

Building Construction I
Unit 1: Safety
Essential Questions: What should you know in order to work safely in this occupational area?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
Voc. Tech Ed 1. A Define health and safety regulations.	<p>Identify and apply OSHA and other health and safety regulations that apply to specific tasks and jobs in the occupational area.</p> <p>Identify and apply Right-To-Know (Hazard Communication Policy) and other communicative regulations that apply to specific tasks and jobs in the occupational area.</p> <p>Explain procedures for documenting and reporting hazards to appropriate authorities.</p> <p>List penalties for non-compliance with appropriate health and safety regulations.</p> <p>Identify contact information for appropriate health and safety agencies and resources.</p> <p>Describe the history, function and importance of the Occupational Safety and Health Administration (OSHA).</p>	<p>Student survey</p> <p>Safety policy</p> <p>Clean up list</p> <p>Writing across the curriculum handouts</p> <p><u>Carpentry</u>, Vogt</p> <p>OSHA materials</p>	<p>Discussion</p> <p>Descriptions</p> <p>Classifications</p> <p>Journal</p> <p>Modeling</p> <p>Note-taking</p> <p>Oral Presentation</p> <p>Step by step sequencing</p>	<p>Journal</p> <p>Writing across the curriculum assignments</p> <p>On/off site performance evaluation</p> <p>Safety tests</p>
Voc. Tech Ed 1. B Demonstrate health and safety practices.	<p>Identify, describe and demonstrate the effective use of Material Safety Data Sheets (MSDS).</p> <p>Read chemical, product, and equipment labels to determine appropriate health and safety considerations.</p> <p>Identify, describe and demonstrate personal, shop and job site safety practices and procedures.</p> <p>Demonstrate safe dress and use of relevant safety gear and personal protective equipment (PPE),</p>	<p>Sample MSDS sheets</p> <p>Proper attire</p> <p>Gloves</p> <p>Boots</p> <p>Ear protection</p> <p>Eye protection</p> <p>Respirators</p> <p>Fall protection harness</p> <p>Shop fire extinguishers</p>	<p>Discussion</p> <p>Descriptions</p> <p>Classifications</p> <p>Journal</p> <p>Modeling</p> <p>Note-taking</p> <p>Oral Presentation</p> <p>Step by step sequencing</p>	<p>Journal Assessment</p> <p>Writing across the curriculum assignments</p> <p>On/off site performance evaluation</p> <p>Safety tests</p>

	<p>including wrist rests, adjustable workspaces and equipment, gloves, boots, earplugs, eye protection, and breathing apparatus. Illustrate appropriate safe body mechanics, including proper lifting techniques and ergonomics. Locate emergency equipment in your lab, shop, and classroom, including (where appropriate) eyewash stations, shower facilities, sinks, fire extinguishers, fire blankets, telephone, master power switches, and emergency exits. Demonstrate the safe use, storage, and maintenance of every piece of equipment in the lab, shop, and classroom. Describe safety practices and procedures to be followed when working with and around electricity. Properly handle, store, dispose of, and recycle hazardous, flammable, and combustible materials. Demonstrate proper workspace cleaning procedures. Identify and describe ladder and scaffold safety practices and procedures. Use and maintain fall arrest systems. Identify and describe standard precautions for blood borne pathogens and the procedures for responding to and reporting exposure.</p>	<p>Exit signs Emergency shut off switch Sinks Telephone Nonflammable cabinet Ladder Staging sections Latex gloves Rags for demos Brooms Trash barrels Dust pan Wisk brooms Shop vac Respirators</p>		
<p>Voc. Tech Ed 1. C Demonstrate responses to situations that threaten health and safety.</p>	<p>Illustrate First Aid procedures for potential injuries and other health concerns in the occupational area. Describe the importance of emergency preparedness and an emergency action plan. Illustrate procedures used to handle emergency situations and accidents, including identification, reporting, response, evacuation plans, and follow-up procedures. Identify practices used to avoid accidents.</p>	<p>Latex gloves First aid kit Evacuation plan</p>	<p>Discussion Descriptions Classifications Journal Modeling Note-taking Oral Presentation Step by step sequencing</p>	<p>Journal Assessment Writing across the curriculum assignments On/off site performance evaluation Safety tests</p>

