

DESE Model Curriculum

GRADE LEVEL/UNIT TITLE: 9-12 / Carpentry — Concrete and Framing

Course Code: CONSTRUCTION

COURSE INTRODUCTION: Carpentry

Carpentry courses provide information related to the building of wooden structures, enabling students to gain an understanding of wood grades and construction methods and to learn skills, such as: laying sills and joists; erecting sills and rafters; applying sheathing, siding, and shingles; setting door jambs; and hanging doors. Carpentry courses may teach skills for rough construction, finish work, or both. Students learn to read blueprints, draft, use tools and machines properly and safely, erect buildings from construction lumber, perform finish work inside of buildings, and do limited cabinet work.

The units in this course are:

1. Materials and Tools
2. Concrete and Framing
3. Weatherproofing
4. Interior Finishing

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<p>UNIT DESCRIPTION: (2 of 4) Concrete and Framing These lessons are designed to introduce the carpentry student to the basic skills and concepts used in constructing foundations and frames used in simple residential buildings.</p>	<p>SUGGESTED UNIT TIMELINE: 4 lessons Lesson 1: Concrete, Reinforcing Materials, and Forms Lesson 2: Walls and Ceilings Lesson 3: Roofs Lesson 4: Floors and Stairs CLASS PERIOD (min.): 90 minutes each</p>					
<p>ESSENTIAL QUESTIONS:</p> <ol style="list-style-type: none"> 1. How are previously-learned skills (e.g., those of math, chemistry, and safety) applied in concrete construction? 2. How is concrete used as a structural component? 3. How do the components of wall and ceiling frames form stable walls and ceilings? 4. How are different methods of/materials for wall and ceiling framing suited for different purposes? 5. How are previously-learned skills and concepts (e.g., those of math, safety, and materials handling) applied in roof framing? 6. What are the basic principles shared by roof-framing tools? 7. How are floor and stair systems designed according to function (i.e., load requirements)? 8. What are the steps involved in framing floor and stair systems? 						
ESSENTIAL MEASURABLE LEARNING OBJECTIVES	CCSS LEARNING GOALS (Anchor Standards/Clusters)	CROSSWALK TO STANDARDS				
		GLEs/CLE s	PS	CCSS	NCCER	DOK
1. Students will demonstrate their knowledge of terms associated with concrete, reinforcing materials, and forms.				L 9-10.1 L 9-10.2 L 11-12.1 L 11-12.2	27108-06	Level 1
2. Students will demonstrate safe and effective procedures for working with concrete.				SL 9-10.1 SL 11-12.1	27108-06	Level 2
3. Students will demonstrate their knowledge of the terms and concepts associated with wall and ceiling framing.				L 9-10.1 L 9-10.2 L 11-12.1 L 11-12.2	27106-06	Level 1
4. Students will select the best materials/methods for a given construction project, and justify their				RI 11-12.1 RI 11-12.3	27106-06	Level 3

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reasoning.			RI 11-12.7 RST 9-10.1 RST 11-12.1 L 9-10.1 L 9-10.2 L 9-10.4 L 9-10.6 L 11-12.1 L 11-12.2 L 11-12.4 L 11-12.6 WHST 9-10.1 WHST 9-10.4 WHST 9-10.8 WHST 9-10.10 WHST 11-12.1 WHST 11-12.4 WHST 11-12.8 WHST 11-12.10 RST 11-12.9		
5. Students will translate information found on construction drawings into quantities of building materials.			N-RN 3 N-Q 1 N-Q 2 N-Q 3 N-CN 6 G-GMD 4 G-MG 3 RI 11-12.1 RI 11-12.3 RI 11-12.7 RST 9-10.1 RST 11-12.1	27105-06 27106-06 27107-06 27110-06	Level 1

