



The Great Garbage Game

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Subjects:	Science, Language Arts
Grades:	K-6
Length:	45-60 minutes
Focus:	The three R's, Landfills, Decomposition and Garbage

Rationale:

All living creatures produce waste of some kind; humans have simply gotten excessive. By making young children aware of ways to divert items from being thrown "away", we can begin to make an impact in reducing our patterns of waste.

Objectives:

The overall purpose of this lesson is to teach the basic principles of the "Three R's" – *Reduce, Reuse, Recycle* and the "one C", *Compost*. By learning these terms, students will recognize that they can help with some of the solid waste issues.

K-5 Students will:

- Define the three "R's" and the one "C".
- Define waste (garbage) and become aware of what happens to it after disposal.
- Discuss why garbage is a problem and how to reduce waste.

Background:

We once considered much of what ends up in our trash valuable, necessary, or desirable because of what was wrapped in it or what it was used for. Once discarded, it loses its value and becomes a part of a messy, dirty problem called **trash**. There are many kinds of trash and many different ways to help alleviate our trash problem. Since we all generate garbage, all of us need to do our part to help solve this problem.

There are several reasons why trash is a problem for us as humans. First, throwing things away wastes valuable natural resources such as trees, minerals, water, energy and so on. A **natural resource** is something that comes from the earth that we use on a daily basis. For example, when we throw out a piece of paper, we are throwing away a part of a tree! Some resources can be renewed such as trees, because we can keep planting trees to replace the ones

that we use. Humans cannot create other resources during our lifespan, such as minerals and fossil fuels.

Second, garbage takes up lots of space in the landfill. A **landfill** is a place where we take our garbage so we don't have to deal with it any more. Landfills are usually an area where the garbage is eventually buried. Most new landfills are fairly safe, but there is always the risk of ground water pollution. Landfills can be unsightly and can smell bad too. When we fill up a landfill with garbage, then we have to make a new landfill for our trash. Some communities choose to burn their garbage in a special facility called and **incinerator**. This can create problems such as air pollution.

Third, garbage can sometimes create problems such as **litter** and **pollution**, when trash is found in places that it really shouldn't be such as in the forest, in public places or in bodies of water such as lakes, rivers, or even the ocean.

Fortunately, there are several ways in which humans can help with our trash problem. First, there are several ways that trash can be **reduced** in the first place. People can buy things in bulk with less packaging material, or they can buy things that will last for a very long time so they don't have to buy those things again in the near future. Second, many things can be **reused**. An example of this is when you give some of your old toys or clothes to your friend or little brother or sister. If things can't be reduced or reused, then they may be able to be recycled. **Recycling** is the process of taking certain items and remaking them into new items. Usually, communities have a set list of things that can be recycled in that region. A good example of this is the aluminum soda can. Aluminum can be recycled over and over again, creating many new soda cans during its lifetime. Some things are actually recycled into new products such as plastic soda bottles that are turned into carpet or polar fleece material. Recycling things usually saves lots of energy and water as well as landfill space. About 40% of the materials in landfills is paper, something that can be recycled in most communities.

A fourth way to help with the trash problem is to compost. **Composting** is a way of using anything that came from a plant and turning it into rich, healthy soil. Any kind of fruit or vegetable can be composted. Other things that can be composted come from outside in your yard or garden such as leaves, grass clippings, wood chips, weeds and other plants. Paper can even be composted because it comes from a plant!

The average American creates about 4.5 lbs. of trash every day. Oregonians are responsible for even more at *7.2 lbs. per person per day!* This material does not just go "away", it gets buried right here in our community. According to EPA statistics, at least 50% of garbage thrown away is recyclable, while another 23% is compostable.

