Nebraska CTE

Advanced Power, Structural, and Technology Systems (2021-)

Utilize physical science and engineering principles to design and implement and improve safe and efficient mechanical systems in AFNR situations. AFNR.HS.1.1	**a** Compare and contrast applications of simple machines in AFNR-related mechanical systems. AFNR.HS.1.1.A
	b Determine appropriate tools, machines, and equipment needed to construct and/or fabricate a project in AFNR. AFNR.HS.1.1.B
	c Classify the types of safety hazards associated with different mechanical systems used in AFNR (e.g., caution, warning, danger). AFNR.HS.1.1.C
	d Apply mathematical calculations to determine the mechanical advantage of simple machines in AFNR-related mechanical systems. AFNR.HS.1.1.D
	e Calculate the maintenance and purchase cost of tools, machines, and equipment used in AFNR. AFNR.HS.1.1.E
	f Apply the scientific method to devise strategies to improve the efficiency of operation of AFNR-related mechanical systems. AFNR.HS.1.1.F
	g Devise processes to safely implement and evaluate the safe use of AFNR-related tools, machinery, and equipment. AFNR.HS.1.1.G
Evaluate structural requirements and specifications and estimate costs for structures within Agriculture Food and Natural Resources. AFNR.HS.1.2	**a** Summarize information needed to complete a bill of materials and cost estimate for an AFNR structure. AFNR.HS.1.2.A
	b Summarize sources of industry construction and materials standards and their importance (e.g., American National Standards Institute, ANSI, Underwriters' Laboratories, UL). AFNR.HS.1.2.B
	c Assess local building code requirements for agricultural structures. AFNR.HS.1.2.C
	d Create a project cost estimate including materials, labor, and management for an AFNR structure. AFNR.HS.1.2.D
	e Design a building functionality and safety assessment on an agricultural structure using knowledge of industry standards and local code requirements. AFNR.HS.1.2.E

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Utilize architectural and mechanical plans to construct, maintain and/or repair AFNR structures (e.g., material selection, site preparation, and/or layout, plumbing, concrete/ masonry, brick/stone). AFNR.HS.1.3	**a** Examine the criteria in selecting materials for constructing, maintaining, and/or repairing AFNR structures. AFNR.HS.1.3.A
	b Compare and contrast the characteristics of products used in constructing AFNR structures (e.g., copper, PVC, PEX, fencing). AFNR.HS.1.3.B
	c Summarize the characteristics of the components found in concrete. AFNR.HS.1.3.C
	d Assess samples of materials or products for quality and efficiency of workmanship. AFNR.HS.1.3.D
	e Complete a building-site-analysis checklist to select an ideal building site. AFNR.HS.1.3.E
	f Measure and calculate the cost of a project (e.g., fencing, metal/wood structures, concrete projects). AFNR.HS.1.3.F
	g Select materials for a project based upon an analysis of the project and the quality of the materials. AFNR.HS.1.3.G
	h Identify processes in the construction, maintenance, and/or repair of fencing (e.g., wood, static wire, electrical wire, and other fencing materials) and AFNR structures. AFNR.HS.1.3.H
	i Calculate costs to insulate a structure and estimate reduced BTU loss. AFNR.HS.1.3.I
Evaluate concepts of electrical drawings to design, install and troubleshoot electronic control systems in AFNR settings. AFNR.HS.1.4	**a** Examine electrical control system components used in AFNR systems (e.g., transistors, relays, HVAC, logic controllers). AFNR.HS.1.4.A
	b Compare and contrast electrical sensors and controls used in AFNR power, structural, and technical systems. AFNR.HS.1.4.B
	c Summarize the importance of AFNR power, structural, and technical control systems using programmable logic controllers (PLC) and/or other computer-based systems. AFNR.HS.1.4.C
	d Interpret schematic drawings for electrical control systems used in AFNR systems. AFNR.HS.1.4.D
	e Interpret maintenance schedules for electrical control systems used in AFNR power, structural, and technical systems. AFNR.HS.1.4.E
	f Assess the functions of AFNR power, structural, and technical control systems using programmable logic controllers (PLC) in agricultural production and manufacturing. AFNR.HS.1.4.F

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g **Design schematic drawings for electrical control systems used in AFNR systems.** AFNR.HS.1.4.G

h **Troubleshoot electrical control system performance problems found in AFNR power, structural, and technical systems.** AFNR.HS.1.4.H

i **Develop AFNR power, structural, and technical control systems using program mable logic controllers (PLC) and/or other computer-based systems.** AFNR.HS.1.4.I