



Wethersfield Public Schools

WHS Curriculum: Construction Technology

Grade(s)	10, 11 & 12	
Unit Title and Purpose	Unit 1: Introduction to Construction Careers Students gain a foundational understanding of the construction industry, including workplace safety, common hazards, employability skills, and career opportunities. The unit sets the stage for deeper exploration of construction practices and prepares students for future coursework and employment pathways.	
Timeframe	3 Days	
Vision of the Graduate		
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit. Students define the problem, brainstorm, research, build prototypes, test, and analyze their solutions. Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal.		
Unit Priority Standards		
<i>Standards in this course are drawn from Connecticut Career & Technical Education Performance Standards & Competencies, 2015; Connecticut State Standards, Technology Education Draft, 2023; and align with the National Center for Construction Education and Research (NCCER) benchmarks.</i> CONS.01.02 Demonstrate and explain knowledge of workplace safety procedures. CONS.01.03 Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in the construction industry. CONS.04.01 Identify proper use and function of hand tools, portable and stationary power tools. CONS.06 Career Exploration: Explore the various career opportunities in construction. CONS.07.01 List and describe the career options available in construction and related fields. CONS.07.02 Compare the educational requirements and duties of the various construction careers.		
Unit Supporting Standards		
ARCH.08 Career Exploration: Explore the various career opportunities in architecture and construction. ARCH.08.01 List and describe the career options available in architecture and residential construction. ARCH.08.02 Compare the educational requirements and duties of the various architecture and construction careers.		
Essential Questions		
What are the most common safety hazards in construction, and how can they be prevented? What employability skills are most important in the construction industry? What careers are available in construction, and how can students prepare for them now?		
Performance Expectations: Skills		Performance Expectations: Essential Knowledge/Concepts
1. Identify and describe construction site safety protocols.		1. Basic OSHA safety standards. 2. Common construction site hazards (fall risks, electrical, chemical).



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2. Demonstrate understanding of OSHA basics and common hazard signs. 3. Discuss employability skills such as teamwork, communication, and problem-solving. 4. Explore career opportunities in construction, construction management, the trades, and identify relevant training and certifications.	3. Personal protective equipment (PPE) 4. Soft skills for workplace success 5. Overview of construction career pathways (carpentry, electrical, plumbing, HVAC)
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
● Hazard photo analysis ● Create a safety poster that highlights safety standards ● Explore career opportunities in the construction industry.	● OSHA Education Center Materials ● NCCER (National Center for Construction Education and Research) resources ● Job safety visuals and posters ● Diagrams and videos



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Grade(s)	10, 11 & 12
Unit Title and Purpose	Unit 2: Construction Engineering This unit introduces students to the fundamental concepts of construction engineering. Students will explore how forces interact with structures and how material properties and shapes influence structural integrity.
Timeframe	4 Days
Vision of the Graduate	
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit. Students define the problem, brainstorm, research, build prototypes, test, and analyze their solutions. Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal.	
Unit Priority Standards	
CONS.04.09 Identify the steps and building systems needed to complete a construction project. CONS.04.10 Identify and describe the function of the components of building systems needed to complete a construction project. ARCH.07.01 Evaluate the environmental impact of building materials and techniques. ARCH.04.01 Explain various forces that begin on and within structures. ARCH.04.03 Demonstrate an understanding of static and dynamic loads related to a structure.	
Unit Supporting Standards	
ARCH.06.06 Employ basic model-building techniques.	
Essential Questions	
How do different types of forces impact construction design? What are the differences between static and dynamic loads? How do materials and shapes influence structural strength? Why are tension, torsion, and compression critical to understanding engineering structures?	
Performance Expectations: Skills	Performance Expectations: Essential Knowledge/Concepts
1. Differentiate between static and dynamic loads. 2. Demonstrate how tension and compression affect structural components. 3. Evaluate the strength of various structural shapes. 4. Evaluate the impact of the natural environment on construction design. 5. Apply the engineering design process to test and analyze a simple structure. 6. Demonstrate the application of construction math, including estimating materials costs and determining labor costs.	1. Define static load, dynamic load, tension, and compression. 2. Identify the basic structural elements: arch, beam, column, truss, and dome. 3. Identify the forces of gravity, torsion, shear, and bending on a structure.



