bag it

curriculum packet

Dear Educators,

Thanks for your interest in bringing *Bag It* into your classroom. Screening the film in your school is a terrific way to get kids involved in reducing our dependence on plastic. Watching the film is the first step to creating change; we hope this curriculum will enable your students to delve deeper into the issues and inspire them to take action.

This curriculum, developed by educators Laura L. Kudo, M.A., and Amy Laubenstein, Ed. M., allows students to explore the effects of their everyday behavior on the environment, their health and well being. The lessons are geared for grades 4-12 and correlate with the different chapters of the film: Single-Use Disposables; Waste and Recycling; Oceans; Human Health; and Activism. Each chapter has one or two lessons, and within each lesson there are several interactive and hands-on activities. The grade levels, specific subject areas and National Standards are highlighted on the first page of each lesson for easy reference. You should be able to take a lesson and tailor it to your individual classes. For more resources, visit our website—www.bagitthemovie.com—and click on 'What You Can Do,' and 'About the Issues.'

These lessons are simply a start; through them we hope that you will find ways to incorporate healthy, more environmentally friendly practices into your life, your students' lives, your school culture and your community.

Thanks for helping us get the message out about this important subject!

The *Bag It* Team

P.S. Please send us your feedback so we can improve the curriculum for other educators! And we would love to see the work your students produce based on these lessons. Send your thoughts and photos to edcurriculum@reelthing.us.

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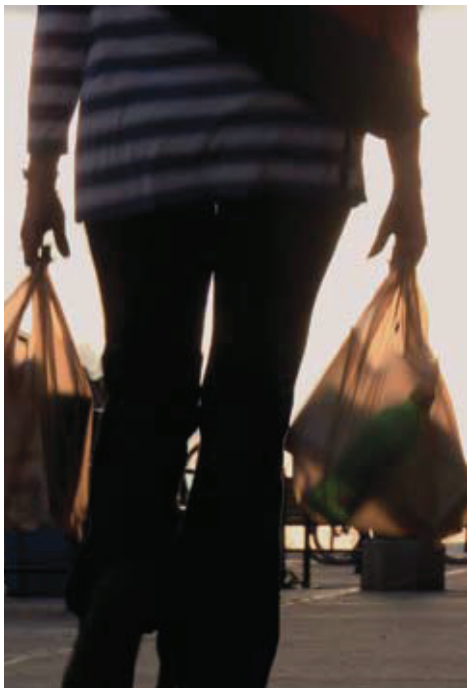
TAKE THE *BAG IT* CHALLENGE



GRADE LEVEL: 4th – 8th Grade

SUBJECT AREAS: Earth Science; Language Arts

DURATION:
Movie: 60 minutes
Activity 1: 1 – 2 hours
Activity 2: Material Collection: 1 week

KIT PREPARATION: 60 minutes

SETTING: Classroom; School

NATIONAL STANDARDS: NS 5-8 .1, .3, .6; NS 9-12 .1, .3, .6; NL-ENG. K-12 .1, .2, .3, .4, .6, .7, .8., .11, .12

INTRODUCTION/BACKGROUND: In the film, viewers are challenged to try to go a day without single-use disposables. What are single-use disposables? They are items that are designed to be used only once and then thrown away: items like water bottles, to-go containers, plastic-lined coffee cups and packaging. How many non-renewable resources are being used to create these items of convenience? Think about the life of a single-use disposable plastic product, from its "birth," through its short functional life, to its long afterlife. Plastic is light and strong, it is easy to mold and shape and it is wonderfully versatile, but it does not decompose—when it goes to the dump it can't biodegrade so it just sits there for thousands of years. Begin to ask yourself these questions: Where does your plastic shopping bag go after you bring your groceries home? Where does your to-go latte cup or plastic water bottle go after you've hydrated? Where does the packaging go after you've opened your new electronic item?

OBJECTIVES: Students will recognize and record single-use plastics. Students will research and record where they go after use. Students will take "citizen action" and be single-use free for one day. Students will gain an awareness that even a student can make a difference. Students will create and maintain an online blog.

KEY CONCEPTS: single-use disposable, land-fills, citizen action, research, inquiry

MATERIALS: *Bag It* video; used newspaper; crayons; To-Go Kit list (see below)

VOCABULARY: single-use disposable, landfill, plastic

PROCEDURE: Use the movie *Bag It* and the two listed activities to create an awareness of single-use disposable plastics.

WARM UP: Watch the movie *Bag It*. Re-introduce the term and definition of "single-use disposable" to your students. Prepare a bulletin board in your room by covering it with old newspapers or used paper. (Reuse) Write the term "Single-Use Disposable Plastics" in bold across the top, along with the definition, and then have the students brainstorm and write any examples of single-use plastics they can think of. Have them record these on the newspaper board. (If the crayons are bold, then the words will stand out, even over the newsprint.)

ACTIVITY 1: Have students pair up, tour the school, and search and record evidence of single-use items or packaging. Go to the cafeteria, photo copy room, teachers lounge, maintenance area, offices, other classrooms, etc. (You may need to prearrange these visits in the school. It is also recommended that the teacher visit before-hand so that you know what the students might find.) Have the student pairs do some online research as to where these single-use disposables go when they are thrown away. (Hint: Where is AWAY?? THERE IS NO AWAY!! Away is over flowing landfills, clogged rivers, islands of trash in our oceans and even our very own toxic bodies.) Use the information from *Bag It* to guide this research.

ACTIVITY 2: CREATE A "TO-GO KIT"

A To-Go Kit is your own set of personal reusable items that you can take with you anywhere, so you don't have to use and purchase single-use disposable products. If your school lunch cafeteria uses throwaway plastic forks, plates and cups, bring your To-Go Kit so you don't have to use these once and then throw them away.

Creating a To-Go Kit can be done at home with parent support, or in school. If it is done in school, then the teacher may need to supply the items, or have a "To-Go Kit Drive" for one week during which the students bring in as many of the listed items as they can to share with the entire class. Have each student build a kit. Brainstorm ways and places where they can use the kits.

