SPRING '25 CHALLENGE

RECYCLE AND REIMAGINE

STEM CHALLENGE

GEORGIA AG EXPERIENCE

A MOBILE CLASSROOM POWERED BY

GEORGIA FOUNDATION FOR AGRICULTURE

STEM CHALLENGE DIGITAL TOOL KIT

The Spring '25 Challenge is sponsored by:

GEORGIA FOUNDATION FOR AGRICULTURE

FARM BUREAU GEORGIA AG IN THE CLASSROOM

RECYCLE & REIMAGINE WORD SCRAMBLE

Unscramble the words below. Each word is related to agriculture and recycling. Write the correct word in the space provided!

1. CYLECER _____
2. YOTEPROTP _____
3. USLOTION _____
4. TIGNAPLN _____
5. NGESDI _____
6. EONRIOS _____
7. OTLAPOLNIR _____
8. NITOENIV _____
9. ETRAILSAM _____
10. RAWANITER _____
11. GRACITLUREA _____
12. GRIRIATONI _____

1. RECYCLE, 2. PROTOTYPE, 3. SOLUTION, 4. PLANTING, 5. DESIGN, 6. EROSION, 7. POLLINATOR, 8. INVENTION, 9. MATERIALS, 10. RAINWATER, 11. AGRICULTURE, 12. IRRIGATION

Lesson Plan: Recycle and Reimagine

Driving Question

- How can recycled materials be used to design solutions for real- world agricultural problems?

Guiding Standards

Georgia Standards of Excellence:

- SEV4. Obtain, evaluate, and communicate information to analyze human impact on natural resources.
- S3L2.a: Explain the effects of pollution (such as littering) on the habitats of plants and animals.
- S3L2.b: Identify ways to protect the environment, such as conservation and recycling.
- S5P2.a: Plan and carry out investigations of physical changes by manipulating, separating, and mixing materials.

Agriculture, Food & Natural Resources (AFNR) Standards:

- 3AS1: Recognize how agriculture impacts daily life through food, clothing, and shelter.
- 4AS2: Explore the connections between natural resources and agriculture.
- 5AS5: Connect the role of pollinators in agriculture.
- 4FA3: Identify how agricultural practices influence the environment.
- 5NRS2: Describe the benefits and the importance of conservation and recycling of natural resources.

Guiding Background Knowledge

What is Recycling?

- Recycling is the process of turning waste into reusable materials. It helps conserve resources, reduce waste, and lower greenhouse gas emissions by reusing items instead of creating new ones.

Why is Recycling Important?

- Preserves landfill space: Extends the life of landfills by reducing waste.
- Reduces greenhouse gas emissions: Saves energy and decreases the need for new material production.
- Conserves natural resources: Reduces demand for raw materials like forests, water, and minerals.
- Prevents pollution: Limits air and water pollution by minimizing extraction and processing of raw materials.
- Improves air and water quality: Promotes cleaner environments through sustainable practices.
- Creates jobs: Boosts economic benefits by supporting the recycling industry.

Challenges Farmers Face

Farming obstacles can affect plant growth, harvests, and overall efficiency. Using recycled materials can help address these challenges:

- Pest Control: Pests damage crops and livestock. Use recycled items like bottles and old clothes to build scarecrows or barriers.
- Resources for Planting: Plastic pots can create waste. Replace them with tin cans or other recycled containers to save money and reduce landfill contributions.
- Erosion Control: Soil erosion impacts crop health. Cardboard and mesh can be repurposed to create barriers that protect soil and reduce runoff.
- Rainwater Collection: Collecting water for irrigation can be expensive. Use recycled jugs or plastic bottles to create simple rainwater collection systems.

Examples of Recyclable Materials

- Cans
- Glass bottles
- Cardboard
- Plastic
- Paper
- Cereal boxes
- Metal
- Wood

Lesson Procedures

Engage: Start with a Mystery

- Show a picture of a barren field or crops destroyed by pests. Ask:
- What could have prevented this? How can we help farmers avoid these challenges?
- Reveal the challenge: You're going to become inventors! Your mission is to create a solution using recycled materials to help farmers tackle real-world problems.