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Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
• Explore the causes and impacts of construction failures, including the Civic Center collapse of 1978. • Design, build, and test a variety of model structures using the engineering design process.	• Classroom materials for model building



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Grade(s)	10, 11 & 12	
Unit Title and Purpose	Unit 3: Construction Drawings This unit introduces students to the foundational concepts in residential design and construction, including zoning laws, blueprint reading, interpreting architectural symbols, and understanding relevant residential building codes.	
Timeframe	4 Days	
Vision of the Graduate		
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students analyze a property in town and problem-solve how various zoning laws and regulations impact that property. Collaborator: Each student takes a specific role in the collaborative process and self-assesses their contributions to the common goal. Students will collaborate while exploring construction drawings.		
Unit Priority Standards		
CONS.02.01 Review the evolution of the history of construction and construction codes. CONS.02.02 Discuss and study different regionally based construction styles. CONS.03.02 Describe, identify, and implement fractional measurements from a basic plan and assembly drawings, within a sixteenth of an inch. CONS.03.03 Identify the difference between nominal and actual dimensions. CONS.03.04 Describe and prepare rough drawings and sketches. CONS.04.13 Explain the sub-systems, (e.g., structural, electrical, mechanical, finish, foundations) appropriate to the architectural design and residential construction. CONS.14.02 Describe the process for obtaining building permits and the inspection process.		
Unit Supporting Standards		
ARCH.05 Plan and design a functional structure. ARCH.06.01 Identify, research, develop, and explain architectural and construction plans, drawings, diagrams, and specifications. ARCH.06.02 Draw and sketch by hand to communicate ideas effectively. ARCH.07.01 Demonstrate knowledge of building codes and regulations.		
Essential Questions		
How do blueprints communicate design intent? What is the relationship between design, safety, and local building codes?		
Performance Expectations: Skills		Performance Expectations: Essential Knowledge/Concepts
1. Investigate and identify residential zoning types and regulations. 2. Read and interpret basic blueprints. 3. Recognize and label architectural symbols for plumbing, HVAC, and electrical. 4. Analyze the role of building codes in residential safety and compliance.		1. Zoning classifications 2. Components of a blueprint (title block, drawing area, legend, north arrow) 3. Common architectural symbols 4. Purpose of the International Residential Code (IRC) 5. Local laws that impact residential design



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	6. Steps to secure a building permit
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
• Use the Town of Wethersfield website to find information on zoning regulations and historic commission regulations; identify steps to secure a building permit for a shed in Wethersfield. • Draw an architectural plan of a home they are familiar with. • Draw a plot plan of a property they are familiar with. • Use blueprints and have a symbol gallery walk (electrical, plumbing, HVAC). • Explore and research career opportunities in architecture.	• Town of Wethersfield zoning handbook and website • Residential blueprint sets • IRC manual • Construction technology textbooks • Diagrams and videos



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Grade(s)	10, 11 & 12
Unit Title and Purpose	Unit 4: Foundations and Concrete Students explore the role of concrete in construction, identify components like cement, aggregate, and rebar, and analyze basic residential foundation systems.
Timeframe	7 Days
Vision of the Graduate	
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit, including pouring a concrete beam for strength. Students will define the problem, brainstorm, research, build prototypes, test, and analyze their solutions. Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal. Students will be working in collaborative teams to mix and pour a variety of cement projects.	
Unit Priority Standards	
CONS.04.01 Identify proper use and function of hand tools, portable and stationary power tools. CONS.04.09 Identify the steps and building systems needed to complete a construction project. CONS.04.10 Identify and describe the function of the components of building systems needed to complete a construction project. CONS.10 Describe the foundation and site preparation for a building. CONS.10.01 Identify site preparation requirements and steps. CONS.10.02 Identify and discuss the differences between types of foundations. CONS.12.03 Identify and discuss the necessity for insulation and vapor barriers.	
Unit Supporting Standards	
CONS.01.01 Demonstrate safe material handling practices. CONS.01.02 Demonstrate and explain knowledge of workplace safety procedures. CONS.01.03 Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in the construction industry. CONS.01.04 Describe safety practices for the stationary, and portable machines as well as hand tools used within the construction instruction. CONS.01.07 Read, and evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.	
Essential Questions	
What are the components of concrete, and how do they affect its strength? How are residential foundations designed and constructed? Why is proper site preparation and safety important when working with concrete?	
Performance Expectations: Skills	Performance Expectations: Essential Knowledge/Concepts
1. Demonstrate safe procedures and proper tool use in a concrete mixing environment. 2. Demonstrate the application of construction math, including finding volume and estimating materials costs.	1. Identify cement, aggregate, and rebar in concrete. 2. Describe how foundation walls are built and reinforced. 3. Differentiate between different types of foundations.