ITEMS FOR "TO-GO KIT":

Reusable Shopping Bag
Reusable Cup or Bottle
Silverware
Sturdy To-Go Container and/or Plate
Cloth Napkin (a Bandana is a good alternative)

Get creative! Have the students brainstorm other items that might go into their kits.

WRAP UP: Have the students record a "reaction journal." It starts to become fun to say, "I'm not using any single-use containers, so I brought my own plate (or bag or cup)." Did they get a strange look? A comment or statement? People asking questions? Have the class create its own blog and record these reactions on the blog for the entire class to see.

ASSESSMENT/FOLLOW UP: Assess the students on their research and recording procedures in Activity 1. The teacher may want to create a specific worksheet and rubric for these procedures (depending on age/grade level and classroom research expectations).

COMMUNITY EXTENSION: Present the list of single-use plastics that are being used in your school to your administration. Ask if your class can attend the next teachers meeting or school board meeting to discuss these uses, and to try and work together to find ways that the school can cut down on this use.

RESOURCES/LINKS/LITERARY CONNECTIONS:

How to Create a Blog: www.blogger.com
Rubric Example: http://bit.ly/eo0396

CHANGE BY CONVERTING

INTRODUCTION/BACKGROUND: Large numbers can seem irrelevant if they are not in a context that can be related to personally. By using the concept of unit conversion, people are able to make more sense of relative amounts of plastics, trash, etc. that impact their environment. Practice math while making it meaningful!
What do the measurements in *Bag It* mean to you? Practice converting the units in the film into smaller and larger amounts in order to measure impact. Once the numbers from the movie make more sense in how they impact YOU, take action and let people know how you feel.

OBJECTIVES: Students will practice conversions by using information from the movie *Bag It*. Students will be familiar with the impact of plastics through the conversions into units that have more meaning and impact on their cognitive awareness. Students will explore how to use their voice and knowledge for positive change!

KEY CONCEPTS: plastics, unit conversions, graphing

MATERIALS: worksheet (printable or electronic), calculator, spring scale or other instrument used to measure weight, reused plastic or paper bag

VOCABULARY: conversion, compost, waste stream, reusable, dispose

GRADE LEVEL: 6th – High School

SUBJECT AREAS: Mathematics; Environmental Science; Art

DURATION:
Warm Up & Activity 1: 60 minutes
Activity 2: Collecting – 24 hours; Weighing & Converting – 60 minutes
Wrap Up: 60 minutes

SETTING: Classroom; School; Home

NATIONAL STANDARDS:
NS 5-8.2, .3, .6; NS 9-12.1, .6

WARM UP: If you were to prevent one pound of packaging and waste from entering the land fill everyday (by replacing your lunch bags, sandwich bags, and using a cloth towel instead of paper towels), how much would you save from the waste stream per week? Per year? What if you were able to compost your food scraps and save another pound per day? How much weight would you then save by the end of the year? By taking small steps, we can make BIG changes!

A quote that appeared in the movie "*Bag It:*"

"Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has." - Margaret Mead

· What does this statement mean to you? Reflect on a time when you made a small change and it resulted in a large result.
· Give an example from the movie "*Bag It*" that illustrated this quote in action.

ACTIVITY 1: (Additional Materials: worksheet, calculator)
Using data from *Bag It*, convert information from the movie into a unit that is more personally impacting. A worksheet is provided at the end of the lesson that lists data from the film.

NOTE TO TEACHERS: Try not to print the sheet… try to keep the document electronic! Contemplate the volume of waste you save from the landfill by using an electronic document instead of a print out.

ACTIVITY 2: (Additional Materials: scale or spring scale, reused plastic or paper bag)

• Reuse a paper or plastic bag from the store to save your reusable waste for one day. Make conscious choices about items that can be reused in a creative way. For example, save the plastic bags from your lunch to be used the following day for the same food!
• What items are in your bag at the end of the day? How can you reuse these items?
• Weigh the amount of reusable goods in the bag, subtract the weight of the bag, and you will have the amount of trash you saved from entering the waste stream.
• Convert this amount into the amount you would save from entering the waste stream:
• Each week?
• Per month?
• How about in a year?
• What if your family did the same as you?
• What if all the kids in your class saved the same amount?

WRAP UP: (Additional Materials: class data, graph paper or graphing software)
Create a line or bar graph to represent the amount of trash the class as a whole was able to save for one day. Extrapolate what this savings would be if the school as a whole were to cut down on the amount of waste they disposed of. Discuss how the school as a whole could make small changes that would lead to big savings.

ASSESSMENT/FOLLOW UP: Grade the line or bar graphs for accuracy, content, and presentation.

COMMUNITY ACTION: Using the items you saved, create a trash sculpture that can show other students how their single-use disposables can have a longer life! Put the trash sculpture next to the trashcan in the lunchroom or near the entrance of your school to demonstrate to others how to think carefully about each piece of trash that goes into the can. Provide an explanation with the sculpture so people can understand that their small, thoughtful actions can indeed change the world.

CONVERSION WORKSHEET 1

Below are various amounts detailed in the movie, *Bag It*.
By converting these units, you may find yourself converting your ways!

1 million plastic grocery bags are used every minute…

How many bags are used per hour? _____

Per day? _____

What would the impact be per year? _____

40,000,000,000 bags were eliminated in China after one year of not using them!
What does this savings equal per day? _____
What are ways that we can reduce the amount of bags used each time we visit the grocery store?

It costs 22 cents per bag in Ireland at the market.
If you went to the store and used 10 bags to tote home your groceries, how much money would you spend?

What if you did the same shopping every day for a month (30 days)? _____

A year? _____

If you purchase one, reusable bag at the grocery store for $3 and bring it each time you go to the grocery store, how much money would you save over the course of a month? _____

If 300 million coffee cups are consumed in 1 day in the US, then…
How many coffee cups are used per hour? _____

Per minute? _____

Per second? _____

CONVERSION WORKSHEET 2

The average person in the US contributes 800 pounds of packaging per year to the waste stream:

How much is this per person, per day? _____

What steps can YOU take to reduce the amount of waste in the form of packaging that you contribute to the waste stream?

