ARTIFICAL INTELLIGENCE

Introduction to AI: What can AI do in Ag?

Intended Audience:

Grades 4-8

Lesson Objectives

- Students will have a better understanding of what AI can and cannot do.
- Students will improve their critical thinking skills by categorizing abilities as "AI can do" or "AI cannot do."

Standards

CCSS.ELA-LITERACY.SL.6-8.1 Engage in collaborative discussions about AI concepts, evaluating different perspectives.

CCSS.ELA-LITERACY.RI.6-8.7 Interpret and analyze how AI is used across different media and technological applications.

Time Needed

30-45 minutes

Equipment and Supplies

- AI Statement Cards (1 set per group)
- AI Sorting Mats (1 set per group)
- Timer (optional)

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Background

Artificial Intelligence (AI) is a powerful tool that enables computer systems to perform tasks that would typically require human intelligence. It is already part of daily life—powering voice assistants, recommending movies, and even sorting photos on mobile devices. Its influence even extends to agriculture by helping farmers make decisions, improving yields, conserving resources.

What to Do

Participants will explore what AI is, how it is transforming agriculture, and will learn its capabilities and limitations through discussion and a hands-on sorting activity.

LESSON: INTRODUCING THE ACTIVITY

Today we are going to learn about a new technology called AI. Let's see what you already know….

What is Artificial Intelligence (AI)*?* AI is when computers or machines are trained to do things that usually require a human brain. Things like learning new information, solving problems, understanding language, recognizing images or *generating text.*

Can you think of any examples in everyday life? You might already know AI from everyday life without even realizing it – voice assistants, self driving cards, streaming services that make recommendations based on your preferences, shopping assistants, Chat generators, and more! AI is even transforming farming. Here are a few examples of the many uses of this technology in agriculture.

Examples of AI in Agriculture

- **Farm Drones:** AI-powered drones can scan fields to check crop health.
- **Insect and Plant Identification:** AI can identify insects, plant disease, weeds and more by analyzing photos.
- **Irrigation Systems:** AI powered tools can help detect leaks and water crops only when needed, saving water and improving yields.
- **Harvest Timing:** AI tools can analyze data to predict the best time to harvest crops.
- **Livestock Monitoring:** AI can track animal health and behavior for better herd management.

As you can see, AI can help farmers and backyard gardeners in many ways. For example, AI can be used to recognize pests, predict the weather, and even decide when to water crops based on data from sensors. AI can even identify insects and plants in backyard gardens and on farms. Today we are going to use an AI powered app to identify insects.

LESSON: EXPLAINING THE CHALLENGE/ACTIVITY

In this activity, participants will explore what AI can and cannot do in agriculture. The facilitator will read a series of scenario statements, and participants must decide whether each scenario describes something AI is capable of or not. They can share their guesses before the correct answer is revealed.

FACILITATOR NOTES:

Facilitation of the sorting activity can be adapted to suit your needs. Please choose the appropriate number of statements for your group age and available time. Here are a few suggestions for how to facilitate the sorting activity:

1) Read each statement and have students indicate their answer by raising their hands, giving a thumbs up or down, or walking to a certain area of the activity space.
2) Divide youth into small groups. Distribute sorting mats and statement cards. Have the youth read each statement, determine if it is something AI can or cannot do, and place on the appropriate sorting mat. Use a timer to increase the excitement.
3) Play as a game where teams take turns guessing and earn points for correct answers.

See attachment for the full list of statements and correct answers.

Digging Deeper

AI is a tool that can help us with a variety of tasks. AI can follow patterns and use data to make decisions or perform tasks quickly and accurately. For example, AI can analyze thousands of images of crops and learn to detect plant diseases early or help predict the crop yield (how much the field will produce). However, AI doesn't think or feel like humans do, it doesn't understand moral judgment, and it can only do what it's programmed to do. We can think of AI as a virtual farmhand—it can help monitor fields, track soil conditions, and even assist in harvesting, but it still relies on human expertise and decision-making. AI and humans can work together, with AI handling data-driven tasks and humans bringing in creativity, problem-solving, and experience.

Activity: Ask each group to brainstorm and develop an idea for an AI-powered tool that could help solve a problem or make farming easier. Examples include:

- A system that monitors soil moisture and automatically adjusts irrigation levels.
- An AI-powered robot that assists farmers in sorting and grading harvested produce.
- A mobile app that scans plant leaves to diagnose diseases and recommend treatments.

Give each group 5 minutes and have them share their ideas.

Talk it Over

SHARE

- How did you decide if AI could or could not do a task?
- Where you surprised that AI can help farmers?
- Did your group agree on most answers, or were there disagreements?

PROCESS

- What patterns did you notice in what AI can and cannot do?
- What does AI need to learn and make decisions?
- What were some tasks that only humans can do? Why do you think that is?

GENERALIZE

- Where have you seen AI being used in your daily life?
- Why do you think AI is helpful in some situations but not in others?

APPLY

- If you could design an AI tool to help on a farm or in your backyard garden, what would it be?
- How can we make sure AI is used responsibly and ethically?
- What are some skills that AI cannot replace, and why are they important for the future?

Career Connection

The following career area(s) connect to this activity:

1) AI Engineer – Designs and trains AI systems to recognize patterns and make decisions.
2) Data Scientist – Analyzes large amounts of data to improve AI learning and predictions.
3) Precision Agriculture Specialist - Uses AI and technology to improve farming practices and crop yields.
4) Ag-Tech Entrepreneur – Creates AI-powered solutions and applications to solve agricultural problems.

