

Educator's Guide



Eco 360

Activity 11: Plastic Waste to Consumer Goods
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Backgrounder: Plastic Waste Solutions

In order to address the issue of plastic waste in our economic system, we need to think of ways to utilize plastic items after use instead of throwing them into landfills. In a circular economy for plastics, we can re-imagine ways how:

- Plastic items can be **eliminated** from our systems where there is no need for them
- Plastic items can be created for **reuse** – by designing them in such a manner that ensures they can be reused, recycled, or composted
- Plastic items **circulated** within our economy and out of our environment by repurposing the materials used in the plastic products and packaging

Corporations, governments, and consumers should work together to move towards a circular model for the economy that employs these principles. By eliminating unwanted and unnecessary plastic items, corporations can play the part in reducing avoidable plastic from the system.

The single-use plastic items pose the biggest challenge in addressing plastic pollution. Moving away from single-use plastic items towards designing plastic items that can be reused, recycled and composted is crucial. Cities across the globe have worked towards banning the use of single-use plastic items. In 2020, the Government of Canada announced the ban of certain single-use plastic items by the end of 2021.

While there are many plastic clean-up efforts happening around the globe, here are examples of some initiatives working to reclaim plastic waste currently found in our environments (Nature Catalysis, 2019):

- Ocean Cleanup is a private environmental organization that is deploying automated plastic collection units in water bodies for clean-up: <https://theoceancleanup.com/>
- Alliance to End Plastic Waste is a non-profit working with various partners in government, non-government sectors, industry and local communities to end plastic waste in the environment. They are also working with cities to improve their waste management systems: <https://endplasticwaste.org/en>
- 4Ocean is certified B-Corporation, who is also working to clean up the plastic polluting our oceans, while also raising awareness and educating the masses: <https://www.4ocean.com/>

One might wonder what can we do with all the plastic when it is collected from our environments—from our oceans and municipal solid waste? The industry is still learning ways to innovate and develop new technologies for dealing with all the plastic waste reclaimed from our environments. Recycling of plastic waste is a common

strategy across the globe in dealing with all the plastic waste reclaimed from our environments. There are two ways of recycling plastics—either **downcycling** or **upcycling** them.

The traditional recycling methods involve using mechanical ways or incineration to create new products that are usually of lower quality than the original plastic, which is essentially a form of **downcycling**. Another form of recycling is catalytic recycling of plastic waste, which entails using plastic waste as “feedstock for the preparation of value-added materials” (Nature Catalysis, 2019)—this is a form of **upcycling** as we create products of higher value and quality through this method.

Plastic **repurposing** is also another term sometimes used interchangeably with upcycling – it also refers to using discarded plastic waste to create new products of higher value and quality. These methods allow for plastic materials to be **circulated** within the economy and out of our environments. Here are some innovative examples of plastic upcycling:

EcoBricks at Collingwood School Calgary

Collingwood School in Calgary, Alberta has an innovative project, called the “Eco-Brick Project”. The idea comes from Colombia as a response to help low-income families, especially recyclers, to have a home made out of eco-bricks! Each class at the Collingwood School brings an empty 2L bottle, where students fill the bottle with all the non-recyclable plastic - plastic that usually goes to the landfill. It looks easy but it is not! It requires strong muscles to press the plastic inside the bottle, fill out all the corners and end up with a very hard bottle, like a brick. The students have built a couch, a table, and chairs with eco-bricks for the entire school to enjoy. As a result of this project, the school’s waste has decreased 70%.



Source: (Collingwood School, 2020)

Here is a link to the project:

https://www.youtube.com/watch?time_continue=20&v=ryGwn_9Ggns&feature=emb_logo

Green Toys

Green Toys® is a US based company that creates toys from recycled plastic milk jars. Using a motto of reduce, reuse and recycle, Green Toys® tracks the number of plastic milk jugs reduced as a primary indicator of their impact. Here is a video on their story:

<https://www.youtube.com/embed/NDUSQrHXiww?autoplay=1>



Source: (Green Toys, 2021)

Rothy's

Rothy's is a US based retail store that creates women's shoes and bags from recycled plastic.

