Tennessee FFA Association

Agricultural Technology and Mechanical Systems Handbook

2017-2021

Purpose

Technological advances in America continue to influence the way students must prepare for their futures.

Students entering the workforce need a strong knowledge base and the ability to comprehend the interaction of complex systems. Employers want productive workers and managers that can access and use a broad range of information. The most sought after employees are those who communicate effectively, continue to stay current with modern technology and work successfully and effectively as individuals and as team members. Students with these skills and abilities are more competitive in the job market, receive financial rewards and are selected for advancement.

Agricultural technology and mechanical systems is comprised of strong technical content and complimented by the development of practical, hands-on skills. The subject matter areas and skill development practices have been grouped into five 'systems' areas, so named because of the complex interaction and synergistic processes common to agriculture. The term 'system' is used to emphasize the interactive relationship between each area of agricultural technology and mechanical systems. These five systems areas are described and examples appear on the pages that follow.

Each agricultural technology and mechanical systems activity is in response to a problem or need encountered in the workplace. The solving of such problems is dependent upon how each decision or solution, imposed on one component, will influence the other system components. Solving one component of a problem without using a 'systems approach' can, and often does, result in additional problems. An example of where this has occurred is observed in the many obstacles that agricultural producers currently face regarding environmental pollution, ground water contamination and stricter governmental regulations. Decisions and solutions made in the past 100 years have impacted the environment negatively and resulted in a new set of problems.

The Tennessee FFA Agricultural Technology and Mechanical Systems Career Development Event recognizes students with agricultural technology and mechanical systems competencies important to the modern workplace. The technical content and required skills continue to include all traditional areas of agricultural technology and mechanical systems. Additionally, the operation of modern equipment, the application of new management strategies and the mastering of advanced technologies are increasingly emphasized.

This career development event selects and awards those students and teams that demonstrate:

- Mastery of the subject matter and skills common to the systems areas.

- Effective communication skills.
- Superior problem solving techniques.
- An understanding of modern technology.
- The ability to function as individuals and as team members working together.

Event Rules and Format

TEAM MAKE-UP

Teams will consist of four members. All four member's scores count. Team ranking is determined by combining the scores of all students from each team.

EQUIPMENT

SAFETY MATERIALS STUDENTS MUST PROVIDE.

Each event participant must adhere to the safe practices and work habits appropriate when performing required activities. Participants are responsible and must provide all personal safety equipment including:

Eye protection:

Each team member must wear eye protection. Safety glasses must have the Z87+ rating. Individuals with prescription glasses will need either prescription safety glasses or safety glasses than can be worn over prescription glasses. Do not bring tinted safety glasses.

Individuals Must Wear Style B

Industrial-quality eye protection should be used during the team activity and the skill/problem solving activities. Safety glasses do not have to be worn while completing the written exam. Those with prescription eyewear that is not Style B must also wear safety glasses or goggles while participating in this event. Acceptable spectacles or goggles must adhere to the American National Standard Practice for Occupational and Education Eye and Face Protection, Z87.1-1979 (or Z87.1-1968) and revisions approved by ANSI.

Descriptions of style A, B and C Industrial Quality Eye Protection are as follows:

- **Style A:** Not acceptable for use in the event. These are safety spectacles without side shields. They are for limited-hazard use requiring only frontal protection. The addition of accessory side shields that are not firmly secured does not upgrade style A to a style B or C.
- **Style B:** Acceptable—Safety spectacles with wire mesh, perforated plastic or non-perforated side shields. The side shields shall be tapered, with an anatomical periphery extending at least half-way around the circumference of the lens frame. Industrial-quality eye protection for those not wearing prescription glasses shall be style B.
- **Style C:** Not acceptable for use in the event. Safety spectacles with semi- or flat-fold

shield that must be firmly secured to the frame. Style C glasses do not provide maximum protection from the top and bottom angles.

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Clothing

Each individual shall furnish and wear appropriate clothing such as long pants and long sleeved cotton shirt, coveralls, etc., for this event. Clothing must be in good repair and fit properly. Oversized or loose fitting clothing is dangerous around agricultural equipment and is not allowed. Long-sleeves must be worn when welding or oxy-fuel cutting. No open-toed footwear shall be worn during the event.

Other Materials

Each participant must have a clear clipboard, two sharpened No. 2 pencils and an electronic, non-programmable calculator. Calculators used in this event should be battery operated and silent. A laptop and printer may be required at the state event. The event superintendent will notify teams prior to the event is this equipment is needed.