1 million plastic cups are used on US airline flights every 6 hours

How many plastic cups are used each minute? _____

How many plastic cups are used in one day? _____

Are there ways you can decrease this number the next time you are flying on an airplane?

Other facts to consider:
106,000 aluminum cans consumed in US every 30 seconds
60,000 plastic bags consumed in US every 5 seconds
2 million plastic bottles consumed in the US every 5 minutes
17 million barrels of oil consumed for plastic bottles each year
2.5 million tons of carbon dioxide released into the air from plastic bottle production
Yankee Stadium can be filled 3 times in one day with the trash that is disposed of in New York City alone
1 billion plastic bags used per year in NYC alone
The average American produces 1 ton of waste each year
71 barrels of waste generated upstream for every one barrel on the curb ... ask students, what does this mean?
260 marine species are affected by plastic ingestion
½ million tons of plastic/year in 1950s; over 260 million tons of plastic/year in 2000s
5 tons of plastic brought to Midway Atoll each year by adult albatross
6 million pieces of trash enter the ocean each day (most of it plastic)
70 million years for oil to form

FREE MY FOOD!

INTRODUCTION/BACKGROUND: What items in your kitchen are packaged? Sometimes, when we peer into our cupboards, it looks more like a holiday or birthday with the amount of wrappings and trappings our food is found in. In this investigation, we will look for the illusive natural state of food, and quantitatively decide just how much packaging is used, and ultimately, if it is necessary.

OBJECTIVES: Students will build an awareness of food items that are packaged. Students will question whether this amount of packaging is necessary. Students will evaluate if the waste can be reduced. Students will investigate their surroundings in order to become more thoughtful of how many layers their food is trapped inside/within?

KEY CONCEPTS: packaging, plastics, waste generation

CLASSROOM MATERIALS: Student's lunch or pictures of lunches, pictures of markets (past and present), packaging table (electronic version, if possible), local or regional recycling guidelines (can be found through a web search, or by contacting your local recycling facility)

VOCABULARY: recyclable, reusable, alternative use, bulk

GRADE LEVEL: 6th – 10th grades

SUBJECT AREAS: Environmental Science

DURATION:
Warm Up & Activity 1: 60 minutes
Activity 2: 30 minutes
Wrap Up: 30 minutes

SETTING: Classroom; Home

NATIONAL STANDARDS: NS 5-8 .1, .6; NS 9-12 .1, .6

WARM UP: View the pictures of food from open-air markets of the colonial era vs. present day grocery stores and farmers markets

• What are some of the differences in the way items are packaged?

• Can you name some benefits of packaging versus not packaging certain products?

• Can you think of ways to reduce or eliminate packaging for some goods?

ACTIVITY 1: LUNCH BOX DISSECTION
What's in your lunch? Students begin this investigation by writing down the contents of their lunch. If some students eat in the cafeteria, use pictures of sample lunches.

1. Record food that was consumed on the organizer provided at the end of the lesson.
Ex: YOGURT, LUNCHABLES, APPLE
(Each food, depending on the amount of packaging or the re-usability of the packaging, is assigned points.)

2. Tally the associated points for packaging:

THE OBJECT IS TO GET THE LEAST AMOUNT OF POINTS!

Points:
0 points: no packaging!
1 point: 1 kind/layer of packaging
2 points: 2 kinds/layers of packaging
and so on... for each layer, or kind of packaging.

You may subtract a certain number of points if:
-1 if the packaging is recyclable (use recycling guidelines for your area)
-1 if the packaging is reusable (you must create a list for the other uses)
-1 if you can think of an alternative packaging technique!

ACTIVITY 2: Using the same point system, look through the cupboards in your kitchen. Are most food items packaged? If so, how many layers of packaging surround the food? Can you think of alternative ways to have food at home that would require less packaging?

WRAP UP: Compare results with other students. What were your findings? Are most food items packaged? If some are not, what kinds of food are they? Do you find that processed foods come in more packaging? Can you think of ways to cut down on the amount of packaging used, or are you able to come up with alternative uses?

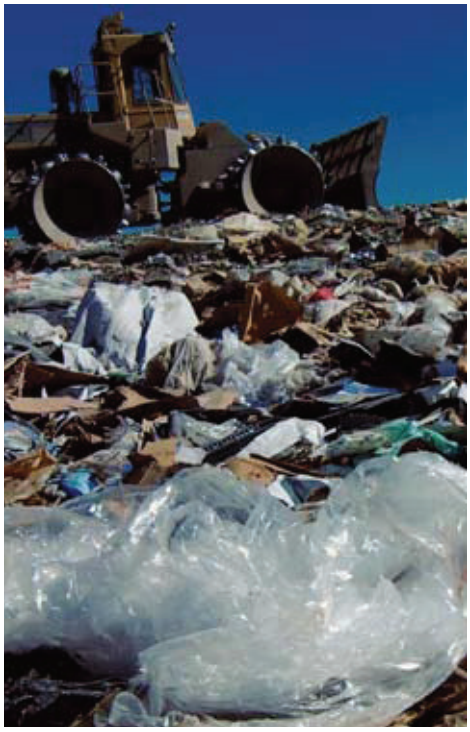
ASSESSMENT/FOLLOW UP: Grade students on classroom participation, level of involvement in the game. Ask them to write some thoughtful conclusions regarding these exercises. (You may use these conclusions in #2 of the Community Action section.)

COMMUNITY ACTION:
Call or look for stores in your area that sell food in bulk. "Bulk" usually means buying food in large quantities, which reduces the cost. Often, you are able to use your own containers and bring them back for more when you need a refill. Sometimes there is a bulk section in a grocery store. Look for one where you shop!

