



# Tracking Trash

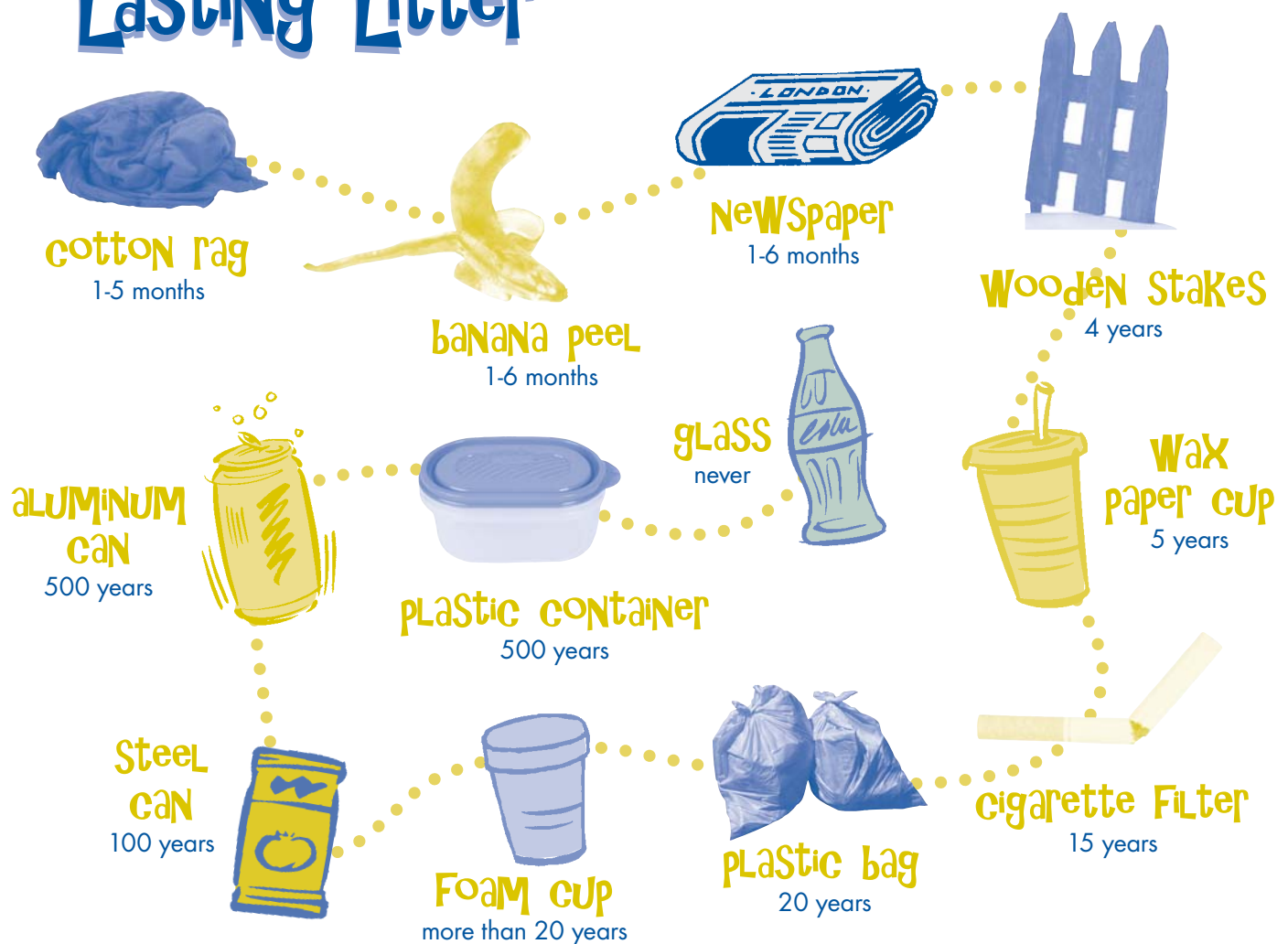


The truth about your trash!

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## Lasting Litter



\*For the above items to decompose at these rates, all the items above would have to be exposed to sun, rain and air.

