

Drafting and Design

Curriculum Content Frameworks

Please note: All assessment questions will be taken from the knowledge portion of these frameworks.

Prepared by

Hervey Galloway, Program Advisor
Doris Soenke, Secretary

Facilitated by

Karen Chisholm, Program Manager
Office of Assessment and Curriculum
Arkansas Department of Workforce Education

Edited by

Melba Shapley, TME, Inc.
Bruce Harkey, Drafting Instructor, Pulaski County
Dick Burchett, Program Manager
Hervey Galloway, Program Advisor

Office of Skilled and Technical Sciences/Technical and Professional Education
Arkansas Department of Workforce Education

Disseminated by

Career and Technical Education
Office of Assessment and Curriculum
Arkansas Department of Workforce Education

Curriculum Content Frameworks

DRAFTING AND DESIGN

Grade Levels: 9-12
Course Code: 494700

Prerequisite: None

Course Description: Drafting and Design focuses on the basic knowledge and skills required to produce engineering and architectural drawings. Emphasis is given to the development of competencies related to the use of drafting equipment, the production of beginning level engineering drawings, and the production of beginning level architectural drawings.

Table of Contents

	Page
Unit 1: Practicing Safety	1
Unit 2: Preparing for a Career in Drafting	2
Unit 3: Using Mathematics in Drafting	3
Unit 4: Orientation to Drafting and Design	5
Unit 5: Performing Computer-Aided Drafting Operations	7
Unit 6: Performing Technical Drafting Operations	9
Unit 7: Drafting with Orthographic Views	10
Unit 8: Dimensioning Technical Drawings	11
Unit 9: Drafting with Pictorial Views	12
Unit 10: Performing Architectural Drafting Operations	14
Unit 11: Preparing Floor Plan Drawings	16

Unit 12: Preparing Building Elevations	18
Unit 13: Career and Technical Student Organizations (SkillsUSA/HOSA)	20
Glossary	25

Unit 1: Practicing Safety

Hours: 2

Terminology: Center of gravity, Emergency exit plan, Ergonomics

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
1.1 Define terminology related to practicing safety	1.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
1.2 Outline general safety procedures applicable to the work environment	1.2.1 Apply general guidelines for safe handling of drafting tools, equipment, and furniture	Foundation	Science	Describes/Explains scientific principles related to school emergency plans [1.4.13]	
	1.2.2 Adhere to safety precautions regarding electrical equipment used in drafting	Personal Management	Organizational Effectiveness	Follows safety guidelines [1.4.15]	
	1.2.3 Prepare an outline of drafting classroom safety guidelines			Applies knowledge to implement work-related system or practice [3.3.4]	
	1.2.4 Prepare a school emergency exit plan				
1.3 Explain how to adjust drafting equipment for maximum comfort and usability	1.3.1 Apply adjustments on a drafting desk or computer-aided drafting workstation for comfort and usability	Thinking	Decision Making	Evaluates information/data to make the best decision [4.2.5]	
	1.3.2 Explain procedures for making comfort and usability adjustments to a drafting desk or computer-aided drafting workstation		Problem Solving	Revises plan of action indicated by findings [4.4.9]	
			Reasoning	Applies rules and principles to a new situation [4.5.1]	
1.4 Describe ergonomic considerations for drafting	1.4.1 Describe comfort, fatigue, and health-related considerations for using drafting and computer-aided drafting equipment (keyboard position, chair position, screen position, lighting levels, and position of arms, wrists, and hands)	Foundation	Science	Describes/Explains scientific principles related to ergonomic considerations [1.4.13]	

Unit 2: Preparing for a Career in Drafting

Hours: 2

Terminology: Career plan, Constructive criticism, Drafter, Short-term goals

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
2.1 Define terminology related to preparing for a career in drafting	2.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
2.2 List career options in drafting	2.2.1 Distinguish positive and negative aspects for career options in architectural drafting for an architect, architectural drafter, model maker, teacher, and technical illustrator	Foundation	Speaking	Speaks effectively, using appropriate eye contact, gestures, and posture [1.5.11]	
	2.2.2 Describe career options in technical drafting for a mechanical engineer, industrial designer, model maker, teacher, technical illustrator, and tool designer	Personal Management	Career Awareness, Development, and Mobility	Analyzes impact of work on individual and family life [3.1.1]	
2.3 Identify educational experiences and personal traits that benefit a drafter	2.3.1 Develop a high school career action plan in drafting with several career options	Foundation	Reading	Comprehends written information, and applies it to a task [1.3.8]	
	2.3.2 Research requirements of a community college program in drafting	Personal Management	Career Awareness, Development, and Mobility	Sets well-defined and realistic personal/career goals (short-term and long-term) [3.1.11]	
	2.3.3 Research requirements of a college major in engineering	Thinking	Reasoning	Comprehends ideas and concepts related to personal traits that benefit a drafter [4.5.2]	
	2.3.4 Explore interest in various occupational areas utilizing drafters				

Unit 3: Using Mathematics in Drafting

Hours: 5

Terminology: Circle, Circumference, Cubic foot, Cubic inch, Cubic yard, Diameter, Radius, Rectangle, Right angle, Square