ACTIVITY 1 WORKSHEET:

FOOD	**EX:** YOGURT				
LAYERS OF (+1 point)	PLASTIC CONTAINER +1				
LAYER 2 (+1 point)	FOIL TOP +1				
LAYER 3 (+1 point)					
RECYCLABLE OR COMPOSTABLE (-1 point)	YES, IT HAS A 2 ON THE BOTTOM. -1				
REUSABLE? If so... Alternative Use Idea (-1 point)	YES, STORAGE FOR PONYTAIL ELASTICS. -1				
ALTERNATIVE WAY TO PACKAGE (-1 point)	BUY A LARGE YOGURT CONTAINER INSTEAD OF MANY SMALL ONES. I COULD MAKE MY OWN YOGURT -1				
TOTAL	-1				

DON'T JUST TRASH IT!



GRADE LEVEL: 4th – High School

SUBJECT AREA: Current Events; Language Arts; Art;

DURATION:
Warm Up & Activity 1: 2 hours
Activity 2/Assessment: 1 week

SETTING: Classroom, Home

NATIONAL STANDARDS: NS 5-8.1, .6; NL.K-12.3, .4, .5, .6, .7; NSS-C.5-8.5; NA-VA.5-8.1; NA-VA.5-8.2; NA-VA.5-8.6

INTRODUCTION/BACKGROUND: According to the Environmental Protection Agency, the average American produces about 4.4 lbs. of garbage a day. That's 29 lbs. per week or 1,600 lbs. per year. The United States produces approximately 220 million tons of garbage each year. This is equivalent to burying more than 82,000 football fields six feet deep in compacted garbage. This amount of trash could cover the state of Texas two and half times and also fills enough trucks to form a line to the moon. Where does it all go? A lot of our trash ends up being buried in a landfill. The U.S. has 3,091 active landfills and over 10,000 old municipal landfills, according to the Environmental Protection Agency. Anything that goes into a landfill is covered with layers of clay and other materials that basically mummify the remains. This means that without air and water, our trash has become our archival remains for future generations. This may sound culturally resourceful, except landfills are the largest human-made methane source in the United States. Once methane is released into the air, it becomes a greenhouse gas. And then there is the toxic leachate, or liquid that seeps and drains from a landfill, that ends up in our aquifers. Not a pretty picture.

OBJECTIVES: Students will observe, describe, and interpret how trash impacts their daily lives and the environment surrounding them. Students will analyze and apply an understanding as to how they may influence a change in their environment regarding trash.

KEY CONCEPTS: conservation, pollution, regional garbage practices, responsibility, inquiry

MATERIALS: used brown paper bags, markers or crayons

VOCABULARY: conservation, methane, greenhouse gas, leachate, landfill, aquifer

PROCEDURE: Use the movie *Bag It* and the two listed activities to create a personal awareness of trash and how it impacts our environment.

WARM UP: Using leftover brown paper bags, create a large wall covering. Title this wall covering "WHAT WE KNOW ABOUT TRASH." Have a class brainstorming session and record everything everyone already knows about trash. It can be words, phrases, pictures, etc. Leave room on your paper bag wall to add to your "knowledge base" as you continue this lesson.

ACTIVITY 1: Watch the movie *Bag It*. Have a class discussion regarding key points that specifically have to do with trash.
Guide the Discussion: What is trash? Where does it go? How does it affect our environment? Discuss how landfills, and the toxicity they create — methane, leachate, greenhouse gases — impact our environment. Why is leachate in our aquifers a bad thing?

ACTIVITY 2: For one week, empty the classroom trashcan at the end of the day on the floor. The first day, analyze what is in the trash:
What is truly trash?
What could be reused or recycled?
What was wastefully thrown away?
Do you need a plastic liner in the trash can?
Do this every day. Challenge the class to have almost 0% trash in the trashcan by the end of the week. See if they can do it! Have them brainstorm ideas to help them in this endeavor (i.e.: cloth towels instead of paper towels, reduce use of packaging, reusable bottles instead of plastic, etc.)

WRAP UP: Brainstorm on the paper bag wall how less trash in the classroom trashcan will help the school, the local community, and the environment. Add any new knowledge the class has obtained through watching the movie, class discussion, and the class activities.

COMMUNITY ACTION: Have your class challenge every classroom in your school to a weeklong "garbage analysis." Have your students be the "experts" in assisting other classrooms in ways that they might reduce their garbage output to 0%.

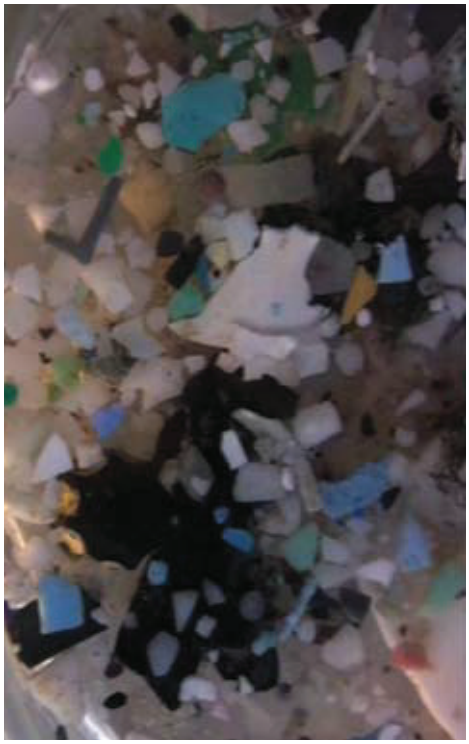
ASSESSMENT/FOLLOW UP: Have the students record a "trash journal" in which they record the trash in their home kitchen trashcan for one week. (They can draw, make lists, photograph, etc. the trash.) Have them journal how they can help their family reduce the amount of trash in their daily lives. Record the strategies they can use to accomplish a reduction of trash at home. Record family participation; who was in favor, who didn't want to participate, and why.

ART PART: Create your own paper bag "trash journal!"