SPECIALIZED SAFETY EQUIPMENT PROVIDED

- Necessary equipment such as basic welding helmets or goggles as required for welding, shields, gloves, welding leathers, hearing protection devices, etc., will be provided by the Tennessee FFA Agricultural Technology and Mechanical Systems Career Development Event committee.
- All required tools and equipment will be furnished for the event. Teams/individuals may choose to use their own equipment subject to approval by the event superintendent.
- If a team member needs modified equipment due to physical size and stature, the student must supply this equipment. The team member or coach must present the student-supplied equipment to the event superintendent prior to the start of the event for approval. Team members who need specialized or modified equipment due to disability as defined by the American Disabilities Act must submit the appropriate special needs request form and documentation at the time of the team’s certification.

Event Areas

The Tennessee FFA Agricultural Technology and Mechanical Systems Career Development Event is divided into the following areas. Each area includes competencies common to agriculture. Students will be assessed on their proficiency as individuals and as a team. Specific competencies will be identified annually from the following areas:

- **Machinery and Equipment:** Repair and maintenance, materials handling, processing, adjustments, metal fabrication
- **Electricity:** AC/DC power, electrical safety, electrical standards, sensing devices, electrical wiring, controls, electronics, motors and other electrical loads, operating instructions, and manufacturer's recommendations
- **Compact Equipment:** Mechanical power, electrical power, hydraulic power, engine operation, maintenance, trouble-shooting, repair
- **Structures:** Structures, storage, concrete, masonry, plumbing, electrical, fabrication, construction, building materials, ventilation, heating, air conditioning
- **Environment and Natural Resources:** Water quality, sustainable agricultural practices, soil and water conservation, surveying, biological waste handling

Team Activities (400 Points Total)

The individuals on each team will work together and be evaluated as a team while solving multi-system agricultural problem(s) selected from the skills and problem solving of the five system competency areas.

The specific problem scenario is presented to the team on the day of the event. Team members will utilize the materials and equipment provided to solve the problem(s) and prepare a computer generated report. Teams will organize themselves, assign duties and complete tasks together or separately depending on individual skills and abilities. Each team will receive a score, and each team member will receive one-quarter of the total team activity score. The team activity score will be based on the finished product, the process including teamwork, and the written report.

The team activity will be evaluated as follows:

- **Teamwork process**: 100 points
- **Team report:** 50 points
- **Finished product:** 250 points

- **Total for team activity:** 400 points

Individual Activities

FIVE PRACTICUM AREAS (5 AT 30 POINTS EACH)

Each student is individually evaluated in each of the five areas. The specific activities occurring in each event are not publicized prior to the event. Each student is allowed 25 minutes to complete each of the five activities.

WRITTEN EXAMINATION (50 POINTS)

Each student completes an examination that consists of 25 problem solving/multiple-choice questions. A test bank of 300 questions will be developed by the event superintendent and posted on tnffa.org under the Downloads tab. The test bank will be updated annually by Tennessee FFA State Staff via the CDE Event Superintendent. The event superintendent will write the exam. There are five questions from each of the five agricultural technology and mechanical systems areas. Students will have 60 minutes to complete this portion of the career development event.

ANNUAL EVENT ANNOUNCEMENTS

Agricultural Technology and Mechanical Systems (ATMS) CDE focus is published and distributed by the National FFA Organization and posted at the following web site: *http://web.missouri.edu/~schumacherl/natcon.html*

Specific information and event updates generally occur following each year's event during November, June and August. The schedule for announcing event information and details on equipment selection is governed by equipment availability and changes by equipment manufacturers, dealers and contributors.

Scoring

Event participants are evaluated as follows:

INDIVIDUAL SCORING	
Written examination	50
Individual activities (5 at 30 points each)	150
Team activity (1/4 of total team activity score)	100
TOTAL POSSIBLE INDIVIDUAL SCORE	**300**

TEAM SCORING	
Written examinations	200
All individual activities	600
Team activity	400
TOTAL POSSIBLE TEAM SCORE	**1,200**

TIEBREAKERS

TEAM

The team activity scores will be used to break a tie associated with the team rankings. If a tie still exists, the combined written exam scores will be used to break the tie.

INDIVIDUAL

If a tie exists between individuals, the combined highest individual/activities scores will break the tie(s). If still tied, the highest written examination score will be used to break the tie.

