**RECOMMENDED GRADES:** applicable for any grade level

**TIME NEEDED:** combined time 2 90-minute blocks and 2 weeks outside of class time

**RATIONALE:** Students are living in a world that is currently contains ~ 8.3 billion tons of plastic, which is being produced at an accelerated pace since the 1950’s and of which only 9% of that total production has been recycled. Currently, people are buying a plastic one-use bottle at the rate of 1 million per minute and that is a very large contributing factor to the fact the 73% of all beach trash is plastic. It is important for students to at least hear the following factoids: worldwide, about 2 million plastic bags are used every minute, 90% of plastic polluting our oceans is carried by just 10 rivers, plastic is killing more than 1.1 million seabirds and animals every year, the average person eats 70,000 microplastics each year, and the average time that a plastic bag is used for is just 12 minutes. Students will be learning about **SDG 11**: Make cities and human settlement inclusive, safe, resilient and sustainable and **SDG 14th**: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

**OBJECTIVES:**

Students will:

* identify the role that stakeholders play in determining the outcome of continuing to use single use plastics
* identify various geographic and political factors that may influence the decision to continue the use of single use plastics
* analyze various consequences from the decision and determine their impact on stakeholders
* analyze the role that stakeholders play in determining the outcome of a complex decision
* explain the complex nature of environmental issues and recognize the solutions to these issues are usually multi-layered and complex
* assess and summarize the impact that a decision had on the stakeholders within the case study

**MATERIALS:**

What materials will need to be gathered or prepared for this lesson? (All materials are available in the link to the activity.)

Handouts & Worksheets

Decision Statement

Decision Rubric

Technology

**PREPARATION:**

Part 1 : Become a GOMI – Detective .In this activity, students will need to be in participant structures that allow for whole class discussion as well as small group work. A space that allows students to move freely between these structures is needed.

In Part 2 :World GOMI - Reality, students will need to be in participant structures that allow for whole class discussion as well as small group work. A space that allows students to move freely between these structures is needed. Students will also need access to computers where they can talk with a small group.

In Part 3 : GOMI – Activists, students will need to be in participant structures that allow for whole class discussion as well as small group work. A space that allows students to move freely between these structures is needed. Students may need to access computers while they are constructing their decision statements and potential actions with their small groups.

**DIRECTIONS:**

**PRIOR SKILLS & UNDERSTANDINGS NEEDED:**

Prior Knowledge

Identification of potential cultural, environmental, and economic consequences of this decision

Identification of potential cultural, environmental, and economic aspects of this decision

Knowledge of the conflict around the decision to reduce or not reduce single use plastics

Identification of stakeholders that could be influenced by the decision to reduce or not reduce the single use plastics.

**MODIFICATIONS:**

Suggest ways in which the lesson might be modified for specific student audiences, different abilities, etc. Students will be working in groups and so modifications for specific audiences will be dependent on the comfort level of the students. Because there not be homogeneous groups, each member of the team should be able to work with/help another.

**Activities**

**Part 1 GOMI- Dectectives ( Locally and Regionally focused ) ( For younger grades, teachers may need to modify the independent work and refocus it to teacher driven )**

1. As an individual: Keep a week-long log of all the GOMI you create. Ex. 15 straws ; 5 ziplock sandwich bags.
2. As a small group do the following: One week after you have done the data , answer the following questions:
	1. What is GOMI for you?
	2. How do you define GOMI?
	3. What GOMI is around you? Please make a list of them.
	4. Where do they go after leaving your house/school ?
	5. Who takes your GOMI away?
	6. Who/What/How/How often?
3. As a group over the next week , keep a log using the [Marine Debris](https://marinedebris.engr.uga.edu/) or [Litterati](https://www.litterati.org/) garbage tracking apps around your community ; in parks or at schools
4. As a small group , look at the data you have collected in the tracker and answer the following questions:
	1. How much GOMI is on public sites?
	2. What type of GOMI is on public sites?
	3. How are we contributing to GOMI on public sites?
	4. How can we reuse and recycle GOMI ?
	5. Can it be used to produce power?
	6. What is the final stage of GOMI ? Where they have they gone ? In what format they are?
5. Using your data from individual GOMI collection and the data that you collected , create a “ Where GOMI goes” map . This will be used in another Part of the activities, so save a file ( work together on a Google doc)

**Part 2 Part II: World GOMI Reality ( Globally focused )**

Students will investigate and learn about and face the facts about single use GOMI we use and “World GOMI reality”. As the same teams which worked together in Part 1 , review the information and watch the videos about the reality of GOMI , in particular, the GOMI that ends up in the ocean.

