STEAM Education & Leadership Workshops:

Student Activity Lesson Plan - Sustaining the World with Smart Farming

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Age range
6-10 years old

Learning objectives

- ☑ Students will explore the concept of smart farming and how it contributes to sustainable agriculture.
- ☑ Students will engage with technology, engineering, and environmental science to understand how innovations can solve food security challenges.
- ☑ Students will investigate global food production challenges and how smart farming technologies can help reduce waste, conserve resources, and increase crop yield.
- ☑ Students will design a simple smart farming solution, encouraging creativity and problem-solving.
- ☑ Students will understand the connections between STEM careers and farming, exploring how they can use these fields to create real-world solutions.

Structure of the lesson

- ☑ Introduction to Smart Farming (15 minutes)
- ☑ Exploring Smart Farming Technologies (20 minutes)
- ☑ Hands-On Activity: Design Your Own Smart Farm (25 minutes)
- ☑ Exploring Global Solutions and Challenges (20 minutes)
- ☑ Creating Action Plans for Sustainable Farming (20 minutes)
- ☑ Reflection and Closing (20 minutes)

Duration
2 hours

Note to Educators

Engage Students with Real-World Relevance
Begin by connecting farming to students' daily lives—ask them where their food comes from and how technology could help farmers grow food more efficiently.

Use Hands-On Exploration for Active Learning
During the "Tech Detective" activity, allow students to explore images and videos of smart farming technologies. Encourage them to think critically about how drones, AI, and sensors improve farming.

Encourage Creativity and Collaboration
In the "Design Your Own Smart Farm" activity, let students work in teams to create innovative farming solutions. Provide materials like paper, markers, and small models to make their ideas tangible.

Foster Global Awareness
When discussing global food security, highlight real-world challenges like droughts, climate change, and food waste. Use a world map to show where smart farming can make the biggest impact.

Timing	Facilitator's actions	Students outcomes	Technical notes
0 - 15 mins	**1. Introduction to Smart Farming (15 minutes)** ● Slide 2: The Futuristic Farm Greet students enthusiastically and set a positive tone. Use an engaging hook: "Imagine a farm where robots plant crops, drones water them, and computers ensure nothing goes to waste—sounds exciting, right? That's what we'll explore today!". Pause to allow students to react to the image and share initial thoughts. ● Slide 3: What is Smart Farming? Definition of smart farming: Using modern technologies like sensors, drones, and AI to improve crop yield and make farming more sustainable. Interactive Question: "Can you guess how technology can help farmers grow food better?" (Brief student discussion).	**Connectedness**: Discuss how technology helps farmers globally and locally. **Empathy**: Develop an understanding of how farmers face challenges in feeding the world.	Ensure that the images and definitions are simple, colorful, and relatable for the students. Use a clicker or a timer to stay on track and ensure participation. Connectedness
16 - 35 mins	**2. Exploring Smart Farming Technologies (20 minutes)** ● Slide 4: Smart Farming Technologies in Action Begin with a "tech detective" challenge: "Can you figure out what each of these technologies does? Let's solve the mystery together!" Show various technologies used in smart farming: drones, sensors, AI, and robots. Use visual aids and: Images and short descriptions of each technology. Share fun facts about each technology (e.g., "Some drones can spray crops 10 times faster than humans!") Ask students: "What do you think these technologies can do for farmers?". Ask open-ended questions like, "Which one would you like to use if you were a farmer?" ● Slide 5: Video on Smart Farming Technologies Build excitement: "We're about to visit a farm of the future—watch closely because you shall be creating your own soon! Encourage students to pay attention by saying, "Count how many times you see drones or sensors in the video." After the video, guide a brief Q&A session: "What surprised you the most? Why?"	**Mastery**: Learn how smart farming technologies improve food production. **Engagement**: Students will engage through visual storytelling in the video.	Ensure the video is no longer than 3-5 minutes to keep attention high. Have a discussion or Q&A after the video to reinforce learning. Test the video in advance to ensure there are no technical difficulties with audio/video quality.
36 - 60 mins	**3. Hands-On Activity: Design Your Own Smart Farm (25 minutes)** ● Design Your Own Smart Farm Create a buzz: "You're now farm designers! Your challenge is to build the smartest, most sustainable farm ever." Walk around the room, offering prompts like, "What will power your farm? Solar energy? Wind?" Provide students with cardboard, markers, and stickers. In small groups, they will design their own smart farm, integrating drones, sensors, and smart irrigation systems. Each group will present their design to the class, explaining how each technology will help make their farm sustainable. ● Slide 6: Example Smart Farm Design Share the sample design enthusiastically: "Here's one idea—but remember, your designs can be even better!" Point out unique features: "Notice the solar panels and irrigation system—how do you think these help?"	**Creativity**: Design innovative solutions for farming using modern technology. **Collaboration**: Work in teams to develop and present their smart farm designs. **Problem-solving**: Consider how their designs can help reduce waste, conserve resources, and increase crop yield.	Provide enough space for group work. Each group should have access to design materials. Have large sheets of paper or boards for students to draw out their designs. Ensure that students have a few minutes to present their ideas at the end of the activity.
61 - 80 mins	**4. Exploring Global Solutions and Challenges (20 minutes)** ● Slide 7: Global Food Challenges Use storytelling: "Imagine you're a farmer in a dry, hot country. What challenges do you think you'd face?" Show the world map dramatically: "Let's take a trip around the world to see where farmers need the most help." Ask students, "If you could send one technology to these farmers, what would it be and why?" ● Slide 8: Case Study: Smart Farming in Action Discuss the world's growing population, food scarcity, and climate change.	**Global-Mindednes**: Understand how smart farming addresses global challenges. **Social Awareness**: Consider how smart farming technologies can help combat food insecurity worldwide.	Use a simple world map to highlight areas of food scarcity and link it to the lesson. Consider showing a short clip or real-world case study of smart farming solutions. Keep the discussion

