



# RECYCLING CHAMPIONS

## ***Sort it Out: Why People Recycle – Stewardship in NYC and Around the World***

*Sort it Out* Recycling Education Series  
Interdisciplinary Education Enrichment Supplement  
Created for Secondary New York City Public Schools  
GrowNYC, August 2014



# Recycling Social Studies Enrichment Unit

## Sort it Out: Stewardship and Recycling in NYC, and Around the World

### Questions

#### Recycling throughout NYC and American History

How was recycling an important part of American's independence from Great Britain?

Why was recycling an important part of industrialization in America?

What historical role did immigrants play in recycling? How does that compare to today?

How did having the United States' first modern Sanitation Department help allow NYC to grow into a major urban center?

Why did recycling help America win the Second World War?

How did a barge of NYC trash help define the nation's solid waste crisis?

#### Stewardship Around the World

Why do countries recycle?

Why do people in some countries recycle more than Americans do, and others less?

What are some incentives and disincentives for recycling?

How does NYC measure up with recycling, and other measures of a "green" city?

What strategies are used to increase recycling?

#### Stewardship in the Community and at the School

Why is trash an environmental justice issue?

What can the students do at home and at school to help increase recycling?

#### Common Core Standards:

How Did the Revolutionary War Affect Lives in New York?

What was the effect of the industrial growth and increased immigration on NY?

How industrialization and immigration change the face of American life?

How has America reacted to challenges of the Modern World



## American Independence and Recycling

The word “paper” comes from the Greek word for papyrus, which is a plant that grows near the Nile River. Around the world, paper was traditionally made from local native plants like papyrus, hemp and recycled cloth—mostly cotton and linen rags.

In 1690 the manufacturing process for recycled paper was invented, which made paper production much faster. This helped the common citizen gain access to printed materials.

**Did you know?** Trees were *not* used to make paper until shipping them and processing the wood pulp became cheaper and more efficient, during the late 19th and early 20th century.



The Massachusetts House of Representatives passed a decree in the 1700's requiring that all towns appoint an individual to recycle rags for the mills.

**Revolutionary War Recycling.** Controversy over imported goods from Britain in the 18<sup>th</sup> Century was one reason American colonists met to discuss independence. The British claimed the additional taxes added on to the cost of imported goods were necessary to help them recover costs from the French and Indian War. The Founding Fathers disagreed and held a mock tea party in Boston to emphasize their point.

“Reduce, Reuse and Recycle” was already commonly practiced as part of survival in colonial America, but when America declared independence in 1776, recycling became part of the war effort.

### Discussion and Debate:

**Why was Benjamin Franklin's ability to print paper from recycled rags so important for American independence?**

### Recycling during the American Revolution:

**In NYC, the nation's first capital**, patriots melted down iron kettles and pots to make weapons. Residents tore down a statue of King George III, which was melted down and made into 42,088 bullets.

**Silversmith Paul Revere** advertises for scrap metal of all kinds.

**George Washington** urges the reuse of old worn chain and other metals for frigates, which was a type of ship used in the war.

**Benjamin Franklin** was first paper merchant in America. He helped establish 19 mills that made paper from scrap paper and rags, then used this paper in his print shops. His ability to print inexpensive leaflets in large quantities was instrumental in securing support for the Revolutionary War. He also started the nation's first “street cleaning” program- or sanitation department.

**Thomas Jefferson** recycled food scraps and manure to build up healthy soils for his model gardens at Monticello, which featured season extension, and many new varieties of fruits and vegetables. He may have been America's first “foodie,” promoting local fine cuisine.

Adapted from: [www.motorcityfreegeek.net/index.php?option=com\\_content&view=article&id=69&Itemid=78](http://www.motorcityfreegeek.net/index.php?option=com_content&view=article&id=69&Itemid=78)

### Activities:

#### Make Recycled Paper



<http://www.wikihow.com/Make-Recycled-Paper>

#### Make Recycled Magazine Bowls



<http://livingonthecheap.com/turn-old-magazines-into-beautiful-bowls/>



## Immigrants and Recycling

From 1840 to 1920, the U.S. urban population grew from about 1.8 million to more than 54 million people.