# Introduction

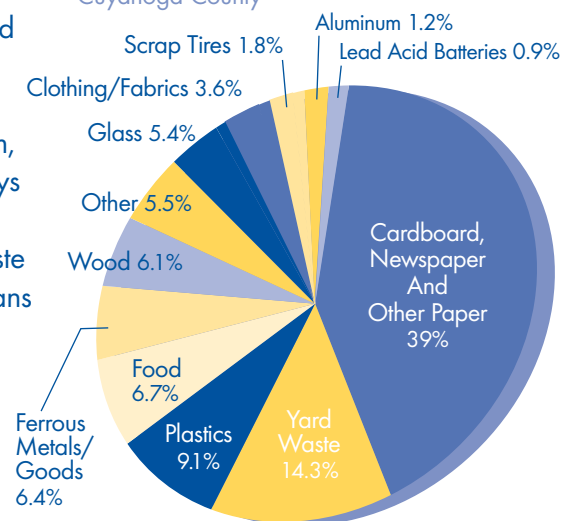


**M**ost people do not know what happens to their trash after it's loaded onto a garbage truck. When trash is "thrown away," it is disposed of in several Ohio landfills. Almost all the trash made in Cuyahoga County is disposed of in a landfill. Unfortunately, trash that is landfilled instead of recycled will never be used again, which wastes the natural resources and energy used to make the product.

As Americans throw away their trash, they are throwing away natural resources such as trees, minerals and oil faster than the earth can replace them. Americans need to know that trash is an environmental problem and to help solve the problem, everyone should practice ways to reduce, reuse and recycle. Landfills will always be a waste disposal method, but Americans can put less in them.

## Waste Stream Percentages

Cuyahoga County



## Trash Myths

**Trash in a landfill decomposes**

**Landfills never leak**

**Trash is not a problem**

**Trash costs never rise**

**A better economy means less trash**

**Nothing can be built on a landfill**

**Landfill technology is limited**

## Reality

Trash is tightly compacted in a landfill without air, light and moisture, so trash is being preserved rather than decomposing.

The plastic liners will crack over time, which is why landfills are monitored for 30 years after they close.

Litter and trash cause many problems for humans, animals and the environment.

When local landfills close, trash costs increase because trucking costs are added to disposal costs.

A better economy actually means more trash, since people buy more because they have more money.

Parks and golf courses can be built over closed landfills; however, buildings cannot be built over areas where trash was buried.

Currently, studies are being conducted to increase the rate of decomposition, thus, making room for additional garbage.





# MAKING SOLID Waste

**T**rash has many names such as

refuse, rubbish, garbage and its technical name, municipal solid waste or MSW.

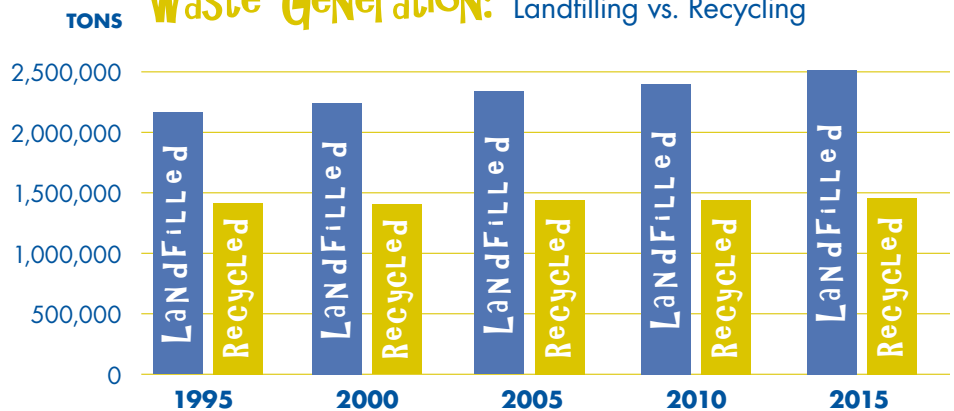
People at home, work or school throw away MSW, which includes plastic, paper, glass, metal, cardboard, food, wood, rubber, furniture, appliances, cleaning and toiletry products, clothing, etc. MSW does not include concrete and asphalt debris, sewage sludge, medical waste, combustion ash and industrial, radioactive or hazardous waste. The non-MSW waste is disposed of in a special way, since some wastes are not safe for landfill disposal.