References and resources

This list of references is not intended to be all-inclusive.

Other sources may be utilized, and teachers are encouraged to make use of the very best instructional materials available. The following list contains references that may prove helpful during event preparation.

The goal of the National FFA Agricultural Technology and Mechanical Systems Career Development Event is to guide and promote quality instructional programs in agricultural technology and mechanical systems. The following list contains references that may prove helpful during event preparation. The multiple-choice test questions are written to be generic in nature and are selected from a variety of sources. It is the intent of the national event committee to reflect current technological practices common to the agricultural production industry. Refer to the CDE website for additional references and resources.

- National FFA Core Catalog—Past CDE Material *(http://shop.ffa.org/cde-qas- c1413.aspx)*
- Information specific to each annual event is available on the National FFA Agricultural Technology and Mechanical Systems Career Development Event web page at *http://web.missouri.edu/~schumacherl/natcon.html*. Specific information and event updates generally occur following each year's event during November, June and August.
- FOS. John Deere.
- FMO. John Deere.
- Agricultural Power and Machinery. (CD format) CEV Multimedia. LTD.
- Agricultural Engineering Technology. (ASABE) Springer Science + Business Media, LLC.
- Mechanics in Agriculture. Prentice Hall.
- Agricultural Mechanics Fundamentals and Applications. Delmar and Thompson
- Modern Agricultural Mechanics, V3. Prentice Hall
- Developing Shop Safety Skills. American Association for Vocational Instructional Materials
- Power Tool Safety and Operation. Hobar Publications
- Practical Farm Buildings. Prentice Hall
- National Electrical Code (latest edition). NFPA
- Ag Wiring Handbook. Rural Electricity Resource Council
- Mechanical Technology in Agriculture. Prentice Hall
- Agricultural Technical Systems and Mechanics by Koel, Maur, Moniz & Radcliff, American Technical Publishers (ATP)

- Industry websites
  - Briggs and Stratton
  - Case IH
  - John Deere
  - New Holland
  - Lincoln Electric

Event Related Competencies

The following list of statements with specific understandings and performances are provided as examples for the systems areas identified. Examination questions are primarily developed from problem solving categories.

The skills categories are the basis for performance activities. Problem solving activities are developed from both problem solving and skills categories. In each systems area, the requirements for effective communication, problem solving activities and the application of modern technology — specifically computers and computer software — are strongly emphasized. Industry has identified important skills, abilities and competencies needed by new employees. These important attributes are described following the list of system competencies.

MACHINERY/EQUIPMENT SYSTEMS COMPETENCIES

- Identify safe machinery operational practices.
- Identify the recommended service and maintenance operations from the operator's manual.
- Identify and use Nebraska Tractor Test or PAMI results.
- Select lubricants for machinery and equipment.
- Identify functions of machinery components.
- Identify parts and functions of hydraulic systems.
- Identify and compute harvest losses.
- Identify safe adjustment [level] on power equipment.
- Select pipe sizes to meet pressure and flow requirements.
- Identify repair procedures, techniques and materials.
- Match tractors to implement.
- Check and adjust driveline components.
- Adjust equipment hitches and drives.
- Install, adjust and service belt and chain drives.
- Select and use test equipment including meters, tachometers and timing devices to determine proper machine operation.
- Adjust and/or calibrate chemical application, seeding, fertilizing, harvesting, processing and materials handling machinery.
- Install, operate, maintain, adjust and evaluate machine systems for field conditions.

- Inflate tires to proper air pressure (e.g., load inflation tables).
- Join metals with appropriate fasteners.
- Select tools and materials for specific repair jobs.
- Select and use appropriate safety equipment.
- Identify safe machinery operation practices for field and highway conditions.
- Identify the recommended service and maintenance operations from the operator's manual.
- Select fuels, lubricants, hydraulic fluids and coolants for proper operation.
- Operation and interpretation of circuit diagrams and flowcharts for electrical, hydraulic, fuel, oil, cooling, intake and exhaust systems.
- Identify the function and operating principles of clutches, transmissions, control devices and brakes.
- Describe principles of power transmission.
- Identify the parts and functions of electrical, hydraulic, lubrication, cooling, governor and fuel systems.
- Select proper ballast for machinery weighting.
- Conduct a pre-operation inspection of a tractor or implement.
- Start, stop and operate machinery/engines.
- Perform recommended periodic service jobs (as found in operator's manuals).
- Conduct on-board tractor monitor checks as identified in operator's manual.
- Select and use engine overhaul equipment, including valve, cylinder, piston, seal and bearing tools.
- Service and maintain fuel, air intake and exhaust, cooling and lubrication systems.
- Operate engine and adjust or check ignition timing, engine speed and carburetor adjustments.