Collecting re-usable materials for recycling became increasingly important as industrialization grew in America in the 1800's.



Thousands of Italian immigrants were rag pickers in Brooklyn and Manhattan in the late 1800's. They picked up not only rags, but broken china, glass and even bones, which could be ground down for powder for industry or made into handles or toys.

The materials were brought home and had to be sorted and washed before they were sold. This contributed to the cramped, uncomfortable and often unsanitary conditions found in the slums and anti-immigration sentiment in NYC at that time.

<http://www.brownstoner.com/blog/2014/08/walkabout-brooklyn-through-rag-and-bone/>

The "Scavenging" industry, as the recycling industry was called, employed many new immigrants in the United States from the 1840's to the 1920's.

As new clothes became mass produced in factories, they became cheaper, so people stopped mending their old ones. These rags were abundant in urban industrial areas and used by the paper mills. Some storeowners took rags as payment for other items.

Scrap-yards and junk shops became common after the Civil War. Immigrants were employed as trash pickers and scavengers, since they could be paid low wages. Some had established routes with horse drawn carts to collect recyclable items.

[http://www.academia.edu/4394635/Recycling\\_is\\_not\\_garbage\\_market\\_agents\\_and\\_municipal\\_recycling\\_in\\_New\\_York\\_City](http://www.academia.edu/4394635/Recycling_is_not_garbage_market_agents_and_municipal_recycling_in_New_York_City)



NYC's Bottle Bill allows individuals to redeem bottles and cans for 5 cents, \$2.50. Once put on the curb, these materials legally belong to the city, but enforcement is rare. In European countries with waste to energy plants, cans are rare since the material is valuable to cities for its energy content.

### Discussion and Debate

**Who are the "canners?" How is this group similar to immigrants in the 1800's?**

**Is this a good system to increase recycling, or should the city try to stop them and collect these recyclables?**

**To learn more about "Canners" see the 2013 Documentary "Redemption:"**

<http://www.imdb.com/title/tt2201886/>



## Recycling and Industrialization: Henry Ford and George Washington Carver

Throughout history, recycling has reduced the costs of transporting goods from where they are harvested, extracted or imported, usually far from urban centers, so industries recycled materials whenever they could. Businesses conserve resources that reduce costs, a practice that can help the environment as well as increase profits.

**Henry Ford and George Washington Carver** advanced industrialization in America, and also shared a passion for recycling. Ford and Carter modernized production, materials science, and supply chains. Both focused on sourcing and selling local and recycled materials- shorting the supply chain. This reduced the energy, materials and money required to move materials over long distances to consumer markets.

Henry Ford used wood scraps from the production of Model Ts to make Kingsford Charcoal, named for Ford's brother-in-law.



The country turned to Ford and Carter to make manufacturing and agriculture more efficient and productive during wartime and economic depression. This involved recycling high volumes of materials, and keeping production "local."

George Washington Carver taught farmers to compost, recycle, and use waste products and native plants already found on their farms to make new products. Carter was a brilliant chemist responsible for material science inventions that helped agriculture develop into a large industry. He developed hundreds of lower cost products, like paint made from used motor oil and soap made from kitchen grease, to help supplement the income of rural populations.

Henry Ford recycled scrap metal, wood, cardboard, paper, rags, bricks at his automobile factories- everything was repaired and recycled that could be. He even used old paint scraped off of buildings to make new paint. Long before Toyota coined the phrase "lean manufacturing" his factories could be classified as "zero waste."

### Activity:

Can you name a **by-product** in something you use or like to eat?  
For example, **Yellow #5**, or **tartrazine**, is found in **macaroni and cheese** and **Doritos chips**. It is a **by-product** made from **coal tar**.

Both Ford and Carter found new uses for industrial and agricultural waste, recycling them into new products. These are called **by-products**, which became an important American industry and the field of material science. Ford operated large scale research and development facilities to develop new materials, coordinating his activities with Thomas Edison and Carter, both friends of Ford.