ART MATERIALS:
Lunch-size paper bag (clean)
Paper (with at least one clean side) from the recycle bin
Scissors
Sewing Machine or needle and yarn, hole punch and brads (or even staples)

ART PROCEDURE:
Fold the paper bag in half, keeping the "bottom" flat. Cut the recycled paper to the same size as the paper bag. Place the recycled paper (probably only 7 to 10 sheets) on top of the paper bag. Sew the pages along the fold-line of the paper bag. The brown paper bag becomes the cover and back of the journal. Decorate the paper bag front and back, and use the interior recycled paper pages to journal on.

TRASH IN OUR OCEANS



GRADE LEVEL: 4th – High School

SUBJECT AREA: Science; Current Issues

DURATION:
Movie: 65 minutes
Activity 1: 1 – 2 hours
Activity 2: 1 hour

SETTING: Classroom; School Library

NATIONAL STANDARDS: NS 5-8 .1, .3, .6; NS 9-12 .1, .3, .6; NSS-C 5-8 .5; NSS-C 9-12 .5

INTRODUCTION/BACKGROUND: The Great Pacific Garbage Patch is an area of the Pacific Ocean created by the currents of the North Pacific Gyre. It's a plastic soup that in some areas has concentrations of plastic 40 times greater than that of plankton. That means there is 40 times more plastic than food for the marine animals to eat. Scientists estimate its size as twice the area of Texas to the size of the continental United States. 80% of the plastic and trash that finds its way into our oceans comes from the land. It takes about five years for garbage from the west coast of the US to make it to the gyre and about one year from Asia. Plastic debris in the ocean doesn't biodegrade, it photodegrades, meaning sunlight and water break it down to smaller and smaller pieces that are mistaken for food by fish, sea birds and marine mammals. Over 260 species of marine animals are affected by plastic debris in the ocean, either by ingestion or entanglement. Laysan Albatross, sea turtles, monk seals, whales and many species of fish have been found with large amounts of plastic in their stomachs. Plastic floating in the water contains pollutants like PCB and DDT.

OBJECTIVES: Students will read background information about gyres, develop a visual (flow chart, picture) that illustrates the path of plastics into oceans from their community and respond to discussion questions about gyres and plastic trash.

KEY CONCEPTS: gyres, food chains, effect of plastics on marine life

MATERIALS: Summary Sheet: "Giant Garbage Soup"; research on gyres from four different websites; discussion questions; materials to illustrate path of plastics to ocean (paper, markers, pencils, etc.)

VOCABULARY: Great Pacific Garbage Patch (GPGP), gyre, marine, photodegrade, biodegrade, PCB, DDT

PROCEDURE: Using the movie, *Bag It*, the summary, "Giant Garbage Soup," and creating a visual map, students will connect the plastics found in the Great Pacific Garbage Patch to items they or their families may purchase.

WARM UP: Watch the educational cut of *Bag It*, then read "Giant Garbage Soup" either individually or to the class (depending on the age group).

ACTIVITY 1: Conduct a whole class discussion, or break into small groups to discuss the following questions about reactions and solutions:

Reactions:
After seeing the movie *Bag It*, and reading "Giant Garbage Soup," what surprised you about this information?
Did you previously know about the garbage patch before viewing the film?

Do you think anyone in your family or your friends are aware of this problem?
What is your reaction to this? How does it make you feel?

Solutions:
What can you or your family do on a daily basis that may have a positive impact on the garbage patch?
What steps do you need to take to convince your family or friends to make a change in their habits?
What can be done about it? What should be done about it?
Is recycling the answer to the problem of the garbage patch?

Brainstorm possible solutions to either mitigating the amount of plastic that makes its way into ocean gyres, or about possible methods of clean up of the gyres.

ACTIVITY 2:

(Ask students)
Think of an item you have used today, or one you have bought recently that is made of plastic.

QUESTIONS FOR DISCUSSION:

How many times did you use this item?
How quickly did you throw it away?
If you have not thrown it away, how many times do you think you will use it before it goes in the trash?
Create a visual (use paper, paints, markers, pencil, or it can be more elaborate!) and illustrate the path of the plastic item to a recycling center (or landfill) or into a river that would lead to an ocean.
(This may be easier for students living near the ocean, where the path is more direct. If students live in an area where they have difficulty seeing how their piece of plastic could make its way to the ocean, use a map to locate nearby waterways to see if trash could make its way into other nearby bodies of water. Compare and contrast your location to one that is coastal and the ease with which trash makes its way into waterways in a different landscape.)

COMMUNITY ACTION:

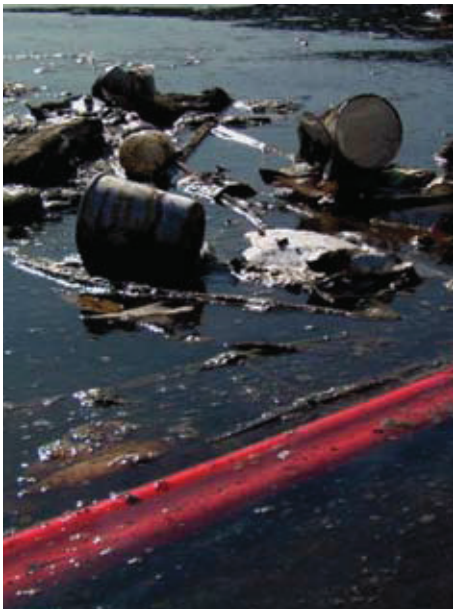
Write a letter to a local or state representative about the problem of plastic trash accumulation in our ocean's gyres.
Follow this format:
Introduce yourself
Provide background information about gyres
State why you are concerned
Ask for their support in fighting for this cause

Write a letter to your local landfill or recycle center to find out the fate of plastics that are either thrown away or recycled.
Follow this format:
Introduce yourself
Provide background information about gyres
State why you are concerned
Ask about the path of plastics, from pick up at your curb (or drop off at the recycling center). See if they can tell you how plastics are disposed of, or recycled.

See the *Bag It* website for sample letters!