Materials:

- Four boxes or bins labeled **Landfill, Reuse, Recycle** and **Compost**
- K-3 Poem – **Sarah Cynthia Sylvia Stout**, by Shel Silverstein
- K-3 Book- **The Great Trash Bash** by Loren Leady – *Optional*
- 4-6 Rates of decomposition and material; fake fruit, fabric, paper, plastic, disposable diaper, tin, aluminum, Styrofoam, fake cigarette(Paper towel tube)
- Pictures of 10-year-old trash (included with lesson plan) and picture of landfill.
- Trashcan or bag, and various sortable (clean) "waste" materials. (The Environmental Center has these materials to loan if needed) It is easy to pull these materials from home and school garbage and recycling; Materials can include cans, paper, plastic

packaging (clamshells), plastic fruits and veggies, durable items such as old coffee mugs, socks, pieces of wood, plastic bottles, etc.

- Be sure to include materials that are found in school as well. Can paper towels be recycled at your school, are you terracycling juice boxes? (Make this an opportunity to train students about school wide recycling practices as well.)

Procedures:

I. Introduction. What is Trash? – 5 – 15 minutes

- Ask the students what they think of when they think of trash? What are some things that they have thrown out?
- When we throw things away, what does that mean? Where do those things go? Often students will say the dump. A dump often is an area where garbage is thrown but the environment is not protected with a liner and there is no regulation. A landfill has a protective liner to prevent toxins, called leachate, from entering the ground water.

READ POEM or BOOK For K-3

For Poem - “Sarah Cynthia Sylvia Stout” by Shel Silverstein

- Ask students questions regarding trash, garbage.
- Who likes trash? Why? What is trash, anyway? Where does garbage go? What is a landfill? Discuss briefly the lining of a landfill. Has anyone here ever been to a landfill? Does garbage ever go away in landfill? **SHOW PICTURES OF GARBAGE** after 10 years. **NO**, the trash that goes into a landfill stays there for a very long time.
- What will happen when the landfill (dump), fills up? We will probably have to create a new landfill in a new location. Who wants to live next door to a landfill?

For Book –

- Ask students what were some ways the animals made less trash? They learned how to reduce, reuse, recycle and compost.

RATES OF DECOMPOSITION 4-6 15-20 minutes

- When we talk about things “going away”, we mean things decomposing, biodegrading, rotting or going back into the earth. (Decomposition is the process of breaking down organic material, such as dead plant or animal tissue, into smaller molecules that are available for use by the organisms of an ecosystem. Decomposition is carried on by bacteria, fungi, protists, worms, and certain other organisms.)
- Explain to students that they are going to play a game to see how well they understand materials and how long they will take to decompose. Lay objects out on the table and go over the **RATES OF DECOMPOSITION** they will be working with. Tell them not to open the envelope. Start with the shortest time frame picking a student to go to the table and placing the time under the object. They can make changes as they go
- When complete, go over the answers and the facts for each item

II. Let's talk trash – 5-10 minutes

- Go over the three R's.
- The first and best way to make less trash is by REDUCING. To reduce waste means to make less trash.
- The second way to make less trash is by REUSING. What does reuse mean? To reuse waste is to use an item again for the same purpose or for another purpose. Often it is fixing it or finding a creative way to reuse. What are some things that we can all reuse?
- The third way to make less trash is to RECYCLE. To recycle means to convert waste into reusable material. Old glass bottles can be melted down and made into new bottles. Newspapers are soaked, shredded, and pressed back into new newspapers. What is recycling anyway? What are some things we can all recycle? What happens to things that are recycled?
- The "C" in trash reduction is COMPOST. What about certain things like our old food that we don't want? What happens to it? Have you ever been out walking in the woods and seen some animal bones? What happened to the rest of the animal? Where did it go? All living things will eventually decompose, that is they will become part of the dirt. This is what we call COMPOST.
- We can use this process as a way of recycling. Instead of throwing out old food or yard trimmings, we can recycle them back into healthy soil. Show small amount of compost to students. Some of you might have a compost pile in your backyard.