Here is a link to their website: <https://rothys.com/about>

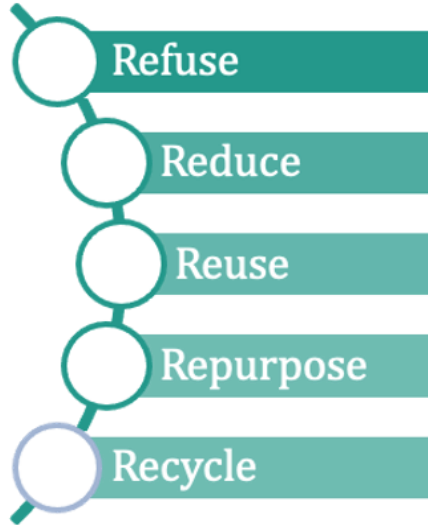


Source: (Rothy's, 2021)

While companies are doing their part to create a circular economy for plastics, we as consumers can also do our part in adopting the 5 Rs approach, see figure below. Learn more

on how you can live sustainably by reducing your plastic footprint by researching ways for applying the 5 Rs model in your lifestyle.

The 5 Rs of Mindful Plastic Consumption



- Refuse to consume plastic by opting for environmentally friendly alternatives
- If you can't avoid certain plastic products, then reduce your consumption of them
- Reuse plastic products that you own as much as possible
- Instead of discarding plastics, repurpose them to make other useful products
- Once you have exhausted all ways to use and reuse the plastic, recycle them

Bibliography

Collingwood School. (2020). EcoBricks Project. Calgary, Alberta.
Green Toys. (2021). *Green Toys*. Retrieved from <https://www.greentoys.com/>
Nature Catalysis. (2019, November 19). Plastic Upcycling. *Nature Catalysis*, pp. 945-946.
Rothy's. (2021). *Rothy's*. Retrieved from <https://rothys.com/>

Curriculum Connections

Activity 11: Plastic Waste to Consumer Goods

Alberta

- ❖ Biology 30 Unit D: Population & Community Dynamics
 - 30-D2.1sts explain why Canadian society supports scientific research and technological development to facilitate a sustainable society, economy and environment
- ❖ Social 10-1
 - 3.7 explore multiple perspectives regarding the relationship among people, the land and globalization (spirituality, stewardship, sustainability, resource development)

Ontario

- ❖ Grade 9 Geography
 - C1. The Sustainability of Resources: analyze impacts of resource policy, resource management, and consumer choices on resource sustainability in Canada
 - E1. The Sustainability of Human Systems: analyze issues relating to the sustainability of human systems in Canada

Activity 11: Plastic Waste to Consumer Goods

Overall Objective

Learners will explore ways in which plastic waste can be repurposed to create consumer goods. Learners will complete a make-remake activity where they will go through a design challenge to make something new out of recycled plastic.

Materials

- Internet-enabled device
- Topic backgrounder
- Eco 360 notebook (we recommend asking learners to maintain a notebook for this program to write down reflections as they go through the program)
- Discarded plastics
- Other craft tools as needed for the make-remake activity (scissors, glue, tape, paper, markers, etc.)

Time Required

1.5 hours - 2 hours

Learning Outcomes

By the end of this activity, learners will:

- describe how plastic can be recycled to make consumer goods in a circular economy
- identify innovative ways in which plastic can be utilized to make consumer goods

Grade Level

Suitable for Grades 9 to 12

Activity Outline

Step One

Begin by conducting a thought experiment with your learners, posing the following question:

- a. "What can we make out of discarded plastics that can be used in our daily lives?"
- b. Have a discussion in class and note down all the ideas that learners share on the whiteboard or a virtual board for everyone to see. We recommend using Jamboard.

Step Two

Put learner ideas into different categories of consumer goods on the whiteboard, such as:

- a. Apparel (clothes, shoes, bags, etc.)
- b. Kitchen items
- c. Bathroom toiletries
- d. Grocery items (shopping bags, containers, etc.)
- e. Cosmetics
- f. Packaging

Step Three

After creating these categories, invite learners to further develop their ideas by completing a design challenge of making or remaking a consumer good out of discarded plastics using the resource below. Learners can create anything they can think of that can be used as a consumer good, it doesn't need to be limited to the categories identified! It can be anything!

- a. http://www.greenlearning.ca/circulareconomy/PDFS/CircularEconomy_MakeRemake.pdf

- b. You can share the following case studies with the learners before they dive in:

http://www.greenlearning.ca/circulareconomy/PDFS/CircularEconomy_WhatToDo.pdf

Learner Assessment

Consolidation: Complete the design in Tinkercad. Be creative and show us what you created by sharing photos of the end product by emailing to programs@greenlearning.ca.

This activity can also be conducted on [Tinkercad](https://www.tinkercad.com) - by selecting the “Making at Home” option in the Tinkercad dropdown, learners can choose plastic items they can usually find at home when creating a 3D design of a new product!