"Industry owes it to society to conserve materials in every possible way, not only for the element of cost in the manufactured article but mostly for the conservation of those materials whose production and transportation are laying an increased burden on society." -Henry Ford

Adapted from the book:  
The Green Vision of Henry Ford  
and George Washington Carver:  
Two Collaborators in the Cause  
of Clean Industry,  
Quentin R. Skrabec, Jr. McFarland,  
Mar 11, 2013

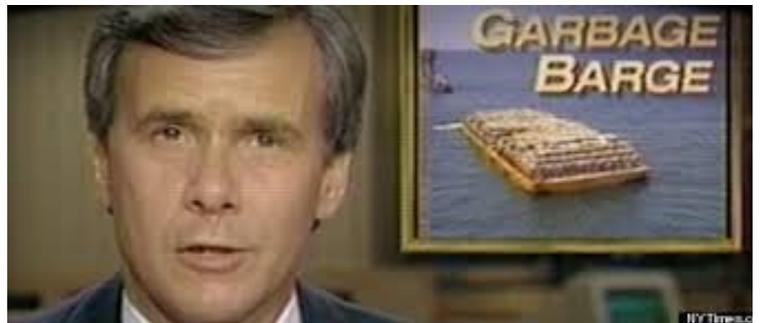
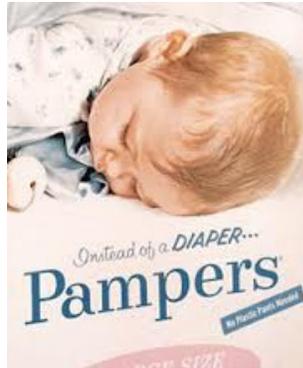


## Recycling in NYC History

- 1657** New Amsterdam (now Manhattan) passes a law against casting waste in the streets.
- 1860's** Trash piles up in NYC neighborhoods, and boys are hired by pedestrians to sweep a path to cross the street. In 1872 the city stops dumping its garbage from a platform built out over the East River.
- 1885** The nation's first modern garbage incinerator is built on Governor's Island, New York
- 1895** New York City appoints Colonel George E. Waring as commissioner of what would become NYC's Department of Sanitation. Known as the "Apostle of Cleanliness," Waring organizes the first comprehensive system of waste management in the United States. Workers wore bright white uniforms, cleaning up the streets-modernizing urban sanitation to accommodate the large population growth. Residents are required to separate food waste, ashes from stoves and fireplaces, paper and street sweepings in separate containers. A sorting facility with "picking yards" in Manhattan served as the city's first recycling plant. Before this initiative, 75% of NYS's waste was dumped into the ocean.
- Early 1900s** American cities begin to estimate and record collected wastes. In Manhattan, Brooklyn, and the Bronx, each citizen produces annually: 141 pounds of wet garbage (food waste,) 1,443 pounds of coal and wood ash, and 88 pounds of dry rubbish -- a total of 1,672 pounds on average.
- 1905** New York begins using a garbage incinerator to generate electricity to light the Williamsburg Bridge.
- 1918** War World 1 brought an end to recycling, due to labor and materials shortages-and ocean dumping was reinstated. Over the next 20 years NYC built 22 incinerators and 89 landfills. "Landfilling" – reclaiming wetlands with layers of garbage, ash, and dirt – is introduced and is adopted widely.
- 1947** The Fresh Kills Landfill opened in Staten Island. It would become the world's largest landfill, becoming one of the tallest human made structures on earth. Closed in 2001, it is now becoming a park.
- 1950's** The use of disposable single use products increases, creating the "throw away" society. In NYC, between 1905 and 2005, there is a tenfold rise in packaging waste, from 92 to 1,242 pounds per person per year.
- 1960** One-third of the city's trash was burned in over 17,000 apartment building and 22 municipal incinerators.
- 1970** 20 million people protest, attend fairs and festivals at the first national environmental teach-in, known later as "Earth Day." In NYC, Fifth Avenue is turned into a pedestrian mall for environmental education.
- 1987** The Mobro, a barge carrying garbage from New York, tries unsuccessfully to get rid of its load in six states and three other countries. The barge travels 6,000 miles for six months before it is finally allowed to dump its load, back on Long Island, NY. The landfills rejected the load despite their capacity to accept the material. The national media refers to a new "solid waste crisis" and renews interest in recycling.
- 1989** Recycling becomes mandatory in NYC (Local Law 19). Mayor Guillian fights against implementation.
- 2006** NYC adopts the Comprehensive Solid Waste Management Plan, expanding in-city recycling efforts
- 2013** NYC expands recycling program to include all rigid plastics, and begins new Organics Collection programs  
Residents protest the re-opening of a waste transfer station on the upper east side of Manhattan.



