

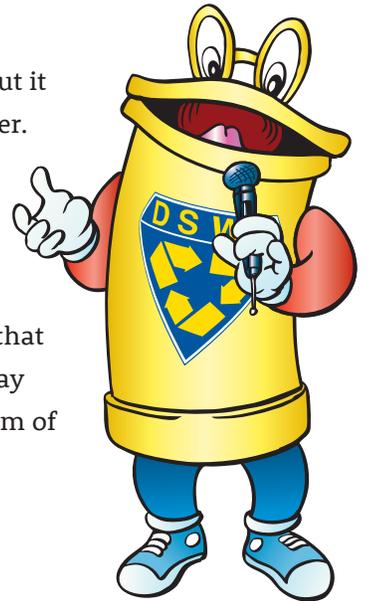
Youth Guide To Waste Reduction and Recycling



Download a digital copy of this guide at cgextra.com/derecycles

Talking Trash

How often do you think about trash? If you're like most people, you only think about it once or twice a week when you have to drag it out to the curb or down to a dumpster. For most people, that's the end of it. Once the trash is out of your house, why worry about it? The truth is, trash doesn't just go away. It has to be handled very carefully to be certain that it does not turn into pollution. In this special booklet, you will learn about trash, yard waste, recyclables, and household hazardous wastes. You will also learn how to properly dispose of the different kinds of waste that we produce every day. The solid waste industry has many words and terms that may be unfamiliar to you. To help you learn them, we have listed some across the bottom of this and the next page. Under each word is what it means.



BIODEGRADABLE (BI-O-DEE-GRAY-DUH-BULL)

The ability to break down or rot and return to the earth as a natural part of it.

COMPOST (KOM-POST)

A natural way to recycle food wastes and vegetation like tree trimmings and grass clippings. Composting turns these wastes into new soil that will help plants grow.

ENVIRONMENT (EN-VI-RON-MENT)

The natural surroundings in which we live.

HOUSEHOLD HAZARDOUS WASTE

Special kinds of waste that can harm our environment if they are not handled carefully. Examples are pesticides, pool chemicals, oil-based paint, and old car batteries.

LITTER

Garbage that is thrown in places other than a garbage can.

MRF

"MRF" (pronounced "murf") stands for Materials recyclables that are collected in your recycling program go to be separated and processed before being sent to a manufacturer that will make them into new products.

POLLUTION (POL-LOO-SHUN)

The contamination of our environment. Pollution can have many sources, but in the waste industry the biggest cause of pollution is illegal dumping of waste.

RECYCLE

To re-use an item that you have already used, and might have been thrown away.

TRASH

Trash includes garbage and large, bulky items that are not thrown out very often. Examples of trash include old carpets and furniture.

Landfill 101

Managing solid waste has come a long way from the days when people threw their trash in the local “dump.” Today, we compost some of our waste, and a lot more is recycled. But there’s still a lot of trash left over, and it has to go somewhere. The final resting place for our trash in Delaware is called a landfill. We take care of our own trash instead of shipping it to the other states, because it’s important to manage our own waste within Delaware.

The Delaware Solid Waste Authority operates three landfills in different parts of the state, and each one has been carefully built to protect our land, air, and water. They are lined to prevent leaks, and the leachate is collected and treated.



BUFFER

Open space around a landfill to lessen impact on the surroundings.

COMPACTOR

Big, heavy vehicle that smashes trash so it takes up less space.

GAS COLLECTION SYSTEM

Series of pipes and pumps that move landfill gas to flares or green power plants

GAS FLARE

Torch-like device that safely burns off landfill gas.

TRANSFER STATION

Buildings that are used as collection points for the waste. The facility helps save on fuel, gas emissions, and trucks traveling to the landfill.

LANDFILL

An area that has been prepared for disposal of garbage or trash. Landfills are lined with plastic or natural liners to keep pollutants from seeping into groundwater.

LANDFILL GAS

A mixture of gases, mostly methane, which can be burned for energy or safely “flared off.”

LEACHATE (LEECH-ATE)

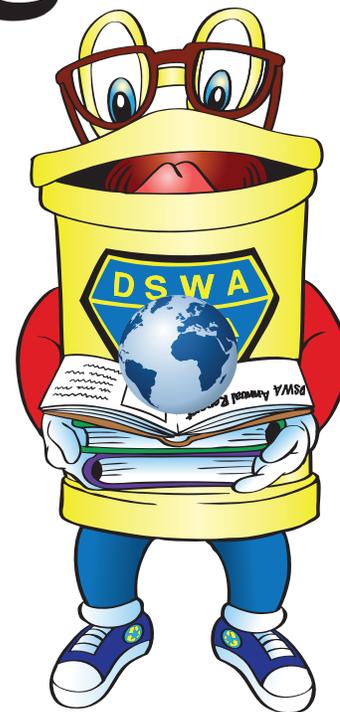
A liquid that is produced when rainwater sinks into the landfill and mixes with garbage.