RESOURCES/LINKS/LITERARY CONNECTIONS:

Using Parts of a Book: http://bit.ly/fr7PER
Encyclopedia Practice: http://bit.ly/gqJyfb
Cinquain: http://bit.ly/5QiOFZ



GIANT GARBAGE SOUP

The amount of plastic pollution in our environment has been growing as a result of the large amount of packaging that encapsulates the goods we buy and because of the large amount of disposable items that we purchase. From plastic forks to detergent bottles, we have become a society that depends on single-use disposables, or items that we use, then throw away. Many would say that the amount of plastic that we use and then dispose of is out of control with much of it filling landfills, washing into our rivers and eventually making its way into our oceans. Once in the ocean, plastics often float just below the surface of the water, where a combination of sunlight and waves wear pieces of plastic down into smaller and smaller particles. These particles end up in massive whirlpool-like currents in the oceans, called gyres. Gyres could be described as circulating clouds of plastic trash, or a giant garbage soup. There are five major gyres, but most of the research about how plastic pollution affects the ocean ecosystem has been done in the North Pacific Gyre.

Marine wildlife (fish, birds, and mammals) is impacted the most by the plastic trash found in gyres. When fish and seabirds mistake tiny pieces of plastic for food and ingest or eat it, dire consequences are the result. Consumption of plastics causes dehydration, starvation, and eventually death. Fish and birds are not the only animals affected, however. There are also human health hazards to consider when toxic chemicals enter the marine food chain, as they eventually come back to us when we eat seafood.

The Great Pacific Garbage Patch is a part of the North Pacific Gyre where trash has become so concentrated there is 40 times more plastic than plankton. This means there is 40 times more plastic than food for the marine animals living there to eat. While some of the plastic floats close to the surface of the ocean, most of it eventually sinks to the bottom, making cleanup extremely difficult. The plastic also acts as a kind of chemical-sucking sponge, concentrating the most dangerous pollutants found in the world's oceans (PCB, DDT) into its small particles. This means that any animal that eats these pieces of plastic will also be ingesting toxic pollutants.

Where does most of this plastic pollution come from? To find the answer, look no further than the consumer, or the person who is shopping in a store and chooses an item packaged in plastic or made of plastic that will be quickly disposed of. This trash will end up circulating in the ocean, eaten by sea life, and eventually, again by humans. This plastic pollution is a serious problem, posing a tangible threat to our ocean ecosystem, and ultimately, to ourselves.

TO LEARN MORE, VISIT THESE WEBSITES:

www.5gyres.org

www.greenpeace.org/international/en/campaigns/oceans/pollution/trash-vortex/

www.sierraclub.typepad.com/compass/2011/02/plastic-pollution-gyres.html

www.bagitmovie.com/about_issues.html

www.kokuahawaiifoundation.org

WE ARE WHAT WE EAT

GRADE LEVEL: 9th–12th

SUBJECT AREA: Environmental Science/Ecology

DURATION:
Warm-up & Activity 1: 60 minutes
Activity 2: 15 minutes
Community Action: 30 minutes
Extension: 15 minutes
Setting: Classroom/Grocery Store

NATIONAL STANDARDS: NS.9-12.6, NS.9-12.7

INTRODUCTION/BACKGROUND: The effect of plastics in the oceans, which then become ingested by fish and birds, is shown vividly in *Bag It*. The effect of plastics on wildlife is disturbing enough, but are humans immune to this threat, or are we interconnected with this cycle?

"We are what we eat," or so the saying goes. But this slogan is truer than you may think. Not only are we what we eat, but we are also what that animal ate before we ate it, and the animal before that too. If somewhere along this food chain a particular animal ate something hazardous, chances are good that chemicals are still lingering in its tissues. This could potentially have negative effects on the health of all the other organisms that consume it down the line.

In this lesson, bioaccumulation (also refered to as biomagnification) is explained and related to food webs on land and in the ocean. As consumers, we need to pay special attention to the health of our environment, since our food comes from our environment. If the food we eat is tainted with toxic chemicals, so will we be.

OBJECTIVES: Become aware of bioaccumulation through history and the presence of this threat in our food chains in the ocean and on land. Understand the terms bioaccumulation, POPS and link these terms to the health of animals and humans alike.

VOCABULARY: POP (Persistent Organic Pollutant), bioaccumulation, DDT, biomagnification

KEY CONCEPTS: bioaccumulation, food chains, food webs

MATERIALS: a POP (prop that can be used as a persistent organic pollutant, i.e. ball, reused wad of paper)

PROCEDURE: Use the movie *Bag It* and the two listed activities to help students understand what POPs are and how they can accumulate in humans through the food we eat.

WARM UP: "What did you have for dinner last night?" Sometimes this question can be difficult to answer in the midst of all of the other things we think about each day. But this question can actually carry quite a bit of impact. If you had beef, for example, which comes from a cow, and the cow ate grass from a field sprayed with pesticides, you are consuming the pesticides just as the cow did, but it will impact you more than it did the cow. Bioaccumulation is the accumulation of a substance in an organism. If one organism, like a fly, happens upon and eats a chemical, and that fly in turn is eaten by a frog, and the frog is consumed by a bird, the concentration of that chemical increases as it moves up the food chain. So the bird at the top of this chain ends up with the largest concentration of toxins in its body.

BIOACCUMULATION AND DDT

In the early to middle 1900's, a chemical known as DDT (dichlorodiphenyltrichloroethane) was sprayed liberally to kill lice on soldiers fighting in World War II, and to kill mosquitoes, preventing the spread of malaria. Dutch Elm disease (also transmitted by insects) was also a prevalent fungus killing many trees, and dusting with DDT was a solution that eliminated the insects causing all of these problems.

After some time, scientists and civilians alike began to notice a decrease in the number of birds, especially in the number of juvenile bald eagles. The reduction in the number of bald eagles was due to the bioaccumulation of DDT in the tissues of the adult eagles, which in turn caused egg-shell thinning. The shells became so thin that the eggs would break open before the baby bird could hatch due to a lack of calcium production in the adult.

The bioaccumulation may have occurred in the following manner:

DDT spraying – chemical washes into streams – worms absorb DDT into their bodies – fish consume worms – eagle consumes fish.