III. The Great Garbage Game – 10 - 15 minutes

- Play the Great Garbage Game. Give instructions to students. The goal is to try and change the amount of garbage in the bag. When trash is bagged and taken to the Landfill, it will never be sorted out, all things will just sit in the "big hole". They need to put the "garbage" in the right place". Help students out if they need it, or they may ask the audience for assistance. Encourage students to be creative about what they can do with the "trash". For example, the old sock could be used to make a puppet or a dog toy. Although we wouldn't always think of these things, it is important for the students to realize that by being creative, they can help keep garbage out of the landfill and possibly use it again.

IV. Conclusion/Assessment – 5 – 10 minutes

- Have students view the contents of each bin. The "Trash" bin should be fairly empty, and the others should have more stuff in them. What does this tell us? Congratulate the students for doing a good job of keeping most things out of the trash bin. Explain that by being a little creative, we can think of other things to do with our trash. Review the three R's and the one C word. Why is this important, again?

Attachments

Sarah Cynthia Sylvia Stout, Shel Silverstein

Recycling and garbage trivia

Additional Resources

Enrichment Options for EarthSmart Kids Classes

If Bagging Trash is Your Game

Decomposition student work

Rates of Decomposition
Voyage of the Mobro
Pictures of 10 year old garbage

Sarah Cynthia Silvia Stout

Sarah Cynthia Silvia Stout
Would not take the garbage out!
She'd scour the pots and scrape the pans,
Candy the yams and spice the hams,
And though her daddy would scream and shout,
She simply would not take the garbage out.
And so it piled up to the ceilings:
Coffee grounds, potato peelings,
Brown bananas, rotten peas,
Chunks of sour cottage cheese.
It filled the can, it covered the floor,
It cracked the window and blocked the door
With bacon rinds and chicken bones,
Prune pits, peach pits, orange peel,
Gloopy glumps of cold oatmeal,
Pizza crusts and withered greens,
Soggy beans and tangerines,
Crusts of black burned buttered toast,
Gristly bits of beefy roasts...
The garbage rolled on down the hall,
It raised the roof, it broke the wall...
Greasy napkins, cookie crumbs,
Globs of gooey bubble gum,
Cellophane from green baloney,
Rubbery, blubbery macaroni,
Peanut butter, caked and dry,
Curdled milk and crusts of pie,
Moldy melons, dried up mustard,
Eggshells mixed with lemon custard,
Cold French fries and rancid meat,
Yellow lumps of Cream of Wheat.
At last the garbage reached so high
That finally it touched the sky.
And all the neighbors moved away,
And none of her friends would come and play.
And finally Sarah Cynthia Stout said,
"OK, I'll take the garbage out!"
But then of course, it was too late...
The garbage reached across the state,
From New York to the Golden Gate.
And there in the garbage she did hate,
Poor Sarah met an awful fate,
That I cannot right now relate
Because the hour is much too late.
But kids, remember Sarah Cynthia Sylvia Stout,

And always take the garbage out!

----Shel Silverstein

Recycling and Garbage Trivia

1. In Oregon, how much garbage (in pounds) on average, does one person **generate** in one day? (Generation means the total amount that is created, before anything is separated for recycling, reuse, etc.) **7.46 pounds per capita per day.**
2. How much garbage does this class create in one day? (This is a math problem – students may need help figuring that out). **Depends on class size.**
3. How much garbage does this class (on average) generate in an entire week? **Depends on class size.**
4. What does it mean for something to **decompose or biodegrade**? **It will eventually break down into the soil.**
5. How long will it take a glass bottle to decompose in a landfill? **Forever.**
6. How long will it take for a disposable diaper to decompose in a landfill? **Over 500 years.**
7. How long will it take for a plastic milk jug to decompose in a landfill? **Forever.**
8. What common item can be recycled and made into stuffing for futon mattresses and ski jackets? **Plastic soft drink bottles. Rising Star Futons in Bend, makes mattresses out of recycled plastic bottles. Five 2-liter bottles make enough stuffing for a ski jacket.**
9. What natural resource does plastic come from? **Oil**
10. How many pounds of plastic toothbrushes are discarded every year? **100 million pounds**
11. If everyone recycled their Sunday newspapers, how many trees would be saved in one week? **500,000 trees**
12. How many tires were discarded in America in 200? **About 281 million tires, weighing 5.68 million tons.**
13. What is composting? **Composting is using the process of decomposition to turn organic materials (such as yard debris, fruits, and veggies) into rich soil.**
14. True or False – Recycling one aluminum can saves the energy equivalent of about 0.5 kWh: enough to light a 100-watt bulb for five hours, or to power an average laptop computer for 11 hours. **True.**
15. True or False - Twenty-seven percent of the food produced for human consumption in the US is thrown out as waste, equaling 48 million tons annually. **True**