PLASTIC LINER

Bottom layer of the landfill which prevents leachate from seeping into groundwater.

Trash is an Important Business

There are many companies throughout the state and across the country that are in the waste business. Recyclers, waste haulers, engineering firms, construction companies, and landfill operators are a few examples. These companies are involved in everything from building landfills to manufacturing recyclables into new products. How successful are they in the business of waste?



Look for this symbol throughout this booklet for activities to complete.

The Write Stuff (Grades 1-3)

As a class write to a company that manufactures a product (such as Nike, McDonald's, General Motors). Ask company officials what they are doing to recycle waste at their company.

Stock up! (Grades 3-5)

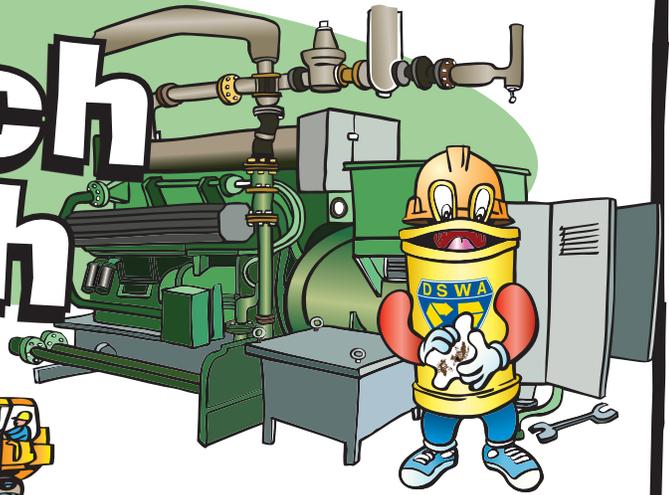
As a class, select two companies from the list you find at right. Look up the stocks online. Write down how much each stock is trading for and track it for two weeks. After the two weeks, graph which stocks have gone up in value and which have gone down.

Look for articles online that relate to the waste industry. Discuss what is happening in the industry that may have affected the value of your companies and their price of your stocks.

Note: Not every company is listed every day. Stock quotes may also be found online.

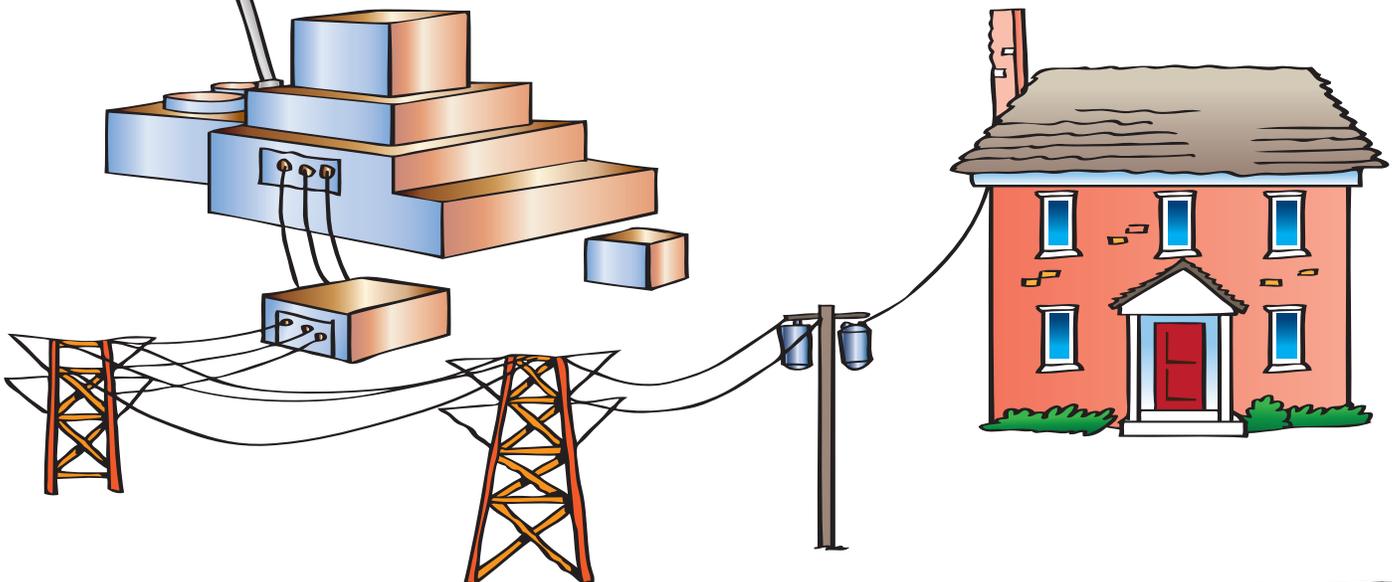
company name	stock identity
Republic Services	RSG
Waste Management Inc	WM
Green For Life Environmental	GFL
Clean Harbors	CLH
Covanta	CVA
Trex Company	TREX
Mohawk Industries	MHK
First Solar	FSLR
Tesla	TSLA
Stericycle	SRCL

High-Tech Trash



Technology is a big part of the waste industry. In many parts of the country, the most advanced technology is being used to turn trash into electricity, keep the environment clean, and make recycling easier and more efficient.