Match the Event in the Recycling Timeline with the Corresponding Picture Below.





## Battle on the Home Front: Recycling and the War Effort

### “Don’t Waste Waste – Save It. Food Will Win the War.”

During World War I, from 1916 – 1918 the Waste Reclamation Service was created to encourage the public to recycle and save old rags and wastepaper. Used paper became a valuable commodity. Thousands of tons of old books, newspapers, and business papers are recycled by paper mills. President Hoover established the Food Administration to teach “home economics” in order to conserve, prepare and grow food so more could be exported to the troops in Europe. Millions of men, women and children patriotically participated in "Meatless Mondays" and "Wheatless Wednesdays on the home front.



WWII Poster encouraging recycling

### The War on the Home front: “Get in the Scrap”

1939 – 1945

Thousands of tons of material are recycled to support U.S. and Allied troops during World War II, in record numbers. The War Production Board’s Salvage Division is responsible for promoting nationwide recycling, and recruits the boy scouts as “poster boys” to hang recycling posters. More than 20,000 salvage committees, 400,000 volunteers, and millions of citizens pledge to “Get in the Scrap” to recycle to help the war effort. Tin, rubber, aluminum, paper and other materials are recycled in unprecedented record numbers.

**Activity: WATCH this!**

**PBS**

**WWII and Recycling video**

<http://www.pbs.org/thewar/>



Women painting “stockings” on their legs during WWII

During WWII, common consumer items like silk and nylon stockings were rationed, as they were needed to make tents and parachutes. Women wore alternatives like “bobby sox,” and even painted their legs to look like stockings. Many simply went without as materials were diverted to the war effort. “Stocking panics” at the start of the war were replaced with patriotic support.

In addition, a lucrative black market for rationed items was widespread in many areas of the country.

### Discussion and Debate:

**Why do you think the recycling campaign during WWII was so successful?**

**Why did so many American citizens stop recycling and conserving resources when the war was over?**



In the 1970’s, President Carter encouraged Americans to conserve energy, turning down the thermostat and installing solar panels on the Whitehouse. He was widely criticized at the time.

**Why did the public react so differently to Carter’s conservation efforts than to conservation efforts during WWII?**



## Recycling Around the World Today: Why do some nations recycle more than others?

Recycling is impacted by many factors that influence individual and group behavior, including culture, convenience, education, necessity, economics, politics, international conflict, and domestic public policies.



**Discussion and Debate:** Residential and public recycling bins are a common site in Austria and Japan, where recycling rates are high and litter thrown on streets is very rare. In contrast, recorded municipal recycling rates are lowest in Russia, Romania, Pakistan and Chile, and in countries in Central and sub-Saharan Africa.

Is this due to convenience, cultural norms, economics, or municipal policies?

**Activity:** Here is a list of variables that impact recycling rates across the world. Do they affect recycling rates in your community? Why or why not?

