



# Lesson Plan: Reduce, Grade 5 Science and Technology

## Activity

Product packaging challenge.

## Introduction

The packaging that surrounds the products we buy serves many purposes. It provides opportunities to store, ship, stack, and display products, offers protection from damage or breakage, minimizes food spoilage, provides information about contents, and provides an opportunity to market products. Despite these advantages, many products are over packaged, creating unnecessary waste that needs to be managed. In this lesson, students will explore the concept of reducing waste and how it relates to product packaging. Students will then evaluate different ways to package items to minimize the environmental impact while considering issues such as cost, availability of new materials, product attractiveness, practicality, and product protection.

## Curriculum Connections

Science and Technology, 2022 (revised)

### Grade 5

- Strand A: STEM Skills and Connections
- Strand C: Energy and Matter
- Strand E: Earth and Space Systems

## Learning Objectives

1. Explain Reduce and provide examples
2. Define product consumer and product producer
3. Describe some different purposes for product packaging
4. Identify packaging qualities that make it environmentally friendly or unfriendly
5. Invent a more environmentally friendly package for a familiar item that currently has wasteful packaging

## Resources Provided (available in the resource folder)

- Video: Reduce

## Materials Required

- A variety of packaged items
- Paper
- Pencils, markers, and pencil crayons
- Access to the internet

## The Regional Municipality of Durham - Waste Management Services

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## Activity Instructions

1. Introduce student to the second “R” – **Reduce**.

Waste reduction is about minimizing waste at the source - decreasing or eliminating waste by reducing the number of products we produce and purchase.

Waste reduction:

- Decreases the need to harvest and process new raw materials
- Reduces pressure on the environment by decreasing or eliminating activities related to consumer goods such as resource extraction, transportation, processing, and disposal
- Delays the need to purchase new equipment and expand waste management infrastructure
- Saves energy and money

2. Introduce today’s focus - waste reduction in relation to product packaging.

We often buy products from the store that are surrounded by packaging. Packaging is used for many purposes such as the need to protect contents, to make items easier to handle, to minimize food spoilage, and to provide attention-getting marketing.

3. What are some common materials used to package household products? Think about items you would purchase at the grocery store, electronics, and items you may get shipped to your home.

Examples include:

- Plastic used for items like margarine tubs, yogurt cups, and drink bottles
- Paperboard used for items like cereal and crackers boxes
- Cardboard/Fiberboard often used for shipping like boxes from home delivery services
- Aluminum used in items like drink cans
- Steel used for items like canned food
- Styrofoam used for items like electronics packaging
- Glass used for items like sauce and olive oil bottles
- Flexible plastic like stand-up and zipper lock pouches, wrappers and bags (chip bags, granola bar wrappers, etc.), flexible packaging with plastic seal, and non-food protective wrap like bubble wrap or plastic envelopes

4. Explain that while some packaging may be necessary, many products are overpackaged.

**Overpackaged** means that the products are wrapped in more material than is needed.

Overpackaging costs the **consumer** (the people purchasing the product) and the environment.

5. Ask the students if they think the consumer should be responsible for avoiding overpackaged products or is it the responsibility of the **producer** (the people making the product) to stop using extra packaging?
6. As a class, brainstorm and make a list of other products they believe are overpackaged. You may choose to do an online search to find examples.

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Examples of overpackaged items include:

- Single-use coffee pods – a small plastic cup, lined with paper, filled with coffee grounds, covered with an aluminum lid. These often also come in an additional paperboard box, sealed in clear flexible plastic.
- Chocolate easter bunny – wrapped in aluminium foil, in a plastic tray, inside a paperboard box, sometime even wrapped with additional clear flexible plastic.
- Plastic wrapped produce – bananas and coconuts sealed in clear flexible plastic, apples on a Styrofoam or paper-based tray and then wrapped in clear flexible plastic, individual corn on the cob peeled and placed in plastic wrapping.
- Individually wrapped snacks – individual cookies that are wrapped in plastic, placed in a plastic tray, placed in a box, then sealed in clear flexible plastic.

7. Ask students what they think makes packaging more environmentally friendly.

This might include the overall amount of packaging, recyclability, compostability, whether the packaging can be returned to retailers, whether the packaging can be reused for another purpose, use of recycled content within the packaging, etc.

8. Split the class into small groups. Assign an overpackaged product to each group that they will work together to redesign. You may pick items from the list, bring in examples to share with the class, or have them use a picture from an item found online.

9. In small groups, students will work as a team of design engineers to redesign their product packaging with waste reduction in mind, while considering issues such as cost, availability of new materials, product attractiveness, practicality, and product protection. Students are encouraged to be creative with their designs and incorporate reusability of their packaging where possible.

10. Once students have agreed on a design, they will work together to build a prototype (this could be a paper drawing, computer illustration, or sample).

## Extension Activity

Students will present their product and packaging to the class. They will show the class the product that they have worked on, including how it is currently packaged, and explain their new packaging ideas. How does the new packaging reduce the amount of waste that needs to be managed? Does the new packaging still meet the needs of the product including product protection, functionality, and design appeal? Students may also choose to bring in a product that they believe has an innovative design or packaging that results in waste reduction to share with the class.

## Summary

The best way to manage garbage is by not creating it in the first place. Waste reduction is about minimizing waste at the source - decreasing or eliminating waste by reducing the number of products we produce and purchase. Examples of waste reduction include drinking municipal tap water instead of bottled water, buying in bulk instead of purchasing single-serve products, and meal planning to reduce food waste. Reducing waste requires planning and making decisions about what we purchase with waste reduction in mind.

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## Expanded Curriculum Connections

Grade 5, Science and Technology, 2022 (revised)

### A: STEM Skills and Connections

#### A1. STEM Investigation and Communication Skills

- A1.1 use a scientific research process and associated skills to conduct investigations
- A1.2 use a scientific experimentation process and associated skills to conduct investigations
- A1.3 use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems
- A1.4 follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials
- A1.5 communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes

#### A3. Applications, Connections, and Contributions

- A3.1 describe practical applications of science and technology concepts in various occupations, including skilled trades, and how these applications address real-world problems
- A3.2 investigate how science and technology can be used with other subject areas to address real-world problems

### C: Energy and Matter

#### C1. Relating Science and Technology to Our Changing World

- C1.1 assess the impacts on society and the environment of various processes used in the manufacture of common products
- C1.2 assess how the use of specific materials in the manufacture of common products affects the environment, and identify actions that society and individuals can take to mitigate negative impacts

### E: Earth and Space Systems

#### E.1. Relating Science and Technology to Our Changing World

E1.1 analyse long-term impacts of human uses of energy and natural resources, on society and the environment, including climate change, and suggest ways to mitigate these impacts