Instructional Plan		Instructor:	
Course:			
Unit:	0 - Introduction to Precision Agriculture		
Lesson:	Getting Started with Precision Agriculture		
Estimated Time:	1-2 days		

Iowa CTE AFNR Standards Connections:

Standard:

- ESS.05.01.03.a. Research how advancements in technology (e.g., unmanned aerial vehicles and drones, genetic modification, fracking, alternative energy, etc.) have changed environmental service systems.
- CS.01.02.02.a. Compare and contrast AFNR systems before and after the integration of technology.
- CS.01.02.02.c. Evaluate the importance of technology use and how it impacts AFNR systems.

Objectives:

1. The student will be able to explain what the term precision agriculture means with 100% accuracy.
2. After viewing the presentation, the student will be able to list technologies that are involved in precision agriculture.

Resources & References:

- Instructional Plan
- Presentation
- Activity Worksheet
- Quiz
- Quiz KEY

Supplies and Equipment:

- Computer with Lecture, projector

Safety:

- No safety concerns

Key Terms:

Precision Agriculture: Using technology to farm more accurately and efficiently.

- **Yield monitor:** A tool on a combine that records crop yield as it's harvested.
- **Satellite-based Positioning:** A system that uses satellites to guide farm equipment with exact location data.
- **Assisted Guidance:** A system that helps the driver steer in straight lines using visual aids.
- **Autosteer:** A hands-free steering system controlled by GPS.
- **Remotely Sensed imagery:** Aerial or satellite images showing crop health and field conditions.
- **Yield Map:** A field map showing where crop yields were high or low.

Bellwork:

Students collect or download guided notes sheet from designated location. Students should also clear their desk for interest approach activity.

Interest Approach:

Hook:

- Hold up a few mystery items or images (either real tools or pictures on slides) related to precision agriculture: Drone, GPS receiver, Soil sensor, Yield map, Tractor steering controller
- Ask: "Can anyone guess what this tool is? What does it do? How might a farmer use it?"

Felt need to learn:

- You don't need to be a computer scientist to work with the newest ag technology, but understanding the tech is critical. Precision ag is where farming meets innovation, and it's changing everything from profitability to sustainability.

Transition to content:

- To really understand what these tools do and how they became part of agriculture, we need to go back, back to the roots of farming innovation, and trace how we got from horse-drawn plows to high-tech precision equipment.

Overview of lesson objectives:

- **Describe** the history and evolution of precision agriculture.
- **Identify** common precision ag technologies and their purposes.
- **Explain** the impact of technology on decision-making in agriculture.
- **Explore** how precision ag is shaping the future of food and farming.

Item 1:	Bell Ringer	Estimated Time:	3 minutes
Content Outline and/or Procedures:		**Instructor Directions:**	
- Students should access to note sheet - Students should also clear their desk for the interest approach activity		- Teacher should take attendance during this time - This may also be a good time to start setting out materials for the interest approach	

Item 2:	Interest Approach	Estimated Time:	5-8 Minutes
Content Outline and/or Procedures:		**Instructor Directions:**	
- Students will sit in seats and talk with their table mates to see if they can come up with the right answers for each picture. - Discuss why precision agriculture is important and how it has changed over time. - Have student read the objectives out loud to the rest of the class.		- Ensure all students have materials for activity - Give clear instructions that students should raise their hands to answer the question.	

Item 3:	Lesson	Estimated Time:	30-45 Minutes
Content Outline and/or Procedures:		**Instructor Directions:**	
- Students will work through learning guide during lecture - Students will engage with their table during discussions		- Engage the students with the questions throughout the slideshow - Pause when the noes sheet has an activity or extra notes for the students work through	

Item 4:	Worksheet	Estimated Time:	30-45 minutes
Content Outline and/or Procedures:		**Instructor Directions:**	
- Students will collect required materials for the activity including: worksheet and pencil		- Set out materials for students - Help students pair off if needed	

Application:
Start the class with the bell work and then move into the interest approach, this will allow the students to understand why we should learn about precision agriculture. The lecture comes next, and the students have a learning guide to fill out as they follow along. After the next lesson, there will be a unit test.

Summary/Review:
- Precision agriculture uses technology to optimize field-level management with detailed spatial data - Technologies include yield monitors, imagery, soil sampling, yield and soil maps, variable rate application, automated section control, and guidance systems - These tools help farmers make better decision and reduce input costs - Many of these technologies were commercialized in the 1990s and early 2000s and are now standard on many farms.

Evaluation:
Formative (for each objective): • Guided Notes Summative: • Module test after unit lesson

Extension *(Optional)*:
FFA Activity: SAE Activity: Extended Classroom Activity: