

Carton Landfills

*This lesson has been adapted from the
Carton 2 Garden Contest Lesson Plan Carton Landfills.*

Overview: Students will create mini "landfills" in milk or juice cartons and investigate what happens to common household waste when buried under soil and plants.

Grade Level/Range: 3rd to 5th Grade

Objective: In this lesson students will:

- Learn about materials that can be recycled and those that need to be disposed of in a landfill.
- Explore the concept of decomposition.
- Be able to identify ways in which recycling and composted is beneficial.

Time: 4+ weeks

Materials:

- Single-serving milk or juice cartons (at least 1 per student)
- Potting soil
- Grass seed such as annual rye or wheatgrass seeds
- Common household trash including things made of paper, metal, glass, and plastic (at least 2 small samples per student)
- Newspaper

Background Information

According to the EPA, in 2017 Americans generated about 268 million tons of trash. While 94 million tons of this material was recycled or composted, there is still much room for improvement, which is why students should learn the importance of being responsible with their waste. In this lesson students will explore what happens to materials that are disposed of in landfill and the benefits of composting and recycling instead. An analysis of the waste generated shows the following categories and percentages:

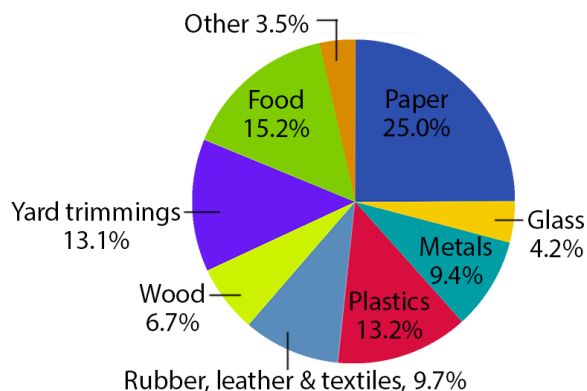


Chart at left is adapted from the EPA's [Advancing Sustainable Materials Management: 2017 Fact Sheet](#)

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

Reduce, Reuse and Recycle. The 3 Rs (reduce, reuse, and recycle) are very important for helping us to decrease the amount of materials going to landfills. They are listed in order of priority. The best way to tackle the problem of waste is to **reduce** the amount of unnecessary materials we are using on a regular basis. For example, use cloth napkins instead of paper, buy products in bulk to reduce packaging, and use reusable water bottles instead of single-use water bottles. If reusing is not an option, the next step should be finding a way to **reuse** things efficiently. For example, a plastic milk jug can become a watering can and a milk carton can be a pot for seed starting. Finally, if you can't reuse something, then **recycle** it so its materials can be reclaimed to manufacture new things.

The garden can be a great place to help you practice your 3 Rs. From using milk cartons to start seeds to turning old disposable silverware into plant labels, there are many ways to creatively use "waste" products to help your garden thrive. Composting your food scraps, yard trimmings, and food-safe wood can be an especially great way to recycle. Composting turns organic matter waste into a nutrient-rich growing medium for the plants in your garden. In addition to adding nutrients to the soil, compost also improves soil texture and helps with water absorption and draining. Some gardeners call compost "black gold" because it is such a valuable product in your garden.

Laying the Groundwork

Share the pie chart showing the breakdown of the categories of waste going to our landfills from the Background Information (full-sized version on last page). Then ask students the following questions:

- What are the 3 Rs? *Reduce, Reuse, and Recycle*
- What does it mean to recycle? *Recycling means taking old materials and making new things from them.*
- Why is it important to follow the three Rs? *Recycling and reducing waste helps the environment. Creating new materials from the old keeps materials out of landfills, takes less energy, saves natural resources like trees, and saves people money.*
- Which of items on this chart do you think could be reduced, reused, or recycled?

