



Lesson 5 of 8

Quality and Reliability

Created: 03/2025 by the National FFA Organization

Description of Lesson Series: *There are a wide range of careers available in the Power, Structural and Technical Systems pathway. Students might not even be aware of many of these careers. This lesson series will dive into the multitude of careers that are needed to take a precision agriculture product from idea to finished product and beyond. These lessons are designed to be used in order.*

Student Learning Objectives:

After completing these activities, students will ...

1. Investigate careers in quality assurance and their significance in ensuring product success.
2. Identify quality problems and how to solve them.

Suggested Grade Level:

Grades 9 and 10 (This lesson is written so instructors can scale up or down based on class needs.)

Suggested Time: 60 minutes (*Time requirements may vary based upon student understanding and class schedule.)

Resources/References:

- i. Video: "John Deere: Quality Is Tradition," <https://www.youtube.com/watch?v=Knp5H3qXUwk>

Related Resources:

1. "Power Up" Your Future With John Deere, <https://FFA.box.com/s/rmzz3a341ei4f0te2hasrch2ep2tgme1>
2. We Are John Deere Series, <https://FFA.box.com/s/3fjke9572nl1zt298rx5oo0k65m8horv>

Equipment and Supplies Needed:

1. A copy of the "Quality and Reliability" worksheet for each student
2. Internet access

Vocabulary:

1. Assurance
2. Durability
3. Reliability
4. Standard
5. Quality

Cross-Curricular Connections:

English/Language Arts	Engineering
• Students will analyze information and provide written responses.	• Students will create a plan for quality control.

Name: _____

SAE and FFA Connections

1. Agricultural Technology and Mechanical Systems CDE, [FFA.org/participate/cdes/agricultural-technology/](https://ffa.org/participate/cdes/agricultural-technology/)

Student Activity Sheets:

Direct access to student activity sheets without lesson plan or answer key for easy upload to a learning management system or printing for classwork.

<https://ffa.box.com/s/zp2p5s9v20d23ynnkt3jbo92avntmmee> (Word)

<https://ffa.box.com/s/gsf83lqzhtoaix6taatd4nh9fygjbkfr> (PDF)

https://docs.google.com/document/d/1-bHUaKdePeeGfg_oXq6iNEJvpcyQsxGgtFOMcc6VM6s/copy (Google)

These Activities Are Aligned to the Following Standards:

FFA Precept

- FFA.PL-A.Action: Assume responsibility and take the necessary steps to achieve the desired results, no matter what the goal or task at hand.
- FFA.PL-C.Vision: Visualize the future and how to get there.
- FFA.PL-E.Awareness: Understand personal vision, mission and goals.
- FFA.PL-F.Continuous Improvement: Accept responsibility for learning and personal growth.
- FFA.PG-I.Professional Growth: Assume responsibility for attaining and improving upon the skills needed for career success.
- FFA.PG-J.Mental Growth: Embrace cognitive and intellectual development relative to reasoning, thinking and coping.
- FFA.CS-M.Communication: Effectively interact with others in personal and professional settings.
- FFA.CS-N.Decision Making: Analyze a situation and execute an appropriate course of action.

AFNR Cluster Skills

- CS.05. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

Common Core – Speaking and Listening

- CCSS.ELA-Literacy.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
- CCSS.ELA-Literacy.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

Common Core – Science & Technical Subjects

- AG5 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources Career Pathways.

AFNR Career Ready Practices

- CRP.04. Communicate clearly, effectively, and with reason. Career-ready individuals communicate thoughts, ideas and action plans with clarity, whether using written, verbal and/or visual methods.
- CRP.07. Employ valid and reliable research strategies. Career-ready individuals are discerning in accepting and using new information to make decisions, change practices or inform strategies.
- CRP.08. Utilize critical thinking to make sense of problems and persevere in solving them. Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem.
- CRP.10. Plan education and career path aligned to personal goals. Career-ready individuals take personal ownership of their own educational and career goals, and they regularly act on a plan to attain these goals.