ELECTRICAL SYSTEMS COMPETENCIES

- Use appropriate standards for agricultural applications, including the National Electrical Code (NEC), Electrical Testing Laboratory (ETL), Factory Mutual, Underwriters Laboratory (UL), Canadian Standard Association (CSA) and/or OSHA standards.
- Identify the characteristics of single and three-phase circuits.
- Plan and evaluate proper grounding systems and ground-fault protection.
- Determine volt, amp and ohm relationships (Ohm's and other application laws).

- Select adequate and appropriate lighting fixtures.
- Select motors based upon type of application.
- Interpret electric motor nameplate data.
- Identify electric motors and motor parts.
- Identify methods of providing electric motor protection.
- Interpret power (horsepower, kilowatt), power factor, torque and other motor selection criteria.
- Calculate heating and cooling loads.
- Identify and describe basic principles of controls including thermostats; humidistat; photoelectric; magnetic relays; programmable controllers; proximity switches and sensors; ultrasonics; timers and other time-delay equipment and pressure, motion, limit, float and sail switches.
- Select controls from supply catalogs/websites.
- Select appropriate wire sizes and protection devices for specific loads and lengths of circuits.
- Use low-voltage electrical control equipment.
- Use electrical test instruments such as: VOA (volt-ohm-amp) meter, DMM (digital multimeter) and tachometer.
- Read schematics and sketch wiring circuits.
- Install service entrance for single phase 120/240V service or three-phase power.
- Connect and operate electrical motors to power source.
- Change the direction of electric motor rotation.
- Select and mount an electric motor on a machine.

COMPACT EQUIPMENT SYSTEMS COMPETENCIES

Compact Equipment is defined here as being 30 horsepower or less.

- Interpret horsepower, torque and other power measurement criteria.
- Compare costs of alternative machine uses.
- Describe operating principles of two-stroke and four-stroke spark or compression ignition engines.
- Evaluate engine/electric motor performance under load and no-load operation.
- Determine hydraulic cylinder force and speed.
- Interpret wiring diagrams/schematics.

- Identify and select devices for automated systems.
- Match tractors to implements.
- Select energy efficient equipment and materials.
- Identify energy conservation measures to reduce costs and operation(s).
- Determine energy consumption and cost savings of alternatives.
- Conduct equipment pre-operation inspection.
- Start, stop and operate machinery and engines.
- Perform recommended periodic service jobs (as found in operator's manuals).
- Use measuring tools and test instruments such as: Micrometer and telescoping gauges, dial indicator, compression tester, torque wrench, VOA (volt-ohm-amp)meter, DMM (digital multi-meter), timing devices, tachometer and dynamometer for determining test procedures.
- Remove, service and replace electrical components.
- Test and service batteries, charging, lighting, warning and cranking systems.
- Select and use engine overhaul equipment, including valve, cylinder, piston, seal and bearing tools.
- Service and maintain fuel, air intake and exhaust, cooling and lubrication systems.
- Operate engine and adjust or check ignition timing, engine speed and carburetor adjustments.
- Measure energy output from or consumption of devices and cost savings of alternatives.

ENVIRONMENTAL AND NATURAL RESOURCES SYSTEMS COMPETENCIES

- Identify environmental problems in livestock and crop handling and processing buildings.
- Read and interpret maps including conservation, land use, soils, topographic, aerial and remote sensing and geological surveys.
- Describe principles involved in appropriate conservation and/or land use planning.
- Interpret legal land descriptions and determine land area.
- Conduct land surveying practices
- Select terracing and water diversion options for soil conservation.
- Selecting strip-cropping principles and practices.
- Select water management techniques including grassed waterways, parallel terrace outlets, tile outlet systems and erosion control structures.
- Determine types of vegetative cover and mulch for erosion stabilization.