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	4. Differentiate between cement, concrete, mortar and asphalt. 5. Types of aggregate and their influence on the mix. 6. Identify the parts of a residential foundation: footings, slab, rebar, vapor barrier, sill plate, anchor bolt)
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
• Mix a small batch of concrete and then test for strength • Label diagrams of foundation systems • Explore current innovations in concrete, including pre-cast, earthquake resistance, and radiant flooring. • Explore the causes and impacts of foundation failures in Connecticut caused by pyrrhotite. • Explore and research career opportunities in the concrete industry.	• Safety equipment (gloves, goggles, masks) • Concrete mixing kits and supplies • NCCER (National Center for Construction Education and Research) resources • Diagrams and videos



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Grade(s)	10, 11 & 12
Unit Title and Purpose	Unit 5: Carpentry This unit introduces students to introductory carpentry concepts, focusing on wall framing, lumber sizing, and tool usage. Students gain hands-on experience using essential carpentry tools safely.
Timeframe	10 Days
Vision of the Graduate	
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit. Students problem-solve various equipment issues that arise in a carpentry setting, including wall framing. Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal. Students will be working in collaborative teams to safely build a framed wall.	
Unit Priority Standards	
CONS.03.02 Describe, identify and implement fractional measurements from a basic plan and assembly drawings, within a sixteenth of an inch. CONS.03.03 Identify the difference between both nominal and actual dimensions. CONS.03.04 Describe and prepare rough drawings and sketches. CONS.04.01 Identify proper use and function of hand tools, portable and stationary power tools. CONS.04.02 Identify characteristics and applications of coniferous softwoods, deciduous hardwoods, and engineered lumber. CONS.04.04 Identify and select the proper cutting process based on grain direction and kerf. CONS.04.06 Identify and describe the purpose and use of construction fasteners. CONS.04.09 Identify the steps and building systems needed to complete a construction project. CONS.04.10 Identify and describe the function of the components of building systems needed to complete a construction project. CONS.11 Identify and describe traditional framing styles. CONS.11.01 Identify proper names and locations of framing members.	
Unit Supporting Standards	
CONS.01.01 Demonstrate safe material handling practices CONS.01.02 Demonstrate and explain knowledge of workplace safety procedures. CONS.01.03 Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in the construction industry. CONS.01.04 Describe safety practices for the stationary, and portable machines as well as hand tools used within the construction instruction. CONS.01.07 Read, and evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.	
Essential Questions	
What are the parts of a framed wall? How is lumber sized and labeled?	



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How are carpentry tools used safely?	
Performance Expectations: Skills	Performance Expectations: Essential Knowledge/Concepts
1. Demonstrate proper measurement of lumber, including nominal dimensions and actual dimensions 2. Mark and cut wood accurately. 3. Safely use carpentry tools: miter saw, jig saw, circular saw, sawzall, and nail gun. 4. Safely use hand tools: framing hammer, hand saw, wrenches, pliers, tape measure, and impact driver. 5. Assemble a basic wall frame using appropriate fasteners and tools.	1. Identify characteristics and applications of construction softwoods, hardwoods, and engineered lumber. 2. Identify characteristics and applications of construction fasteners and hardware. 3. Understand lumber sizing (nominal vs. actual dimensions) 4. Identify components of wall framing (top plate, jack stud, stud, rough sill, cripple stud, sole plate, header) 5. Recognize and name tools and their function.
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
• Match tool names to functions. • Review carpentry tool safety and functions. • Create a list of tools and equipment needed to assemble a carpenters tool kit. • Diagram the parts of a framed wall. • Rotate through carpentry tool practice stations, with the ultimate goal of framing a 2 x 4 scale wall. • Explore and research career opportunities in carpentry.	• Safety equipment (gloves, goggles, masks) • NCCER (National Center for Construction Education and Research) resources • Diagrams and videos