As the chemical DDT moved up this food chain, it was stored in the animal's fat reserves in larger and larger amounts.

In the movie, *Bag It*, a food chain of fish eating other fish was shown, as well as the bioaccumulation of POPs, or "Persistent Organic Pollutants'" that are toxic to the first consumer, and highly toxic to an animal at the top of the food chain (oftentimes, HUMANS!) To read more about POPs, see the EPA's website: http://www.epa.gov/international/toxics/pop.html.

ACTIVITY 1: In this activity, students will learn the concept of bioaccumulation and the transfer of POPs from one level of the food chain to the next.

Assign students to be animals found in an ocean ecosystem.
Animals found in an ocean ecosystem in the different levels of the food chain include:
Level 1: zooplankton, phytoplankton, krill, shrimp
Level 2: squid, sardines, herring and other small fish
Level 3: seal, shark, swordfish, tuna and other large fish

Depending on the number of students in the class, assign roles where the greatest number belong to Level 1 ocean animals, the next greatest number to Level 2 ocean animals, and the least number to Level 3. (For example, in a class of 21, assign approximately 12 as Level 1, 6 as Level 2, and 3 as Level 3.) Students should identify themselves by using a piece of recycled paper with their animal name and level written on it, so all other students can identify them.

Have students "feed," first letting Level 2 feed on as many Level 1 animals as they can, then have Level 3 feed on as many Level 2 animals as they can. Once an organism or animal is "eaten," they should sit down in place. At the end, only Level 3 animals will be left standing. This exercise shows the basic concept of a food chain, where larger animals feed on smaller animals.

Start the activity again. This time give each Level 1 animal a prop to represent a POP (such as a wad of paper, a pencil, a book, etc.) Have the Level 2 animals eat the Level 1 animals, taking the POP props with them. Again, once an animal is eaten, have them sit down. Then have the Level 3 animals eat the Level 2 animals, again taking the POPs with them. Notice how many POPs have accumulated by the time we get to Level 3.

Now we'll introduce Level 4 animals, such at Killer Whales, Polar Bears and Humans, that eat the Level 3 animals. Pick a student to be the Level 4 animal who will eat all of the remaining Level 3 animals and accumulate the POPs. The Level 4 animal should be the last animal standing. Count how many POPs the Level 4 animal has accumulated compared to the Level 1 animals that only had one. This is bioaccumulation!

ACTIVITY 2: Using a food chain that might be found in your area (for example: grass → cow → human or mosquito → frog → trout → human) select students to stand in front of the class representing each animal in the food chain. To further illustrate the concept of bioaccumulation or biomagnification, set the "scene" by handing the POP that was used in Activity 1 to the first member of the food chain. This illustrates that this animal has been affected by this chemical and now has POP in its tissues. Each time the next animal consumes the previous animal, the amount of the POP found in its tissue increases by 10x. This means the grass would have an initial concentration of 10 units of POP in its tissue. The cow would then have 10x10 or 100 units in its tissues. A human would have 100x10, or 1000 units of the POP accumulated in its tissue. After illustrating this concept verbally, have students present to the class how many units of POP they would have in their tissues, starting with the first member of the food chain, and proceeding to the top. Create another chain, using different animals to illustrate this concept in different food chains, found in different ecosystems.

Going further: What POPs could potentially be introduced into your local food chain? Dioxin, DDT, PCBs and other chemical pesticides and compounds are examples of persistent organic pollutants that are toxic to organisms when ingested or eaten. Contact local farmers and agencies to find out potential areas of contamination and how these chemicals could make their way into your food chain.

CITATION: http://bit.ly/e0ag7b

Using the food chain that the human was involved in, have individuals stand in front of the class. Show the effects of the POP by having the concentration of the POP increase by 10x as it moves its way up the food web. What would be the concentration in the human?

WRAP UP: As a class, discuss other current events where environmental contaminants have been introduced into the ecosystem and have the potential to move up the food chain and accumulate in the tissues of animals, affecting human populations (i.e. BP Oil Spill.)

COMMUNITY ACTION: Bioaccumulation can occur in other ecosystems: on land where pesticides are used to control insect populations and in watersheds where fertilizers are used to control weeds. Look around your community or call your local town/city offices to see if/where chemicals are used. What organisms could they potentially affect? Could they affect you?

FINDING YOUR VOICE

INTRODUCTION/BACKGROUND: The world of plastics, especially the plastic bag, is mired in economic and political issues. The American Chemistry Council (which is funded by major petroleum producers like BP and Shell, as well as other chemical companies) uses its lobbying efforts to keep the plastic bag alive and well in every city and town in the nation. But there are cities like Seattle and San Francisco that are fighting the ACC and other big petroleum producers to "just say no" to plastic bags. This is just one of many environmental and ecological issues that is coming to the forefront of local and regional politics, and driving the everyday citizen to become active in making his/her voice heard.

OBJECTIVES: Students will discuss, research, and record current local environmental issues. Students will apply this process to a written persuasive argument.

KEY CONCEPTS: taking a stand, persuasive argument, informed opinions, research methods

MATERIALS: letter writing materials; stamps; access to computers

VOCABULARY: ban, activist, persuasive, debate, environmental issue

PROCEDURE: Use the movie *Bag It* and local current environmental issues to create awareness in the students. Introduce the students to the concept of opinion and activism through letter writing and debate.

GRADE LEVEL: 4th – High School

SUBJECT AREAS: Earth Science; Language Arts; Current Issues

DURATION:
Movie: 65 minutes
Warm-up & Activity 1: 60 minutes
Activity 2: 60 minutes
Extension: 2 hours

SETTING: Classroom

NATIONAL STANDARDS: NS 5-8 .1, .6; NS 9-12 .1, .6; NSS-C 5-8 .5; NSS-C 9-12 .5; NL-ENG K-12 .1, .2, .3, .4, .6, .7, .8, .11, .12

WARM UP: Brainstorm with the class on different issues that might be brought up in the context of the environment. Start with worldwide (dams, off-shore oil rigs, nuclear power, etc.), and bring it down into your own immediate area (whatever issues might be most local and current.) Write these on the board.