Even though over half of all trash is recyclable, on average a person throws away five pounds of trash a day. Since 1970, the national average has increased from two pounds per day per

person. The amount of trash generated relates to how much money a person earns and where a person lives. When people earn more, they buy more, so more trash is generated. People living in a city buy their food and products from a store, which are packaged and in some cases over packaged creating more pounds of trash per person.

*People spend money buying trash. For example, a chocolate bar, fast food burger or bar of soap is what someone wants and the wrapper is instantly trash once the product is opened.*

## Waste Generation: Landfilling vs. Recycling

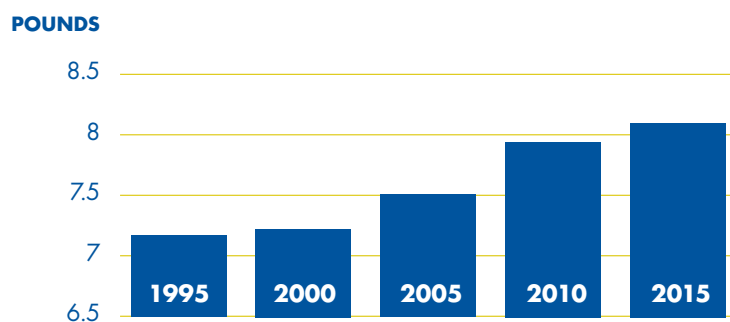


*This graph shows that amount of waste disposed of in the landfill while the rate of recycling stays relatively the same. The amount of waste generated in the county increases each year which means less is being recycled.*

## DUMPING Dangers

Disposing of waste in an improper place can be harmful to humans and the environment. For example, household cleaners can contain toxic (poisonous) substances, which if poured on the ground or down a storm drain can pollute the soil and water and harm animals that live in rivers and Lake Erie. Another example is the illegal dumping of tires, which can create an excellent breeding ground for mosquitoes and other pests as tires fill with rainwater. Great numbers of mosquito larvae can develop without being preyed on by fish that would be present in a pond or stream. Mosquitos and other pests can carry diseases that are harmful to humans.

## Daily Generation Rate: Pound Per Person Per Day



*More than 3.7 million tons of waste are generated from Cuyahoga County where residents throw away upwards to 7.2 pounds of trash a day, which is more than one ton per person per year.*



Name: \_\_\_\_\_

# WHO CAUSED THIS TRASH

**Directions:** Draw a line to match from where the trash came.



**Fast Food Restaurant**

**Gas/Auto Repair Station**

**Beauty Salon**

**House**

**Fish Market**

**Pizzeria**

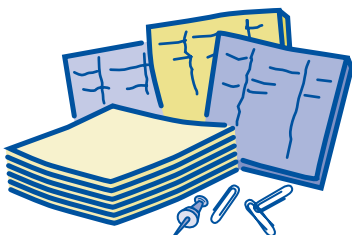
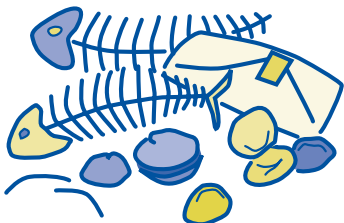
**Clothing Store**

**Daycare Center**

**Office**

**Pet Store**

**Flower Shop**



# Landfill Layers & Protective Measures



A landfill containing three million tons of garbage can produce enough gas to meet the heating and cooling needs of about 18,000 homes for 15 years.

**1 Composite Liner.** The liners are made of a clay layer and a synthetic layer, which offer different cracking resistant properties. Also, the liners prevent leachate from seeping into the groundwater.

*Clay Layer:*  
Recompacted clay creates a natural layer due to its ability to clump together and hold in liquid.

*Plastic Liner:* The liner is made from high density polyethylene (HDPE) or polyvinyl chloride.