As your trash decomposes, landfill gas is produced. The amount of gas produced depends on the size and age of the landfill, as well as the composition of waste. The Delaware Solid Waste Authority (DSWA) captures its landfill gas at each of its three landfills and turns it into electricity. DSWA began collecting gas to fuel power plants at its Cherry Island landfill in 1995. The main goal of the project was to use the landfill gas generated from decomposing organic waste to produce electricity.



Litter is no Laughing Matter

Litter is one of the most common forms of pollution. According to the book “Keep America Beautiful,” there are three main reasons why people litter and dump garbage in places where they should not:

- They feel no ownership of the property where they are littering.
- They think someone else will clean up after them.
- They see others doing it or see trash already piled up in the area.

None of these are good reasons to litter. Littering and illegal dumping are not only ugly, they can cause severe problems for both wildlife and people. Birds can mistake some forms of litter for food and choke on it. Plastic bags and other plastics thrown into the ocean kill as many as one million sea creatures every year!



Anti-Litter Campaign

(All Grades)

Think of ways you could convince people not to litter.
Create a billboard persuading people not to litter.



Campus Service App

(All Grades)

Developed in partnership with Governor Carney’s Keep DE Litter Free initiative, Keep Delaware Beautiful has created an app that is available for ALL schools in Delaware to use. Teachers and Admins are able to use this app to present volunteer opportunities for campus beautification projects to students and their families. Students and families can easily sign up 365 days a year for tasks that need to be done around their school campus and pitch in to earn volunteer hours. Schools can register on the Campus Service App by visiting campusserviceapp.com

Keep Delaware Beautiful was formed in 2016 with the purpose of fostering and promoting Keep America Beautiful programs focused on litter prevention, community beautification and minimizing the impact of solid waste in the State of Delaware.

In partnership with the Governors Office, Delaware has launched a statewide campaign called Keep DE Litter Free, to encourage Delawareans to not litter, to clean up public spaces, and protect Delaware’s unique natural landscape.

Going...Going Gone?

Have you ever opened an old container in the back of the refrigerator? Gross! Rotten food sure does stink. But the process of rotting is actually very important.



It's called

DECOMPOSITION

and it simply means that something is breaking apart into basic elements.

The litter you see on the ground could be there for months or even hundreds of years!

See for yourself →



Number of Years Until it Breaks Down

10 - 15



Cigarette butts

10 - 100



Plastic bags

100 - 500



Plastic straws

450 - 600



Fishing line

500 - 1,000



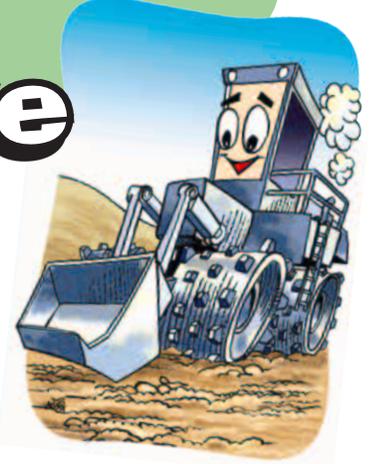
Plastic bottles

Forever



Styrofoam

Landfills: More than meets the Eye



In years past, before we used the types of landfills we use today, all of our trash was put into dumps. These dumps were nothing more than big piles of trash that were allowed to rot without any kind of controls on them. Today's landfills are much more sophisticated than that.

When a landfill is built, it has to be lined with layers of plastic or natural materials and have a collection system for the leachate and gas. These controls are necessary to keep pollutants from entering the air and water table where we get our drinking water. Every day, the garbage that is brought to the landfill is covered with a layer of soil to help keep odors from spreading. Landfill gases, made of mostly methane, is also collected and "flared" or turned into electricity.

Once the landfill is full, it is covered with another layer of plastic and several feet of dirt.

TRY THIS AT HOME!

Luscious Layered Landfill

Ingredients

Clear plastic cup
Cookies
Vanilla pudding
Licorice
Fruit cereal
Rice cereal
White chocolate chips
Peanut butter chips
Mini marshmallows
Chocolate cereal
Chocolate candy
Green sprinkles
2 straws
Spoon

Instructions

1. Crumble cookies in a plastic bag. Put a layer of the crumbs in the bottom of the cup. The cookies are acting as the clay at the bottom of a landfill.
2. Add a thin layer of pudding. This layer is acting as a plastic liner.
3. Add into it small licorice strips. These are acting as leachate collection pipes. Leachate is water that needs to be dealt with after it is contaminated by chemicals in the soil or a landfill.
4. Add a second layer of the cookie crumbs. This is acting as sand and gravel to protect the pipes and plastic.
5. Add fruit cereal to represent organic waste. Add rice cereal to represent recyclable materials.
6. Add white chocolate chips, peanut butter chips, mini marshmallows, and chocolate cereal. These items are acting as plastics, glass, and metals.
7. Add chocolate candy. This represents all other materials collected in a landfill.
8. Add another layer of pudding for plastic.
9. Add another layer of cookie crumbs for soil and green sprinkles for grass at the top.
10. Punch in straws to represent methane gas collectors.
11. Dig into your parfait!