- Determine and select appropriate cultural tillage or mechanical practices of equipment for specific soil type and residue management.
- Calculate soil loss using universal equations and determine effects of the components of the equations.
- Determine appropriate types, locations and uses of erosion and sedimentation control basins.
- Describe and/or calculate surface and subsurface drainage and irrigation techniques.
- Determine land shaping and grading requirements.
- Select irrigation systems for specific conditions.
- Select irrigation equipment and techniques.
- Determine power requirements and pump size for specific applications.
- Apply water pressure, flow and head concepts.
- Select pumps and power sources and compare efficiencies.
- Interpret pump characteristics curves.
- Utilize GPS systems and components.
- Lay out grade stakes for cut/fills.
- Determine soil types and select appropriate structures or practices.
- Use water-testing equipment.
- Lay out and map contour lines.
- Measure crop residue on the land.
- Identify soil limitations and determine the effects on land use.
- Assemble turf irrigation equipment.
- Install drainage systems or components.
- Install components of irrigation systems for specific applications.

STRUCTURES SYSTEMS COMPETENCIES

- Determine the size, specifications and layout of building.
- Develop a bill of materials.
- Interpret plans and working drawings.
- Select and plan concrete construction.
- Interpret lumber and manufactured wood product grade stamps.
- Determine ventilation air requirements for intake and exhaust fan capacity.

- Select alternative construction styles and components (stud frame, post frame, rigid arch and stressed skin).
- Select arc welding machines and accessories.
- Read drawings and welding symbols.
- Test weld quality.
- Select, assemble and check welding equipment and supplies.
- Operate welding equipment and accessories for metal joining operations.
- Select tools and perform operations for cold metal working.
- Read metal working plans and prints.
- Select paint and other finishing materials.
- Use and maintain concrete and masonry tools and equipment.
- Fabricate and install reinforcing steel bar and welded wire mesh.
- Select and apply appropriate roofing, insulation and vapor barrier materials.
- Identify types of metals.
- Recommend metals based on load bearing strength.
- Fuse and braze welding basic joints on mild steel and cast iron.
- Estimate and calculate welding materials costs.
- Cut metal with plasma cutting unit.
- Operate power tools such as nibblers, drills and saws.
- Operate hand tools such as saws and files.
- Select appropriate metals for projects (strength).
- Cut and assemble plastic pipe.
- Solder copper fittings, tubing and copper wire.

GENERAL CLUSTER SKILLS

- Demonstrate strong interpersonal communication abilities.
- Knowledge combined with leadership qualities and the ability to delegate responsibilities.
- Use people skills to deal with customers, the public and large groups.
- Identify and interpret the correct resources to make an educated decision.
- Understand and apply principles of mathematics, economics, biology and physics.
- Have a high level of common sense, logic and critical thinking skills.

- Think independently and analytically.
- Ability to understand and follow detailed instruction - written and oral.
- Motivated to learn from various methods of instruction.
- Utilize current technologies - computers, electronics, mechanical systems, etc.
- Calculate cost per units, per hour, per bushel, per acre, etc.
- Estimate value of equipment and recommend future buying decisions.
- Use technology to eliminate waste of time and resources.
- Use computer hardware, software, Internet, etc.
- Productively use time, money and people.
- Be knowledgeable of global agriculture - encompassing planning, production, marketing and finance.
- Use cash flow for critical business planning and operation.
- Measure and estimate costs and develop plans for business/ industry improvements.
- Write annual goals with specific objectives and measurement tools for review.
- Demonstrate skills in business operations and management.
- Use a systematic approach to diagnose equipment problems.
- Service and maintain equipment to maintain optimum productivity.
- Use on-board computerized systems that monitor, test, store and report equipment operation.
- Be familiar with computerized recognition of crop productivity and quality, field conditions and pests.
- Understand electrical circuits - amperage, watts, voltage, resistance and transistors.
- Understand hydraulic system operation - flow, resistance and temperature.
- Understand mechanical system operation - mechanical advantage, material specifications and gear design.
- Read schematics, replace components – including control modules.
- Diagnosis electrical, computer, mechanical and hydraulic systems.
- Analyze mechanical system failures.

