STEAM Education & Leadership Workshops:

Lesson Plan - Agricultural Practices

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Age range

13 - 17

Learning objectives

By the end of the lesson, students will be able to:

- ☑ Identify key agricultural practices relevant to rural and underserved communities.
- ☑ Describe sustainable farming methods such as crop rotation, mulching, organic manure application, and water conservation.
- ☑ Demonstrate basic skills in planting seedlings and caring for crops.
- ☑ Explain the importance of agriculture in food security, entrepreneurship, and future careers.
- ☑ Work collaboratively to solve agricultural problems using STEAM principles (Science, Technology, Engineering, Arts, Mathematics).

Structure of the lesson

- Introduction & Engagement
- Concept Exploration
- Practical Demonstration
- Group Design Activity
- Sustainable Farming Discussion
- Agriculture & Future Careers
- Reflection & Closing

Duration

1 hour 30 minutes

Note to Educators

This session follows an interactive, hands-on approach designed to help learners understand key agricultural practices and apply them in real-life contexts. The lesson blends discussion, demonstration, group collaboration, and practical activities to strengthen learners' curiosity and problem-solving skills.

- **Emphasize Local Context and Real-life Application**
  Use soil samples(sandy, Loamy, clay), farming challenges, and environmental issues common in your region so students can easily relate the concepts to their daily lives.
- **Encourage Inquiry Through Hands-on Activities**

Allow learners to explore soil textures, observe moisture levels, and handle planting materials. Guiding them with exploratory questions helps build curiosity and strengthens scientific thinking.

- **Weave Sustainability Throughout the Lesson**
  Highlight simple, practical approaches to conserving water and enriching soil health. Use demonstrations—such as basic water reuse—to show how sustainable techniques can work within their homes or communities.
- **Link Community Issues to Global Agricultural Realities**
  Help students see that the problems they experience—poor soil, drought, erosion—are also global concerns. Introduce examples of innovative agricultural practices used worldwide and discuss whether they can be adapted locally.
- **Support Creativity, Problem-Solving, and Leadership**
  Offer opportunities for learners to design small solutions to soil and water challenges. Encourage them to think creatively, collaborate in groups, and suggest improvements for their school farm or home gardens.

Materials Needed

- Soil types: Sandy, Clay, Loamy.
- Tools: Hand trowels, rakes, hoes, garden forks, watering cans e.t.c
- Sustainable materials: Dry leaves (for mulching), compost samples, and water sachets.

Resources

- **Slides**: Agricultural Practices

Timing	Facilitator's actions	Students outcomes	Technical notes
10 mins	**Introduction** The facilitator begins by welcoming students and introducing the topic through short visuals or relatable examples. Students are encouraged to share what they already know about farming in their community. **STEAM Connections**: Sets the stage for inquiry and curiosity, encouraging learners to make observations and share	***(Connectedness + Wellbeing)*** Focus: Curiosity, Perspective-taking and cognitive Students become curious, engaged, and can share their prior knowledge about farming. Students feel connected and welcomed, share prior knowledge, and begin building a sense of belonging.	Ensure the video is available for offline playback. Printed images should be made available in the absence of a projector.

	perspectives Science: Observing and discussing local farming environments. Technology: Using videos, slides, or digital visuals to introduce agriculture concepts. Arts: Using visuals and storytelling to introduce concepts. Mathematics: Informal estimation or counting of local crops, if prompted.		
15 mins	**Concept Exploration** Foundational agricultural concepts are introduced—such as soil types(sandy, clay, loamy), common crops, planting seasons particular to your context, and simple farm tools like hand trowel, rakes, hoes, garden fork, e.t.c. The facilitator uses physical examples and prompts learners to ask clarifying questions. **STEAM Connections:** • **Science:** Understanding soil types, crops, planting seasons, and plant growth. • **Technology:** Introducing simple digital tools for tracking crops or plant growth (e.g., mobile apps, timers). • **Engineering:** Thinking about tools and farm layouts to solve agricultural challenges. • **Mathematics:** Measuring quantities (soil, seeds) or comparing growth rates. • **Arts:** Observing and sketching soil or crop	***(Mastery + Awareness)*** Focus: Foundational knowledge, Critical thinking and evaluation Students will be able to distinguish among various soil types and determine the appropriate crop selection (seeds) for each. Students will develop foundational content knowledge, strengthen critical thinking skills, and reflect on their own observational strengths.	Utilize local and contextually appropriate tools such as the hoe, cutlass, and watering can for the activity. Ensure the use of protective gloves and all necessary safety measures and protocols are strictly implemented prior to the start of the activity.