Partnership for 21st Century Skills

- Communication
- Critical Thinking and Problem Solving
- Initiative and Self-direction
- Leadership and Responsibility

Name: _____

Lesson Plan:

1. **Bell Ringer:** Think of a time when a product you used didn't work as expected. What was that product, and what didn't work? How did that impact your experience?
2. **Introduction:** *Ensuring a product is reliable and meets quality standards before it reaches customers is critical. Careers in quality assurance focus on testing and refining products to ensure they perform as expected. Today, you will learn about the importance of quality control in agriculture. You will also evaluate your prototypes and make a plan for quality testing.*
3. **Activity:** Each student needs a copy of the worksheet "Quality and Reliability."
 - a. **Part 1:** Students will watch the video "John Deere: Quality Is Tradition" found at <https://www.youtube.com/watch?v=Knp5H3gXUwk>. While watching, they will complete their student activity sheets about the careers seen in the video and the different aspects of the product that are quality tested.
 - b. **Part 2:** Students will get into their groups and will create a plan for how they would quality test their product, how they would address certain issues and what careers would be associated with each step of the process. Once done, they will answer reflection questions about the process.
4. **Follow-up:** Discuss what would happen if quality standards weren't met during the production process.
5. **Optional – Extended Learning Opportunities (Not factored into time requirement):**
 - a. Assign teams to investigate real-world quality standards for agricultural equipment. Each team will write a one-page summary on how these standards ensure product reliability and share how they would apply these principles to their own product.
6. **Exit Ticket:** What is the purpose of quality testing in product development?

Name: _____

Quality and Reliability

Part 1

Directions:

Watch the video "John Deere: Quality Is Tradition." Use this page to record your answers while watching the video.

1. Quality isn't just a _____; it's _____.
2. What are three of the testing methods discussed in the video?



3. What are three careers shown in the video?

-
-
-

4. What are four of the different things that Mitzi tests when conducting her quality check?



Why do you think quality testing is so important to John Deere?

Name: _____

Part 2

Directions:

In your group, imagine you are performing quality testing on the product you developed in the previous lesson. Create a plan for how you would quality test your product, how you would address certain issues and what careers would be associated with each step of the process.

Quality Assurance Testing Plan

Group Members:

Step 1: Define Quality Testing Goals.

1. What is the purpose of your product?
(Briefly describe your precision agriculture product and its main function.)
2. What factors need to be tested to ensure quality?
(Circle or write the key factors your group will focus on testing.)
 - Durability
 - Performance
 - Safety
 - Environmental impact
 - Usability
 - Efficiency (e.g., fuel, energy use)
 - Other: _____

Step 2: Identify Testing Procedures.

1. Describe your testing procedures for each factor.
(For each factor selected above, describe how your group plans to test it.)

Example: "To test durability, we will simulate the equipment operating in extreme weather conditions."

Factor	Testing Procedure
Example: Durability	Simulate the equipment operating in extreme weather conditions (e.g., heavy rain, extreme heat).

Name: _____

Step 3: Address Potential Issues

- 1. What problems might arise during product use? (List at least three potential issues and their possible causes.)
- 2. How will you address these issues? (Describe solutions or strategies for each issue.)

Potential Issue	Possible Cause	Solution
<i>Example: Sensor malfunctions</i>	<i>Exposure to dust or moisture</i>	<i>Conduct regular maintenance</i>

Step 4: Connect Careers

- 1. What careers are involved in each step of the testing process?
(Match careers to the factors being tested or issues being addressed.)

Testing Step	Career	Issue Being Addressed	Career
<i>Example: Safety testing</i>	<i>Safety specialists</i>	<i>Mechanical breakdown</i>	<i>Mechanic</i>

Step 5: Reflection

- 1. What was the biggest challenge your team faced while creating your quality testing plan?
- 2. How did your team overcome this challenge?
- 3. Why is quality testing important for the success of your product?

Name: _____

KEY: Quality and Reliability

Part 1

Directions:

Watch the video "John Deere: Quality Is Tradition." Use this page to record your answers while watching the video.

1. Quality isn't just a ____goal____; it's ____tradition____.
2. What are three of the testing methods discussed in the video?



Field testing



Lab testing



Customer testing

3. What are three careers shown in the video?
 - Engineer
 - Product planner
 - Auditor

4. What are four of the different things that Mitzi tests when conducting her quality check?



Paint quality



Safety decals



Welds



Hardware

Why do you think quality testing is so important to John Deere?

Answers will vary.

Name: _____

Part 2

Directions:

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Answers will vary.

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Answers will vary.	Answers will vary.
Answers will vary.	Answers will vary.
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Name: _____

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Step 5: Reflection

1. What was the biggest challenge your team faced while creating your quality testing plan?

Answers will vary.

2. How did your team overcome this challenge?

Answers will vary.

3. Why is quality testing important for the success of your product?

Answers will vary.