

ACHIEVEMENT LEVEL DESCRIPTORS

FOR THE POWER, STRUCTURAL, AND TECHNICAL SYSTEMS MODULE

Please note: Students performing at the Meets Expectations level also meet all standards at the Approaches Expectations level.

APPROACHES EXPECTATIONS

Students performing at the Approaches Expectations level are able to research technologies used in agriculture, food, and natural resources systems as well as compare and contrast these systems before and after the integration of technology. These students can research and summarize the purposes and objectives of health and safety policies and procedures relevant to agriculture, food, and natural resources careers. They are able to identify factors of a clean and orderly work environment. These students are able to examine and categorize examples of how to avoid health or safety risks in agriculture, food, and natural resources workplaces and identify the emergency response procedures at the workplace. Students at this level can describe how mechanical and technical systems have improved agriculture industry segments (for example, producers, processors, or consumers) and distribution channels.

Students who approach expectations are able to identify tools and their uses as well as identify and demonstrate safe use and maintenance of measurement and layout tools. Additionally, students are able to identify tools that will be used in plumbing projects, identify the proper supplies needed for the project, and determine the type of plumbing pipe needed for the process. Students performing at the Approaches Expectations level can define basic terms used in construction. They are able to identify different construction materials and criteria in selecting materials in agricultural construction and fabrication.

Students performing at this level are able to identify blueprints, blueprint components, and describe the purpose of a blueprint. They are able to identify and describe different views, scales, and tools necessary for a working drawing. These students are able to describe a bill of materials, its purpose, and the importance of a procedures list and order of fabrication. Additionally, these students are able to prepare bills of materials. Students at this level are able to identify symbols and drawing techniques used to develop plans and sketches and identify major parts of a construction drawing.

Students who perform at this level can apply the meaning and measurement of electricity, including amperage, voltage, and wattage. These students can identify the kinds of applications of electricity, including direct and alternating current. They are able to discuss the various types and sources of electricity as well as recognize common electrical symbols. These students can identify uses of electrical sensors and controls and identify hazards and safety practices in planning, installing, and using electricity.

Students performing at this level can identify and classify components of internal combustion engines used in agriculture, food, and natural resources (AFNR) power, structural, and technical systems. They are able to distinguish the characteristics of spark-and-compression internal combustion engines used in these systems as well as identify different components and systems of internal combustion engines. These students should be able to describe the operation of internal combustion engines by types of fuel used.

Finally, students performing at the Approaches Expectations level can identify different kinds and characteristics of metal materials, welding processes used in the industry, and safe welding practices for each welding process. Additionally, these students are able to identify and describe uses of equipment and materials (filler rod) for each welding process and the types of situations that each process would be utilized.

MEETS EXPECTATIONS

Students performing at the Meets Expectations level can apply appropriate use of technologies in agriculture, food, and natural resources workplace scenarios as well as analyze and evaluate the impact of current health and safety practices in these settings. These students are able to analyze how technology is used in agriculture, food, and natural resources systems to maximize productivity. They can also adequately explain the local, regional, national, and global agriculture production as well as the role of agricultural technology at each of those levels. They are able to assess various emergency response plan requirements and assess and apply first aid knowledge and procedures in agriculture, food, and natural resources workplaces or facilities. Students at this level should be able to distinguish between safe and unsafe work environments.

Students who perform at the Meets Expectations level are able to demonstrate their knowledge of proper and safe operation of tools and select, maintain, and use hand and power tools in service, construction, and fabrication. These students can identify different plumbing materials (pipes) and joints (couplings) and determine the length and cut of pieces of pipe to size. Additionally, these students can define and utilize appropriate construction terminology. They can identify construction materials, common dimensions, and make selections regarding the types materials that should be used; determine the quantity of the materials needed; and estimate the costs of the materials and other costs associated with a specified project plan.

Students at this level can accurately read blueprints and use a drawing to complete a project. They are able to complete a bill of materials, including prices and quantities, and develop a list of procedures and a timeline for project completion. Students can develop plans and sketches using scale measurement and dimension, drafting equipment, and computer programs. Additionally, these students can identify and interpret different views of a construction drawing.

Students who meet expectations are able to assess and install electrical circuits, including conductors, insulators, and controls. They interpret electrical system symbols and diagrams. Students also use volt and amp meters as well as continuity testers to demonstrate electricity principles. These students can read and design schematic drawings for an electrical control system as well as interpret maintenance schedules for electrical control systems. They are able to distinguish and select materials and tools used in electrical control circuit installation.

Students performing at this level are able to analyze and explain how the components of internal combustion engines interrelate during operation. They utilize technical manuals and diagnostic tools to determine service and repair needs of spark-and-compression internal combustion engines used in agriculture, food, and natural resources (AFNR) power, structural and technical systems. These students utilize technical manuals and computer-based diagnostics in engine analysis and repair to analyze and troubleshoot internal combustion engines.

Finally, students performing at the Meets Expectations level are able to distinguish the welding processes, positions, and materials preparation. They can demonstrate safe welding practices for each welding process and select the appropriate process for a given application. They are able to describe the reaction that occurs in each welding process, both physical and chemical (metallurgic).