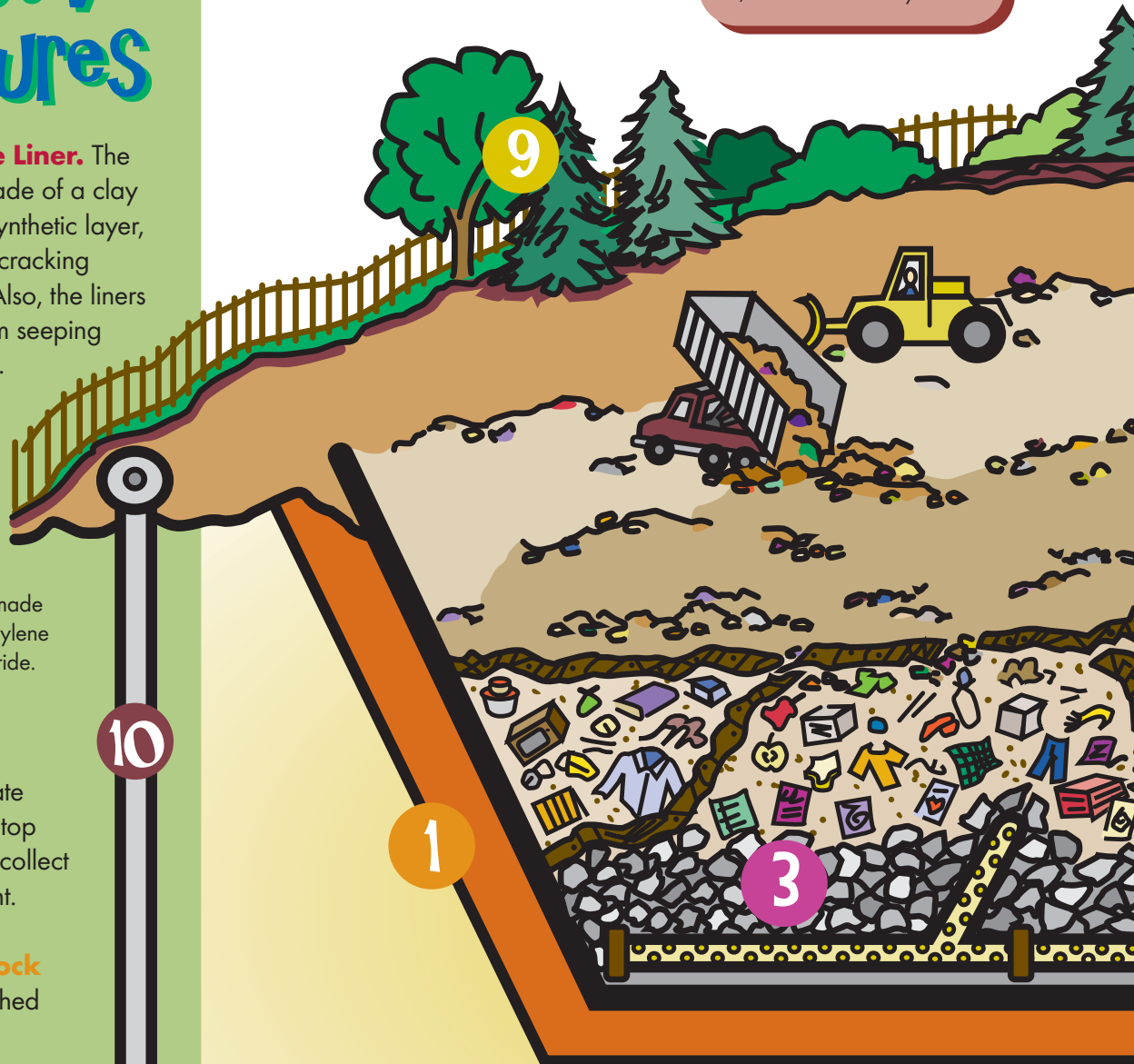
**2 Leachate Collection Pipes.** Leachate pipes are placed on top of the plastic liner to collect leachate for treatment.

**3 Crushed Rock Layer.** Crushed rock is placed around leachate pipes to prevent clogging.

**4 Methane Gas Collection System.** Methane gas forms pockets at the center and bottom of the landfill, so pipes run throughout the landfill collecting the gas and sending it to a collection well.

