Innovation Never Stops

Episode 3 Classroom Materials

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Welcome

Get ready to explore how science, technology and creativity are transforming agriculture every day. In this series, you'll learn how Helena Agri-Enterprises helps farmers grow healthier crops, protect the environment and feed the world using tools and ideas that are always evolving. In Episode 3, join us in Pennsylvania as we learn about running a family farming operation, soil fertility/health and leveraging precision agriculture technology for sustainability and profitability.

Whether you're curious about ag careers, new farming techniques or how innovation impacts your community, this series will show you that in agriculture, innovation never stops—and neither do the people behind it.

Let's dive in and discover the future of farming together!

Objectives

1.Students will **analyze** how precision agriculture technologies from Helena's AGRIntelligence® (e.g., soil sampling and yield mapping) influence crop management decisions.

2. Students will be able to **identify** major challenges in modern farming (e.g., market volatility, rising input costs) and **understand** how innovative solutions help growers maintain profitability and generational continuity.

3. Students will **identify** key challenges faced by farmers—such as volatile markets, rising input costs, and unpredictable weather—and **describe** strategies that help farms remain competitive and sustainable.

Did You know?

1. Star Rock Farms began operations in 1932 when Abram M. Barley (1st generation) purchased 12 acres in Manor Township, Pennsylvania.

2. Star Rock Farms operations cover crops (grain corn, corn silage, rye silage, wheat and soybeans), dairy, beef and swine.

3. Star Rock Farms is currently being operated by 7 members of the Barley family.

4. Helena's digital agronomy platform called AGRIntelligence includes 8 different services to help growers make informed decisions and identify potential problems in the field before they take root.

5. Helena collects hundreds of thousands of soil data points and tens of thousands of plant tissue samples annually.

Vocabulary

AGRIntelligence- AGRIntelligence optimizes seed, fertilizer, crop protection chemistry and Helena products for each unique operation. Helena AGRIntelligence Technicians, along with knowledgeable sales staff, can assist growers with data collection, analysis, recommendations and the tools needed to collect and process the information to drive decisions. See Helena Corporate (AGRIntelligence) in Recommended Resources for more.

Conventional Till- Conventional tillage refers to a traditional soil preparation method characterized by significant soil disruption, often achieved through tools like the moldboard plow. This practice typically incorporates most crop residues into the soil, creating a uniform and residue-free seedbed. Lessons From Long Term Research: Comparing No-Till to Conventional Tillage Over 30 years - Soil Health

Cover Crops- A cover crop is any crop grown to cover the soil and may be incorporated into the soil later for enrichment. Cover Crops and Crop Rotation | USDA

Crop Scout- A crop scout inspects farmers' fields and records weed, insect, disease and other observations. This is an important role to help farmers make timely, informed and economical field crop decisions. Crop Scout | Career Profile | AgCareers.com

Enertia®- Enertia is an enzyme-based, biological soybean seed treatment that strengthens plant growth and yield potential by increasing microbial activity in the root zone. See Helena Corporate (Enertia) in Recommended Resources for more.

Fertility Recommendation- Providing guidelines on the type and amount of nutrients that should be applied to soil or crops to achieve optimal plant growth and yield.

Humic Acid- Humic acid is a naturally occurring organic compound formed from decomposed plant and animal matter, rich in carbon and other essential elements. It enhances nutrient availability in soil, making it easier for crops to absorb nutrition.

Hydra-Hume®- Hydra-Hume is a fertilizer efficiency tool available in dry or liquid form that helps growers maximize the value of applied fertilizer. It improves nutrient uptake and reduces nitrogen and phosphorus loss through leaching. See Helena Corporate (Hydra-Hume) in Recommended Resources for more.

Vocabulary

HyGround®- HyGround is a soil analysis product that uses a highly efficient and costeffective smart sampling method to provide an accurate picture of field variability. Working hand in hand with the grower, Helena agronomy specialists sample, analyze and advise based on each field's unique needs. See Helena Corporate (Digital Products) in Recommended Resources for more.

Leaching- The process by which water-soluble nutrients move downward through the soil profile beyond the root zone due to percolating water. This results in nutrients becoming unavailable to plants and possibly contaminating groundwater. Volatilization vs Leaching: Nutrient Loss Explained | Live to Plant

No Till-No-till farming is an agricultural practice where seeds are sown directly into undisturbed soil, eliminating the need for plowing or other mechanical soil preparation. Crop residues from previous harvests remain on the surface, creating a protective layer that conserves moisture, reduces erosion and enhances soil health. Lessons From Long Term Research: Comparing No-Till to Conventional Tillage Over 30 years - Soil Health

Precision Agriculture- Agricultural practice that uses technology to optimize crop yields and reduce waste. The core concept revolves around understanding and managing the variability within fields to make informed decisions. Helena's AGRIntelligence® platform combines agronomy, data management and technology to provide customers with best-in-class precision agriculture. See Helena Corporate (AGRIntelligence) in Recommended Resources for more.

ROI (Return on Investment) -A financial metric that evaluates the profitability of farming operations by comparing the net gains achieved to the total costs incurred. It serves as a key tool for farmers to guide resource allocation and shape effective investment strategies.

Resurge®- Resurge is a low-dust granule that provides growers with humic compounds engineered to improve nutrient efficiency and strengthen plant growth by fast release of the active ingredient. See Helena Corporate (Resurge) in Recommended Resources for more.

Vocabulary

Soil Sampling- The process of collecting to analyze its physical, chemical and biological properties. The goal is to determine soil fertility and nutrient levels so farmers can make informed decisions about crop management, fertilizer application and soil health improvement. Helena's exclusive soil management program is HyGround. See Helena Corporate (Digital Products) in Recommended Resources for more.

Tissue Sampling- The process of collecting plant tissue from crops to analyze their nutrient content. By testing for essential nutrients, results help growers make informed decisions about nutrient management. Helena's exclusive tissue sampling tool is Extractor®. See Helena Corporate (Digital Products) in Recommended Resources for more.

Volatilization- A process where nutrients in the soil or applied fertilizers transform into gaseous forms and escape into the atmosphere. This gaseous loss primarily affects nitrogen but can also involve other elements under certain conditions. https://livetoplant.com/volatilization-vs-leaching-nutrient-loss-explained/

Yield Data-The measured amount of crop produced per unit of land area. It is important for evaluating crop performance under different conditions and guiding decision-making for fertilization, irrigation, harvesting and planting.

Discussion Questions

1. Why do you think generational farms are important to rural communities? What types of challenges do family farms face?

2. Helena's AGRIntelligence platform uses data to help growers make informed agronomic decisions. How do you think technology is changing the role of farmers today?

3. What is the importance of humic acids? How do they help grower's crops get the necessary nutrients they need?

4. How does improving nutrient efficiency help both the environment and farm profitability?

5. In the episode, the grower said "You're either going forward or you're going backwards. You're never sitting still." What does this mean in the context of agricultural innovation? What are some examples of innovative practices on modern farms? What are some innovative practices you would integrate?

Recommended Resources

Careers in Agriculture
AgCareers.com - Agriculture Jobs & Agriculture Careers

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Innovation Never Stops - Helena Agri-Enterprises

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Helena Agri-Enterprises | Powerhouse of Agronomic Solutions

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