	examples for clarity.		
20 mins	**Practical Demonstration** Organize students into small working groups of 4-5 and guide them through a hands-on demonstration on either preparing a nursery bed or planting seedlings in designated containers. **STEAM Connections:** • **Science:** Applying knowledge of plant biology, soil, and nutrient needs. • **Technology:** Demonstrating irrigation techniques or small sensors to monitor water/soil conditions (even conceptually). • **Engineering:** Designing and preparing planting containers and soil arrangements. • **Mathematics:** Tracking seed counts, measuring soil depth, or spacing seedlings. • **Arts:** Arranging plants aesthetically and documenting growth visually.	**(Agency + Mastery)** Focus: Collaboration, self-efficacy, sense of belonging and curiosity. Students will practice essential planting skills, develop problem-solving strategies, and build self-efficacy through intentional engagement in productive struggle. Students develop and refine practical planting skills and cultivate self-efficacy by employing problem-solving strategies during periods of productive struggle. Students observe and practice how to prepare planting containers, arrange soil, and plant seedlings. This hands-on segment helps them connect theory with real agricultural techniques	Buckets, repurposed water sachets, or plastic bottles can be effectively utilized as substitute planting containers (or 'upcycled planting containers').
20 mins	**Group Activity:** Supervise Students to collaboratively design a simple, functional farm layout on paper. They should strategically identify and designate specific areas for crops, compost production, and water sources.	**(Connectedness + Agency)** Focus: Collaboration, Perspective-taking,and social skills Students will collaborate effectively, value diverse peer perspectives, and apply creativity in the process of designing practical solutions Students will foster collaborative skills, cultivate appreciation for	Provide plain paper, pencils, and markers.

	STEAM Connections: • **Science:** Considering sunlight, water, and soil needs for each crop. • **Technology:** Using digital tools (if available) to map farm layout or simulate irrigation. • **Engineering:** Designing efficient farm layouts for water flow, composting, and planting. • **Arts:** Sketching diagrams to communicate ideas. • **Mathematics:** Calculating area, plant spacing, or compost ratios.	diverse peer input, and leverage creativity to develop innovative solutions. Students work in small groups to sketch a basic farm layout, applying STEAM thinking to design crop placement, water access, and organic waste management.	
10 mins	**Class Discussion** Lead a class discussion on the purpose and application of sustainable agricultural practices: mulching, composting/organic manure, and water conservation, highlighting how these methods improve long-term productivity. Facilitate a review and analysis of key sustainable practices: mulching, organic manure application (composting), and water conservation techniques **STEAM Connections:** • **Science:** Understanding environmental impacts of farming. • **Technology:** Introducing water-saving or soil monitoring tools. • **Engineering:** Discussing designs for composting, mulching, or rainwater	**(Wellbeing, Awareness and Connectedness)** Focus: Social awareness and sense of purpose. Students reflect on their environmental and social awareness, connect key learning outcomes to local community challenges, and explore their personal sense of purpose in addressing them. Students feel healthy, secure, and loved enough to share what they think, knowing it is okay to make mistakes. This fosters a sense of belonging and leads to deeper learning from their peers	Prepare and acquire demonstration materials: Dry leaves, various compost samples (at different stages of decomposition), and/or organic waste materials.

	collection. • **Arts:** Presenting ideas creatively with posters or diagrams. • **Mathematics:** Estimating resource usage and efficiency.		
10 mins	**Agriculture & Future Career:** Conduct a session on future career pathways in agriculture, specifically emphasizing the role of innovation and technology (AgriTech, CEA/Greenhouse Farming, and Digital Tools). **STEAM Connections:** • **Science & Technology:** Learning about agritech, greenhouse systems, drones, sensors, and digital agriculture tools. • **Engineering:** Exploring how technologies are applied to improve efficiency. • **Arts & Entrepreneurship:** Using creativity to propose innovations in agriculture. • **Mathematics:** Analyzing crop yields, productivity, and cost-benefit data.	**(Awareness + Agency + Wellbeing)** Focus: Foundational knowledge, Sense of Belonging, awareness. Students will expand their curiosity regarding future career pathways, connect personal strengths to emerging opportunities, and cultivate optimism about their potential for meaningful impact. Students are introduced to modern opportunities within agriculture, including agritech tools, greenhouse systems, digital farming solutions, and entrepreneurship.	Showcase simple agritech examples like moisture sensors (optional).
5 mins	**Wrap-up:** The Facilitator Concludes the session with a Wrap-up activity, guides students through reflection questions, and assigns a simple follow-up task (e.g., observing a plant or soil changes at home). **STEAM Connections:** • **Science & Mathematics:**	**(Awareness + Wellbeing)** Focus:Inclusivity, sense of belonging, and gratitude Students summarize key takeaways and state one action they will try at home or in school. Students will express appreciation and gratitude, and reflect	Provide Cardboard and Marker for students to document reflection.

	Reviewing observations and insights. • **Technology:** Encouraging use of digital tools for ongoing plant monitoring or journaling. • **Engineering & Arts:** Reflecting on design choices or creative approaches to farming challenges.	meaningfully on both individual achievements and challenges encountered.	