Additional Websites for Waste Trivia and Fun Facts:

Facts about Waste and Recycling:

Waste Facts:

<http://www.cleanair.org/Waste/wasteFacts.html>

Resourceful Schools Project –Fun facts about recycling in Missouri:

<http://www.resourcefulschools.org/facts.html>

Resourceful Schools Project- How Do They Do That?

<http://www.resourcefulschools.org/fun-recycling-facts/how-do-they-do-that/turning-recyclables-into-something-new#4>

EPA Commodities Site – Great report for reference:

http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw_2010_rev_factsheet.pdf

Recycling Fact Sheet:

<http://www.recycling-revolution.com/recycling-facts.html>

EPA- How To Start or Expand a Recycling Collection Program:

<http://www.epa.gov/epawaste/conserva/smm/wastewise/pubs/howtopdf.pdf>

Waste Quiz:

<http://www.inspiregreeninc.com/blog/trash-trivia/>

More Information on Source Reduction and Solid Waste:

U.S. Environmental Protection Agency (EPA):

<http://www.epa.gov/gateway/learn/wastes.html>

Oregon Department of Environmental Quality: <http://www.deq.state.or.us/lq/education/index.htm>

Activities and Resources:

Planet Protectors Club for Kids- activities K-5:

<http://www.epa.gov/osw/education/kids/planetprotectors/index.htm>

<http://www.epa.gov/osw/education/pdfs/ppc-fact.pdf>

The Quest for Less- Grades 6-8:

<http://www.epa.gov/osw/education/quest/index.htm>

Resources Grades 9-12:

http://www.epa.gov/osw/education/teach_curric.htm#teens

Videos and Graphic Resources

PBS Kids Loop Scoops- games and videos on reducing and recycling:

<http://pbskids.org/loopscoops/>

The Story of Stuff- dark look at consumerism and the life-cycle of goods- appropriate for middle school and up:

<http://www.storyofstuff.org/movies-all/story-of-stuff/>

The Story of Bottled Water- appropriate for middle school and up:

<http://www.storyofstuff.org/movies-all/story-of-bottled-water/>

What's in Your Trash Infographic:

<http://dailyinfographic.com/wp-content/uploads/2012/02/whats-in-your-trash-infographic.jpg>

Project Aware- The Ugly Journey of Our Trash:

<http://www.projectaware.org/infographic>



Enrichment Options for Great Garbage Game

Enrichment #1

Have students weigh their classroom waste each day for a week to determine how much waste is generated by the class. Estimates could be calculated to expand this analysis to include the entire school. Debrief by discussing ways that students could decrease the amount of waste generated at school.

Enrichment #2

Have students interview their grandparents or other senior citizens in the community about past solid waste practices. Questions might include the following:

- How and where did they dispose of their garbage?
- What types of things were typically thrown away?
- Did disposal include open burning of garbage?
- What items would they reuse or recycle?
- Did they compost?
- How has garbage disposal or recycling changed over the years?

After the interviews, have students share their findings. Students should write a thank you note to the person they interviewed. A variation of this activity is to invite two or three senior citizens to visit the class and share the answers with the whole class.

