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## Lesson 7: What Goes Around Comes Around

**Description:** A team building game that explores the ways in which we are all connected through the waste stream.





Upon completion  
of this lesson  
students will be  
able to:

**Describe  
the cycle  
of our trash.**

## Concepts:

1. We are part of a continual cycle in which we use goods and throw them away, often without considering where they go.
2. The world is connected through the waste stream.
3. We can choose to take care of our trash and create less of it.

## Outcomes:

Upon completion of this lesson students will be able to:

1. Describe the cycle of our trash.
2. Explain how trash can move between communities and countries.
3. Describe what it means to refuse, reduce, reuse, and recycle.

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## Outline:

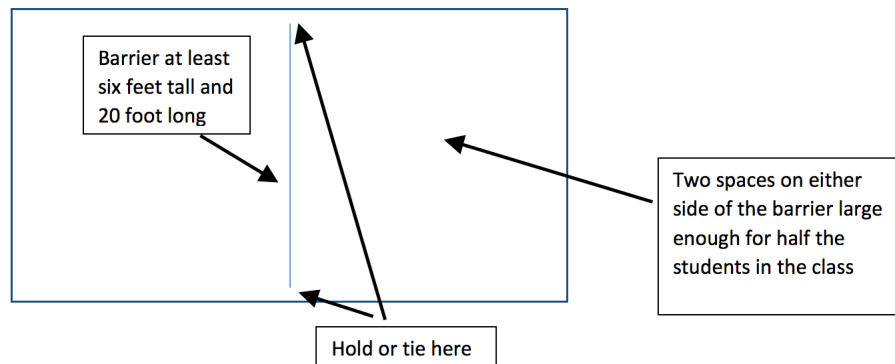
- I. Set up (20 min.)
  - II. Introduction (5 min.)
    - a. Learner Level Assessment
    - b. Behavior Guidelines
  - III. Trash Game Activity (20 min.)
  - IV. Reduce, Reuse, Refuse Activity (15 min.)
  - V. Conclusion and Review (5 min.)
  - VI. Follow-up Activities
    - a. The Motion of the Ocean
    - b. Follow the Leader
    - c. How many Bottles?
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**When students arrive, it should look like there is trash all over the floor of their side.**

## I. Set up (20 min.)

This lesson requires constructing a visual barrier between two groups of students so that two sides are created that can't see each other. This can be done in a classroom, auditorium, or any other suitable space. One way to create this barrier is to use a tarp, painter's cloth, or another opaque material. It should be slightly taller than the tallest students in the class so that no one can see over, touch the floor so that no one can see under, bisect the space you are using, and be at least twenty feet long. The simplest way to hold up the material is to have two adults hold either side, the teacher can be one of them. It is also possible to drape the material from a volleyball net in a gym or to secure it to the wall or ceiling with rope. Once it is created, the space you are using should look something like this:



### Materials:

- Tarp, or other suitable opaque material
- Rope to secure the visual barrier if it is not being held up by people
- Selected materials from the reclaimed materials set used for this unit including: plastic bags, plastic bottles, food wrappers, Styrofoam cups and plates, straws, and Styrofoam and plastic packaging
- A screen and projector to show the gyre map provided in this lesson
- A stopwatch

Prepare your space as described above. Next, spread half of the household trash on one side and half on the other. Make sure that any heavy or pointed items are removed from the piles. When students arrive, it should look like there is trash all over the floor of their side. One alternative way to set this lesson up for effect is to separate the trash into two bags or boxes and wait until students arrive to dump it onto their side.



**The purpose of this game is to show students the cycle of acquiring more stuff and throwing it “away.”**

## II. Introduction (5 min.)

### a. Learner Level Assessment

#### Background

The purpose of this game is to show students the cycle of acquiring more stuff and throwing it “away.” This is the cycle that most of us engage in daily. The game is both a learning experience and a team building activity. The students will attempt to clean up their own side by throwing their trash to the other side. They will soon notice that while they are doing this, the other side is throwing trash right back to them. For the team building portion of this lesson, we are going to play several rounds. The instructions for the first few rounds will be, “Clean up your side! The cleanest side wins” Each round will only be 30 seconds long. After doing this a few times, students may start to get frustrated. After two or three rounds, pause for one minute between rounds and ask each side to come up with a strategy for the next round that is different from what they have been doing. Don’t give hints, allow the students to work through communicating as a group in order to find leaders and create strategies. You will soon see that students begin to fill bags and throw them at the last second. Once you get to this stage, modify the instructions slightly. Let the students know, “You can only win if there is nothing on the floor at the end of the round.” It may take several rounds for students to realize that the only way to win is to bag and hold their own trash. Once the game is over and both sides are holding onto their own trash, let them know that this is the way out of the system we have created; for everyone to take care of their own garbage. This game is further described below. Here is a video of the game as conducted at a teacher workshop at the National Zoo:

<https://www.youtube.com/watch?v=Nf2RdPiSiLA>

**Instructions for setting up the game with students:** When students arrive, divide them into two groups. Have one group go to each side of the barrier. Standing where both groups can see you, let the students know that the space they are in is their bedroom or home. Ask students, “When our rooms and homes get dirty and full of trash, what do we do?” Responses will range from, “We throw it out,” to “We recycle it,” etc. After hearing a number of responses, let students know that whatever they do with their trash, they usually get it out of their sight. The goal of this game is to get all of the trash on their side cleaned up and out of their sight.

### b. Behavior Guidelines

Some lessons and activities in this curriculum require tools and/or physical activity, so there may be a need to discuss behavior expectations before activities. For this lesson, students will be throwing items across to the other side of the room. Depending on your class, you may want to specify that students can only throw underhanded. Even though this is a fun and active game, stress respect for classmates, self, and their environment before the game begins. (Although the trash set chosen should not have any items that could pose a problem when thrown, make sure to go through and remove any heavy or pointy objects before students arrive.) This activity can get loud when students get excited. If you are in a space where this is not appropriate, discuss using inside voices with your students.



**On the national level, we import stuff from across the ocean while our trash and their trash is ending up in the ocean and swirling between us.**

### III. The Trash Game (20 min.)

#### a. A Trip to the Dump

It's important to remember that this is both a team building and learning experience. This means that your goal is to let students work through this activity on their own with limited instruction. The instructions for stages one and two are, "Clean up your side, cleanest side wins."

**Stage 1:** For the first set of rounds, let students get a feel for the activity. Time each round for 30 seconds and count down the last 10. In these rounds, it's likely that students will be throwing individual items back and forth and won't make much progress. They may begin to get frustrated and that's okay. Allow for just a few seconds between rounds after you reveal the winner by lowering the tarp so that they can see the other side.

**Stage 2:** After two or three rounds, pause for one minute between rounds and ask students to form a strategy as a group. They may require more than a minute, and if both sides are having a constructive strategy discussion, the time can be extended. Before each round begins, ask each side if they have a strategy that they have all agreed upon. In general, students will begin to fill up bags with trash and throw them over to the other side at the last second. When they start to do this, it's time to move on to stage three.

The instructions for stage three are, "You can only win if there is nothing on the ground at the end of the round."

**Stage 3:** Use the same model of round two and break for a one minute strategy meeting between each thirty second round. Ask students if everyone is on board with the strategy before you begin each round. Students will eventually realize that the only way to win is to hold on to their own bags and not throw them. When both sides do this, lower the tarp so that they can see the other side holding their own bags.

**Activity wrap up:** Once both sides hold on to their trash, it's time for the big reveal. Let students know that what they have been simulating is the cycle that we all go through every day. We constantly bring more stuff in and throw more stuff out. This doesn't mean that our stuff goes "away," it just goes somewhere else. This is true on the level of individual homes, where we use whatever system is in place to get rid of our trash, on the level of communities, where we get the trash out of our community to another place while we bring in more stuff from another place, and on the level of nations. On the national level, we import stuff from across the ocean while our trash and their trash is ending up in the ocean and swirling between us. For this level, project the gyre map, found below, that shows the "garbage patches" in the Pacific Ocean between North American and Asia. Let students know similar "garbage patches" can be found in every ocean in the world. The only way out of this constant cycle is for individuals, communities, and nations to take care of their own trash.