- 1) **Geographic capacity.** Little land may be available that is not already designated for development or conservation—so space for landfills, despite technological advances that increase their capacity, may be an issue.
- 2) **Natural resources.** The supply of virgin materials for particular products may be limited.
- 3) **Cultural/Social Norms.** A conservation ethic is valued within the local culture, and elected officials are brought into office with the expectation that they will support sustainability practices. Recycling and other conservation practices like cycling to work may be the “social norm,” a widely adopted and expected group behavior.
- 4) **Environmental sustainability.** Local governments may set environmental sustainability goals and targets. For example, the European Union has a mandated target to recycle 50 % of household and similar waste by 2020, but recycling rates of the nations within the EU vary.
- 5) **Laws.** Recycling is mandatory and part of the law.
- 6) **Punishment.** Residents are fined when they do not separate their recycling.
- 7) **Healthy Community.** Recycling was instituted because of widespread problems with litter.
- 8) **Markets.** Recycling may be market driven and local governments may have public private partnerships that favor recycling a particular material more than another, or may be more profitable to sell.
- 9) **Capacity.** Governments have different capacities to set up an infrastructure that can handle collection, storage, transportation, sorting and the remanufacturing of recyclable materials. Solid waste management services are often a cities’ single largest budget item. Private citizens’ or companies handle recycling collection when municipal budgets are low, or populations are small.
- 10) **Economics.** The average household income impacts how frequently citizens may purchase disposable, single use items, which are most often more expensive than reusable ones. Therefore the amount of trash generated is less.
- 11) **Policy Incentives.** “Pay as you throw” policies charge residents per pound to collect trash, instead of everyone paying the same amount regardless of the amount of trash they throw away. Rewards for recycling can also be available beyond cost savings.
- 12) **Technology.** Waste disposal systems vary, as waste-to-energy incinerator plants are common in Europe but rare in the Americas, where most waste goes into landfills.



## Too Much Waste or Not Enough? The Newest European Import

The US produces one quarter of the world's waste but is less than 5% of the world's population. In 2014, over half of the world's population lives in urban areas, making waste management increasingly important. According to the World Bank, in 2012, open dumpsites are still most common in developing countries.



“Throw Away” cultures have been less common in less industrialized communities, where it is rare not to re-use an object for another purpose, until no additional uses can be found. This can be driven by economics or culture, or both. In economically distressed areas, waste is still most often placed in waterways and/or an open dump, where residents sort through the material to search for valuable recyclables to sell.

A major trend in Europe, Waste to Energy programs that capture heat and/or create electricity from burning trash have increased recycling. These facilities help the EU meet carbon emissions reduction goals.

Currently there are 420 waste incinerator plants in Europe that provide energy to more than 20 million people. Norway, Germany, Sweden, Belgium and the Netherlands have large scale waste to energy programs. Switzerland and Norway have a land-filling ban, requiring that all non-recycled combustible waste be incinerated. Trash is more meticulously sorted prior to incineration, with some countries returning potentially toxic ashes for land-filling. Incineration remains controversial in the United States. (See STEM unit for detailed more information.)



Norway leads Europe in waste to energy district heat production

Many of the same countries with incinerator waste to energy plants have the highest rates of recycling, but the amount of municipal solid waste they generate varies. Trash is now an imported commodity throughout Europe.

### Pounds of trash (Municipal Solid Waste) in 2012-3 produced per person per year in selected countries:

The United States (1,600 lbs or 4.4 lbs per day\* )  
Canada (1,450\* lbs)  
Germany (1282 or 3.6 pounds per day)  
The Netherlands (1,250)  
France (1,050)  
Switzerland (800)  
Japan (875) (For comparison)

Sources: Organization for Economic Cooperation and Development, Center for Sustainable Studies, University of Michigan)

### Residential Recycling Rates in 2012-3 in select countries:

The United States: (34% \*)  
Canada (34%\*)  
Germany (62 %)  
The Netherlands (51%)  
France (47%)  
Switzerland (51%)  
Japan (40%) (For comparison)

*\*This varies greatly across region/cities.*

Sources: EPA, European Commission, BBC, UN.