Enrichment #3

Have students look at the amount of garbage that their family creates in one week. Look at the amount in the trash can and compare to the amount in the recycling bin or compost bin. If possible, weigh the amount of garbage for one day, or even one week.

Answer the following questions:

- Are there things in the garbage that could have been recycled, reused or composted?
- What are some other ways to reduce the amount of garbage being thrown out?
- What are some of the natural resources found in your garbage can? For example, if there is a lot of paper in the trash, that equals trees being thrown away!

Enrichment #4

Have students create posters to encourage reducing, reusing or recycling. Display those posters where students in the school will see them or in prominent public places, such as the library or a grocery store

Enrichment #5

Conduct a waste audit of your school and design ways to decrease the amount of garbage sent to the landfill

Waste Prevention Word Search (adapted from Oregon DEQ's Rethinking Recycling Curriculum Guide)

Help! Some very valuable things are on their way to the landfill. Save them from being thrown away. Circle in blue, the things that can be recycled. Circle in green, things that can be reused. Some items may be both! Be sure to look for:

- | | | | | |
|---------------|-------------|--------------|-----------|-----------|
| newspaper | tin cans | plastic bag | cardboard | jars |
| crayons | bottles | grocery bags | pencils | milk jugs |
| margarine tub | blank paper | old toys | box | art paper |
| brush | motor oil | aluminum | plates | sock |

Can you find some **bonus** words too? What do they tell you?

S	O	C	K	Y	A	R	E	D	U	C	E	L	M	N	O	P	
V	W	X	Y	Z	L	X	R	E	P	A	P	K	N	A	L	B	
G	H	I	T	B	U	T	E	N	I	R	A	G	R	A	M	J	
F	T	X	I	P	M	I	L	K	J	U	G	S	S	Q	R	S	
L	P	E	N	C	I	L	S	C	O	L	D	T	O	Y	S	A	
U	N	E	C	V	N	R	E	U	S	E	I	C	X	M	D	X	
N	I	T	A	M	U	S	A	V	E	C	R	A	Y	M	O	N	S
C	E	B	N	C	M	A	B	C	B	N	Q	R	S	T	E	R	E
H	O	W	S	U	X	P	Q	A	T	O	M	D	R	O	G	E	C
B	A	R	S	Z	P	Y	G	B	S	I	X	B	L	R	A	C	Y
A	R	E	L	P	L	R	M	R	O	T	B	O	X	O	B	Y	C
G	T	U	Z	J	A	R	S	U	P	U	O	A	K	I	R	C	L
S	P	S	K	R	T	P	K	S	M	L	T	R	D	L	A	L	E
F	A	E	L	M	E	P	E	H	O	L	T	D	M	L	G	L	E
R	P	X	Y	Z	S	O	P	R	C	O	L	D	O	N	T	M	E
O	E	C	Y	T	N	E	V	E	R	P	E	W	A	S	T	E	J
G	R	O	C	E	R	Y	B	A	G	S	S	E	R	O	X	J	

If Bagging Trash is Your Game, This Match is For You!

Match each word on the left with the phrase that best describes it.

(Adapted from Oregon DEQ's Rethinking Recycling Curriculum Guide)

_____ **Trash**

A. To find a new use for something instead of throwing it away.

_____ **Litter**

B. A recyclable material made from trees.

_____ **Reuse**

C. To buy and to throw away less trash.

_____ **Natural Resources**

D. Leaves, grass clippings, and fruit and veggie scraps that are broken down by natural forces and can be used on gardens.

_____ **Landfill**

E. Our garbage, all the things we throw away.

_____ **Recycling**

F. Trash that is in the wrong place, such as on the ground or in the street.

_____ **Aluminum & Tin**

G. Damage to the environment from chemicals or other human activities.

_____ **Paper**

H. Metals that are made from minerals in the ground.

_____ **Reduce**

I. When we throw things away, this is where it is buried in the ground.

_____ **Compost**

J. Things that are found in nature such as air, water, trees, and minerals, that we use to create energy and to help us make things.