What is Composting?

Composting is a natural process that breaks down organic materials over a period of time. When handled properly, materials like tree trimmings, grass clippings, and fallen leaves decompose into fertilizer that can be used on your plants and lawn. In fact, studies have shown that plants grown with the use of compost grow faster and are healthier than those grown without compost.

It may take a long time, though. If you want to speed up your composting, you can create a “hot” compost pile. You will want to add water to keep the compost moist (but not soaking wet). You will want to keep it covered. And you will need to turn and mix the compost every few days to make sure air mixes in with it. This approach “cooks” the plant matter and speeds up the breakdown into soil you can use in your garden. You will be surprised at how hot this can get. In just a few days time your pile will be very warm to the touch. You will notice as you turn the material that it first turns gray, then a rich brown. When it is all brown, your compost is cooked!

Compost Riddles (Grades 1-3)

1. My favorite season is Fall because I always get to show my colors. Red, yellow or brown I float to the ground. I will become food for worms and help plants grow. I belong in the compost pile. What am I?
2. Scrambled, sunnyside or over easy. Plain, with salsa or extra cheesy. You eat the inside not the outside, you can save that for your compost pile. Everyday the worms will thank you for keeping them healthy and making them smile. Adding me to your compost pile is an egg-celant idea! What am I?



SCIENCE FICTION (Grades 3-5)



Science fiction mixes today's real science with imagination. It takes the true facts of science and gives them a twist by asking “**What if...?**” A compost pile would be a great starting point for a science fiction story. **What if...** something got into the mix that wasn't supposed to be there? **What if...** the heat of the compost created unexpected changes in it?

Write a plot idea for a sci-fi story based on the facts you have read above about compost. Share plot lines with classmates. Who had the most creative idea? Finish by writing your science fiction stories!

What are the Benefits of Composting?

Composting enables you to recycle your yard wastes, returning organic matter to the soil, and providing some nutrients for healthy plant growth. The amount picked up by your trash collection service every week can be reduced by almost 15% a year by composting. In the long run, composting helps you exercise, reduce what you discard, improve your garden, and even save money!

Visit de.gov/composting to learn more.

Yes

From the Garden:

- Dry grass
- Tree/shrub trimmings
- Garden Plants
- Weeds
- Old potting soil
- Soft plant stems

From the Kitchen:

- Fruit Scraps
- Vegetable trimmings
- Egg Shells (crushed)
- Tea bags
- Coffee grounds and filters

Other:

- Shredded paper
- Tissues
- Paper towels
- Shredded cardboard
- Paperboard

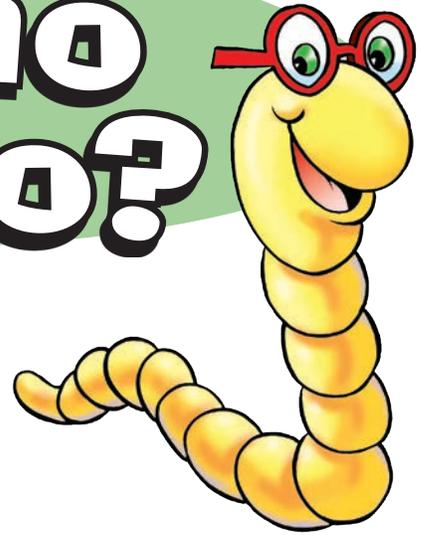
No

- Meat Scraps
- Bones
- Fish
- Dairy Products
- Oils, grease
- Sauces
- Plastics
- Metals
- Glass
- Stone
- Pet waste, kitty litter
- Diseased plants
- Weeds gone to seed
- Painted or treated wood



(Some of these materials may create pest or odor problems.)

Just who is Cosmo?



Cosmo is an earthworm. He may be small, but he has a big job in nature. He burrows through soil, eating as he goes and increasing aeration, which supports plant growth. He also helps enrich the soil by leaving behind castings and by mixing layers together as he travels around. When you start a compost pile, you're making the perfect habitat for him to do his work!

Cosmo's Worm Terms!

AERATION

Exposure to air, which allows the exchange of gases that make soil better for growing plants.

BACTERIA

Simple one-celled organisms.

DETRITIVORE

Organism that eats dead and rotting matter.

HABITAT

The environment and specific conditions an organism needs to live.

INVERTEBRATE

An animal without a backbone, like a worm.

BURROW

A tunnel formed when an earthworm eats its way through soil or pushes soil aside to make a place to live.

CASTINGS

Worm manure, or "poop."

