

LESSON: PLASTIC CYCLE

Activity 2: A Closer Look at Plastic



OVERVIEW

We're going to take a closer look at how plastic is made and how this plays a role in a plastic product's end of life disposal (what happens when we're done using it). We'll also learn about what a circular economy is by comparing it to a linear economy.

LEARNING OBJECTIVES

After completing this activity, participants will be able to:

1. Describe the process of how plastic and plastic items are made
2. Understand that there is a large diversity of plastic types and that this influences how they are managed as waste
3. Describe the concept of a linear economy and circular economy and show how they are different from each other
4. Properly sort household waste with the help of online tool, the Toronto Waste Wizard

SETUP AND MATERIALS

This activity takes approximately 40 minutes and is done in 3 parts.

- **Print a copy of the worksheet and grab a pen or pencil.**
 - The same worksheet is used for all 3 parts.

Part 1: Where does plastic come from?

- Open link to AsapSCIENCE video on YouTube: [We Wore our Plastic Waste IN PUBLIC for 7 Days, It Changed our Lives](#). Start at 2 min 13 sec and watch up to 3 min 10 sec.
- Download our supplementary sheet with more details on the steps of the Plastic Cycle.

Part 2: Become a Waste Wizard!

- Provide 3 small bins, one to represent 3 main waste bins: Garbage, Recycling and Compost
- Find an assortment of **at least** 10 items from around the home that you have finished using
 - Optional: Download our **supplementary sheet** with a list of suggested "trash" items and turn it into a scavenger hunt to find them around the house!
- Open a copy of the [City of Toronto Put Waste in Its Place Poster](#)
- Open the Toronto Waste Wizard (download [TOwaste app](#) or visit the [City of Toronto website](#))

Part 3: What happens to plastic after it's thrown away?

- Use the Fill in the Blank game board found on page 4 of the worksheet.
- Cut out the game pieces found on page 5 of the worksheet (9 images total).
- Download our supplementary sheet "Circular and Linear Economies" for the correct answers.

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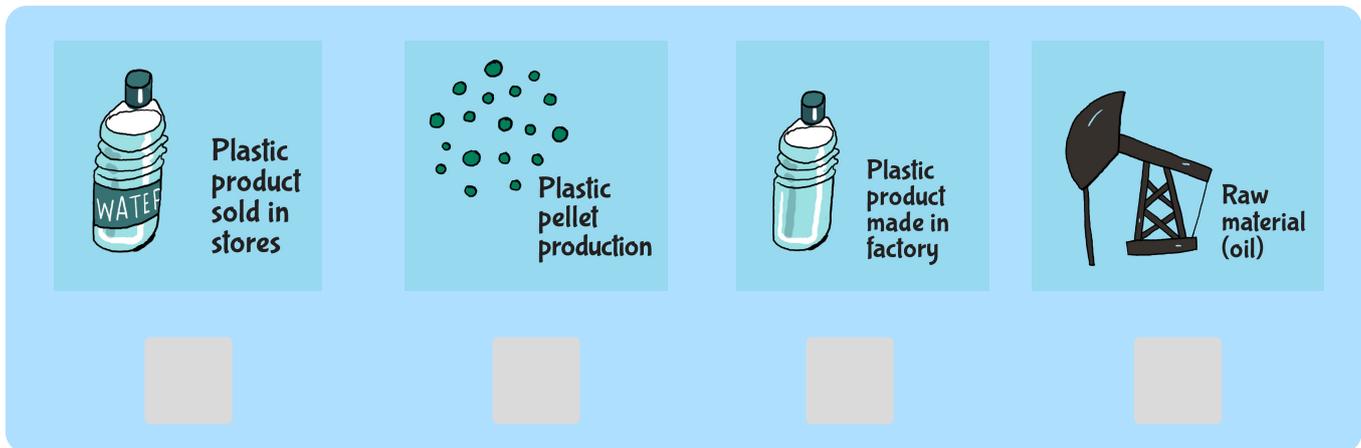
PART 1: WHERE DOES PLASTIC COME FROM?

INSTRUCTIONS

- Provide participants with a copy of the worksheet.

1. First teach participants about the Plastic Cycle (how plastic products are made).

- Ask participants where they think plastic comes from. Is it a naturally occurring material or something that is made from a natural resource found on Earth? Answer on page 1 of the worksheet.
- Ask participants to try and guess the correct order of steps for how plastic is made and record this on page 1 of the worksheet.



2. Now review the Plastic Cycle with participants.

- Open the supplementary sheet to share the correct answers and learn more details about the main steps of how plastic products are made.
- Take a minute to review how plastic is made and how it becomes the plastics products we can buy in stores.
- Watch the AsapSCIENCE clip to learn a little bit more about the steps to make plastic and the diversity of products we just learned about.
 - You can watch the entire video but the Plastic Cycle is shown from [2 min 13 sec to 3 min 10 sec](#).

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PART 2: BECOME A WASTE WIZARD

INSTRUCTIONS

- Provide participants with a copy of the worksheet. This activity can be done by one participant or in small teams.

