

Making Something Useful

STEM Challenge

BACKGROUND:

We know that we need to do something about how much plastic is in the world. We can use fewer things made of plastic, reuse plastics by using them for other things, and we can recycle plastic things to be made into other products. We all want to help and so do farmers. We can help each other!

CHALLENGE:

How can we make something useful for an Ontario grain farmer from a used plastic jug?



RECOMMENDED MATERIALS:

Clean plastic bottle/jug (vinegar container, large soft drink bottle), craft supplies, materials/objects from around the school. Provide safety glasses as needed.

PROJECT STEPS:

CREATE



Students will use the Engineering Design Process to repurpose a plastic bottle/jug to make it something useful on the farm. Remind students that the plastic bottle (e.g., vinegar container) represents a “jug” that would be used on a farm. Encourage them to develop a useful new product.

TEST & IMPROVE



- Students will try it out!
- Does it work the way they want it to?
- How can they make it even better?
- Don't forget your safety glasses!

SHARE



Students will describe how their creation will help Ontario grain farmers and tell what they have learned. Students may report orally or, if time permits, they may write a report.

Ontario Curriculum Links:

Science and Technology, A1.1, A1.2, A1.3, A1.4, A1.5, A3.1, and A3.2.
It also meets the expectations in Language, A1.1, A1.2, B2.2, B2.4.

Additional Resources:

Engineering Design Process: https://goodineverygrain.ca/wp-content/uploads/2024/02/Engineering-Design-Process-Final_compressed.pdf

Real Dirt on Farming: <https://publuu.com/flip-book/319289/736970/page/1>



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Thought Starters for Educators

STEM Challenge

REPURPOSING PLASTIC JUGS

Repurposing plastic jugs in industrial settings offers a way to reduce waste and promote sustainable practices. Several methods are giving used jugs a new life:

- 1 Recycling into New Products:** Plastic jugs can be shredded into flakes and melted, then made into new products, such as new jugs, bottles or storage containers, outdoor furniture, and automotive parts.
- 2 Building Materials:** Shredded or melted plastic, including jugs, can be used as a component in building materials. For example, they can be mixed with other materials to create composite lumber or bricks, which are then used in construction projects.
- 3 Fabric and Textile Production:** Plastics from jugs can be processed into fibres then used to make fabrics. These fabrics are often used in items like backpacks, rugs, or fleece clothing.
- 4 Insulation Material:** Ground or shredded plastic from jugs can be used as insulation material in buildings. The repurposed plastic insulation is a sustainable alternative to traditional insulation materials.



HORTICULTURE APPLICATIONS FOR REPURPOSING PLASTIC JUGS

Jugs can be repurposed in various applications that contribute to sustainable gardening and plant care. The average Ontario grain farm is approximately 250 acres, much larger than your average garden. Ask your students how the ideas below may or may not work on an Ontario grain farm. Why would they work? What would need to be made differently?

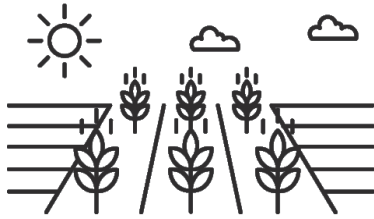
- 1 Container Gardening:** Cut-off plastic jugs can become plant containers. By cutting off the top to leave the bottom the depth you want, and poking drainage holes in the bottom, jugs become suitable pots for growing small plants, herbs, or flowers.
- 2 Seed Starters:** By cutting a plastic jug horizontally and using the bottom as a tray and the top as a protective cover, you have a mini greenhouse effect that helps seeds germinate in a controlled environment.
- 3 Watering Devices:** A plastic jug punctured with small holes at the base, becomes a DIY watering device. When buried near the roots of plants, the jug releases water slowly, providing an irrigation system.
- 4 Plant Protectors/Mini Greenhouses:** Cut the bottom from a jug to create a protective shield for a delicate plant. Placed over seedlings or small plants, the jug shields them from harsh weather conditions, such as frost or strong winds. They also trap heat and provide a warmer microclimate, which is useful for getting the growing season off to an early start.



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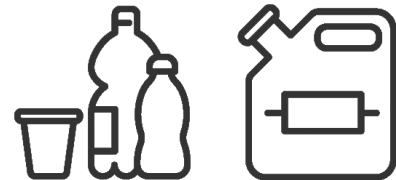
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What About Plastic on Farms?

LESSON ASSESSMENT

1. What can all of us, including farmers, do about too much plastic?

- Reduce the amount of plastic we use
- Reuse plastic when we can
- Recycle plastic we cannot reuse
- All of the above



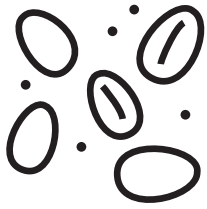
2. The video shows multiple ways that farmers use plastic on their farms. What did you notice was similar to how you use plastic in your life?

3. Farmers and researchers are working together to come up with ideas to reduce single-use plastic on farms. Why do you think this is important?

Visual Word Wall



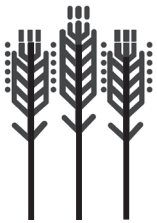
jug: a container with a handle used for holding liquids



grain: a single fruit or seed of a cereal



container: used to hold or transport something



straw: dried stalks of grain



reduce: make smaller or less in amount



twine: a strong string of two or more strands twisted together



reuse: to use again in a different way



fertilizer: a substance used to improve growth of plants



recycle: convert into reusable material



seed: plants need seeds to reproduce



investigate: to inquire or examine the facts



single-use: designed to be used once



wrap: to cover or enclose something

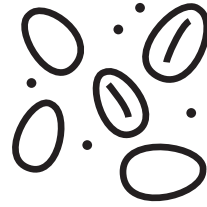


jug

Visual Word Wall



container



grain



reduce



straw



reuse



twine



recycle



fertilizer



investigate



seed



wrap



single-use