*Assessment (Outcome 1): Ask students how the classroom is part of the cycle of trash demonstrated in this game. Which item is used and thrown away most often. Estimate how many are used each week, month, and year. Where do these items come from and where do they go?*

*Assessment (Outcome 2): Using the map below and the Ocean Surface Current Simulator, ask students how trash could travel across the Pacific Ocean. Where might an item that started in California end up if it stayed in the surface current travelling across the Pacific? (For a more in-depth look at ocean currents see follow-up activities below.)*





**Recycling also does not affect the amount of stuff produced in the world, it just enables some of it to be made from existing material instead of raw material.**

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#### **IV. Reduce, Reuse, Refuse Activity (15 min.)**

What does it mean to take care of our own trash? To explore this concept, have each student choose one item from the trash game that they use often in daily life. Most of us have heard of using the three R's, reduce, reuse, and recycle, to be responsible consumers. While recycling does reduce the amount of raw material needed to make products, plastic can only be recycled once or twice and is generally downcycled into a lower grade product. Recycling also does not affect the amount of stuff produced in the world, it just enables some of it to be made from existing material instead of raw material. Although recycling is part of taking care of our trash, we need to do more if we are going to change the cycle. For this activity, we are going to replace recycling with the concept of refusing. The three R's that we are going to focus on are Reduce, Reuse, and Refuse. These are all ways to take care of trash and get out of the cycle of constantly bringing in more.

Use a piece of plastic silverware as an example. How could we reduce, reuse, and refuse this item in order to take care of our trash by creating less of it. Provide specific examples:

- Reduce the amount of plastic silverware we use by eating at restaurants that don't provide it and choosing food that you don't need it for, consider specific examples from your area
- Reuse the plastic silverware we already have by washing it and using it again. You may also want to include an example of reusing the item for something other than it was intended- reuse the spoon as a digging tool
- Refuse plastic silverware by letting restaurants and other providers know that you planned ahead and brought your own silverware. It's important for this step not to just say that we could refuse something, but to provide a specific example of when you would refuse it and what you would use instead.

Have students form groups of two to four with others who have similar items to the ones they chose at the end of the trash game. In their small group, have them brainstorm and write down how they could reduce (using specific local examples), reuse (including an example of reusing the item for the purpose it was intended and for another purpose), and refuse (including an example of when to refuse it and what you could use instead and the language of how to refuse an item).

*Assessment (Outcome 3) After all students have completed their list, have them share their answers with the class. If time is running short and does not allow for all groups to share, have each group share their answers with one other group instead of the whole class.*

#### **V. Conclusion and Review (5 min.)**

During this lesson we learned about the cycle of trash in our lives. We played a game to explore how modern disposal often means getting our trash out of sight and out of mind. We also explored how trash can move between continents and the concept of Refusing, Reusing, and Reducing.

*Assessment (Outcome 3): Ask students to refuse, reuse, or reduce one plastic item in the next 24 hours. Check in with them the next day to see what they did. Ask them to report on where the item came from, where it would have gone if they had used it and thrown it away, and what happened instead.*



**The United States uses more water bottles than any other country in the world, despite the fact that we have almost universally safe drinking water.**

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## **VI. Follow-up Activities**

### **a. The Motion of the Ocean**

Understanding ocean currents can be difficult. Many factors influence how water moves between continents. Introduce students to ocean currents using NOAA resources found here:

[http://www.education.noaa.gov/Ocean\\_and\\_Coasts/Ocean\\_Currents.html](http://www.education.noaa.gov/Ocean_and_Coasts/Ocean_Currents.html)

*Assessment (Outcome 2) Have students research and present on what creates an ocean gyre. Here's an extra visual of four drifter buoys traveling across the Pacific to explore this concept.*

### **b. Follow the Leader**

Although this lesson focused on the cycle of trash during the trash game, the game also serves as a teambuilding activity. Teambuilding is valuable in any classroom or group setting, and students will have to work together to create the community art piece that is the culmination of this unit. Use the "Leadership in-class activity" to continue to explore how a team functions and what it means to be a leader or follower. It's important to note that teams only function when both roles are fulfilled and that followers are as important as leaders in their roles. Both roles also have a responsibility to the other. This can make for some great classroom discussions or follow-up writing activities.

### **c. How many Bottles?**

Very few items epitomize the cycle demonstrated in the trash game more than the plastic water bottle. The United States uses more water bottles than any other country in the world, despite the fact that we have almost universally safe drinking water. It wasn't long ago that most people in the United States thought that buying water was a very silly idea. Have students research the positive and negative aspects of using bottled water. (This lesson may be more difficult for younger students. For 4th and 5th graders, it may work better to choose a few articles and read them with students or work through them as a class.) This article from Fast Company is a very well written summary for teacher background.