ACTIVITY 1: Have the students pair up and decide on a specific local environmental issue that they would like to research. Have them get online and do a search regarding this issue. (The teacher will need to do some preresearch on what your local issues might be, and help guide the students to them.) Have the students fill out the attached questionnaire regarding their findings.

ACTIVITY 2: Guide the students in writing a letter to a congressman, senator, company or business regarding their chosen issue. For a good working sample, see the "Take Action" section of the *Bag It* website: www.bagitmovie.com/get_involved.html.
Use this exercise as a practice for persuasive paragraphs. Be sure to have the students include facts, figures and official data in their letters that they found during their team web search.

WRAP UP: Have the students share their letters with the entire class. In this way, students will learn about more than just their issue.

CLASSROOM EXTENSION: Guide the students in a pro or con debate regarding one of the most current local environmental issues. Divide the class into pro or con, and have students work as two teams to research, record and prepare a verbal persuasive argument supporting their team's stance.

ASSESSMENT/FOLLOW UP: Grade the student letters in regard to the following: proper letter format; language arts mechanics; use of research and facts; use of persuasive language. (For a good guideline/example, see: http://bit.ly/fuQAXM)

COMMUNITY ACTION: Send the students' letters to the appropriate official or business.

RESOURCES/LINKS/LITERARY CONNECTIONS:
www.bagitmovie.com/get_involved.html
http://bit.ly/fuQAXM
www.riseaboveplastics.org/
http://ewg.org/actioncenter

SAMPLE LETTER TO YOUR ELECTED OFFICIAL

Dear _____,

Disposable single-use plastic bags, introduced just 25 years ago, are currently consumed at an alarming global rate of 500 billion per year. As a concerned citizen and constituent of _____, I am writing to ask you to consider introducing legislature that taxes these bags, a solution proven effective around the world.

Single-use disposable bags present an insidious threat to our environment on multiple levels. They often wind up in waterways or on the landscape, becoming eyesores and degrading water and soil as they break down into tiny toxic bits. Their manufacture, transportation and disposal uses large quantities of non-renewable resources and releases equally large amounts of global-warming gases. Ecologically, hundreds of thousands of marine animals die every year when they eat plastic bags mistaken for food.

These problems can be mitigated by simply advocating—and legislating—the consumption of fewer disposable bags and the use of reusable ones. One easy way to do this is by charging for their usage at the point of purchase. This was first done successfully in Ireland where the government introduced a plastic bag tax (PlasTax) that has slashed consumption over 90% and raised $9.6 million for environmental and waste management projects. Retailers were happy as well: they both saved the costs of bag purchases and improved their public image by doing the right thing.

Please consider legislation for a PlasTax here in our home state. It creates a foundation for consumer responsibility and market-based solutions to environmental problems. And it's an easy, win-win solution to a problem that has gotten out of control.

Sincerely,

_____

STUDENT RESEARCH QUESTIONNAIRE

Describe your environmental issue in at least two complete sentences, using technical or scientific terms when possible.

Briefly describe the "pro" view; briefly describe the "con" view; use technical or scientific terms when possible.

List some of the key figures who are involved with your issue. (i.e. congressman, senator, mayor, local business owner)

List at least two possible solutions to your issue. Which one do you think is the most effective? Which one is best for the environment?

HIGH SCHOOL EXTENSION ACTIVITY

PROCEDURE/ACTIVITY: Students and teachers can act together to promote change. Even a small issue within the school or community can be used to demonstrate the power of voices and actions of a small group of committed people! Using the diagram below, work as a team to identify an issue and work through the process of community organization to promote social change.

CYCLE FOR SOCIAL CHANGE

1

IDENTIFY AN ISSUE IN YOUR SCHOOL OR COMMUNITY

-Work together
-Develop a central theme for why this issue should be addressed
-Support your case with specific examples

2

DEVELOP YOUR VOICE

-Develop strategies to make your voice heard by the right people
-Ideas for getting your voice heard include: posters, emails, blogs, meetings, announcements, speeches, petitions
-What other methods can you come up with to get your voice heard?

3

REFLECT ON YOUR PROGRESS

-What were your successes?
-Were there any failures or areas that need to be re-thought?
-Were you able to affect the change you had hoped for?
-How could you do things differently in your next approach?
-Are there different audiences you should address?

WRAP UP: The most effective portion of the model above is the reflection. Have students journal, blog, or discuss their reflections with one another. Focus on both success and failures to promote the process of advocacy.

ASSESSMENT/FOLLOW UP: Grade the student journals on content, thoughtfulness, and classroom literacy standards. Have the students share portions of their journals with the class.

COMMUNITY ACTION: Read local newspapers to find out about issues impacting your community. Find a topic that has merit, and compose a letter to the local paper that states your position, along with supporting information. Become educated and stand up for something you believe in!

RESOURCES/LINKS/LITERARY CONNECTIONS:
Student Leadership Model:
http://www.socialchangemodel.org/

VOCABULARY PAGE

CITIZEN ACTION
When everyday people band together about an issue in an effort to cause a change.

CONVERSION
To change a number or value into an equivalent amount of a different measurement. For example, you can convert a meter into a foot.

DISPOSE
To throw something away.

LANDFILL
A location where garbage is taken after it leaves your trash can. Trash is stored in a landfill, where it remains buried and breaks down slowly over time.

PACKAGING
The plastic, paper, cardboard or other substance wrapped around, or encasing food, toys or other items.

PLASTIC
A substance that is synthetic, or not naturally occurring, that can be made into objects that are used everyday by people. For instance, toys, containers, even fragrances are made of plastics.

RECYCLABLE
The ability to make an item into a different substance, so it can be re-used and not thrown away.

REUSABLE
The ability to use an item again, in its original state.

SINGLE-USE DISPOSABLES
Items you buy at the store that are designed to be used once, then thrown away. Examples include a plastic fork, a bottle of water, a to-go coffee cup.

WASTE STREAM
The total amount of waste that is thrown away.