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6. Students will demonstrate their knowledge of the terms and concepts associated with roof framing and the tools used in roof framing.				L 9-10.1 L 9-10.2 L 11-12.1 L 11-12.2	27107-06	Level 1
7. Students will demonstrate the proper use of tools for roof framing.				SL 9-10.1 SL 11-12.1	27107-06	Level 1
8. Students will demonstrate their knowledge of the terms and concepts associated with floor and stair framing.				L 9-10.1 L 9-10.2 L 11-12.1 L 11-12.2	27105-06 27110-06	Level 1
9. Students will translate specifications into a construction drawing.				N-RN 3 N-Q 1 N-Q 2 N-CN 6 A-SSE 1 F-IF 4 G-CO 12 G-GPE 6 G-MG 1 G-MG 3 RI 11-12.1 RI 11-12.3 RI 11-12.7 RST 9-10.1 RST 11-12.1	27105-06 27110-06	Level 2

ASSESSMENT DESCRIPTIONS*: (Write a brief overview here. Identify Formative/Summative. Actual assessments will be accessed by a link to PDF file or Word doc.)

Students will demonstrate their understanding of content and ability to apply learned skills by:

- Participating in a Jeopardy!-style game covering the terms associated with concrete, reinforcing materials, and forms (Formative)
- Presenting to their peers safe and effective procedures for working with concrete and roofing tools (Summative)
- Completing diagram worksheets labeling components of wall, ceiling, roof, floor, and stair frames (Formative)
- Writing short-answer essays justifying their reasons for choosing certain construction materials and methods for a construction project (Summative)
- Performing materials estimates for construction projects related to framing (Formative)

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<ul style="list-style-type: none"> • Creating construction drawings for stair and floor systems (Summative) • Creating process lists based on information obtained from construction drawings (Formative) <p>*Attach Unit Summative Assessment, including Scoring Guides/Scoring Keys/Alignment Codes and DOK Levels for all items. Label each assessment according to the unit descriptions above (i.e., Grade Level/Course Title/Course Code, Unit #).</p>	
Obj. #	INSTRUCTIONAL STRATEGIES (research-based): (Teacher Methods)
1, 3, 6, 8	Direct: Instructor-led demonstrations and games
2, 7	Interactive: Instructor guides students to work in teams.
4, 5, 9	Indirect/Independent Study: Instructor provides materials to guide student learning.
Obj. #	INSTRUCTIONAL ACTIVITIES: (What Students Do)
4, 5, 9	Reading for Meaning
4	Essays
2, 7	Peer Partner Learning
1, 3, 6, 8	Assigned Questions
<p>UNIT RESOURCES: (include Internet addresses for linking)</p> <p>Support documents:</p> <ul style="list-style-type: none"> • [PRESENTATION-VIDEO RUBRIC] • [SHORT-ANSWER ESSAY RUBRIC] • [MATERIALS ESTIMATE CHECKLIST] • [CONSTRUCTION DRAWING RUBRIC] • [CONSTRUCTION PROCESS CHECKLIST] <p>Internet resources:</p> <ul style="list-style-type: none"> • http://jeopardylabs.com/play/concrete6 • http://jeopardylabs.com/play/all-about-concrete • http://construction.about.com/od/Materials/a/Concrete-Mix-Concrete-Mix-Basics.htm • http://www.basiccarpentrytechniques.com/index.html 	

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- http://www.workspacetraining.com.au/timberplustoolbox/toolbox13_05/unit7_assembling_wall_frames/section1_wall_frame_components/lesson2_parts_of_a_wall_frame.htm
- <http://www.mcvicker.com/resguide/page010.htm#RACF>
- <http://www.hometips.com/how-it-works/floor-subflooring.html>
- <http://www6.homedepot.com/stairparts/gallery.html>

Resources available from MCCE free loan library (www.mcce.org):

