

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](#)

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](#)

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 programmable logic controllers (PLC) and/or other computer-based systems. [AFNR.HS.1.4.I](#)