Statements with Answers

Statement 1: AI can analyze soil conditions and recommend the best crops to plant.
(*AI can do it!* AI can process soil data to suggest crops that will grow best based on nutrients, moisture levels, and climate.)

Statement 2: AI can decide which farming techniques are ethical and sustainable.
(*AI cannot do it!* AI can analyze data, but it doesn't have morals or values to determine ethical farming practices—it relies on human judgment.)

Statement 3: AI can recognize different types of plants and weeds in a field.
(*AI can do it!* AI-powered image recognition systems help farmers identify crops and weeds, improving precision agriculture.)

Statement 4: AI can tell farmers the perfect time to harvest crops based on weather and plant conditions.
(*AI cannot do it!* While AI models can use weather forecasts, soil conditions, and crop maturity data to predict the best harvest time, it cannot be 100% accurate as weather, pests, and plant diseases can be unpredictable.

Statement 5: AI can predict which crops a farmer will want to plant next season based on previous choices.
(*AI can do it!* AI-driven recommendation systems analyze past planting data to suggest optimal crop rotations.)

Statement 6: AI can feel concern for a struggling farm and suggest emotional support resources.
(*AI cannot do it!* AI does not have emotions or empathy—it can provide data-driven advice, but it doesn't "care" like a human would.)

Statement 7: AI can operate a self-driving tractor to plow a field without human supervision.
(*AI can do it!* Autonomous farm equipment uses AI and GPS to navigate and complete tasks like plowing, planting, and spraying.)

Statement 8: AI can create completely new types of crops without human help.
(*AI cannot do it!* AI can assist scientists by analyzing genetic data, but humans make the final decisions in crop breeding and genetic engineering.)

Statement 9: AI can analyze weather patterns to help farmers prepare for droughts.
(*AI can do it!* AI uses climate data and satellite imagery to predict droughts and extreme weather events.)

Statement 10: AI can learn how to manage a farm entirely on its own without human input.
(*AI cannot do it!* AI assists with decision-making, but farming requires human expertise, intuition, and adaptability.)

Statement 11: AI can analyze livestock behavior and detect early signs of illness.
(*AI can do it!* AI-powered monitoring systems use sensors and cameras to track livestock health and detect unusual behaviors.)

Statement 12: AI can understand how farmers feel about a bad harvest and offer emotional support.
(*AI cannot do it!* AI doesn't have emotions, though it can provide helpful resources and financial predictions based on data.)

Statement 13: AI can write a guide on best farming practices.
(*AI can do it!* AI can generate informative guides using existing agricultural knowledge and research.)

Statement 14: AI can develop new irrigation techniques completely by itself.
(*AI cannot do it!* AI can suggest improvements, but new techniques require human research, engineering, and innovation.)

Statement 15: AI can predict exactly how much rain a farm will get in the next month.
(*AI cannot do it!* AI can make weather predictions based on patterns, but it isn't always 100% accurate.)

Statement 16: AI can recognize different types of pests in a field.
(*AI can do it!* AI-powered image recognition can detect pests and diseases, helping farmers take early action.)

Statement 17: AI can physically plant and harvest crops on its own.
(*AI cannot do it!* While AI can guide robotic machinery, the physical work still requires machines and human oversight.)

Statement 18: AI can analyze satellite images and detect areas of a farm that need more water or fertilizer.
(*AI can do it!* AI-powered precision agriculture tools can assess soil moisture and nutrient levels using satellite and drone imagery.)

Statement 19: AI can predict the best market price for crops before selling.
(*AI can do it!* AI analyzes market trends, supply and demand, and weather conditions to predict crop prices.)

Statement 20: AI can replace all farmers and run every aspect of a farm without human involvement.
(*AI cannot do it!* AI is a powerful tool, but human farmers are essential for decision-making, troubleshooting, and adapting to unexpected challenges.)

Statement 21: AI can sort harvested produce by size, color, and ripeness.
(*AI can do it!* AI-powered sorting machines help ensure only high-quality produce reaches the market.)

Statement 22: AI can detect diseases in plants before symptoms are visible to the human eye.
(*AI can do it!* AI can analyze infrared images and early plant stress signals to detect diseases before visible signs appear.)

Statement 23: AI can predict exactly how much food a farm will produce each year.
(*AI cannot do it!* AI can estimate yields based on data, but unexpected factors like pests or weather changes can affect results.)

Statement 24: AI can decide which fertilizers and pesticides are safe for the environment.
(*AI cannot do it!* AI can provide data on chemical effects, but regulatory agencies and experts make the final decisions.)

Statement 25: AI can analyze the sound of insects to detect pest infestations.
(*AI can do it!* AI-powered monitoring tools use sound recognition to detect harmful pests in fields and greenhouses.)

Statement 26: AI can determine when to apply pesticides for maximum effectiveness.
(*AI can do it!* AI uses weather patterns, pest cycles, and plant conditions to recommend the best pesticide application times. However, it isn't always 100% accurate.)

Statement 27: AI can create a new recipe using farm ingredients based on flavor profiles.
(*AI can do it!* AI-powered recipe generators can suggest meal ideas based on available ingredients.)

Statement 28: AI can decide which farming technique is the absolute best for all farms.
(*AI cannot do it!* Every farm is different, and AI provides recommendations, but human farmers must decide what works best for their land.)

Statement 29: AI can suggest the most efficient way to transport harvested crops to market.
(*AI can do it!* AI optimizes logistics by analyzing routes, fuel costs, and transportation schedules.)

Statement 30: AI can discover a brand-new farming method completely on its own.
(*AI cannot do it!* AI can assist in research, but new farming innovations require human experimentation, creativity, and scientific testing.)