**5 Trash Layer.** Trash is dumped and compacted into cells, which can be several acres in size.

**6 Soil Cover Layer.** At the end of the work day, the working face or where trash was dumped is covered with up to six inches of soil. The soil is used to minimize the odor, control litter and discourage animals and insects, thus, protecting public health.



Leachate is created when rainwater washes through trash picking up chemicals, inks and heavy metals creating a "toxic soup."



A liner made from HDPE would have to be 60 mils thick, which equals a stack of 60 garbage bags. The construction cost can be as high as \$750,000 per acre.



Methane gas, a flammable, odorless and colorless gas, is created when trash decomposes without oxygen. The methane gas can either be burned off or captured as a fuel to be converted to electricity. Carbon dioxide and other gases are released from landfills as well, but landfill gas is almost 60% methane gas. Methane, a greenhouse gas, is a major concern because it is an air pollutant and it destroys the ozone layer contributing to global warming.



**7 Final Cap.** When a landfill is full and regulations state that it cannot accept more trash, it must be closed. A final cap is installed over the landfill. The cap is made from a synthetic plastic followed by a four foot layer of dirt. Grass and shallow rooted plants are planted on top to prevent the erosion of the soil cap.

**8 Fencing** for litter control.

**9 Vegetation** for sound and dust control.

**10 Groundwater monitoring** to ensure protection of drinking water sources from leachate.

**11 Continued methane collection** and monitoring.





# Traveling Trash

If your name was written on a lunch bag and it was thrown away, what would happen to it?



1

Trash is stored in garbage cans and bags until garbage day.

5

The load is dumped on a concrete floor and further compacted.

2

The trash is loaded into a garbage truck called a packer.



4

At the transfer station, the garbage truck is weighed.



3

The packer truck travels to a transfer station once it is filled with compacted waste.



8

Once a packer truck is filled, a compactor presses the garbage from the back to front making room for more waste.

A garbage truck can haul four and five tons of compacted waste, since they are not meant to travel far distances. There are ten transfer stations in the Cuyahoga County.

The weight of garbage in the truck determines the cost of the tip fee, which is the cost of transporting waste plus a disposal fee at the landfill.



Let's Follow Its Journey to a Landfill.

6

The trash is loaded into a long haul tractor trailer.



7

The trash is inspected and dumped in the landfill.

9

Compacted trash is covered with six inches of dirt at the end of the work day.



8

The trash is spread out and leveled by large earth moving equipment.



In order to dump the trash at the landfill, the trailer either has a hydraulic lift to dump the waste by gravity or walking floors like a conveyor belt to push the trash on the ground.

A compactor with large spiked wheels helps pack down the trash.

The dirt keeps insects, animals and birds out of the trash. It also helps with odor and litter.

Note: Browning Ferris Industries (BFI) in Oberlin will allow student tours of their operating landfill and material recovery facility (recycling center).

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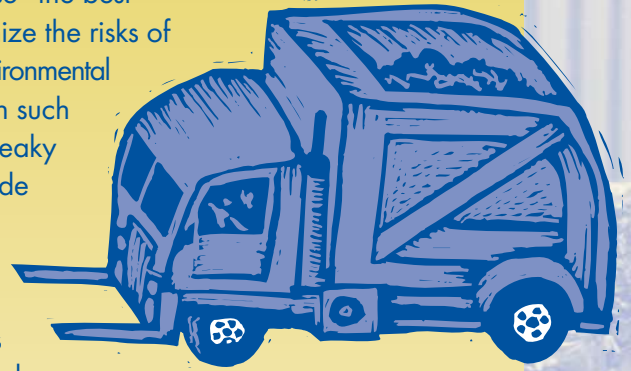
## CHANGING TIMES OF TRASH

Open dumps used to be found in every town in the county. Residents either brought their trash to the dump or had a hauler pick up the trash and bring it to the local dump. A dump was just a hole in the ground or a low-lying area such as a wetland or along a riverbed. Local communities started to cover trash with dirt after World War II to keep out pests, but most small local landfills still did not have safety features to protect the environment. Methane gas explosions occurred at and near dumps and leachate leaked into water supplies causing water pollution.