### Debate and Discussion:

**The amount of waste generated and recycling rates differ in industrialized countries with similar economies. The highest national recycling rates are in Western Europe, where waste-to-energy facilities are common. What other factors might explain the difference?**

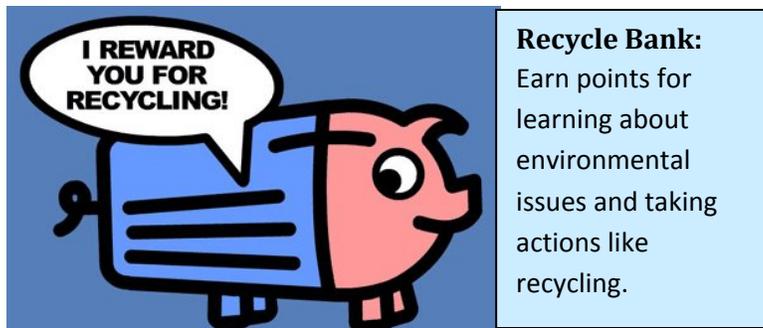


## Recycling Incentive Programs

Giving tangible rewards to residents and businesses for recycling can increase recycling behaviors. Incentive based programs are expanding, despite the fact that they are controversial. Rewarding recycling, or any behavior, tends to decrease when the reward is no longer available. [http://content.usatoday.com/communities/greenhouse/post/2010/03/getting-paid-to-save-energy-recycle-incentives-expand/1#.U\\_Jpg7N0zIU](http://content.usatoday.com/communities/greenhouse/post/2010/03/getting-paid-to-save-energy-recycle-incentives-expand/1#.U_Jpg7N0zIU). Rewards also increase a municipality's costs for recycling programs, which could be used for other services.



In Lagos, Africans recycle to collect points, which are later redeemed for prizes, similar to Recycle Bank programs in the U.S.



### Recycle Bank:

Earn points for learning about environmental issues and taking actions like recycling.

Online gaming engages Recycle Bank players to adopt "green" behaviors, and points can be redeemed for eco-friendly and/or local products and services. Hundreds of American cities have adopted a partnership program with Recycle Bank.



"Delicious Recycling", a program that exchanges fresh vegetables for recyclables in the Brazilian cities of Jundiaí and Curitiba as well as Mexico City

<http://www.treehugger.com/culture/brazilian-city-trades-vegetables-recycling.html>



**Terracycle** is a program that collects difficult to recycle materials like candy wrappers and toothpaste tubes to make new products, and offers direct rewards to non-profits and schools for the materials. Participants must collect and ship the materials to Terracycle, although shipping costs are paid for by the company.

**Competitions** have been used effectively as a behavior change tool, since they offer extrinsic rewards for those less likely to participate.



### Recycle to Ride

In an effort to reduce litter, a new program in the city of Beijing, China allows subway commuters to exchange plastic bottles for subway fare.

### Activity: Host a Recycling Competition at Your School!

- **Counting recycling actions with clickers at the cafeteria sorting station**
- **Weigh bags with luggage scales to measure the weight of recyclables of a specific grade**
- **Score classrooms on their recycling efforts**
- **Offer tips and instruction, positive feedback**
- **Create campaign messaging, reminder prompts**
- **Make your progress public!**

### K-12 School Recycling Contests:

**Golden Apple:** DSNY's recycling contest for NYC schools

**Recycle Bowl:** Keep America Beautiful national recycling competition



## A Closer Look: Gamification: Play as a Reward and a Tool

### Is gaming an effective way to teach environmental stewardship?

Online games, rewards, contests or interactive content can be used to teach, to sell products, or even get people to recycle. “**Gamification**” uses gaming techniques to encourage people to adopt certain behaviors- using play and our natural desire to learn, compete, socialize and reach closure. Making mistakes while playing games are perceived as more socially acceptable, resulting in longer engagement and increased learning.

NYC schools use “Quest to Learn” game-based learning programs as part of the 2013 curriculum to improve academic performance, and there is widespread use of gaming across all disciplines and grades. (NYC DOE)

Over 70% of Forbes Global 2000 companies surveyed in 2013 said they used gamification for marketing.

<http://en.wikipedia.org/wiki/Gamification>

Many cities are turning to “green apps” to promote sustainable behavior. Companies like Joulebug create city specific games, which citizens can share and compete through Twitter and Facebook. Popular recycling APP’s include GRO Recycling, Recycle Hero, iRecycle. Online recycling games are also phone friendly, including Trash Chaos and Recycle Roundup.

Since the introduction of these tools is relatively new, little is known about their long term impact on environmental sustainability.

