<td>D6.2 Attach a sill plate at top of concrete foundation.</td>
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<td>D6.3 Lay out, cut, and install joist supports, rim joists, and floor joists as specified on construction plans.</td>
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<td>D6.4 Install a subfloor.</td>
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<td>D6.5 Demonstrate wall and plate layout, including rough openings.</td>
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<td>D6.6 Measure, cut, and assemble wall components using appropriate tools and fasteners.</td>
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<td>D6.7 Demonstrate the ability to square wall systems and install wall bracing and shear panels according to code.</td>
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<td>D6.8 Stand, square, plumb, and brace walls.</td>
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<td>D6.9 Describe the applications and uses of metal stud framing.</td>
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<td>D6.10 Lay out, cut, and install ceiling joists and common and jack rafters.</td>
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<td>D6.11 Frame and erect shed and gable roof systems.</td>
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<td>D6.12 Lay out and install trusses “on-center” with specified hardware.</td>
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<td>D6.13 Install appropriate blocking, bracing, lookouts, fascia, and drip edge.</td>
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<td>D6.14 Frame for roof penetrations and attic access.</td>
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<td>D6.15 Apply roof sheathing and install appropriate flashings.</td>
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<tr>
<td>D6.16 Understand different roofing materials and methods of application.</td>
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**Standards for Mathematical Practice:**

- **2. Reason abstractly and quantitatively:** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

- **4. Model with mathematics:** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an additional equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity changes when another quantity changes.
of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
### Unit 7: Green Technology

#### Unit Description
This unit introduces students to the concepts and best practices related to sustainable building design and construction. Students will study green technology including building codes and practices, building materials, insulation (R value) technology, and industry standards. Unit topics will also include environmental regulations, alternative energy sources, conservation methods, and environmental impact. Students will explore green construction career pathways, research industry certifications needed to work in the green technology industry and locate a variety of local colleges and courses that offer programs in their desired path.

#### Unit Outline

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- **Reading Standard:** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. ([CCSS.ELA-LITERACY.RST.11-12.8](#))
- **Reading Standard:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. ([CCSS.ELA-LITERACY.RST.11-12.9](#))

**Building and Construction Trades- Knowledge and Performance Anchor Standards:**
- 2.0 Communications: Acquire and accurately use Building and Construction Trades sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)
  - 2.1 Recognize the elements of communication using a sender–receiver model.
  - 2.2 Identify barriers to accurate and appropriate communication.
  - 2.3 Interpret verbal and nonverbal communications and respond appropriately.
  - 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.

**Learning Objectives**
- Students will...
  - research green technology concepts and best practices related to sustainable building design and construction.
  - identify green construction career pathways that may be an appropriate fit for them.
  - draft a letter and speech with integrated research findings focused on how to reduce carbon footprint for a formal audience.

**Essential Questions**
1. How are best practices and technologies evolving in the green technology field in a way that impacts construction?
2. Which regulations and reports should be considered when applying for industry permits?
3. Which careers in this field might be a good fit for my interests?

#### Sample Performance Tasks/Assessments
- **Green Garden Shed:** In this assignment, students will work in groups to research and construct a green garden shed that incorporates a rainwater recovery system and an organic waste composting system. Students will use reclaimed lumber and install a solar energy panel. Students will also provide a detailed analysis of green materials used vs traditional materials, their associated costs, and techniques used for construction/installing and present their findings for peer review.
- **State of Emergency:** Climate Change in California: Students will read a series of informational text resources related to the science of climate change. Students will then complete an assignment in which the governor of California has declared a state of emergency...
- 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
- 5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Building and Construction Trades sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)
- 5.1 Identify and ask significant questions that clarify various points of view to solve problems.
- 5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.
- 5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.
- 5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.
- 8.0 Ethics and Legal Responsibilities: Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d)
- 8.1 Access, analyze, and implement quality assurance standards of practice.
- 8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Building and Construction Trades industry sector.
- 8.3 Demonstrate ethical and legal practices consistent with Building and Construction Trades sector workplace standards.
- 8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.
- 8.5 Analyze organizational culture and practices within the workplace environment.
- 8.6 Adhere to copyright and intellectual property laws and regulations and use and appropriately cite proprietary information.

and is asking all of the residents to calculate their carbon footprint. In this assignment, students will write a reference letter back to the governor explaining what their carbon footprint is as well as the steps they will take to reduce their carbon footprint. Students will then draft a speech and present their findings, and evidence to reduce their carbon footprint, at a city council meeting.
8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Building and Construction Trades sector laws and practices.