	Identify and describe fire protection, precautions and response procedures. Discuss the role of the individual and the company/organization in ensuring workplace safety. Discuss ways to identify and prevent workplace/school violence.			
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Unit 2: Read and Interpret Prints
Essential Questions: How do you interpret a set of building plans?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
Voc. Tech Ed 2.A Read and interpret prints.	Explain the basic layout of a set of prints as well as the importance of the accompanying job specifications document. Recognize and identify basic print terms, abbreviations, line types, symbols and notes. Interpret and follow drawing dimensions. Determine true measurements from a print using an Architect's scale. Read and interpret plan, elevation, section and detail views and schedules.	Plans for on/off-site projects Drafting definitions handout Architect's ruler <u>Carpentry</u> , Vogt	Action project Authentic instruction-real plans for actual projects Collaborative Learning Demonstration Discussion Formulas Higher order thinking skills Measuring Managing Pair project Scale drawings Whole to part Word banks	Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/off site performance evaluation

Unit 3: Demonstrate the fundamentals of carpentry.
Essential Questions: What is the most effective carpentry technique used to solve a specific problem?
What would a Master Carpenter do to complete this task?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
Voc. Tech Ed 2.B Demonstrate the fundamentals of carpentry.	Identify building materials and describe their applications. Identify engineered building materials and describe their application. Illustrate of pre-fabricated panelized construction systems and techniques. Read and interpret construction blueprints, working drawings and building codes. Estimate needs, costs, and quantity of building materials. Apply basic carpentry math principles. Demonstrate measuring and layout procedures and applications. Explain proper storage methods for lumber. Install batter boards. Set ground and corner stakes. Check materials for square, plumb, and level.	Carpentry, Vogt <u>Fine Homebuilding</u> <u>Journal of light construction</u> <u>Mass State Building Code</u> Samples of dimensional lumber Samples of engineered lumber Plans for off-site projects Batter boards String Tape measure Framing square Calculator Stakes Sledge hammer Level On/off-site project	Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on Known to unknown Modeling Measuring Performance of skills Practice Routine Skill inventory	Journal assessments (Writing across the curriculum assignments Quiz based on plans and classroom experiences Off/ on site performance evaluation

Unit 4: Use hand tools.
Essential Questions: How do you use hand tools safely and effectively?
How can I apply hand tool skill to solve problems?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
Voc. Tech Ed 2.C Use hand tools.	Demonstrate use and maintenance of layout, marking, and measuring tools. Demonstrate use and maintenance of fastening, clamping and dismantling tools. Demonstrate use and maintenance of sawing tools. Demonstrate use and maintenance of drilling and boring tools. Demonstrate use and maintenance	Framing square, sliding t bevel, speed square, tape measure, cat's paw, pry-bars, c clamps, bar clamps, ratchet straps, wood clamps, pull saw, hack saw, flush cut saw, rip saw, cross cut saw, Block planes, framing chisels, sharpening stones, files, nail set	Activating prior knowledge Authentic instruction-work on projects on/off site Community work Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on Known to unknown Modeling Measuring	Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences Off/on site performance evaluation