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
3.1 Define terminology related to mathematics in drafting	3.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
3.2 Describe procedures for performing mathematical conversions within a measurement system	3.2.1 Show how to convert inches to feet and feet to inches	Foundation	Arithmetic/ Mathematics	Converts different units of measurement [1.1.17]	
	3.2.2 Convert centimeters to millimeters and millimeters to centimeters				
	3.2.3 Convert cubic feet to cubic yards and cubic yards to cubic feet				
3.3 Identify basic mathematical operations used in drafting	3.3.1 Apply the principles of addition, subtraction, multiplication, and division involving whole numbers, fractions, mixed numbers, and decimals	Foundation	Arithmetic/ Mathematics	Calculates different units of measurement [1.1.6]	
	3.3.2 Convert common fractions to decimal fractions and decimal fractions to common fractions				
	3.3.3 Show how to measure distances using a rule and a scale				
	3.3.4 Use and draw common geometric shapes used daily in drafting				

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
3.4 Explain mathematical calculations involving practical geometry and trigonometry	3.4.1 Apply practical geometry and trigonometry principles using the Pythagorean Theorem (3-4-5 Triangle)	Foundation	Arithmetic/ Mathematics	Applies mathematical principles related to the Pythagorean Theorem (3-4-5 Triangle) and the Law of Sines [1.1.4]
	3.4.2 Use mathematical formulas to calculate area			Uses basic algebraic symbols, terms, principles, and formulas [1.1.33]
	3.4.3 Use mathematical formulas to calculate volume			Uses basic geometric symbols, terms, principles, and formulas [1.1.34]
	3.4.4 List practical applications of the Pythagorean Theorem (3-4-5 Triangle)			
3.5 Identify material quantities used in drafting	3.5.1 Use approximate dimensions to determine how many cubic yards of concrete are needed for wall footings or other construction features	Foundation	Arithmetic/ Mathematics	Estimates arithmetic results without a calculator [1.1.22]
	3.5.2 Use approximate dimensions to determine quantities of lumber needed for floor framing and wall framing			Makes rough measurements [1.1.28]
	3.5.3 Use approximate dimensions to determine quantities of wall and floor coverings needed to complete a project			

Unit 4: Orientation to Drafting and Design

Hours: 6

Terminology: Compass, Drafting triangle, Parallel bar, Scale, Working drawing

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
4.1 Define terminology related to drafting and design	4.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
4.2 Identify traditional drafting equipment and tools	4.2.1 Show how to use traditional drafting equipment and tools	Foundation	Reading	Applies information and concepts derived from printed materials [1.3.3]	
	4.2.2 Apply techniques for the use of traditional drafting equipment and tools		Speaking	Applies/Uses technical terms appropriate to audience [1.5.2]	
4.3 Describe types of architectural and technical drawings	4.3.1 Use components of architectural drawings	Foundation	Writing	Presents answers/conclusions in a clear and understandable form [1.6.13]	
	4.3.2 Apply components of technical drawings			Uses technical words and symbols [1.6.20]	
	4.3.3 Determine uses for various types of architectural drawings				
	4.3.4 Demonstrate uses for various types of technical drawings				
4.4 Outline techniques of drawing to scale	4.4.1 Draw objects to a scale of full size, larger than full size, and smaller than full size	Foundation	Arithmetic/ Mathematics	Makes precision measurements using a scale [1.1.27]	
	4.4.2 Use the architect's scale, engineer's scale, mechanical drafter's scale, and metric scale to measure and lay out drawings or sketches	Thinking	Reasoning	Comprehends ideas and concepts related to drawing to scale [4.5.2]	

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
4.5 Discuss methods for preparing architectural and technical sketches	4.5.1 Apply techniques for developing freehand field sketches	Thinking	Seeing Things in the Mind's Eye	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]
	4.5.2 Show techniques for developing sketches using traditional drafting equipment and tools			
	4.5.3 Compile sketches of geometric shapes			
4.6 Identify freehand lettering techniques	4.6.1 Construct large and small uppercase letters and numbers using the American National Standards Institute (ANSI) recommended Single-Stroke Gothic Alphabet	Foundation	Writing	Uses technical words and symbols [1.6.20] Writes/Prints legibly [1.6.24]
	4.6.2 Compose typical notes found on architectural and technical drawings, using freehand lettering techniques			
4.7 Label methods of geometric construction used for architectural and technical drafting	4.7.1 Use geometric construction techniques for creating lines, arcs, and angles	Foundation	Arithmetic/ Mathematics	Applies computation skills to geometric construction [1.1.5]
	4.7.2 Bisect lines, arcs, and angles using geometric construction		Speaking	
	4.7.3 Construct parallel and perpendicular lines using geometric construction			
	4.7.4 Construct angles and triangles using geometric construction			
	4.7.5 Construct tangent lines and arcs using geometric construction			
	4.7.6 Construct regular and irregular polygons using geometric construction			
	4.7.7 Create representations of ellipses using geometric construction			

Unit 5: Performing Computer-Aided Drafting Operations

Hours: 10

Terminology: Computer-aided drafting (CAD), Hardware, Plot, Software, Symbol library