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Grade(s)	10, 11 & 12		
Unit Title and Purpose	Unit 6: Electrical Students explore residential wiring systems, electrical safety, basic electrical theory, and hands-on wiring of circuits, including rough-in and finish wiring, outlets, GFCI, and 3-way switches.		
Timeframe	10 Days		
Vision of the Graduate			
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic.			
Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit. Students troubleshoot various issues that can arise when working with electrical wiring.			
Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal. Students will be working in collaborative teams to safely wire an outlet, switch, and light fixture.			
Unit Priority Standards			
CONS.04.01 Identify proper use and function of hand tools, portable and stationary power tools.			
CONS.04.09 Identify the steps and building systems needed to complete a construction project.			
CONS.04.10 Identify and describe the function of the components of building systems needed to complete a construction project.			
CONS.14 Research and discuss the traditional and new technologies used in Mechanical, Electrical, Plumbing systems.			
Unit Supporting Standards			
CONS.01.01 Demonstrate safe material handling practices.			
CONS.01.02 Demonstrate and explain knowledge of workplace safety procedures.			
CONS.01.03 Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in the construction industry.			
CONS.01.04 Describe safety practices for the stationary, and portable machines as well as hand tools used within the construction instruction.			
CONS.01.07 Read, and evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.			
Essential Questions			
What are the basic components of a residential electrical system?			
How do electricians ensure safety and code compliance?			
How do rough-in and finish wiring differ?			
Why is understanding electrical theory important for practical wiring tasks?			
Performance Expectations: Skills		Performance Expectations: Essential Knowledge/Concepts	
1. Measure, strip, and connect electrical wires.		1. National Electric Code (NEC) residential electrical code basics	
2. Wire basic circuits, including lights, switches, and outlets.		2. Purpose and function of GFCI and 3-way switch systems	
3. Interpret wiring diagrams and install rough and finish wiring to state and national electrical standards.		3. Wiring color codes and gauge standards	
4. Safely use hand tools: wire stripper, screwdriver, and linesman pliers.		4. Differentiate between amps, volts, watts, and resistance	
		5. Electrical safety protocols	



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5. Install and test GCFI and 3-way switches. 6. Describe how electricity flows from a power plant to a home outlet 7. Describe how energy is transformed into electrical energy. 8. Demonstrate the application of construction math, including estimating materials costs.	
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
● Group and individual practice of wiring outlets and switch circuits ● Electrical theory ● Rough-in and finish wiring ● 3-way switch troubleshooting challenge ● Create a quote for a small electrical wiring task that includes labor, materials, and equipment ● Explore and research career opportunities in the electrical industry	● NEC code book (student version) ● Training resources (Mike Holt or similar) ● A classroom set of wiring tools and materials ● Safety posters and OSHA handouts



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Grade(s)	10, 11 & 12
Unit Title and Purpose	Unit 7: Plumbing Students explore basic residential plumbing systems, common plumbing tools, and joining copper, ABS, PVC, and PEX pipes. Students also explore basic residential plumbing fixture installation and maintenance.
Timeframe	9 Days
Vision of the Graduate	
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit. Students solve various problems that can arise when installing sinks, toilets, and plumbing pipes. Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal. Students will be working in collaborative teams to properly install a sink and toilet.	
Unit Priority Standards	
CONS.04.01 Identify proper use and function of hand tools, portable and stationary power tools. CONS.04.09 Identify the steps and building systems needed to complete a construction project. CONS.04.10 Identify and describe the function of the components of building systems needed to complete a construction project. CONS.12.02 Identify functional considerations for kitchens and bathrooms. CONS.14 Research and discuss the traditional and new technologies used in Mechanical, Electrical, Plumbing systems.	
Unit Supporting Standards	
CONS.01.01 Demonstrate safe material handling practices. CONS.01.02 Demonstrate and explain knowledge of workplace safety procedures. CONS.01.03 Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in the construction industry. CONS.01.04 Describe safety practices for the stationary, and portable machines as well as hand tools used within the construction instruction. CONS.01.07 Read, and evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.	
Essential Questions	
What are the main types of piping used in residential plumbing? How are basic plumbing systems assembled and maintained? What safety practices must be followed during plumbing work? How does clean drinking water get to our school?	
Performance Expectations: Skills	Performance Expectations: Essential Knowledge/Concepts
1. Cut, join, and install various types of pipe (copper, ABS, PVC, PEX) 2. Solder copper pipes safely 3. Install a sink and toilet, and connect supply and drain lines	1. Understand water supply and drain-waste vent systems 2. Identify and use appropriate plumbing tools 3. Differentiate between the properties and appreciate the use of copper, ABS, PVC, and PEX pipe