_____ **Pollution**

K. A process that makes something new out of something old.

Name _____

1. Define the words below. Give an example of an application

- a. Reduce
- b. Reuse
- c. Recycle

2. List some ways that your community is using to manage solid waste.

Your best guess	Item of trash	Group Consensus	Times estimated by "garbologists"
	Aluminum can		
	Paper bag		
	Plastic bottle		
	Tin Can		
	Diaper		
	Cigarette Butt		
	Styrofoam Cup		
	Wool Sock		

3. List items that you have thrown away in the last day or two. Will the items disappear/disintegrate/degrade or will they take up space in the landfill?

4. Which items if any may never decompose?

5. Opinion essay. *Knott Landfill is getting close to full. Community leaders in Deschutes County are searching for another site to develop as a sanitary landfill. The Source and the Bulletin are encouraging readers to write a letter to the editor with thoughts and facts about this issue. Describe, in an essay, your opinion about community solid waste management. Use as many facts as you know to support your statement.*

Rates of Decomposition and Facts

2-5 Weeks = Fruit

FACT

Food scraps make up 17% of what we send to the landfills. When it rots, it becomes METHANE- a potent greenhouse gas

2 Months = Paper

Americans discard 4 million tons of office paper every year. That's enough to build a 12 foot-high wall of paper from New York to California.

1 Year = Fabric

The Environmental Protection Agency estimates that the average person throws away 70 pounds of fabrics every year.

2-5 Years = Cigarette

Cigarettes are the most littered item in America. 52 million cigarette filters have been collected from beaches over the past 25 years.

100 years = Tin can

Americans use 100 million tin and steel cans each day. Recycling steel and tin cans saves between 60 and 74 percent of the energy used to produce them from raw materials.

200-500 years = Aluminum

In the United States, over 100,000 aluminum cans are recycled each minute. Over 50% of the aluminum cans produced are recycled

500 years = Diaper

7.6 billion pounds of diapers a year discarded in the U.S. A baby will go through about 8,000 diapers.

Forever = Plastic

Americans go through 2.5 million plastic bottles every hour. 8 out of 10 become landfill waste

Forever = Styrofoam

Each year American throw away 25 trillion Styrofoam cups. That is 25,000,000,000,000

Read the story below and answer the questions in complete sentences.

THE VOYAGE OF THE MOBRO

During the spring of 1987, the small town of Islip, New York hit national headlines. The media focused not on the people of the town, but rather on its garbage-nearly 3,200 tons of it. The landfills near Islip were filled beyond capacity, so Islip officials made a deal with Jones County, North Carolina, to handle Islip's trash.

When the Mobro-the barge transporting those tons of garbage from Islip-reached its destination, Jones County officials refused to accept the trash after determining that the cargo held hospital waste and other non-paper trash as well. Fearing contamination of county water supplies, the North Carolina County sent the Mobro away.

For four months, the barge traveled along the Atlantic Coast to the Gulf of Mexico trying to find a state willing to dispose of the garbage.

Unsuccessful, the Mobro even approached Mexico, Belize, and the Bahamas, but to no avail. The barge returned to dock at New York Harbor after a frustrating 6,000-mile (9,654-kilometer) voyage and awaited word from New York officials as to exactly what would become of its smelly cargo. A Brooklyn, New York, incinerator finally burned the garbage, reducing the volume to about 430 tons of ash, which was then dumped in a landfill back in Islip.

www.gracespace.com/Hamilton/recycle.htm

1. Why do you think a story about a barge in NY made national headlines?
2. What are some methods for disposing of garbage?
3. What are steps can we take to reduce the amount of garbage we produce?
4. Do you think that something like this could ever happen again? Explain.
5. How does recycling help alleviate garbage in landfills?



Foley N. Kinman/University of Cincinnati

Carets after 10 years in a sanitary landfill

Paper milk cartons and other wastes after 10 years in a sanitary landfill



Riley N. Kinman/University of Cincinnati