Quick Brainstorm

- Write a few example problems on the board (e.g., helping pollinators, collecting rainwater, preventing soil erosion).
- Ask students to shout out quick ideas about what they might create using recycled materials.

Kick Off with a Question:

- Begin with: What problems do farmers face every day? Discuss issues like protecting crops, conserving water, preventing soil erosion, and supporting pollinators.
- Pose the challenge: How could we use recycled materials to solve these problems?

Show Real-World Inspiration:

- Share a short video like What Is Recycling? to introduce recycling and its potential to solve challenges.
- Highlight real-life examples of farmers creatively reusing materials, such as:
  - Pollinator houses from tin cans.
  - Simple rainwater collection systems using plastic bottles.
  - Barriers for erosion control made from cardboard or mesh.

Brainstorm Ideas

- As a class, brainstorm problems farmers face and list them on the board.
- Decide together if the class will focus on one problem or split into groups to tackle different ones.

Explore: Investigate and Research

1. **Research Agricultural Problems**
   - Divide students into groups. Each group can either choose a problem from the examples provided or come up with their own.
   - Groups research their chosen problem using books, videos, and online resources.
2. **Explore Recycled Materials**
   - Set up a "Recycling Station" in the classroom. Students bring clean recycled materials from home, such as cans, bottles, cardboard, and plastic.
   - Encourage groups to think creatively about how these materials can be used to solve their problem.
3. **Learn from Experts**
   - Invite a guest speaker, such as a local farmer or recycling expert, to discuss agricultural challenges.
   - If a speaker isn't available, encourage students to find videos or articles to learn more about these topics.
4. **Plan the Solution**
   - Groups create initial sketches of their designs, labeling materials and explaining how their solution works.

Test:

1. Set up Testing Stations

- Create stations for each prototype test. For example:
  - Pollinator Houses: A window area or outdoor spot where students can see if the house is stable and inviting. Set up a fan for wind testing.
  - Rainwater Collection Systems: A sink or large tub for pouring water into their system to check how well it collects and stores water.
  - Erosion Control Barriers: A container filled with soil and a small slope for testing how well the barrier stops water from washing away the soil.
  - Pest Deterrents: A mock garden setup or small area where scarecrows or barriers can be tested for stability.

2. **Guide the Testing Process:**
    - Have each group bring their prototype to the appropriate station.
    - Ask them to explain their design before starting the test.
    - Observe and take notes as groups test their prototypes. Encourage them to document their findings:
        - What worked as planned?
        - What didn't work as expected?
        - What was surprising?
3. **Facilitate Group Discussions:**
    - Once all groups have tested their prototypes, bring them back together to discuss results. Use guiding questions like:
    - What did you learn from the test?
    - What parts of your design need improvement?

Improve:

1. **Help Groups Analyze Results:**
    - Provide time for groups to review their test results.
    - Encourage students to think about practical changes they can make to improve their designs. Examples:
    - Reinforcing a pollinator house to make it more stable.
    - Adjusting the angle or size of a rainwater collection funnel.
    - Adding more material to an erosion barrier to make it stronger.
2. **Guide the Redesign Process:**
    - Supply additional recycled materials if needed.
    - Give groups time to make adjustments to their prototypes based on their analysis.
3. **Facilitate Retesting:**
    - Have groups retest their improved prototypes at the same stations.
    - Ask them to observe and document whether their changes made a difference.
4. **Wrap up with Reflection:**

- After testing and improving, lead a class reflection:
    - How did your design solve the problem?
    - What would a farmer think of your solution? How could it help in real life?
    - Encourage groups to write or present a summary of their process, including what they learned and how their design changed.

Guiding Questions

1. What agricultural problem did you choose to solve, and why is it important?
2. How does your design use recycled materials to address the problem?
3. What steps did you take to create and test your prototype?
4. What changes or improvements did you make after testing your design?
5. How could your solution help farmers or the environment in real life?