Based on environmental concerns, open dumps and the small local landfills began to close. They did not meet state and federal design and operation standards, and installing new safety features were very expensive, so the local landfills closed. Instead, larger regional landfills or "mega-fills" were built to handle local trash disposal needs.

## BUILDING a Mega LandFill

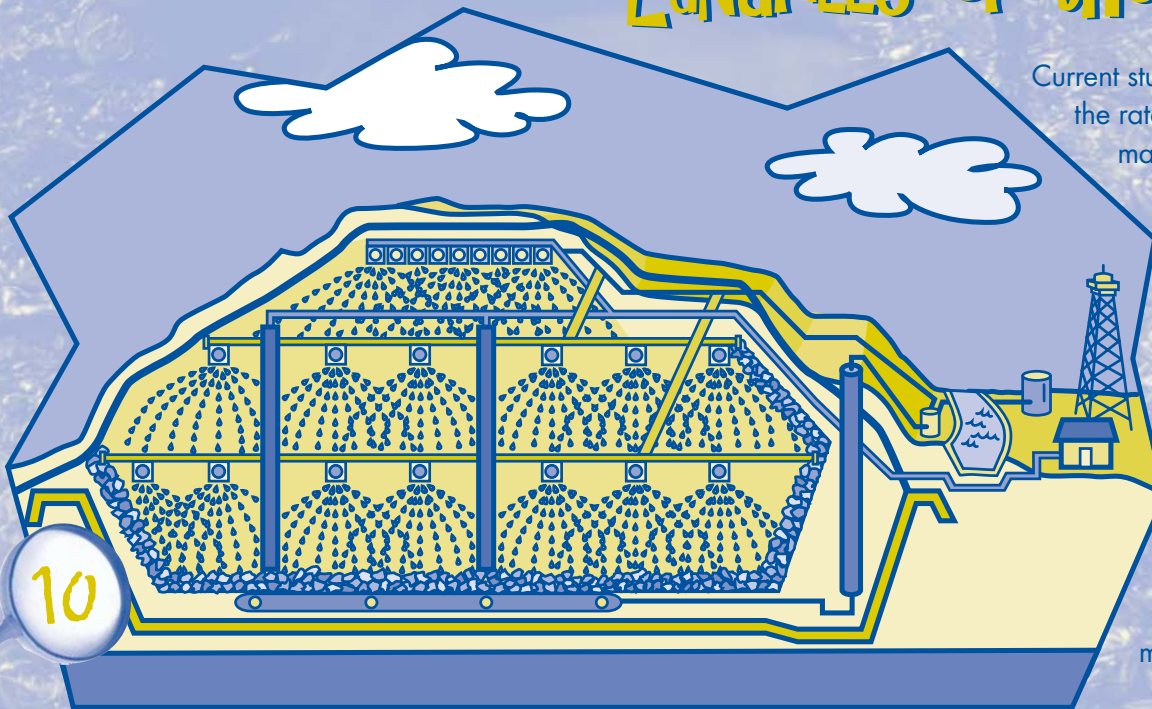
Today's sanitary landfills use "the best available technology" to minimize the risks of buried trash; however, serious environmental problems still must be dealt with such as traveling methane gas and leaky leachate. Other problems include litter and odor and when garbage is transported to regional landfills, noise and dust is created by the hundreds of trucks using the landfill each day.



The Environmental Protection Agency oversees the siting process of new landfills in the State of Ohio. General restrictions include that landfills not to be built near airport runways, in wetlands or floodplains or near geologic fault lines where an earthquake may occur. New landfills may be unwanted in communities, but they create money for a county through taxes and new jobs. Siting a landfill can take five to eight years to complete, which requires addressing public concerns, potential risks, economic and environmental impacts and political and social issues. Also, a plan must be designed for post closure maintenance and possible environmental cleanup. After all the approvals have been met, a landfill operator can start construction by creating a several hundred acre hole in the ground, called a cell.

See also pages 6 & 7.

## LANDFILLS OF the Future



Current studies are trying to increase the rate of decomposition to make room for more trash without having to build new landfills. Studies suggest that trash would decompose faster if air is added and leachate is circulated. Air and water if added will mimic natural processes. The studies claim that a wet landfill will break down trash in five years, and left over materials can be mined for reuse.