[http://www.sustainablebrands.com/news\\_and\\_views/articles/recyclebank-google-explain-how-game-environmental-behavior](http://www.sustainablebrands.com/news_and_views/articles/recyclebank-google-explain-how-game-environmental-behavior)



Popular recycling APP for children

### **Activity: PLAY or NOT to PLAY? Test the difference.**

Playing games makes learning about recycling more fun. Will the students recycle more if you teach them through recycling games, or informational presentations without any interaction?

Divide your class into two groups: Offer a simple informational presentation the first group on how to recycle common materials in school. The first group will receive no further programming.

The second group will receive brief instruction, and play recycling games:

- Use a phone stopwatch to see who can sort a cafeteria tray the fastest
- Set up a relay race or guessing game to recycle
- Have students play recycling trivia games
- Create your own game
- Have students play recycling APP



Interview and/or observe and record which group recycles the most in the classroom and cafeteria. Are there any differences between the recycling rates with the two study groups?



# Pay as You Throw Policies: Financial Incentives to Reduce Trash

In “Pay as you throw” (PAYT) waste management policies, also called trash metering, unit pricing, variable rate pricing, or user-pay, charges a rate based on how much waste is collected, instead of charging one flat fee for all residents or businesses. Other PAYT programs may include punitive fines that have to be paid if items are not recycled. Residents have to purchase bags, bins, or stickers for trash collection, although recycling and/or compost is usually free.

## United States

According to the EPA, in the U.S., PAYT programs resulted in recycling increasing, up to 40%, depending on the program. In 2013, 7,100 towns and cities across the United States operated some sort of PAYT system, including 30 of the largest 100 cities. NYC does not have a PAYT policy. The monthly rate in San Francisco, for weekly pickup of a 32 gallon bin is \$27.55, which encourages residents to recycle and compost materials.



Official trash bag in Switzerland, costs range from \$1.64 to \$9.60 depending on the size.

**Germany** Residents have to pay nearly \$9.00 USD for every 60-liter bin of trash collected, but they have recycling bins for almost every type of material, including food scraps and dead animals.

## Italy

In Rome, you can be fined up to \$833 US dollars if you don't separate your recycling from your trash if there is a recycling bin within 500 meters from your front door. The mayor's office distributes recycling pamphlets with all marriage licenses, appealing citizen's to take care and “Love Rome.”

Solid waste is particularly challenging in tourist dependent Ancient cities, where streets are narrow and do not accommodate large trash trucks. Participation is critical when space is so limited. NYC's Sanitation Department also issues fines, although enforcement is difficult especially with multi-family buildings.

<http://travelmag.co.uk/2011/03/recycling-comes-to-rome-with-all-the-force-of-empire/>



“Whoever loves Rome really loves her”  
Recycling campaign featuring Italian superstar Manuela Arcuri

### Discussion and Debate: PAYT in NYC? Would a trash bag fee encourage recycling in NYC?

Over 90% of the waste stream in NYC schools is recyclable or compostable. What if for each bag of trash generated in the cafeteria and the classrooms, the school had to pay \$8.00 (but recycling and/or composting is free?) or could invest the same money in sports, computers, arts or music activities?

NYC spends over 300 million dollars a year on trash “tipping fees” at landfills- just the cost of dumping all those bags, not including all the costs for collection and transportation. If bag fees reduced waste, the money could be spent on schools, parks and other needed services.

## Japan

954 municipalities (30%) in Japan have implemented PAYT programs. In Japan, 70% of all waste is burned and generates electricity. Part of a product stewardship initiative, there is a law requiring a recycling fee to dispose of large appliances, like refrigerators, which cost residents about \$32 USD.

**Product stewardship** refers to when companies assume the responsibility for the environmental, health, and safety impacts of a product throughout its entire lifespan. Governments may require businesses to recycle their own products, or pay additional fees for excessive packaging.



## Closing Landfills: Case Studies in Nantucket and NYC

### Small New England Island Reaches for Zero Waste To Solve Landfill Problem

Nantucket Island, 30 miles south of Cape Cod, Massachusetts, is on track to become a zero-waste community, recovering over 90% of its waste materials in 2012, more than the City of San Francisco.