9.0 Leadership and Teamwork: Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the career technical student organization. (Direct alignment with SLS 11-12.1b)

9.1 Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.

9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills as applied in groups, teams, and career technical student organization activities.

9.3 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.

9.4 Explain how professional associations and organizations and associated leadership development and competitive career development activities enhance academic preparation, promote career choices, and contribute to employment opportunities.

9.5 Understand that the modern world is an international community and requires an expanded global view.

9.6 Respect individual and cultural differences and recognize the importance of diversity in the workplace.

9.7 Participate in interactive teamwork to solve real Building and Construction Trades sector issues and problems.

Residential and Commercial Construction Pathway Standards:

D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.

D1.1 Understand significant historical trends in the construction industry.

D1.2 Understand the environmental regulations that influence residential and commercial design.

D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.
● D3.1 Identify the elements used in technical drawings, including types of lines, symbols, details, and views.
● D3.2 Identify and interpret the elements of technical drawings, including plan, elevation, section, and detail views.
● D3.3 Interpret technical drawings specifications.
● D3.4 Identify plumbing, electrical, and mechanical symbols and other abbreviations used in construction drawings.
● D3.5 Interpret and scale dimensions from a set of plans using an architect’s scale.
● D3.6 Interpret sectional and detail drawings to determine construction details such as corners, rough openings, stairs, and roof systems.
● D3.7 Understand the sequencing and phases of residential and commercial construction projects.
● D9.0 Understand, integrate, and employ sustainable construction practices in the building trades.
● D9.1 Identify design and energy solutions for improving building energy efficiency.
● D9.2 Identify materials used in building construction to increase energy efficiency and sustainability.
● D9.3 Calculate energy requirements and loads for buildings and structures.
● D9.4 Demonstrate the application of constructing materials intended to improve building efficiency and sustainability.
● D9.5 Analyze and evaluate buildings for energy efficiency and performance.
● D9.6 Develop solutions to improve building energy performance and efficiency.
● D10.0 Demonstrate skills necessary to complete a plumbing system in a single-family residence in accordance with accepted industry standards.

Standards for Mathematical Practice:

● 2. Reason abstractly and quantitatively: Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without
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## Unit 8: Preparing for a Career in Construction

### Unit Description
In this unit, students will explore the expectations of professional conduct in the construction industry, including personal qualities of workers and attention to personal presentation. Students will focus on the importance of teamwork and the components of effective leadership. Students will review the multiple career paths available in construction and understand the process of looking and applying for a job; this will include an overview of the education and credentialing requirements and how to navigate the application process.