# Studying Old Landfills

In the past, the Garbage Project conducted by University of Arizona students has studied landfills to determine the throw away habits of typical Americans.

More sausage and lunch meats appeared in landfills, which are more fattening, but they have less visible fat.

Study released linking fat and cancer

1970's

Due to a panic to buy whatever sugar was available, Mexican sugar in landfills increased because of its unfamiliar taste and texture, and it spoiled faster.

Spring sugar shortage

1973

Increase in beef with some still in the packaging, due to a buying panic. Much of the beef went bad when people bought unfamiliar cuts, which they found that they did not like or did not know how to prepare.

Spring beef shortage

1975

A great increase of paper waste occurred in landfills. computer technology hits the market

1982



1970's

Public scavenging became illegal and more usable goods arrived and stayed in landfills.

1950's

More food waste appeared in landfills.

Feeding pigs food waste is now regulated due to prevalent disease

1939

Rags increased in landfills. The Act destroyed the recycled wool market by creating negative public awareness against rag pickers, who went out of business.

Wool Labeling Act

1920's

Paper started to be manufactured out of wood rather than rags, so paper increased in landfills because it was seen as disposable.

Railroad and wood pulp treatment processed improved

## Did Ya Know?

In June of 2001, the Nestle Corporation constructed a pipeline to use methane gas to heat the hot water used in Stouffer's cooking process. The Cuyahoga Regional Landfill in Solon provides the methane for Stouffers, which prepares packaged meals. The gas is chilled to remove any water in the methane, then compressed and piped 2.2 miles to Stouffers. The system collects about 3,300 scfm of landfill gas from the existing landfill. Nestle is saving money on their fuel bill since the price of landfill gas is less than natural gas.



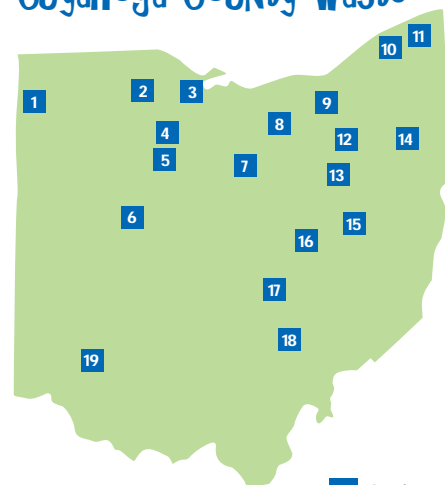


# What **You** Can Do To Make Less Waste

- ✓ **Recycle** at home, work and school.
- ✓ **Recycle/reuse** whenever and wherever possible.
- ✓ **Maintain and repair** products that you own.
- ✓ **Buy good quality** or durable goods.
- ✓ **Buy in bulk** or minimally packaged products.
- ✓ **Use returnable, refillable or reusable** packaging.
- ✓ **Use nontoxic alternatives** instead of harmful cleaning products.
- ✓ **Compost** food waste and yard waste in the backyard.
- ✓ **Use fewer single use items** such as ketchup packets, paper towels and paper napkins.
- ✓ **Borrow, rent or share** seldom used items.
- ✓ **Sell or donate** unwanted goods and clothing.
- ✓ **Recycle** special items like computers at Solid Waste District Collection events.



## COUNTIES WHICH RECEIVE CUYAHOGA COUNTY WASTE



1 Williams	7 Richland	13 Stark
2 Wood	8 Lorain	14 Mahoning
3 Ottawa	9 Cuyahoga	15 Tuscarawas
4 Seneca	10 Lake	16 Coshocton
5 Wyandot	11 Ashtabula	17 Perry
6 Logan	12 Summit	18 Athens
		19 Warren

## Invite A Guest Speaker

To request a classroom presentation on waste or landfills, contact Kathleen, Education Specialist at **216-443-3731** or [krocco@www.cuyahoga.oh.us](mailto:krocco@www.cuyahoga.oh.us). Check out classroom resources for educational information at [www.cuyahogaswd.org](http://www.cuyahogaswd.org).



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