



Lesson 3 of 8

Careers with Plants: Pre-Production

Created: 06/2025 by the National FFA Organization

Description of Lesson: *This lesson explores the importance of pre-production planning, trials and regulatory compliance in plant science. Students will engage in hands-on activities to understand how agricultural products are tested before being mass-produced. They will also explore careers in pre-production and the educational pathways needed for these roles.*

Student Learning Objectives:

After completing these activities, students will ...

1. Describe the role of pre-production in agricultural product development.
2. Identify careers related to field trials, testing and regulatory compliance.
3. Conduct a hands-on activity simulating decision-making in pre-production.
4. Explore educational pathways and skill sets required for careers in pre-production.

Suggested Grade Level:

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

Suggested Time: 90 minutes (*Time requirements may vary based upon student understanding and class schedule.)

Resources/References:

1. Website: AgExplorer (2023), AgExplorer.FFA.org

Related Resources:

1. AgExplorer Implementation Guide, <https://FFA.box.com/s/w3o6ep5l2509qtwlfsgrkc718o3d143m>
2. Who Is Syngenta? <https://FFA.box.com/s/rn1aabyi6ndcils1mptx4ewkiw340j>

Equipment and Supplies Needed:

1. A copy of the "Careers in Pre-Production" worksheet for each student
2. A copy of the "[Plant Systems Career Cards](#)" cut out ahead of time, one card per group
3. A copy of the "[Pre-Production Scenario Cards](#)" cut out ahead of time, one card per group

Vocabulary:

1. Collaboration
2. Plant Breeder
3. Plant Geneticist
4. Pre-production
5. Scenario
6. Soil Scientist

Cross-Curricular Connections:

English/Language Arts	Technology
Research careers and complete a career profile.	Explore the different roles within Plant Systems.

SAE and FFA Connections

Name: _____

1. Agronomy CDE, [FFA.org/participate/cdes/agronomy/](https://ffa.org/participate/cdes/agronomy/)
2. Floriculture CDE, [FFA.org/participate/cdes/floriculture/](https://ffa.org/participate/cdes/floriculture/)
3. Nursery/Landscape CDE, [FFA.org/participate/cdes/nursery-landscape/](https://ffa.org/participate/cdes/nursery-landscape/)
4. SAE Idea Cards, <https://ffa.box.com/v/saeideacards>

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/wes668tt7dz1m5wp4422tuio6s5hgtbm> (Word)

<https://ffa.box.com/s/d16f4uj0mpy6xlv9kadpu2w32loa2t8> (PDF)

<https://docs.google.com/document/d/1MYN8AJ015jDgqqYRSQ6f7IJkGrUOCnsZyo9dytgwj6Q/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:** A new snack called Neon Nibbles just hit the shelves. It tastes great, but hours later, everyone who eats it notices something strange: Their tongues are stained bright green ... and it won't wash off. Not with water. Not with toothpaste. Not even after three days.
How would you feel if this happened to you?
What should the company have done before releasing this product to the public?
Why is it important to test new things before they're shared with people or the environment?
2. **Introduction:** *Before an agricultural product is brought to market, it must go through extensive pre-production testing to ensure its effectiveness and safety. Companies like Syngenta conduct field trials and work with regulatory bodies to meet industry standards.*
In this lesson, we will explore the steps taken before a product reaches full-scale production. You will participate in a hands-on decision-making activity, analyze different pre-production challenges and explore careers in pre-production. By the end of this activity, you will better understand how pre-production influences the industry of agriculture.
3. **Activity:** Each student needs a copy of the worksheet "Careers in Pre-Production."
 - a. **Part 1:** Role Assignment and Research
 - Divide students into groups of two or three.
 - Each group will be assigned a [pre-production career card](#).
 - Groups will research their assigned career using [AgExplorer](#).
 - Students will fill in the job profiles.
 - b. **Part 2:** Role-Playing Challenge
 - Groups will each be given a [real-world scenario card](#).
 - Each group will respond to the challenge based on their assigned career's perspective.
 - Once initial responses are written, form mixed-role collaboration groups (combine two or three groups).
 - Students share their role's approach, then collaborate to create a shared action plan.
 - Encourage students to use the sentence starters provided and discuss why their career matters in this scenario.
 - c. **Part 3:** Career Reflection and Discussion
 - Groups will present their career findings and solutions to the class in two- to three-minute presentations.
 - Students will reflect on how their assigned roles fit into the agricultural value chain by answering reflection questions.
4. **Optional – Extended Learning Opportunities (Not factored into time requirement):**
 - a. Students can visit a local agricultural research facility or university extension office to observe pre-production trials in action and report on their findings.
5. **Exit Ticket:** Which two or three skills do you think are most important for someone working in pre-production? How do these skills relate to your own interests?