ORGANIC LAYER

Made of decomposing material from nature that eventually turns into humus.

NUTRIENTS

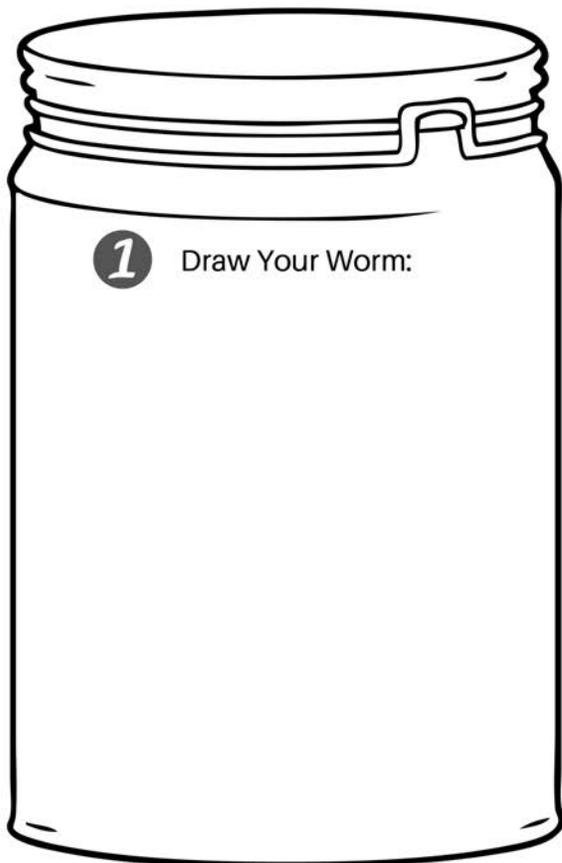
Elements such as nitrogen and phosphorus that are necessary for plant growth.

HUMUS

Nutrient-rich organic matter in soil.



All About Worms



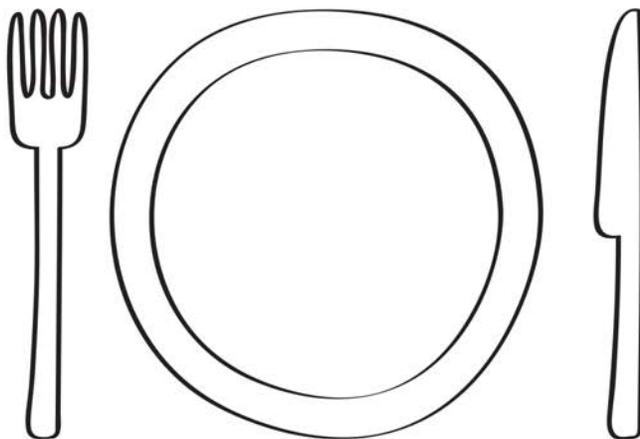
1 Draw Your Worm:

Materials: A worm, two paper plates, a flashlight, two damp paper towels, a small cup of water & a cup of dirt.
Feel free to wear gloves as well.

Directions: Place a damp paper towel on each paper plate. Then find a worm outside! Remember to be gentle as you handle the worm. Carefully place the worm on one of the paper towels while you answer the questions and do the experiments. Place the worm back where you found it when you are done.

Wash your hands!

2 I Think My Worm Eats:



3

I Found My Worm:

My Worm Can:

- 1.
- 2.

I know My Worm Is Alive Because It...

Reduce & Recycle



The average American creates about 3 - 4 pounds of trash every day. Where does all this waste come from? Some studies have shown that every year Americans use millions of feet of paper towels.

That's a lot of stuff that has to be thrown away — and we've just scratched the surface! For many years Americans were known as a "throw-away society." That means that we depended on disposable items that we just threw away when we were finished with them.

We now know that recycling is not the only way to help the environment. When we use durable and reusable products, we can reduce the amount of waste we produce. By reducing our waste, we also reduce the need to build new landfills. Reducing waste is the right thing to do!

Classroom Waste Study (All Grades)

Collect two weeks' worth of waste from your classroom and keep it in a separate area so that your custodian will not throw it out. DO NOT INCLUDE ANY FOOD WASTES. Sort the class trash into the following categories and record the weight of each. (Then check the categories that are collected in the recycling programs in your area.)

ALUMINUM _____ **CARDBOARD** _____ **FILE FOLDERS** _____ **GLASS** _____
NEWSPAPER _____ **MAGAZINES** _____ **PAPER** _____ **PLASTICS** _____
OLD SCHOOL SUPPLIES _____ **STEEL** _____ **OTHER** _____

A. At the end of two weeks, weigh all the waste to see how much has accumulated.

Our class trash weighs _____ lbs.