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
5.1 Define terminology related to computer-aided drafting operations	5.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
5.2 Identify components of a computer-aided drafting system	5.2.1 Use basic components of a computer-aided drafting system, including a CPU, monitor, keyboard, mouse, digitizer, plotter, printer, and software	Foundation	Speaking	Applies/Uses technical terms as appropriate to audience [1.5.2] Communicates a thought, idea, or fact in spoken form [1.5.5]	
	5.2.2 Apply common features of computer-aided drafting software programs	Thinking	Reasoning	Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]	
	5.2.3 Navigate computer-aided drafting system command menus				
5.3 Outline how to perform fundamental computer skills	5.3.1 Show how to open and close software applications	Foundation	Science	Applies a scientific principle to solve a problem [1.4.7]	
	5.3.2 Show how to manage files (i.e., saving, backing up, organizing)	Thinking	Writing	Produces neat, legible document from a typewriter or computer [1.6.15]	
	5.3.3 Perform monitor and mouse configuration and setup		Decision Making	Comprehends ideas and concepts related to opening and closing software applications [4.2.2]	
	5.3.4 Demonstrate ability to perform basic word processing (compose, cut, copy, paste, print)				

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description	
5.4 Describe the use of computer-aided drafting drawing commands on technical drawings	5.4.1 Use computer-aided drafting drawing commands to construct lines, circles, arcs, polylines, polygons, ellipses, rectangles, text, and hatch patterns	Foundation	Arithmetic/ Mathematics	Uses computer in mathematical applications – information processing, problem solving [1.1.38]	
	5.4.2 Create blocks or symbols using computer-aided drafting commands	Thinking	Seeing Things in the Mind's Eye	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]	
	5.4.3 Insert various symbols in computer-aided drafting drawings				
5.5 Outline how to use computer-aided drafting file commands correctly	5.5.1 Use computer-aided drafting file commands to create new files and folders	Thinking	Decision Making	Demonstrates decision-making skills [4.2.4]	
	5.5.2 Use computer-aided drafting file commands to save, save as, plot, import, export, open, close, and exit a drawing file				
5.6 Describe how to plot computer-aided drawings	5.6.1 Apply techniques for scaling drawings using a computer-aided drafting system	Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]	
	5.6.2 Show how to plot computer-aided drafting drawings to various scales			Revises plan of action indicated by findings [4.4.9]	
	5.6.3 Set and modify plot settings for a computer-aided drafting file				
	5.6.4 Show how to plot computer-aided drafting drawings having single and multiple view ports				

Unit 6: Performing Technical Drafting Operations

Hours: 14

Terminology: Alphabet of lines, Hidden line, Title block, Visible line

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description	
6.1 Define terminology related to technical drafting operations	6.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
6.2 Identify reference materials for technical drawings	6.2.1 Demonstrate use of a table of contents, indexes, cross-references, etc., in technical reference materials 6.2.2 Show how to reference information for technical drawings using Internet resources	Thinking	Knowing how to Learn	Locates appropriate learning resources to acquire or improve knowledge and skills [4.3.3] Uses available resources to acquire new skills or improve skills [4.3.4] Uses available resources to apply new skills [4.3.6]	
6.3 Label line conventions on technical drawings	6.3.1 Show common line symbols used on technical drawings 6.3.2 Apply common line symbols to technical drawings 6.3.3 Describe uses for special line symbols on technical drawings 6.3.4 Apply various special line symbols to technical drawings			Foundation Thinking	Reading Reasoning Seeing Things in the Mind's Eye
6.4 Describe drafting standards used to prepare technical drawings	6.4.1 Relate the purpose for drawing standards 6.4.2 Show how to use ANSI and ISO standards to prepare technical drawings 6.4.3 Demonstrate an ability to prepare technical drawings according to ANSI and ISO standards	Foundation Thinking	Speaking Reasoning	Organizes ideas, and communicates oral messages to listeners [1.5.7] Extracts rules or principles from written information [4.5.4] Sees relationship between two or more ideas, objects, or situations [4.5.5]	

Unit 7: Drafting with Orthographic Views

Hours: 14

Terminology: Multiview drawing, Orthographic projections

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
7.1 Define terminology related to drafting with orthographic views	7.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
7.2 Outline steps to apply orthographic projection techniques	7.2.1 Apply techniques to develop object views, using orthographic projection	Foundation	Speaking	Applies/Uses technical terms appropriate to audience [1.5.2]	
	7.2.2 Relate types of drawings that use orthographic projection				
	7.2.3 Explain techniques for transferring the location of drawing features between views, using orthographic projection				
7.3 Describe how to prepare single and multiview drawings using orthographic projection	7.3.1 Develop single-view orthographic projections of simple objects with appropriate line precedence and positioning of views, circles, arcs, and angular features	Foundation	Arithmetic/ Mathematics	Makes precision measurements using a scale [1.1.27]	
	7.3.2 Discuss characteristics of multiview drawings	Thinking	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]	
	7.3.3 Develop multiview orthographic projections of simple objects, including front, top, right-side, left-side, bottom, and rear views		Problem Solving	Interprets drawings to solve design problems [4.4.7]	

Unit 8: Dimensioning Technical Drawings

Hours: 16

Terminology: Aligned dimension system, Centerline, Datum Dimensioning, Dimension line, Extension line, Leader, Unidirectional dimension system