Name: _____

Careers in Pre-Production

Part 1

Directions:

Join your team, as designated by your teacher. Your team will draw a card from your teacher to determine your role. Your team represents a real-world expert in the early stages of plant production. Use [AgExplorer](https://AgExplorer.FFA.org) (AgExplorer.FFA.org) to answer the following as your career expert:

Education or Training Needed	
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Career Name:

(include picture)

Are you interested in this career? Why or why not?

- **What is the role of this career?**

- **What is the average salary for this career?**



Where does this job usually happen?

List three daily tasks or responsibilities.

-
-
-

What two skills or personality traits help someone be successful in this job?

-
-

Name: _____

Part 2

Directions: Your group has been assigned a real-world Plant Systems scenario. As an expert in your career area, you'll analyze the problem, develop a response and collaborate with other career groups to form a full solution. Fill out the questions below as you work.

Group/Career Role: _____

Step 1: Understand the Scenario

Scenario Title: _____

1. What is the main problem in this scenario?
2. Why is this a concern in the world of plant production?
3. What details or data would be helpful to know more about?

Step 2: Your Role's Perspective

4. What would someone in your assigned career do about this problem?
5. What three steps would your role take to solve or investigate the issue?
6. What three limitations, risks or concerns would your expert have?

Name: _____

Step 3: Interdepartmental Collaboration

Now that your team has created a plan based on your expert's point of view, it's time to connect with other groups who have different roles. In real plant science careers, professionals work together to solve complex problems by sharing knowledge and ideas.

You will now meet with two or three other groups. Each group will take turns sharing their role, their first idea for solving the problem and what challenges they are facing. Listen closely and ask questions if something is unclear.

Use these sentence starters during discussion:

- Our role is _____, and we think the main problem is _____.
- One solution we're considering is _____.
- We're unsure about _____ and would like your advice on it.
- What would someone in your career role suggest we try?

7. What are two new ideas that other career groups shared that helped your team think differently?

8. Did any ideas challenge your original thinking or make you change your plan? What and why?

9. In a report format that could be presented to the lead of the committee (teacher), write your group's final solution or plan after hearing from other experts.



Name: _____

Part 3

Directions:

After completing the scenario activity and collaborating with other career groups, take time to reflect on what you learned. This activity will help you connect your career role to real-life plant science and teamwork. Answer the reflection questions after the presentations.

Group Presentation

Each group will present the following to the class:

- The name of your assigned career role
- Two or three interesting facts you learned about that career
- Your original idea to solve the scenario
- How your plan changed after collaboration
- What role your career played in the final solution

Presentation Rubric

Qualification	Very strong evidence of skill is present. (5–4 pts)	Moderate evidence of skill is present. (3–2 pts)	Weak evidence of skill is present. (1–0 pts)	Total Points (20 possible)
Presentation Skills	Is thorough and maintains eye contact	Somewhat professional and depends on the presentation	No evidence of preparation	
Grammar/Punctuation/Spelling	Spelling, grammar and punctuation are extremely high quality with two or less errors in the document.	Spelling, grammar and punctuation are adequate with three to five errors in the document.	Spelling, grammar and punctuation are less than adequate with six or more errors in the document.	
Time	Two minutes or more	Between one and two minutes	Under one minute	
Overall Impression	Presentation was professional, and presenter thoroughly explained the plan/idea.	Presentation was complete but lacked some detail.	The presentation lacked polish and information.	
			Total	

Name: _____

Reflection Questions:

1. Which career roles worked well together?
2. What would happen if one of these roles didn't exist in the real world?
3. Which role would YOU want on your team if this happened in real life? Why?
4. What is something new you learned about your assigned career?
5. What was your favorite part of being in this role?
6. How did your role help the group solve the problem?
7. How is your career role connected to the bigger picture of agriculture (the agricultural value chain)?
8. Would you be interested in learning more about this career or working in it one day? Why or why not?



Name: _____

KEY: Careers in Pre-Production

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Education or Training Needed

Answers will vary.

Career Name:

Answers will vary.
(include picture)

Are you interested in this career? Why or why not?

Answers will vary.

- **What is the role of this career?**

Answers will vary.

- **What is the average salary for this career?**



Answers will vary.

Where does this job usually happen?

Answers will vary.

List three daily tasks or responsibilities.

Answers will vary.

What two skills or personality traits help someone be successful in this job?

- Answers will vary.

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Name: _____

Part 2

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Group/Career Role: _____ **Answers will vary.** _____

Step 1: Understand the Scenario

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1. What is the main problem in this scenario?

Answers will vary.

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