- **Footing Forms**
The Associated General Contractors of America and CIMC, WASHINGTON, DC 20006, THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA AND CIMC. VIDEO — Common practices in setting footing and slab forms on grade; constructing and setting forms for a pile cap; constructing and setting forms for a pier footing. 27 minutes
- **Edge Forms On-Grade**
The Associated General Contractors of America and CIMC, WASHINGTON, D.C., GENERAL CONTRACTORS OF AMERICAN, CIMC. VIDEO — On-grade setting screeds with stakes and screed chairs; setting edge forms for a slab on-grade with foundation; setting forms with a radius. 18 minutes
- **Vertical Piers and Columns**
The Associated General Contractors of America and CIMC, WASHINGTON, D.C., GENERAL CONTRACTORS OF AMERICA & CIMC. VIDEO — Constructing forms for a round fluted column. 11 minutes
- **Wall Forms**
General Contractors of America & CIMC, WASHINGTON, D.C., CIMC & GENERAL CONTRACTORS OF AMERICA & CIMC. VIDEO — Constructing circular wall forms (built in place). 19 minutes
- **On-Grade Curb Forms**
General Contractors of America & CIMC, WASHINGTON, D.C., GENERAL CONTRACTORS OF AMERICA & CIMC. VIDEO — Constructing straight curb forms, setting metal curb & gutter forms with a radius, constructing curb and gutter forms. 21 minutes.
- **Horizontal Beam Forms**
General Contractors of America & CIMC, WASHINGTON, D.C., GENERAL CONTRACTORS OF AMERICA & CIMC. VIDEO — Constructing an interior beam form; constructing a spandrel beam form; constructing a post-tensioned inverted beam form. 29 minutes.

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- **Above-Grade Slab Systems**
General Contractors of America & CIMC, WASHINGTON, D.C., GENERAL CONTRACTORS OF AMERICA & CIMC. VIDEO — Constructing forms for a two-way joist system; constructing forms for a one-way joist system. 14 minutes.
- **Preparing the Site for Form Building**
General Contractors of America & CIMC, WASHINGTON, D.C., GENERAL CONTRACTORS OF AMERICA & CIMC. VIDEO — Covers site preparation for form building. 8 minutes.
- **Building Construction: Basic Site Evaluation**
CEV Multimedia, LUBBOCK, TX, CEV MULTIMEDIA. VIDEO — An experienced instructor explains the step-by-step processes involved in developing land for a home or business. Graphics and visual effects help illustrate the concepts as you travel to various sites. You will observe pre-construction practices, such as preparing public roads, providing for drainage, leveling the site and installing utility lines. You will briefly view various stages of residential construction: pouring the slab, framing, roofing, completing the walls, bricking the outside and landscaping. In addition, you will examine developmental issues, such as zoning classifications, urban sprawl and land usage. A supplement is included. 34 minutes.
- **Modern Carpentry, Building Construction**
Willis H Wagner, Howard Bud Smith, TINLEY PARK, IL, THE GOODHEART-WILLCOX CO INC, 2004. CD ROM — G-W Test Creation Software. This software enables an instructor to quickly create tests using a furnished test bank, or by adding their own questions.
- **Building Construction: Fundamentals**
CEV Multimedia, LUBBOCK, TX, CEV MULTIMEDIA, 2003. DVD ROM — This presentation includes how to layout plates, make corners and tees, construct wall units, partitions, window and door units and headers. Step-by-step instructions are provided for cutting ceiling joists and rafters with demonstrations on proper techniques for some of the more exacting procedures ("lipping" a joist, cutting a "birdsmouth," marking a ridgeboard and assembling the rafters) necessary for beginning builders. During completion of the 16' X 10' portable building, you will learn proper techniques for laying a roof with discussions and demonstrations of the following roof construction steps: laying the roof deck, attaching metal flashing along the edges, rolling out and laying the roofing felt, marking the felt to prepare it for the asbestos shingles, and cutting a nailing composition shingles in an effective method and pattern. 160 min, 4 sections, 1 printable resource and 17 web resources.