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
8.1 Define terminology related to dimensioning technical drawings	8.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
8.2 Describe how to dimension multiview drawings	8.2.1 Show how to apply methods for the placement of dimensions using the unidirectional and aligned dimensioning systems on multiview drawings	Foundation	Arithmetic/ Mathematics	Uses common measuring devices/tools to measure dimensions on multiview drawings [1.1.37]	
	8.2.2 Use the standards for applying dimensions to various features of a multiview drawing	Thinking	Problem Solving	Comprehends ideas and concepts related to dimensioning multiview drawings [4.4.1] Interprets drawings to solve design problems [4.4.7]	
	8.2.3 Apply dimensions and notes to multiview drawings, including units of measurement, arrowheads, and leaders			Reasoning	Applies rules and principles to a new situation [4.5.1]
	8.2.4 Prepare and dimension multiview drawings of objects with machined surfaces, using appropriate positioning of views, line precedence, circles, arcs, fillets, and rounds			Determines which conclusions are correct when given a set of facts and a set of conclusions [4.5.3]	
	8.2.5 Develop an understanding of standards for applying datumline dimensions to various features of a multiview drawing				

Unit 9: Drafting with Pictorial Views

Hours: 14

Terminology: Cabinet oblique, Cavalier oblique, Oblique drawing, Perspective drawing

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
9.1 Define terminology related to drafting with pictorial views	9.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
9.2 Describe characteristics of pictorial drawings	9.2.1 Depict the general characteristics of pictorial (axonometric) drawings, isometric drawings, oblique drawings, and perspective drawings	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]	
9.3 Outline how to apply techniques to develop isometric drawings	9.3.1 Use techniques to develop isometric drawings of simple objects	Foundation	Science	Uses equipment and techniques to develop isometric drawings [1.4.23]	
	9.3.2 Prepare isometric drawings of simple cubic and cylindrical objects	Thinking	Seeing Things in the Mind's Eye	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]	
9.4 State how to apply techniques to develop oblique drawings	9.4.1 Describe techniques to develop oblique drawings of simple objects	Foundation	Arithmetic/ Mathematics	Uses common measuring devices/tools to measure dimensions on oblique drawings [1.1.37]	
	9.4.2 Prepare general oblique drawings	Thinking	Seeing Things in the Mind's Eye	Organizes and processes images – symbols, pictures, graphs, objects, etc. [4.6.2]	
	9.4.3 Prepare cavalier oblique drawings				
	9.4.4 Prepare cabinet oblique drawings				

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
9.5 State how to dimension isometric drawings	9.5.1 Apply methods for the placement of dimensions, using the unidirectional dimensioning system on isometric drawings	Foundation	Arithmetic/ Mathematics	Uses common measuring devices/tools to measure dimensions on isometric drawings [1.1.37]	
	9.5.2 Apply dimensions and notes to isometric drawings, including units of measurement, arrowheads, and leaders	Thinking	Problem Solving	Comprehends ideas and concepts related to dimensioning isometric drawings [4.4.1]	
	9.5.3 Develop an understanding of standards for applying dimensions to various features of an isometric drawing			Interprets drawings to solve design problems [4.4.7]	
	9.5.4 Prepare a dimension isometric drawing of objects, using appropriate positioning of view, line precedence, circles, and arcs		Reasoning	Applies rules and principles to a new situation [4.5.1]	
	9.5.5 Use standards to apply datum dimensioning to various features of an isometric drawing				
9.6 Describe types of notes used on technical drawings	9.6.1 Apply general notes to multiview drawings	Foundation	Speaking	Communicates a thought, idea, or fact in spoken form [1.5.5]	
	9.6.2 Prepare general notes for an isometric drawing		Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]	
	9.6.3 Apply general notes to working drawings			Uses technical words and symbols [1.6.20]	

Unit 10: Performing Architectural Drafting Operations

Hours: 10

Terminology: Architecture, Contractor, Symbol, Water closet

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do			ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description	
10.1 Define terminology related to performing architectural drafting operations	10.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]	
10.2 Describe how to apply line conventions used on architectural drawings	10.2.1 Depict common line symbols used on architectural drawings	Foundation	Speaking	Applies/Uses technical terms appropriate to audience [1.5.2]	
	10.2.2 Use special line symbols on architectural drawings	Thinking	Decision Making	Evaluates information/data to make the best decision [4.2.5]	
	10.2.3 Apply common line symbols to architectural drawings		Problem Solving	Interprets drawings to solve design problems [4.4.7]	
	10.2.4 Apply various special line symbols to architectural drawings				
10.3 Identify the use of symbols on architectural drawings	10.3.1 Demonstrate how architectural symbols are used to communicate information for construction of a building	Foundation	Reading	Uses standard occupational resource materials [1.3.22]	
	10.3.2 Demonstrate techniques to create and place various architectural symbols on drawings		Speaking	Applies/Uses technical terms appropriate to audience [1.5.2] Communicates a thought, idea, or fact in spoken form [1.5.5]	
	10.3.3 Discuss types of symbols typically found on architectural drawings			Organizes ideas, and communicates oral messages to listeners [1.5.7]	
	10.3.4 Research architectural symbols used on drawings				

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
10.4 Identify dimensioning on architectural drawings	10.4.1 Locate dimensioning systems on architectural drawings	Foundation	Arithmetic/ Mathematics	Comprehends mathematical ideas and concepts related to dimensioning architectural drawings [1.1.13]	
	10.4.2 Show how notes are used to indicate location and size of construction components on architectural drawings			Expresses mathematical ideas and concepts orally and in writing [1.1.23]	
	10.4.3 Use standards to apply dimensions and notes to various architectural features on construction drawings			Uses basic numerical concepts in practical situations [1.1.32]	
	10.4.4 Depict abbreviations used with dimensions on architectural drawings			Reading Uses standard occupational resource materials [1.3.22]	
	10.4.5 Note procedures and line types used for placement of dimension lines, notes, and leaders on architectural drawings			Speaking Communicates a thought, idea, or fact in spoken form [1.5.5]	