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4. Troubleshoot and repair common sink and toilet issues 5. Safely use hand tools, PEX cutter, soldering brush, soldering torch, wrench, and plumbing tools. 6. Demonstrate the application of construction math, including estimating materials costs.	4. Describe the water treatment process, including the role of the MDC, reservoirs, and waste treatment 5. Describe the connection between plumbing and the installation of fire sprinklers and HVAC systems
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
• Pipe identification and cutting activity • Soldering copper pipe • Half bathroom tear down and rebuild using PEX pipe • Sink and toilet installation • Tool identification • Create a quote for a small plumbing task that includes labor, materials, and equipment • Explore and research career opportunities in the plumbing industry	• A classroom set of plumbing tools and materials • Safety posters and OSHA handouts



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Grade(s)	10, 11 & 12
Unit Title and Purpose	Unit 8: Drywall and Paint Students develop skills in drywall installation and repair techniques. Wall finishing, including surface preparation and painting, will be explored.
Timeframe	7 Days
Vision of the Graduate	
Communicator: Students engage in active classroom discussions. They practice active listening, asking questions, and monitoring their thinking to effectively communicate about the topic. Problem Solver: Students utilize the engineering design process to solve the design challenges presented throughout the unit. Students solve various issues that arise when installing and repairing drywall. Collaborator: Each student takes a specific role in the collaborative process and will self-assess their contributions to the common goal. Students will be working in collaborative teams to properly install drywall, repair damaged drywall, and paint finished drywall.	
Unit Priority Standards	
CONS.04.01 Identify proper use and function of hand tools, portable and stationary power tools. CONS.04.06 Identify and describe the purpose and use of construction fasteners. CONS.04.09 Identify the steps and building systems needed to complete a construction project. CONS.04.10 Identify and describe the function of the components of building systems needed to complete a construction project. CONS.12.04 Identify and discuss the use of various paints, strains and finishes.	
Unit Supporting Standards	
CONS.01.01 Demonstrate safe material handling practices. CONS.01.02 Demonstrate and explain knowledge of workplace safety procedures. CONS.01.03 Demonstrate and explain knowledge of personal safety practices pertaining to eye wear, footwear, clothing, and personal protective equipment (PPE) used in the construction industry. CONS.01.04 Describe safety practices for the stationary, and portable machines as well as hand tools used within the construction instruction. CONS.01.07 Read, and evaluate workplace/jobsite activities for compliance with governmental and other applicable safety regulations such as EPA and OSHA.	
Essential Questions	
What are the steps in installing and finishing drywall? Why is surface preparation important before painting? What tools and materials are essential for drywall repair?	
Performance Expectations: Skills	Performance Expectations: Essential Knowledge/Concepts
1. Safely measure, cut, and fasten drywall. 2. Apply tape and joint compound effectively. 3. Sand drywall to a paint-ready finish. 4. Perform basic drywall repair. 5. Prime and paint an interior wall surface. 6. Demonstrate the application of construction math,	1. Differentiate between the applications of drywall, cement board, and plaster. 2. Materials used in finishing (joint compound, mesh tape, spackle, primer, paint) 3. Process of patching holes and seams



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including finding square feet and estimating materials costs.	4. Differentiate among uses of paints, stains, and finishes 5. Proper painting techniques for even application 6. Safety procedures with drywall tools and dust control
Student Learning Tasks & Resources	Suggested Teacher Materials & Resources
• Small-group drywall installation • Small-group taping and mudding practice • Repair drywall with pre-cut holes and dents • Painting practice (rolling, edging, cutting in) • Safely use hand tools putty knife, taping knife, screw driver, drill, and drywall saw • Create a quote for a small drywall task that includes labor, materials, and equipment • Explore and research career opportunities in the drywall and painting industry	• Classroom set of drywall and painting tools, and materials.