*Assessment (Outcome 3) Divide students into debate teams with one team on the pro plastic water bottle side and one team on the anti-water bottle side and run a class debate. For younger students, it may help to give individual students or student teams specific topics. For example, "How much waste is created by plastic water bottles," on the anti-bottle side and, "How are water bottles used during national disasters," on the pro bottle side.*



**Garbage patch:  
An area in an  
ocean gyre that  
has collected  
a large amount  
of trash.**

## VI. Additional Resources

### a. Sources

- **Fast Company article, “Message in a Bottle”**  
<http://fastcompany.com/59971/message-bottle>
- **Gilag Feldman Research Website**  
<http://mgto.org/in-class-experiments-8-leadership-group-collaboration/>
- **NOAA**  
<https://coast.noaa.gov/psc/dataviewer/?redirect=301ocm#view=mdebris>  
<http://noaa.gov/resource-collections/ocean-currents>  
<http://las.pfeg.noaa.gov/oskurs/>
- **United Nations World Ocean Assessment Website:**  
<http://worldoceanassessment.org/>

### b. Vocabulary

In this lesson, these are words that may be unfamiliar to students. In this context, they have the following definitions:

**Waste Stream:** The path that most of our garbage follows to get from the consumer to the landfill or recycling facility.

**Reduce:** Use less of something. For example, use less packaging by buying in bulk.

**Reuse:** Use an item for an additional purpose than it was manufactured. For example, using anything that was manufactured to be single use multiple times.

**Recycle:** Create newly manufactured items from materials that entered the waste stream.

**Downcycle:** “To recycle (something) in such a way that the resulting product is of a lower value than the original item: to create an object of lesser value from (a discarded object of higher value).” Merriam-Webster.

**Refuse:** Decline to accept something offered. For example, declining the offer a bag at the grocery store.

**Ocean Gyre:** “A circular or spiral motion or form; especially: a giant circular oceanic surface current.” Merriam-Webster.

**Garbage patch:** An area in an ocean gyre that has collected a large amount of trash.





## 2016 Washed Ashore Fact:

**Every ocean and every marine environment contain pieces of our trash.**

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## Washed Ashore Mission Statement:

Washed Ashore builds and exhibits aesthetically powerful art to educate a global audience about plastic pollution in oceans and waterways and spark positive changes in consumer habits.

## How We Fulfill Our Mission:

Our travelling exhibit of sculptures made completely of marine debris moves around the country in order to reach as many people as possible. Through both educational programs and interactions with our art and signage, we help audiences understand the problems of plastic pollution and marine debris. We offer educational programming at exhibit sites and support materials to educators interested in spreading awareness about plastic pollution through community art.

In order to create the sculptures we build, we first collect trash that has been removed from beaches through community beach cleanups and individual volunteers. This trash is then washed, sorted and prepared for the creation process. Each sculpture is designed and directed by a lead artist and then created through a collaboration of Washed Ashore team members, volunteers, students and artists.

## Washed Ashore Facts as of 2016:

- Over 65 giant sculptures have been created.
- Over 35,000 pounds of marine debris have been processed.
- Over 12,500 volunteers have contributed to this project.

## Marine Debris Facts as of 2016:

- Every ocean and every marine environment contain pieces of our trash.
- 80% of marine debris comes from land; from streets to streams to rivers to oceans.
- Plastic pollution is becoming one of the most common items in the sea and has entered the bottom of the ocean food chain.

## National Standards Addressed:

### Next Generation Science Standards

#### 5-PS1-1.

**Develop a model to describe that matter is made of particles too small to be seen.** [Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

#### 5-ESS3-1.

**Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**

#### MS-LS2-1.

**Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.** [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

#### MS-ESS2-6.

**Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.** [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]

#### MS-ESS3-3.

**Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.\*** [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

#### MS-ESS3-4.

**Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.** [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

## National Curriculum Standards for Social Studies

- **Thematic Standard #1) Culture:** Include experiences that provide for the study of culture and cultural diversity.
- **Thematic Standard #2) Time, Continuity, and Change:** Include experiences that provide for the study of the past and its legacy.
- **Thematic Standard #3) People, Places and Environments:** Include experiences that provide for the study of people places and environments.
- **Thematic Standard #7) Production, Distribution, and Consumption:** Include experiences that provide for the study of how people organize for the production, distribution and consumption of goods and services.
- **Thematic Standard #8) Science, Technology, and Society:** Include experiences that provide for the study of relationships among science, technology, and society.
- **Thematic Standard #9) Global Connections:** Include experiences that provide for the study of global connections and interdependence.
- **Thematic Standard #10) Civic Ideals and Practices:** Include experiences that provide for the study of the ideals, principles and practices of citizenship in a Democratic Republic.