Unit 11: Preparing Floor Plan Drawings

Hours: 10

Terminology: Cabinet, Floor plan, Millwork, Portico

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
11.1 Define terminology related to preparing floor plan drawings	11.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]
			Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]
11.2 Explain how to develop a floor plan	11.2.1 Construct a list of building considerations for construction based on consumer desires and needs, including budget, family size and lifestyle, foot-traffic patterns, and kitchen functionality requirements	Personal Management	Organizational Effectiveness	Applies knowledge to implement work-related system or practice [3.3.4]
		Thinking	Knowing how to Learn	Applies new knowledge and skills to place dimensions on a floor plan [4.3.1]
	11.2.2 Prepare a sketch of a floor plan, illustrating walls, windows, doors, kitchen and bathroom cabinets, major appliances, plumbing fixtures, etc., based on design considerations		Problem Solving	Comprehends ideas and concepts related to symbols for architectural features [4.4.1]
				Interprets drawings to solve design problems [4.4.7]
11.2.3 Use standards to apply various symbols for architectural features of a floor plan				
11.2.4 Develop an understanding of standards for placing dimensions on a floor plan drawing				

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
11.3 Describe how to prepare a floor plan drawing	11.3.1 Show how to draw lines and symbols representing various building features for a floor plan, including interior and exterior walls, windows, doors, kitchen and bathroom cabinets, major appliances, plumbing fixtures, and HVAC equipment	Foundation	Arithmetic/ Mathematics	Makes precision measurements using a scale [1.1.27]
	11.3.2 Apply correct location dimensions and notes for building features on a floor plan of a residential structure		Speaking	Applies/Uses technical terms appropriate to audience [1.5.2]
		Writing	Adapts notes to a proper form [1.6.1]	
		Thinking	Decision Making	Evaluates information/data to make the best decision [4.2.5]
			11.3.3 Apply correct dimensions and notes for kitchen and bathroom cabinets and other millwork on a floor plan	
11.3.4 Place room names and general notes on a floor plan				
11.3.5 Discuss considerations for locating stairs on a floor plan for a multistory structure				

Unit 12: Preparing Building Elevations

Hours: 5

Terminology: Elevation, Flashing, Gable roof, Hip roof

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS				
What the Student Should be Able to Do		What the Instruction Should Reinforce				
Knowledge	Application	Skill Group	Skill	Description		
12.1	Define terminology related to preparing building elevations	12.1.1	Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to drafting and design [1.3.6]
					Writing	Applies/Uses technical words and concepts [1.6.4] Uses words appropriately [1.6.21]
12.2	Describe how to develop building elevation drawings	12.2.1	Use characteristics of various architectural styles, site considerations, and desired roof design to draw sketches of exterior building elevations	Foundation	Reading	Analyzes and applies what has been read to a specific task [1.3.2] Applies information and concepts derived from printed materials [1.3.3] Draws conclusions from what is read [1.3.12]
		12.2.2	Determine consumer needs and tastes in selection of exterior finish materials			
		12.2.3	Consult wall sections, floor plan, and foundation plan to determine grade line, exterior details, heights of finished floor and ceiling, roof slope, window and door appearances, etc.			

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS		
What the Student Should be Able to Do		What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
12.3 Describe how to prepare building elevation drawings	12.3.1 Show how to project horizontal dimensions of exterior walls, windows, doors, and other elements from a floor plan 12.3.2 Note how to project heights of grade lines, depth and thickness of footings, window and door heights, eave lines, and roof height from wall section drawings 12.3.3 Demonstrate how to add architectural details for windows, doors, railings, gables, and other exterior features to an elevation drawing 12.3.4 Demonstrate how to add dimensions, symbols, and notes identifying the elevation, floor and ceiling levels, roof slope, grade lines, etc., to elevation drawings	Thinking	Creative Thinking Knowing how to Learn Problem Solving	Uses imagination to create something new [4.1.1] Applies new knowledge and skills to project horizontal lines from a floor plan [4.3.1] Demonstrates logical reasoning in reaching a conclusion [4.4.2]

Unit 13: Career and Technical Student Organizations (SkillsUSA/HOSA)

Hours: 12

Terminology: Assess, Assessment, Behavior, Business meeting, Career, Competency, Critique, Cultural diversity, Customer, Equity issue, Expectation, Government, Image, Interview, Job application, Journal, Management, Mentor, Organizational chart, Parliamentary procedure, Portfolio, Presentation, Professional organization, Résumé, Self-motivation, Short-term goals, Stress, Task, Trade union