Exploration

1. Display an assortment of common waste items such as a plastic bottles, fruit and vegetable scraps, glass, paper, a metal can, and/or an old piece of clothing. The items need to be safely cut into small pieces that would fit inside of a milk carton. Ask students to sort items and consider what a particular item was used for and how it could be recycled.

Examples:

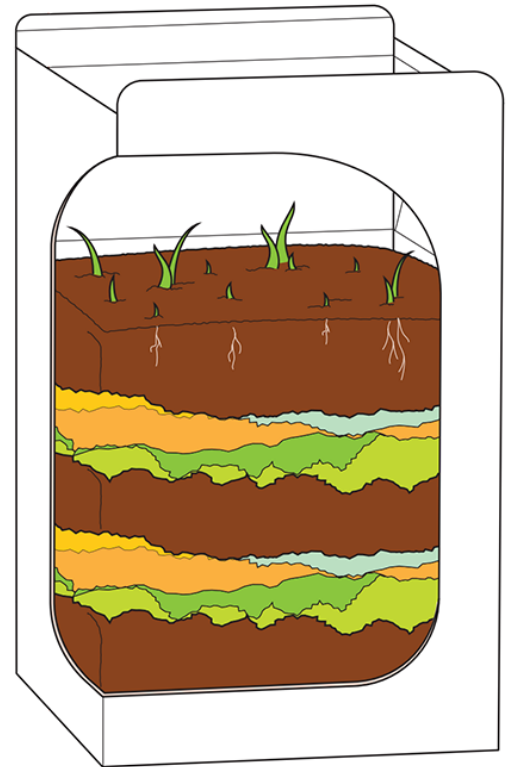
- A plastic bottle can be made into new plastic items and fabric.
- Fruits and vegetables be made into compost and put back into the garden.

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

- Paper can be recycled into more paper, paper towels, or toilet paper.
- Glass can be made into new bottles or jars.
- An aluminum can become another aluminum can or foil.
- Clothing can become new clothing, rags for cleaning, or other textiles.

Ask students: What items cannot be recycled? What happens to these materials? Where do they go?

2. Explain to students that they are going to make their own mini-landfills. Provide one single-serving carton per student (with the top open and small holes at the bottom for drainage). Let each student choose one common waste item from your samples.
3. Make mini landfills by layering moist potting soil and the chosen waste item in the container.
4. Plant ryegrass or wheatgrass seeds in your carton. Water the containers and allow them to grow for 4 to 6 weeks. For comparison, your class may also want to plant a few cartons that just have potting soil and seeds (no waste item).
5. Ask students to make a hypothesis about what they think will happen to their waste item over time. Will it change? Will it stay the same?
6. After 4 to 6 weeks, give students a piece of newspaper to protect their desks. Then have them remove the contents of their mini-landfill and investigate the waste items. Ask them, What happened? Was your hypothesis correct?



Making Connections

To conclude the activity, make a list of items that can be recycled and composted. Revisit questions about the importance of reducing waste and recycling. Moving forward, have students document any and all waste they generate in one week in the classroom. This exercise can be repeated in the home environment. Provide a posterboard to write down or draw what is thrown away, recycled, and composted (if applicable).

If you want to dig deep, start a school-wide recycling campaign. Have students create informational posters about recycling based on their study.

Older students can also explore recycling, composting, and garbage laws and regulations in their community, state, neighboring states, or different countries. Have students develop presentations that compare and contrast rules from different locations.

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

Branching Out

Check out the EPA's interactive Recycle City at: <https://www3.epa.gov/recyclecity/>

Start a [compost pile](#) in your garden or a [worm bin](#) in your classroom.

Composting: <https://kidsgardening.org/gardening-basics-composting/>

Worm Bin: <https://kidsgardening.org/worm-compost/>

KidsGardening is a nonprofit educational organization. Support provided by sponsors and donors is critical to our ability to provide free garden-based resources for parents and educators. All gifts are tax-deductible.

Landfill Usage