Unit 5: Operate power tools.
Essential Questions: How do you safely and effectively operate these common power tools?
What is the most effective and appropriate power tool for completing a given task?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
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<p>Voc. Tech Ed 2.D Operate power tools.</p>	<p>Demonstrate use and maintenance of a portable circular saw. Demonstrate use and maintenance of a portable table saw. Demonstrate use and maintenance of reciprocating saws. Demonstrate use and maintenance of portable drills. Demonstrate use and maintenance of a portable router. Demonstrate use and maintenance of a portable power miter box. Demonstrate use and maintenance of portable sanders. Demonstrate use and maintenance of a screw gun.</p>	<p>Skill saw Makita contractors saw Jig saw Sawzall Cordless drills/ bits Router and cutters Sliding compound miter saw Belt sander Palm sander Compressor with brad nailer, finish nailer, framing nailer, stapler, and coil nailer On/off-site projects</p>	<p>Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on Known to unknown Modeling Measuring Performance of skills Practice Routine</p>	<p>Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/ off- site performance evaluation</p>
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Unit 6: Use and maintain ladders and scaffolds.
Essential Questions: How do you safely set up ladders, pump jacks, and staging?
How do you decide what is the most appropriate staging for a given problem?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
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<p>Voc. Tech Ed 2. E Use and maintain ladders and scaffolds.</p>	<p>Demonstrate use and maintenance of ladders. Identify the safety hazards associated with the use of ladder brackets, and suggest alternatives. Erect tubular pipe staging. Erect light duty rolling scaffolds. Erect pump jack staging. Demonstrate use and maintenance of wall brackets. Demonstrate use and maintenance of roof brackets.</p>	<p>Different size ladders Multiple sections of pipe staging with bracing Staging wheels Set of pump jacks and bracing 2 x 4 legs for pump jacks Wall brackets Roof brackets Off-site project</p>	<p>Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on Known to unknown Modeling Measuring</p>	<p>Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/ off site performance evaluation</p>
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Unit 7: Frame floors and walls
Essential Questions: How do you safely and effectively frame a floor space?
What is the proper and most appropriate method for framing a floor?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
<p>Voc. Tech Ed 2. F Frame floors.</p>	<p>Install sills and girders. Layout and install floor frame. Install floor sheathing.</p>	<p><u>Carpentry</u>, Vogt <u>Fine Homebuilding</u> <u>Journal of light construction</u> <u>Mass State Building Code</u> Based on off-site project Floor framing</p>	<p>Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions</p>	<p>Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/off- site performance evaluation</p>

		members, fasteners, and floor sheathing, 2 x 12 x 12 (stair stringer)	Direct-Interactive Teaching Hands-on Known to unknown Modeling Measuring Performance of skills Practice Routine Skill inventory	
Voc. Tech Ed 2.G Frame walls	Layout walls. Frame walls. Sheathe walls. Erect walls. Frame and sheathe gable ends. Determine opening sizes and components for floors and walls. Determine sizes for door headers. Determine floor and wall framing members.	<u>Carpentry</u> , Vogt <u>Journal of light construction</u> <u>Fine Homebuilding</u> <u>Ma State Building Code</u> Based on off-site project 2 x conventional lumber for wall framing, wall sheathing material and fasteners		Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/ off- site performance evaluation

Unit 9: Frame ceilings and roofs

Essential Questions: How do you safely and effectively frame a ceiling and roof?

What is the proper and most appropriate method for framing a ceiling and roof?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
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Voc. Tech Ed 2.H Frame ceilings and roofs	Layout ceiling and roof frame. Frame ceiling. Layout common rafter. Frame and sheathe gable roof. Layout and install strapping. Explain hip and valley roof construction. Explain roof truss systems.	<u>Carpentry</u> , Vogt Selected articles from <u>Journal of light construction</u> , <u>Fine Homebuilding</u> <u>Ma State Building Code</u> Plans for off-site jobs Materials and plans for shed model	Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on	Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/ off- site performance evaluation
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Unit 10: Finish the exterior
Essential Questions: What is the safest and most effective way to finish the exterior of a structure?
What is the proper and most appropriate method for finishing the exterior of a structure?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
Voc. Tech Ed 2.I Finish the exterior	Install roof trim. Install roofing materials. Install windows and exterior doors. Apply siding and finish trim. Construct porches and decks. Apply caulking and weatherization materials.	<u>Carpentry</u> , Vogt Selected articles from <u>Journal of light construction</u> <u>Ma State Building Code</u> Sample pieces of trim, roofing material, and fasteners Plans for off-site work	Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on	Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/off -site performance evaluation