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
13.1 Define terminology related to student organizations	13.1.1 Use terms appropriately in context	Foundation	Reading	Applies/Understands technical words that pertain to student organizations [1.3.6]	
			Writing	Applies/Uses technical words and concepts [1.6.4]	
				Uses words appropriately [1.6.21]	
13.2 Outline a self-assessment, and identify individual learning styles	13.2.1 Show individual strengths	Interpersonal	Leadership	Conveys attitudes and values of group to others [2.4.3]	
	13.2.2 Show areas in need of improvement	Thinking	Problem Solving	Identifies possible reasons for problem [4.4.6]	
13.3 Describe self-motivation techniques, and establish short-term goals	13.3.1 Prepare a list of short-term goals	Personal Management	Self-esteem	Develops/Initiates a plan for self-improvement [3.5.4]	
	13.3.2 Discuss ways to change or improve lifestyle, appearance, and behavior	Thinking	Creative Thinking	Identifies new goals and objectives [4.1.8]	
13.4 Give examples of individual time-management skills	13.4.1 Prepare and maintain a time journal	Foundation	Writing	Prepares a complex document in a concise manner [1.6.12]	
	13.4.2 Outline ways to improve time-management skills	Thinking	Problem Solving	Devises and implements a plan of action to resolve a problem [4.4.3]	
13.5 Predict future occupations	13.5.1 Research the Internet to explore career opportunities in specified fields of study	Foundation	Reading	Draws conclusions from what is read [1.3.12]	
			Writing	Summarizes written information [1.6.17]	
	13.5.2 Prepare a presentation on a specified career area	Personal Management	Career Awareness, Development, and Mobility	Explores career opportunities [3.1.6]	
		Thinking	Creative Thinking	Prepares presentation based on subject research, interviews, and surveys [4.1.10]	

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
13.6 Identify the customer	13.6.1 Differentiate between external and internal customers	Interpersonal	Customer Service	Recognizes effects of positive/negative attitudes on customers [2.3.7]	
	13.6.2 Identify factors that contribute to poor customer relationships	Thinking	Decision Making	Shows initiative and courtesy in meeting and working with customers [2.3.8] Evaluates information/data to make the best decision [4.2.5]	
13.7 Identify the benefits of doing a community service project	13.7.1 Outline ways to become involved in the community	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]	
	13.7.2 Develop a community service project	Interpersonal	Teamwork	Contributes to group with ideas, suggestions, and effort [2.6.2]	
13.8 Describe effective communication with others	13.8.1 Note personal barriers to listening	Thinking	Problem Solving	Recognizes/Defines problem [4.4.8]	
	13.8.2 Relate a personal plan to overcome barriers to listening			Revises plan of action indicated by findings [4.4.9]	
13.9 Give locations for a shadowing activity	13.9.1 Summarize and relate an experience of job shadowing	Interpersonal	Leadership	Encourages/Motivates members of a group or team [2.4.6]	
13.10 Identify the components of an employment portfolio	13.10.1 Present parts of a portfolio	Foundation	Writing	Completes form accurately [1.6.7]	
	13.10.2 Compile a personal employment portfolio for an interview			Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]	
13.11 List proficiency in program competencies	13.11.1 Construct an interpersonal competency assessment	Foundation	Writing	Analyzes data, summarizes results, and makes conclusions [1.6.2]	
13.12 Describe how to measure/modify short-term goals	13.12.1 Discuss how to pursue short-term goals	Thinking	Creative Thinking	Identifies new goals and objectives [4.1.8]	
13.13 Identify stress sources	13.13.1 Prepare a list of personal stress sources	Foundation	Writing	Communicates thoughts, ideas, or facts in written form in a clear, concise manner [1.6.6]	
	13.13.2 Outline techniques to cope with individual sources of stress	Thinking	Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]	

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS			
What the Student Should be Able to Do		What the Instruction Should Reinforce			
Knowledge	Application	Skill Group	Skill	Description	
13.14 Identify characteristics of a positive image	13.14.1 List behaviors and traits that lead to a positive image	Foundation	Reading	Determines what information is needed [1.3.10]	
	13.14.2 Note behaviors and traits that lead to a negative image	Personal Management	Self-esteem	Comprehends the importance of a positive self-concept [3.5.1] Develops/Initiates a plan for self-improvement [3.5.4]	
		Thinking	Decision Making	Identifies pros and cons to assist in the decision-making process [4.2.7]	
			Problem Solving	Demonstrates logical reasoning in reaching a conclusion [4.4.2]	
13.15 Describe how team skills can be applied to a group project	13.15.1 Form a team to develop a class project	Interpersonal	Teamwork	Works effectively with others to reach a common goal [2.6.6]	
13.16 Outline how to observe and critique a meeting	13.16.1 Attend a formal meeting held in the community	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8]	
	13.16.2 Prepare a critique of the meeting attended	Interpersonal	Customer Service	Shows initiative and courtesy in meeting and working with customers [2.3.8]	
13.17 List business meeting skills	13.17.1 Relate the basic rules required to ensure an orderly, business-like meeting	Foundation	Speaking	Organizes ideas, and communicates oral messages to listeners [1.5.7]	
	13.17.2 Demonstrate through role-playing appropriate meeting skills	Interpersonal	Leadership	Conveys attitudes and values of group to others [2.4.3] Influences group behavior [2.4.8]	
13.18 Outline a survey of employment opportunities	13.18.1 Compile information on a particular employment opportunity of interest	Foundation	Writing	Presents own opinion in written form in a clear, concise manner [1.6.14]	
	13.18.2 Perform an Internet search of a specific career area	Personal Management	Career Awareness, Development, and Mobility	Develops skills to locate, evaluate, and interpret career information [3.1.4]	
13.19 Select a professional journal for review, and develop a three- to five-minute presentation	13.19.1 Prepare a presentation on the content, purpose, and distribution of a particular professional journal	Foundation	Writing	Prepares a complex document in a concise manner [1.6.12]	