	Use a world map to show areas facing food insecurity. Interactive Discussion: "How do you think smart farming can help in countries facing food shortages?"		open-ended, allowing for student questions and ideas.
81 - 100 mins	**5. Creating Action Plans for Sustainable Farming (20 minutes)** ● Slide 9: Action Plan for Sustainable Farming Energize students: “Time to become change-makers! What’s one thing YOU can do to make a difference?” Guide brainstorming: “Think about water, soil, and even planting trees—how can these help?” Share personal ideas: “In my community, I try to conserve water by…” Students will work individually or in groups to create a personal or group action plan for how they can support sustainable farming in their community. Prompt Questions: "What can you do in your community to help conserve water or improve farming?" "How can you use technology to help your local farmers?” ● Slide 10: Inspirational Quotes Read each quote dramatically and discuss its meaning: “What do you think this quote is trying to tell us?” Tie quotes to students’ lives: “How can YOU be someone who saves the planet?” Challenge them: “Which quote inspires you the most, and why?”	**Purposeful Action:** Create a clear plan to support sustainable farming. **Inspiration**: Draw motivation from the lesson and quotes to take action.	Provide action plan templates or worksheets for students to fill out. Encourage students to think about what small actions they can take and how they can implement them. Make the action plans personal and connected to their lives.
101 - 120 mins	**6. Reflection and Closing (20 minutes)** ● Slide 11: Reflection Circle Facilitate with warmth: “Let’s hear from everyone—what’s one thing you loved about today’s lesson?” Share your own learning: “I was amazed at how creative your farm designs were!” Create an applause moment after each student shares. ● Slide 12: Closing Challenge Motivate students: “Who’s ready for a challenge? Let’s see what difference we can make this week!” Share examples: “Maybe plant a seed, save water, or research a cool farming gadget online.” End with excitement: “Remember, every small action makes a big difference!”	**Wellbeing**: Reflect on personal learning in a supportive, positive environment. **Agency**: Feel inspired to act and make a difference in the world.	Use a timer to ensure the reflection session stays within the time limit. Provide students with the opportunity to share their thoughts in a circle, fostering an open environment.