			Known to unknown Modeling Measuring Performance of skills Practice Routine Skill inventory	
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Unit 11: Finish the interior
Essential Questions: How do you safely and effectively finish the interior of a structure?
What is the proper and most appropriate method for finishing the interior of a structure?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
Voc. Tech Ed 2.J Finish the interior	Install door and window trim. Install underlayment. Level materials using appropriate leveling instruments. Identify basic concrete formwork principles and applications.	<u>Carpentry</u> , Vogt <u>Ma State Building Code</u> Selected articles from <u>Journal of light construction</u> Samples of windows, doors, underlayment, trim, cabinets, laminates, countertops Concrete, wheel barrel, shovel, float, form stock, level	Activating prior knowledge Authentic instruction-work on projects on/off site Community work Cooperative learning Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on Known to unknown Modeling	Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/off- site performance evaluation

Unit 12: Engineering Design
Essential Questions: How do I apply the engineering design process to solve real world problems?

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
<p>Technology/ Engineering 1.0 Engineering Design <i>Central Concepts:</i> Engineering design involves practical problem solving, research, development, and invention/innovation, and requires designing, drawing, building, testing, and redesigning. Students should demonstrate the ability to use the engineering design process to solve a problem or meet a challenge</p>	<p>1.1 Identify and explain the steps of the engineering design process: identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct prototypes and/or models, test and evaluate, communicate the solutions, and redesign. 1.2 Understand that the engineering design process is used in the solution of problems and the advancement of society. Identify examples of technologies, objects, and processes that have been modified to advance society, and explain why and how they were modified. 1.3 Produce and analyze multi-view drawings (orthographic projections) and pictorial drawings (isometric, oblique, perspective), using various techniques. 1.4 Interpret and apply scale and proportion to orthographic projections and pictorial drawings (e.g., 1/4" = 1'0", 1 cm = 1 m). 1.5 Interpret plans, diagrams, and working drawings in the construction of prototypes or models.</p>	<p>Carpentry, Vogt <u>Ma State Building Code</u> Ma. State Frameworks On/ off site Building construction projects, tools, and materials</p>	<p>Activating prior knowledge Authentic instruction-work on projects on/off site Demonstrations Discussion-directions Hands-on Known to unknown Modeling Measuring Performance of skills Practice Routine Skill inventory</p>	<p>Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/off- site performance evaluation</p>

Unit 13: Construction Technologies

Framework Standard	Content / Skills	Resources	Instructional Strategies	Assessments
<p>Technology Engineering 2.0 Construction Technologies The construction process is a series of actions taken to build a structure, including preparing a site, setting a foundation, erecting a structure, installing utilities, and finishing a site. Various materials, processes, and systems are used to build structures. Students should demonstrate and apply the concepts of construction technology through building and constructing either full-size models or scale models using various materials commonly used in construction. Students should demonstrate the ability to use the engineering design process to solve a problem or meet a challenge in construction technology.</p>	<p>2.1 Identify and explain the engineering properties of materials used in structures (e.g., elasticity, plasticity, R value, density, strength). 2.2 Distinguish among tension, compression, shear, and torsion, and explain how they relate to the selection of materials in structures. 2.3 Explain Bernoulli’s principle and its effect on structures such as buildings and bridges. 2.4 Calculate the resultant force(s) for a combination of live loads and dead loads. 2.5 Identify and demonstrate the safe and proper use of common hand tools, power tools, and measurement devices used in construction. 2.6 Recognize the purposes of zoning laws and building codes in the design and use of structures.</p>	<p><u>Carpentry</u>, Vogt <u>Ma State Building Code</u> Ma. State Frameworks</p>	<p>Activating prior knowledge Authentic instruction-work on projects on/off site Audio-visuais Checklist Demonstrations Discussion-directions Direct-Interactive Teaching Hands-on Lunch with the teacher Known to unknown Modeling Measuring Performance of skills Practice One-way lecture Routine Skill inventory Didactic question Directive Model Field trips Journal</p>	<p>Journal assessments Writing across the curriculum assignments Quiz based on plans and classroom experiences On/off- site performance evaluation</p>