CAREER and TECHNICAL SKILLS		ACADEMIC and WORKPLACE SKILLS		
What the Student Should be Able to Do		What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
13.20 Identify customer expectations	13.20.1 List customer expectations 13.20.2 Discover the consequences of unmet customer expectations	Interpersonal	Customer Service	Applies human relations skills in real-life situations [2.3.1] Recognizes effects of positive/negative attitudes on customers [2.3.7] Works with customers to satisfy their expectations [2.3.9]
13.21 List parts of a job application	13.21.1 Prepare a job application from various businesses in the community 13.21.2 Demonstrate a mock job interview	Foundation	Reading Speaking Writing	Determines what information is needed [1.3.10] Communicates a thought, idea, or fact in spoken form [1.5.5] Uses verbal language and other cues, such as body language, appropriate in style, tone, and level of complexity to the audience and the occasion [1.5.14] Completes form accurately [1.6.7]
13.22 Outline your employment portfolio	13.22.1 Construct a personal employment portfolio	Foundation	Writing	Composes and creates documents – letters, manuals, reports, proposals, graphs, flow charts, etc. [1.6.8] Produces a neat, legible document from a typewriter or computer [1.6.15] Summarizes written information [1.6.17] Uses language, style, organization, and format appropriate to subject matter, purpose, and audience [1.6.19]
13.23 Identify supervisory and management roles in an organization	13.23.1 Prepare an organizational chart 13.23.2 Outline the responsibilities of managers and supervisors	Foundation Interpersonal Thinking	Writing Leadership Creative Thinking	Produces a neat, legible document from a typewriter or computer [1.6.15] Helps an individual or group challenge existing procedures, policies, or authority [2.4.7] Develops visual aids to create audience interest [4.1.4]

CAREER and TECHNICAL SKILLS What the Student Should be Able to Do		ACADEMIC and WORKPLACE SKILLS What the Instruction Should Reinforce		
Knowledge	Application	Skill Group	Skill	Description
13.24 Outline safety issues	13.24.1 Research safety issues in a given career area	Foundation	Reading	Identifies relevant details, facts, and specifications [1.3.16]
			Science	Follows safety guidelines [1.4.15]
		Personal Management	Integrity/Honesty/Work Ethic	Follows established rules, regulations, and policies [3.2.5]

Glossary

Unit 1: Practicing Safety

1. Center of gravity – the point in any solid where a single applied force could support it; the point where the mass of the object is equally balanced
2. Emergency exit plan – description of routes for occupants of a building to follow to leave a building safely in case of fire or other emergency
3. Ergonomics – the applied science of equipment design intended to maximize productivity by reducing operator fatigue and discomfort

Unit 2: Preparing for a Career in Drafting

1. Career plan — a program designed for an individual that enables him/her to accomplish a chosen pursuit or purpose for a profession, education, or occupation
2. Constructive criticism — to judge the merits and faults of another person in a way that serves to improve or advance that person
3. Drafter — a person who plans or designs a systematic representation of dimensional specifications related to mechanical objects and architectural structures
4. Short-term goals — goals or targets that are reachable within a short period of time

Unit 3: Using Mathematics in Drafting

1. Circle — a plane figure formed by a single curved line on which all points are equally distant from a single point, called the *center*
2. Circumference — the measure of distance around a circle; the circle's rim
3. Cubic foot — a unit or a system of units used to measure volume or capacity; a volume of measurement equal to that of a cube that measures one foot on each side or its equivalent
4. Cubic inch — a unit or a system of units used to measure volume or capacity; a volume of measurement equal to that of a cube that measures one inch on each side or its equivalent
5. Cubic yard — a unit or system of units used to measure volume or capacity; a volume of measurement equal to that of a cube that measures one yard on each side or its equivalent
6. Diameter — the distance across a circle measured through its center point
7. Radius — the distance from the center of a circle to its edge
8. Rectangle — a four-sided plane figure with four right angles
9. Right angle — an angle that measures exactly 90 degrees
10. Square — a rectangle having four equal sides

Unit 4: Orientation to Drafting and Design

1. Compass – a drawing instrument used to create circles and arcs
2. Drafting triangle – any of various three-sided drawing and drafting guides
3. Parallel bar – a straight-edge drafting tool that uses a system of cords and pulleys to maintain parallel control as the bar is moved across the drawing surface
4. Scale – an instrument used to lay off distances and make measurements
5. Working drawing – the drawing from which a part is manufactured; gives all the information needed to manufacture or build a single part or a complete machine or structure

Unit 5: Performing Computer-Aided Drafting Operations

1. Computer-aided drafting (CAD) – the process of using computer software for drafting and design functions
2. Hardware – computer equipment such as the CPU, monitor, printer, mouse, and keyboard
3. Plot – to print hard copies of CAD files on various media
4. Software – instructions that allow computer hardware to perform intended tasks
5. Symbol library – a collection of drafting symbols saved to a file that can be quickly inserted in a computer-aided drawing