1. Start with a discussion on waste management as you get set up for the Waste Wizard game.

- Provide participant or each team of participants with different samples of trash or any other plastic material (refer to our supplementary sheet with a list of examples) and explain that they'll work together to guess which of the 3 waste bins each item goes.
- Start the conversation with questions and encourage them to write answers on worksheet:
 - What do they think happens after plastic products are used by people?
 - **Suggested prompts: Are plastic products used again? Thrown in the garbage? Recycled?**
 - When they have something to throw out, how do they know which of these main 3 waste bins it goes into?
- Share that when you don't know where items go after you're done using them, if you live in Toronto, you can look for this information by looking at the [City of Toronto Put Waste in Its Place Poster](#) or by using the Toronto Waste Wizard (using either the [TOwaste app](#) or [City of Toronto website](#))
- Now get ready to play the Waste Wizard Game. Follow the steps below and have fun!

TIP: Encourage participants to make a wizard hat or wizard wand by reusing items found around the home. They may even wish to share their wizard creations with us on Twitter, facebook or Instagram @UofTTrashTeam!

HOW TO PLAY: WASTE WIZARD GAME

Object of the game: Sort the most number of correct waste items into the correct bin.

- If you have more than one person who wants to play, you can set up different teams and they can compete against each other.
- Hold up the 3 bins and explain these represent the 3 main waste streams in the City of Toronto: recycling, garbage and compost.
- **Step 1:** Hand out waste items and explain they'll have 2 minutes to discuss which bin each item goes into. They can write their ideas on page 1 of the worksheet.
- **Step 2:** After 2 minutes, tell them to share their answers by now placing each waste item into the bin they think is correct.
- **Step 3:** After all items are sorted, visit each team and use the Waste Wizard to check their answers, explaining why their answer was correct or incorrect.
- **Step 4:** Ask them if they were surprised by any of the answers. Why or why not?

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Trash Team

PART 3: CIRCULAR AND LINEAR ECONOMIES

INSTRUCTIONS

- Provide participants with a copy of the worksheet.

1. Start by discussing what happens after waste items have been placed in the correct bin.

- Ask participants what they think happens to waste items after they've been placed in the correct bin.
 - **Prompting questions: What do you think happens to the waste after it is thrown in the garbage bin? What about after it is placed in the recycling bin?**

2. Next, introduce a Linear Economy to explain what happens to waste sent to the landfill.

- Explain that after you throw your waste in the garbage bin this waste goes to the landfill.
- Ask participants if they know what a landfill is and if they think products sent to landfill can be used again. Have them write their answers on the worksheet.
 - **Answer: Landfill is a place on land where the trash is buried. It stays there for a very long time. Products generally can't be used again once they are in landfill.**
- Explain products in landfill can't be used again and this represents something called a **Linear Economy**. Tell participants to imagine a straight line, explaining it has a start and an end point and no way to get back to the start of the line without starting all over again from the beginning.
- Ask participants to answer if they think a Linear Economy means more or less natural resources (raw materials) are taken from the environment and if they feel it's a long-term sustainable option for the environment. Answer on the worksheet.
 - **Answer: More natural resources, like oil, are taken to start the plastic cycle again and create new plastic products from pellets. These resources are not replaced and the new plastic products will get thrown away again when we're done with them. It's not a very sustainable process.**

3. Now introduce a Circular Economy to explain what happens to waste placed in the recycling.

- Explain to participants that waste in the recycling is sorted into different categories based on materials (like plastic, paper, glass). It is then sent to a recycling factory where the material is transformed back into a new product.
- Explain recycled products can be used again and this represents something called a **Circular Economy**. Tell participants to imagine a circle and think about how there is no start or end point. Describe that it's a continual cycle that repeats over and over again.
- Ask participants to answer if they think a Circular Economy means more or less natural resources (raw materials) are taken from the environment and if they feel it's a long-term sustainable option for the environment. Answer on the worksheet.
 - **Answer: Less natural resources are taken because the same resources are used over and over again. It's a more sustainable process.**
- Now it's time to play the Fill in the Blanks game. Follow the steps below and have fun!

HOW TO PLAY: FILL IN THE BLANKS GAME

Object of the game: Guess the correct order of steps to show the difference between a circular economy and a linear economy.

- **Step 1:** Cut out the game pieces found on page 5 of the worksheet (9 total).
- **Step 2:** Ask participants guess the correct order by placing the cut out images on the correct blank spot (page 5 of the worksheet) **Tip: Encourage them to review what they learned about the plastic cycle.**
- **Step 3:** Discuss their answers and why they chose the order they did.
- **Step 4:** Share the correct answers by showing the supplementary sheet: Circular Vs. Linear Economy.

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FINAL REFLECTION

Now that you have completed all parts of the activity, it's time to reflect back on what participants have learned.

- Emphasize that while recycling is important to a circular economy, it's also important to reduce what we use as much as possible so we can also reduce what potentially ends up in the landfill.
- Have participants return to the last page of their worksheet to answer the questions below.
 - What natural resource found on earth is used in the production of plastic?
 - What were some of the main differences between a circular economy and a linear economy?
 - When you are finished using a plastic product, what are some ways we can use them for longer and reduce waste instead of placing them in the garbage or recycling?

Some extra information to help with the discussion:

- Canadians throw away over 3 million tonnes of plastic waste every year
- Only 9% is recycled, the rest end up in a combination of landfill, waste-to-energy facilities, or back into the environment*.

Coming up next: We'll learn more about some sustainable alternatives to single-use plastics in Activity 3: Match The Sustainable Alternative.

*Source: Environment and Climate Change Canada (Jan 2020)