**Readings:**

1. Marine Litter
	1. <https://oceanservice.noaa.gov/news/marinedebris/ten-things.html>
	2. <https://oceanservice.noaa.gov/facts/most-common-ocean-litter.html>
	3. <https://www.lessplastic.org.uk/10-marine-litter-facts-how-reduce-plastic-pollution/>
	4. <https://ourworldindata.org/plastic-pollution>
2. Ocean Currents
	1. ５ GOMI Belts in oceans <https://www.5gyres.org/faq>
	2. <http://www.oceansplasticleanup.com/Gyres_Oceans_Plastics_Marine/Gyres_Index_Oceans_A_To_Z_Marine_Litter_Garbage.htm>
3. Micro Plastic in the sea
	1. <http://oceancrusaders.org/plastic-crusades/plastic-statistics/>
	2. <https://www.weforum.org/agenda/2019/12/microplastics-ocean-plastic-pollution-research-salps/>
	3. <https://oceanservice.noaa.gov/facts/microplastics.html>
	4. <https://oceanservice.noaa.gov/hazards/marinedebris/plastics-in-the-ocean.html>

**Videos**

What are microplastics and gyres ? <https://www.youtube.com/watch?v=tfHfoafRxtY>

Marine Plastics <https://ocean.si.edu/conservation/pollution/marine-plastics>

You Eat Thousands of pieces of plastic a year <https://www.nationalgeographic.com/environment/2019/06/you-eat-thousands-of-bits-of-plastic-every-year/>

Plastics into fuel <https://www.anthropocenemagazine.org/2019/02/new-technique-converts-plastic-waste-to-fuel/>

Turning Plastic Bags and containers in to fuel <https://www.youtube.com/watch?v=AWdNUDfgCRc>

There are a lot of videos and articles that a Google search will provide if more are needed.

**Part III: You are GOMI Activists**

Students as the same teams: You are now GOMI Activists. Your actions are to design a presentation to show how to care for GOMI and to create some GOMI solutions. You will share you results with your class and a group of others yet to be decided.

EXPECTED OUTCOMES to be included:

1. GOMI data pieces
2. GOMI Map
3. Creative media about "how you care about and for the Earth and want to rid it of GOMI: Some examples could include creating songs, videos, dances or artwork. The possibilities are endless and are limited only by your creativity.
4. What your solutions are to lessen the GOMI on Earth."

Your group and individual contributions to help in your expected outcomes will be determined by a rubric that we will design as a class at the beginning of the project:

We are hopeful that as you work on learning about GOMI, you will develop a mindfulness about “GOMI SORTING” before it ever leaves your hands. Hopefully, you will want to keep our mother land and ocean as one healthy EARTH.

SDG 11 Make cities and human settlement inclusive, safe, resilient and sustainable

SDG 14th Conserve and sustainably use the oceans, seas and marine resources for sustainable development

 **VOCABULARY:**

1. **biodiversity**

**Noun**

**all the different kinds of living organisms within a given area.**

1. **microplastics**

**Noun**

**Extremely small pieces of plastic debris in the environment resulting from the disposal and breakdown of consumer products and industrial waste**

1. **single – use plastics**

**Noun**

**Plastics that are used only once before they are thrown away or recycled.**

**4.consequence**

**Noun**

**result or outcome of an action or situation.**

1. **decision**

**Noun**

**judgment, conclusion, or finding.**

1. **gyres**

**Noun**

**Huge circular moving current systems that dominate the surfaces of the oceans.**

1. **economy**

**Noun**

**system of production, distribution, and consumption of goods and services.**

1. **ecosystem**

**Noun**

**community and interactions of living and nonliving things in an area.**

1. **litter**

**Noun**

**Rubbish in the street**

1. **disposable**

**Adjective**

**Something that is designed to be thrown away after you have used it once or a few times.**

1. **biodegradable**

**Adjective**

**Capable of being readily decomposed into harmless substances by microorganisms**

1. **stakeholder**

**Noun**

**person or organization that has an interest or investment in a place, situation, or company.**

**watershed**

**Noun**

**entire river system or an area drained by a river and its tributaries.**

**If you want to assess this activity:**

Since this is a [PBL lesson](https://my.pblworks.org/), students will be assessed formatively throughout most of the activity. The [formative assessment](https://www.edutopia.org/groups/assessment/250941) will be in the form of daily progress in journals – were there questions that they had and either asked or worked out, etc. Summative assessment will be in the form of a teacher/group grade determined by teacher /group reflection of the product that they have created. The rubric that they will use for this will be class generated. Students will also receive a formative grade on the reflection of their individual performance and the group as a whole. Students can create their own or they may use the Template found at :[RubiStar Home](http://rubistar.4teachers.org/index.php)