B. Divide weight by the number of people in your class to find the average amount of trash per person.

$$\frac{\text{lbs. of trash (FROM ABOVE)}}{\text{\# of students in your class}} = \text{lbs per student}$$

C. Assume that your class is typical, how much waste is created in all of the classrooms in your school?

$$\frac{\text{lbs of trash}}{\text{class}} \times \text{\# of classrooms} = \text{total lbs for school}$$

D. Weigh the items that can be recycled. Then use the formula below to find the percentage of recyclables.

$$\frac{\text{lbs of recyclable trash}}{\text{lbs of total trash}} = \text{\% recyclable}$$

Recycle Right

Delaware's single-stream recycling program accepts many items curbside or at a DSWA Recycling Drop-Off Center. "Single-stream" recycling is a system where all traditional recyclables such as cans, cardboard, cartons, glass bottles and jars, paper, and plastic containers are placed in the same container (cart or dumpster), separate from your trash. Be a smart recycler and find out exactly which recyclable items are acceptable to keep your recycling container free of contamination.

Download the **Recycling in Delaware poster** at de.gov/recycling to post by your recycling bin.



YES!

- NEWSPAPER, ENVELOPES, JUNK MAIL & PAPER BAGS
- CARDBOARD BOXES, PAPERBOARD BOXES, JUICE BOXES & CARTONS
- PLASTIC BOTTLES, PLASTIC JUGS & PLASTIC CONTAINERS
- GLASS BOTTLES & GLASS JARS
- METAL CANS & LIDS

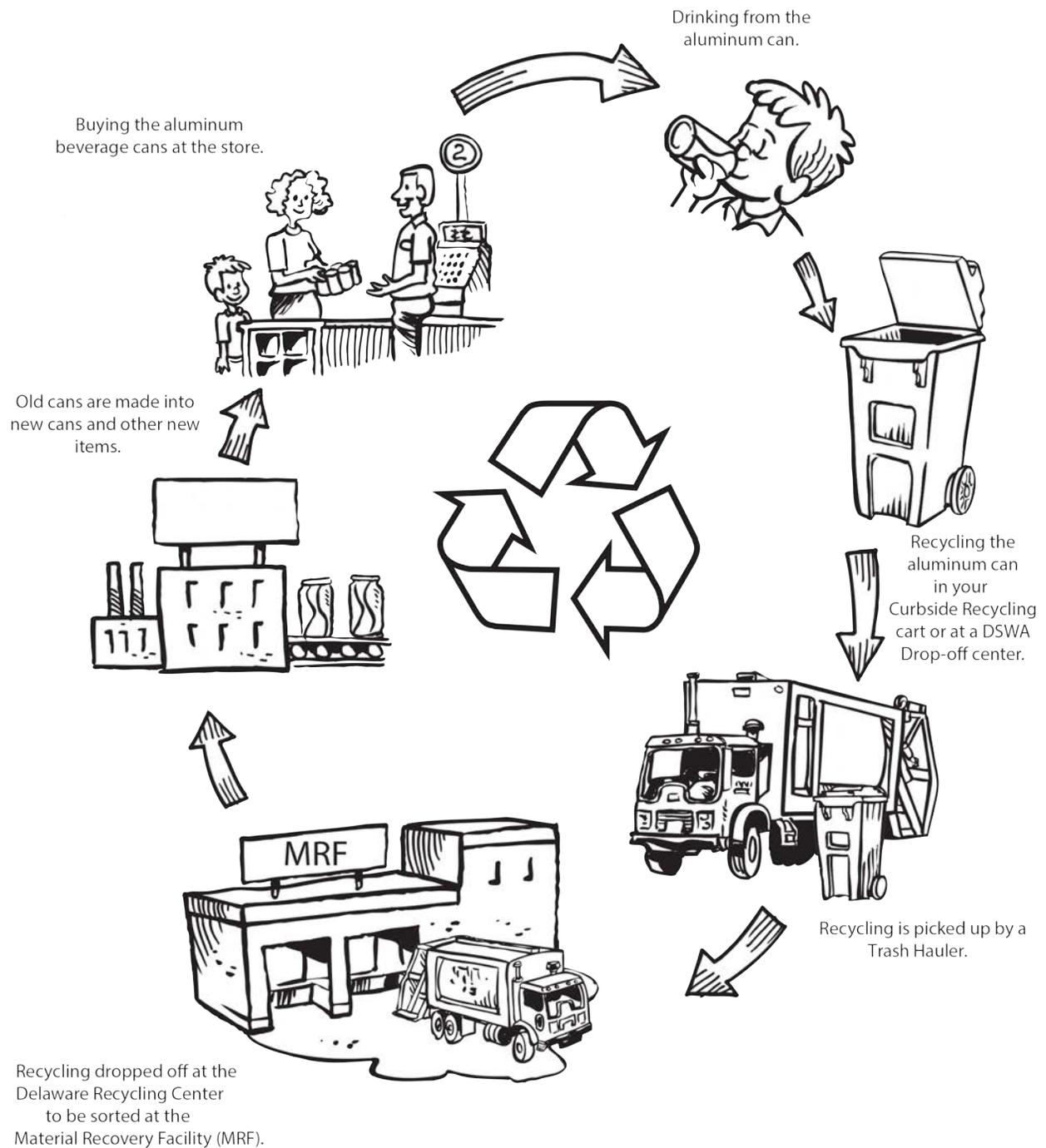
WHAT CAN I PUT IN MY RECYCLE BIN?