Safety Rubric

25 points

	Very strong evidence of skill is present 5-4 points	Moderate evidence of skill is present 3-2 points	Strong evidence of skill is not present 0-1 points	Points earned	Weight	Total Points
Safety glasses	Safety glasses are worn by all team members at all times with one or no reminders.	Safety glasses are worn by team members most of the time with two to three reminders.	Safety glasses are worn seldom by team members with four or more reminders.		X2	
Safety practices	Safety practices used at all times.	Safety practices used most of the time with minor violations.	Moderate to major violations of safety practices observed.		X1	
Injuries	No injuries occurred during the activity.	Minor injuries occurred during the activity requiring no medical attention.	Moderate to severe occurred during the activity.		X2	
					TOTAL POINTS	

Team Activity Process Rubric

50 points

	Very strong evidence of skill is present 5-4 points	Moderate evidence of skill is present 3-2 points	Strong evidence of skill is not present 0-1 points	Points earned	Weight	Total Points
Communications	All team members effectively communicate with each other throughout the entire activity.	Most team members communicate fairly effectively with each other during most of the activity.	Communication between team members is ineffective and sporadic during the activity.		X2	
Work distribution	Work was evenly distributed between all team members and all team members were employed at all times.	Work was distributed between two to three team members and these members were employed most of the time.	Work was completed by only one team member with little employment of the other members.		X4	
Time management	All team members managed their time efficiently.	Most team members managed their time fairly efficiently.	One (or no) team member managed their time efficiently.		X2	
Team organization	Team started right away, had no down time, was not rushed at the end of the task.	Team was delayed in starting, had down time, and was somewhat rushed at the end of the task.	Team delayed starting, had long down times, and did not complete all tasks during the time allotted.		X2	
				TOTAL POINTS		

Team Activity Writing Summary Rubric

50 points

	Very strong evidence of skill is present 5-4 points	Moderate evidence of skill is present 3-2 points	Strong evidence of skill is not present 0-1 points	Points earned	Weight	Total Points
Introduction *Written in narrative form*	Concise and brief overview of the team activity, written in narrative form that accurately described the activity.	Somewhat elaborate and lengthy overview of the team activity, partially written in narrative form and somewhat described the activity.	Introduction rambled without describing the activity or was too brief to adequately describe the activity. Narrative form was not used.		X1	
Delegation of tasks *Begins with an introductory sentence. The remainder can be written with bullet points*.	Fully explains how the labor and responsibilities were divided and how the group worked as a team. Identifies the division of labor and management.	Partially explains how the labor and responsibilities were divided and how the group worked as a team. Partially Identifies the division of labor and management.	Vaguely explains how the labor and responsibilities were divided and how the group worked as a team. Vaguely identifies the division of labor and management.		X2	
Discussion and success or challenges *Begin with an introductory sentence. The remainder can be written with bullet points*.	Fully identifies portions of the activity where the team succeeded and portions of the activity where the team struggled.	Partially identifies successes and challenges by only including successes or only including challenges. Partially describes successes and challenges.	Omits success and challenges or rambles without clearly identifying what portions of the activity were successful for the team or what portions were struggles.		X1	
Steps to designing the product *Use this section to briefly describe the process you went through to design the product*	All needed steps are included for designing the product constructed. All steps were clear described.	Most steps are included for designing the product constructed. Some steps included were not clearly described.	A few or none of the steps are included for designing the product constructed. Steps included were and did not describe the steps to designing the product.		X1	
Steps to construction *Explain to another group the process of constructing the*	Complete and thorough steps are listed including suggestions to improve the process. Steps provide clarity so	A partial list of steps are listed and suggestions to improve the process. Steps provide moderate clarity for another	Few if any steps are listed with minimum suggestions to improve the process. Steps are vague and another team would struggle to		X2	

	Very strong evidence of skill is present 5-4 points	Moderate evidence of skill is present 3-2 points	Strong evidence of skill is not present 0-1 points	Points earned	Weight	Total Points
product built in this activity. *Begin with an introductory sentence. The remainder can be presented in numbered statements.* *This part of the report can be an opportunity to make suggestions that would improve the process where you experienced particular challenges.*	another team could follow the steps and construct the same product.	team to construct the same product.	construct the same product using these steps.			
Annual team activity details *Each year this will vary depending on activity details*	A complete description related to the annual team activity.	A partial description related to the annual team activity.	Few if any details are related to the team activity.		X1	
Safety	A complete list of safety practices are included in the report	A partial list of safety practices are included in the report.	Few if any safety practices are included in the report.		X1	
Conclusion	Concise, complete description of what team learned, and benefits of completing activity.	Somewhat elaborate and lengthy, incomplete description of what team learned and benefits of completing activity. Or very briefly written conclusion only partially describes what the team learned.	Elaborate and lengthy, with little or no description of what team learned and benefits of completing activity. Or missing or extremely brief conclusion does not describe what the team learned.		X1	