Unit 6: Performing Technical Drafting Operations

1. Alphabet of lines – the lines and symbols used on drawings
2. Hidden lines – a line consisting of a series of short dashes that represents a feature hidden from view
3. Title block – a section of the drawing that gives important information about the product and progress of the project; can include part name, drawing number, scale of the drawing, material specifications and special treatment, company name and address, date of completion, revision dates, general tolerances, and names of drafter, checker, and people responsible for engineering, materials, and production approvals
4. Visible line – a line representing a visible edge of an object when seen from a specific reference point

Unit 7: Drafting with Orthographic Views

1. Multiview drawing – a method of drawing views of an object as it is seen from different positions and arranged in a standard order
2. Orthographic projections – the process of projecting two or more views of an object onto imaginary planes by drawing lines from the object perpendicular to the planes

Unit 8: Dimensioning Technical Drawings

1. Aligned dimension system – a system of dimensioning in which the dimensions are placed parallel with the dimension lines
2. Centerline – an imaginary line that marks the exact center of an object
3. Datum dimensioning – a dimensioning system in which each dimension originates from a common surface, plane, or axis
4. Dimension line – a thin line, usually with arrowheads at each end, that shows where a dimension begins and ends
5. Extension line – thin line used to extend the shape of the object to the dimension line
6. Leader – a thin line with a horizontal dash at one end and an angled line ending with an arrowhead at the other; drawn from a note or dimension to the object to which the note or dimension applies
7. Unidirectional dimensioning system – a dimensioning system in which all dimensions read from the bottom of the page

Unit 9: Drafting with Pictorial Views

1. Cabinet oblique – an oblique sketch or drawing in which the receding depth of the drawing is exactly one half of the true depth of the object
2. Cavalier oblique – an oblique sketch or drawing that shows the depth of the object in full scale
3. Oblique drawing – a form of pictorial drawing in which the plane of projection is parallel to the front surface of the object and the lines representing receding surfaces are drawn at an angle of 0 to 45 degrees
4. Perspective drawing – a pictorial drawing in which the lines representing receding surfaces converge to vanishing points on the horizon; a three-dimensional representation of an object as it looks to the eye from a particular point

Unit 10: Performing Architectural Drafting Operations

1. Architecture – the art and science of designing and erecting buildings
2. Contractor – the manager of a construction project or one specific phase of it
3. Symbol – a printed or written sign used to represent an operation, element, quantity, quality, or relation; one that represents something else by association, resemblance, or convention
4. Water closet – a flush toilet that disposes of the waste products by using water to sweep them away down a drainpipe

Unit 11: Preparing Floor Plan Drawings

1. Cabinet – an upright cupboard-like repository box with shelves, drawers, or compartments
2. Floor plan – an architectural drawing of a room or building as if seen from above with the roof removed
3. Millwork – finished woodwork that has been manufactured in a milling plant; examples are window and door frames, mantels, moldings, and stairway components
4. Portico – a roof supported by columns instead of walls

Unit 12: Preparing Building Elevations

1. Elevation – the height of a specific point in relation to another point; the exterior views of a structure
2. Flashing – metal used to prevent water leaking through surface intersections
3. Gable roof – a roof that slopes upward from opposite sides of a building, forming a central ridge and triangular-shaped end walls
4. Hip roof – a roof shape with four sloping sides

Unit 13: Career and Technical Student Organizations (SkillsUSA/HOSA)

1. Assess – to determine the value, significance, or extent; to judge
2. Assessment – a tool used to determine value, significance, or extent
3. Behavior – the actions one takes; how one conducts oneself
4. Business meeting – planned gathering of individuals (occupational, work, trade, or organizational) that is methodical, systematic and for a common purpose
5. Career – a chosen pursuit; the general course of progression of one's working life
6. Competency – the knowledge that enables one to comprehend and complete a task
7. Critique – a critical review or commentary
8. Cultural diversity – integrated existence of ethnic groups based on their values, beliefs, and behavior patterns (social, educational, economic, religious, and artistic values)
9. Customer – one who buys goods or services
10. Equity issue – a point of matter affecting the justice and fairness for all concerned
11. Expectation – eager anticipation; to look forward to the probable occurrence or appearance of something
12. Government – the agency or apparatus through which a governing individual or body functions and exercises authority
13. Image – the public's opinion or concept of something
14. Interview – a formal, in-person meeting in which the qualifications of an applicant are demonstrated/assessed
15. Job application – a form or document used by an employer when hiring prospective employees
16. Journal – a personal record of occurrences, experiences, or reflections kept on a regular basis
17. Management – the person or people who control or direct a business or other enterprise
18. Mentor – a wise or trusted counselor or teacher
19. Organizational chart – a chart that reflects the structure through which individuals cooperate systematically to conduct business
20. Parliamentary procedure – a body of rules governing a meeting

21. Portfolio – a portable case for holding materials – such as photographs, drawings, or other materials – that represent a person's work
22. Presentation – a performance; a formal introduction; the process of offering for consideration or display
23. Professional organization – a service provider utilizing a business relationship that allows outsourcing of human resources tasks, mainly for small to mid-sized businesses that do not have the need or resources for a dedicated human resources department; the concept is virtually unknown outside the United States
24. Résumé – a brief account of one's professional or work experience and qualifications often submitted with a job application
25. Self-motivation – to take action, move forward of one's own volition
26. Short-term goals – goals or targets that are reachable within a short period of time
27. Stress – an extreme pressure, strain, or difficulty
28. Task – a function to be performed
29. Trade union – a labor union, especially one limited in membership to people in the same trade