NO!

- DIRTY PIZZA BOXES, PAPER CUPS & STRAWS
- FOOD
- PLASTIC & METAL SILVERWARE/UTENSILS
- DRINK POUCHES, WRAPPERS & CHIP BAGS
- PLASTIC BAGS
- STYROFOAM
- ELECTRONICS & BATTERIES
- TISSUES & PAPER TOWELS
- CLOTHES, SHOES & TOYS
- HOSES, WIRES & STRING LIGHTS

Round & Round

Follow an aluminum can through the process of recycling.





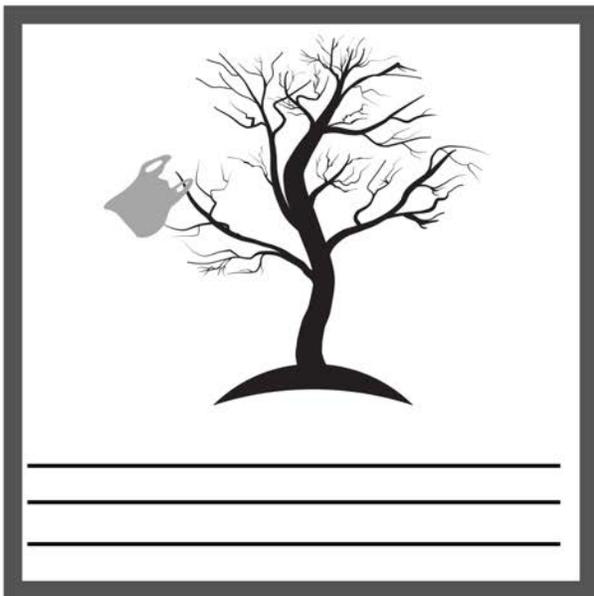
Plastic Bag Drag

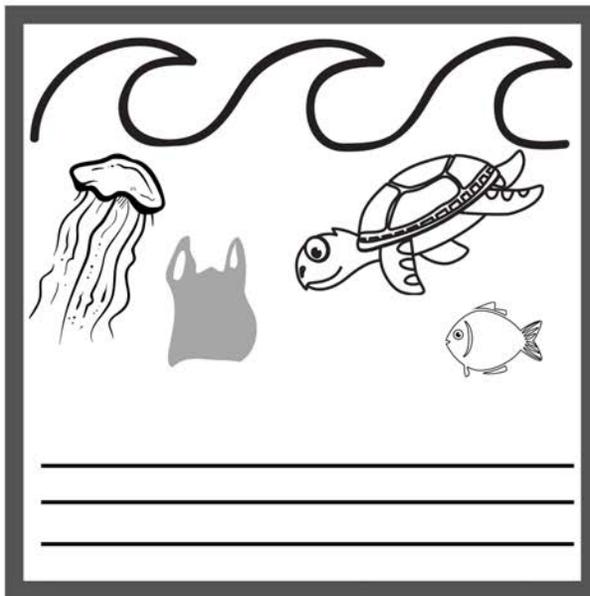


Name _____



Plastic bags end up in the wrong places everyday. In each box below explain how the plastic bag could cause a problem or be harmful. Then answer the follow up question.







How can you help the problem of plastic pollution? What are some tips for people on how to use less plastic bags?

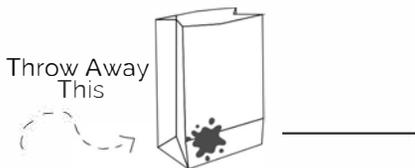
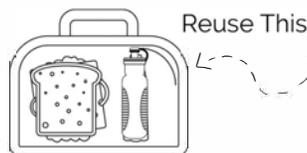
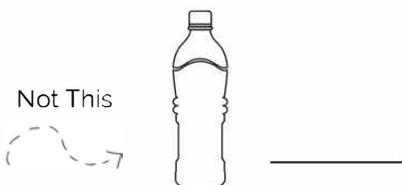


Helpful Habits

Match the scenario in column **A** to the corresponding phrases in column **B**.

A

B



1. Even though this item is made out of recyclable material it is not accepted in recycle bins. It is coated with a wax material to help it maintain its shape while holding hot liquids. The lid and straw are also trash!
2. This type of waste is generated the most in households across the United States. Millions of tons end up in landfills every year. Many people don't know how beneficial these scraps can be!
3. This single-use item causes the most problems at recycling centers because it clogs and tangles in machines. Never place it into a recycle bin! It is easily blown out of trucks, gets stuck in trees, and often fools wildlife into thinking it's food.
4. The recycling process is beneficial to the environment, but energy is still needed to turn old things into new. Making a new one of these from raw materials also contributes to the depletion of oil as a non-renewable resource. By choosing a reusable option you save resources and energy!
5. This disposable option is actually recyclable but it can easily become dirty from leaky drinks or food. If it's dirty it cannot be recycled and is therefore trash. Using a sturdy, washable, reusable option also saves money!