Lesson Resources:

Book Suggestions

1. *What a waste*, by Jess French
2. *Don't Throw that Away*, by Lara Bergen
3. *I'm Trying to Love Garbage*, by Bethany Barton
4. *How the Crayons Saved the Earth*, by Monica Sweeney

Video Suggestions

1. Build a Recycling Machine
2. Recycled Material Project
3. Ag Tech Projects

Ask an Expert

1. 4-H Agent
2. Local Farm Bureau Office
3. Ask A Farmer: Ask a local farmer concerning issues related to farming and recycling at his locations.
4. Georgia Recycling Coalition: https://georgiarecycles.org/
5. Draw Down Georgia: https://info.drawdownga.org/how-to-recycle-toolkit

Career Connections

Careers

1. Agricultural Mechanic
2. Agricultural Engineer
3. Agronomist
4. Agricultural Biologist
5. Horticulturalist

Vocabulary Words

1. Pollution
2. Habitat
3. Conservation
4. Recycle
5. Prototype
6. Sustainability

Suggested Challenge Timeline

Week 1: Kickoff & Brainstorming

- Introduce the challenge and driving question: How can recycled materials be used to solve real-world agricultural problems?
- Engage students with an opening activity (e.g., word scramble or brainstorming session).
- Discuss agricultural problems and brainstorm potential solutions as a class or in groups.
- Assign problems for students or groups to research.

Week 2: Research & Planning

- Students research their chosen agricultural problem and explore how recycled materials could be used to address it.
- Set up a "Recycling Station" with clean, safe materials for students to examine.
- Groups sketch their initial designs, labeling materials and explaining their proposed solution.

Week 3: Build & Prototype

- Groups begin building their prototypes using recycled materials.
- Encourage creativity while ensuring the prototypes align with their chosen problem and solution.
- Support groups by asking guiding questions and helping them troubleshoot challenges.

Week 4: Testing

- Create stations to test prototypes (e.g., wind for pollinator houses, water flow for erosion barriers).
- Groups test their prototypes, document their results, and identify what worked and what needs improvement.
- Facilitate a class discussion to share testing experiences and learn from each other.

Week 5: Improve & Retest

- Groups analyze their test results and identify practical ways to improve their prototypes.
- Provide additional materials as needed for redesigns.
- Retest the improved prototypes and document new results.
- Begin preparing presentation materials, including photos and a summary of the process.

Week 6: Final Presentation

- Students finalize their prototypes and create a short presentation or video.
- Submit the video and photos for the STEM challenge.
- Host a class showcase or share the results with community partners.

Submission Instructions

1. Please submit your video through the '25 STEM Challenge Submission form linked here.
2. Email your photo for the online gallery to info@georgiaagexperience.org with your team name, school, and a brief description of the project.
3. You will need to create a YouTube video link to submit your entry. Please follow the instructions below to upload your video and create a shareable link:

Go to YouTube.com and create a channel

1. Find the video camera icon in the top right corner
2. Click "Upload Video"
3. Click "Select File"
4. Select your video you would like to submit for the STEM Challenge
5. Please title your video as follows: "Team Class Name – Spring 25 STEM"
6. Scroll down to find "Audience" and select "Yes, this is for kids"
7. Click "Next"
8. On the "Video Elements" page, Click "Next"
9. On the "Checks" page, Click "Next"
10. On the "Visibility" page, select "Unlisted: Anyone with the video link can view your video" 12. Click "Save"
11. Copy video link on the "Video Published" page
12. Please paste your video link to the '25 STEM Challenge Submission Form under "video link"

Challenge Rubric

Category	Description	Points
Time Requirement:	This video must be no longer than 5 minutes .	Up to 5 minutes- 5 points Over 6 minutes - 4 points Over 7 minutes - 3 points Over 8 minutes - 2 points
Delivery:	Student's voices and video quality were clear, and the volume was at an appropriate level.	15 points
Orderly Progress:	Video flows from beginning to end with a clear introduction, main points, and conclusion.	20 points
Research:	Video demonstrates the research done by students relating to issues in farming and obstacles farmers face in their work. The video should also clearly demonstrate the selection process the team used to determine their project.	10 points
Coverage of Subject:	Video demonstrates a project created to display a solution to ag-related issue using recycled materials and the project's development process and conclusion.	10 points
Creativity:	Get creative with your video! We want to see more than just your students reading off a paper. This could include video editing, artistic elements, out of the box thinking, acting, costumes, text overlays, animations, visuals, audience engagement, and showcasing curiosity.	20 points
Supportive Materials:	Video must include photos and video of students throughout the challenge process.	20 points
TOTAL		100 Points