### Unit Outline

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<td>• create a resume which showcases their potential as well as a complete application representing their skills, experience, and educational background.</td>
<td>2. What skills are needed in different workplaces?</td>
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<td>• establish a professional social media presence appropriate to the construction industry.</td>
<td>3. How can social media be leveraged to benefit my work in the construction industry?</td>
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<td>• <strong>Reading Standard:</strong> Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CCSS.ELA-LITERACY.RST.11-12.9)</td>
<td>• justify the expectations of different types of behavior, attire, and professionalism in the construction industry.</td>
<td>4. What personal/professional presentation is expected in this field?</td>
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<td><strong>Building and Construction Trades- Knowledge and Performance Anchor Standards:</strong></td>
<td>• participate in mock job interviews.</td>
<td>5. How are professional goals created and reached?</td>
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<td><strong>Sample Performance Tasks/Assessments</strong></td>
<td><strong>Social Media Professional Portfolio:</strong> In this two-part assignment, students will perform a social media audit and develop their professional social media portfolio to prepare for a job in the construction industry. Additionally, students will understand the potential pitfalls created when employers review social media platforms that do not flatter a job applicant.</td>
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<td>• 2.1 Recognize the elements of communication using a sender–receiver model.</td>
<td>○ <strong>Part 1: Social Media Audit:</strong> In the social media self-audit, students will assess their presence on social media platforms. Their audit will consider their intended audience of each platform and what story their shared information is telling people about them. Students will then write a proposal for improving their social media presence in light of a future career in the construction industry.</td>
<td><strong>Essential Questions</strong></td>
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<td>• 2.3 Interpret verbal and nonverbal communications and respond appropriately.</td>
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<td>• 2.4 Demonstrate elements of written and electronic communication such as accurate spelling, grammar, and format.</td>
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<td>3. How can social media be leveraged to benefit my work in the construction industry?</td>
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• 2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
• 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.
• 3.0 Career Planning and Management: Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)
• 3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.
• 3.2 Evaluate personal character traits such as trust, respect, and responsibility and understand the impact they can have on career success.
• 3.3 Explore how information and communication technologies are used in career planning and decision making.
• 3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.
• 3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning.
• 3.6 Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.
• 3.7 Recognize the importance of small business in the California and global economies.
• 3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.
• 3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.
• 4.0 Technology: Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Building and Construction Trades sector workplace environment. (Direct alignment with WS 11-12.6)
• 4.1 Use electronic reference materials to gather information and produce products and services.
• 4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.

○ Part 2: Professional Social Media Portfolio: In part 2 of this assignment, students will finalize a professional social media portfolio that demonstrates their social media capabilities and uses selected social media channels. Students will consider how they want to appear electronically to potential employers, relative to everyone else seeking a similar position. The social media portfolio will demonstrate their potential through a collection of digital artifacts articulating experiences, achievements, and learning. Students will aim for an impactful business profile that links to other media, including but not limited to a blog and Twitter account.
| 4.3 | Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources. |
| 4.4 | Discern the quality and value of information collected using digital technologies and recognize bias and intent of the associated sources. |
| 4.5 | Research past, present, and projected technological advances as they impact a particular pathway. |
| 4.6 | Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task. |
| 8.0 | Ethics and Legal Responsibilities: Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d) |
| 8.1 | Access, analyze, and implement quality assurance standards of practice. |
| 8.2 | Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Building and Construction Trades industry sector. |
| 8.3 | Demonstrate ethical and legal practices consistent with Building and Construction Trades sector workplace standards. |
| 8.4 | Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace. |
| 8.5 | Analyze organizational culture and practices within the workplace environment. |
| 8.6 | Adhere to copyright and intellectual property laws and regulations and use and appropriately cite proprietary information. |
| 8.7 | Conform to rules and regulations regarding sharing of confidential information, as determined by Building and Construction Trades sector laws and practices. |
| 11.0 | Demonstration and Application: Demonstrate and apply the knowledge and skills contained in the Building and Construction Trades anchor standards, pathway standards, and performance
indicators in classroom, laboratory, and workplace settings, and through the career technical student organizations.

- 11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Building and Construction Trades sector program of study.
- 11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.
- 11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.
- 11.4 Employ entrepreneurial practices and behaviors appropriate to Building and Construction Trades sector opportunities.
- 11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

Residential and Commercial Construction Pathway Standards:
- D1.0 Recognize the impact of financial, technical, environmental, and labor trends on the past and future of the construction industry.
- D1.1 Understand significant historical trends in the construction industry.
- D1.2 Understand the environmental regulations that influence residential and commercial design.
- D1.3 Demonstrate knowledge of the California Environmental Quality Act (CEQA) and Environmental Impact Review (EIRs) impacts on residential and commercial construction.

Standards for Mathematical Practice:
- 2. **Reason abstractly and quantitatively:** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they
have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

- **Model with mathematics:** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an additional equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.