Electronics Recycling

DSWA's Electronic Goods Recycling (EGR) program allows residents to conveniently drop off their unwanted items for free at DSWA facilities statewide. Recycling electronic goods removes hazardous materials from the waste stream and saves landfill space.

- Computer Components And/Or Parts
- Mainframe Computers
- Mini Computers
- Terminals
- Printers
- Personal Computers
- Monitors
- Keyboards
- Mice
- Cables
- Laptop Computers
- Notebook Computers
- Notepad Computers
- Copying Equipment
- Electronic Typewriters
- Calculators
- Microwave Ovens
- Telephone Systems
- Terminals
- Telephones
- Fax Machines
- Pay Telephones
- Cordless Telephones
- Cellular Telephones
- Answering Machines
- Televisions
- Video Cameras
- Video Recorders
- Tape Recorders
- Audio Amplifiers
- VCRs
- Cassette Players
- Record Players
- Radios
- DVD players
- Vacuum Cleaners
- Handheld game systems
- Video Game Systems
- Electronic toys



Household Hazardous Waste

Many of the products used in your home, such as oil-based paints, cleaners, pesticides, and even old smoke detectors can be dangerous and poisonous! These products are not only dangerous in the house, but if they are not disposed of correctly they can cause pollution and harm fish, wildlife, and people. The Delaware Solid Waste Authority (DSWA) holds events each year for the collection of household hazardous waste. Look at the schedule below to check when the next event in your area will be.



Examples of items you **CAN** bring to a collection site. Product containers marked with the words: "WARNING: HAZARDOUS," "FLAMMABLE," "POISONOUS," "CORROSIVE," or "EXPLOSIVE"



Household items

- Full aerosol cans
- Bleach
- Chemistry kits
- Nail polish/polish removers/perfumes
- Disinfectants
- Drain cleaners
- Floor wax
- Mercury thermometers
- Mothballs
- Oven cleaner
- Smoke detectors
- Spot remover
- Toilet cleaner
- Compact fluorescent light bulbs (CFL)

Workshop items

- Corrosives
- Paints (other than Latex)
- Small compressed-gas cylinders
- Solvents
- Stains
- Strippers
- Thinners
- Varnish
- Wood preservatives
- Fluorescent bulbs/tubes

Garden & yard items

- Fungicides
- Herbicides
- Pesticides
- Pool chemicals

Home health care

- Prescription medicines
- Used syringes

Automotive items

- Antifreeze
- Auto batteries
- Degreasers
- Waste fuels - gasoline, kerosene
- Used motor oil mixed with other fuels

Explosives

- Ammunition
- Gunpowder
- Fireworks



Special Waste Search

Find the Electronics or Household Hazardous Waste that may be in each room.





Earth Day Word Search

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

Can you find these garbage, recycling and energy words?

Aluminum
Ores
Bottles
Fuel
Paper
Cans
Garbage
Plastics
Cardboard

Geothermal
Recycle
Clean Air
Glass
Reduce
Clean Water
Healthy
Repair it
Compost

Help
Reuse
Decompose
Hybrid
Soil
Dirt
Landfill
Solar
Earth Day

Litter
Trash
Earthworms
Metal
Trees
Environment
Oil
Wind

DSWA Environmental Education Program

The Delaware Solid Waste Authority is excited to be able to share its Environmental Education Building with teachers, students, scout groups, and other organizations! Education programs focus on how we can save natural resources and protect the environment through recycling and reliable solid waste management practices. One of the biggest goals of the education program is to foster a sense of environmental stewardship among students.

The education program combines classroom learning with interactive and hands-on activities. A short bus tour around the Delaware Recycling Center will allow students to view the Materials Recovery Facility and Construction and Demolition Recycling facilities.

In addition to the education goals of DSWA, our educators are ready to assist teachers in achieving curriculum goals. Requests for topic specific programs are welcomed!

Setting up a Field Trip!

- A field trip to the education building can be scheduled Monday through Saturday.
- Programs run for approximately 1.5-2 hours.
- Groups up to 60 children can be accommodated. Larger groups can schedule two programs per day or over a multiple-day period.
- Field trips are FREE, however groups are responsible for providing transportation.
- Students may bring bag lunches. Classroom setting may be used for eating.

For questions or to schedule a field a trip contact:

Stacey Helmer

1-800-404-7080

seh@dswa.com

or visit

www.DSWAEducation.com



Credits

This project was a collaboration with the Cape Gazette, Delaware Solid Waste Authority and The Delaware Department of Natural Resources & Environmental Control.

Illustrator Bot Roda

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@DE_Recycles

Cape Gazette

capegazette.com



@CapeGazette



@CapeGazette



WE PLEDGE TO
RECYCLE THE
PRESENT TO SAVE
THE FUTURE

CLASSROOM

DATE