Nantucket Island drop off recycling center

In 1989, Nantucket had a residential recycling rate of 7%, but their landfill posed a threat to the islands' only freshwater supply. Rather than ship everything to landfills elsewhere, at quadruple the existing price, residents chose to handle the material locally. They mandated recycling, banned plastic and Styrofoam® packaging, and invested in construction and demolition recycling. The island built a facility to pre-treat non-recyclable trash so any remaining materials will not produce greenhouse gas emissions or threaten the groundwater. There is no incinerator on Nantucket Island. Jim Lentowski, executive director of the nonprofit Nantucket Conservation Foundation and a year-round resident since 1971, said that while the amount of trash that island residents brought to the dump had remained steady, the proportion going into the landfill had plummeted to 8 percent.

<http://www.ecocycle.org/zerowaste/aroundtheworld#nantucket>  
[http://www.nytimes.com/2009/10/20/science/earth/20trash.html?\\_r=0](http://www.nytimes.com/2009/10/20/science/earth/20trash.html?_r=0)

### NYC: Nation's Largest City Closes its Landfills

In 2001, NYC Mayor Guillian closed NYC's only remaining landfill, Fresh Kills in Staten Island, choosing instead to export the city's waste to landfills as far away as South Carolina. After Fresh Kills closed, the New York City's annual bill for collecting and disposing residential trash jumped by nearly 50 percent, from about \$658 million to well over \$1 billion today. But the cost increases of exporting waste have been gradual, and for the most part escaped media attention.

In 2002, the city began to develop a long-term plan for managing waste, but after the 9/11 terrorist attacks caused a budget crisis, NYC suspended recycling of glass and plastics. By 2004, both were reintroduced to collection with more cost effective contracts. The city's new Solid Waste Management Plan reduced emissions and fuel costs by transporting more waste by barge instead of in trucks, and emphasized waste reduction and recycling programs. In 2013, the city's plastics recycling expanded, and organics collection programs started in select schools and neighborhoods.

New York City's 8 million residents and millions of visitors generate over 25,000 tons of municipal solid waste per day. The city's Department of Sanitation (DSNY) handles nearly 13,000 tons per day of waste generated by residents, public agencies and non-profit corporations; private carting companies handle the remainder (DSNY 2001).

**\$300 Million:** How much NYC pays in "tipping fees" or just the fee to dump trash into a landfill (does not include collection or transportation).

**\$300 Million=**  
Over 750,000 iPad 2's with Wi-Fi 16GB



**\$300 Million=**  
Over 13,000 NYC student's tuition to SUNY for all four years, plus money left over (books?)





## How Does NYC Measure Up? Going Green and Recycling



**Activity:**  
**What Makes a City “Green?”**  
**Create a Banner with Your Vision**

Grow NYC operates 54 Farmers Markets in NYC, a source of locally grown food for residents, a measure of sustainability. What would you include in your Green City? Solar panels on rooftops? Public composting? Electric vehicles? Be creative and innovative.

### Common sustainability measures:

Carbon per capita footprint  
Air pollution standard  
Public transportation infrastructure  
**Recycling and waste management**  
Green Space  
Energy production, efficiency  
Green LEED certified or better buildings  
Population density  
Mixed use development  
Production and access to local foods

### How Green is NYC? Sustainability Measures in 2013

NYC has the highest population density of any U.S. city, with 8.5 million people.

NYC reduced its carbon emissions by 16% from 2007 to 2013.

NYC has a dense and diverse mix of homes, businesses, services, jobs and parks within a short walk of most residents.

NYC now has largest bike share system in the country.

The average NYC resident uses 4700 Kwh of energy compared with the national average of 11,000.

New York City is more populous than all but eleven states; if it were granted statehood, it would rank fifty-first in per-capita energy use. (The New Yorker, October 18, 2004)

50% New Yorkers city wide commute by public transit, 30% walk or cycle. That's ten times the rate for Americans in general, and eight times the rate for residents of Los Angeles County.

[www1.nyc.gov/office-of-the-mayor/news/195-13/mayor-bloomberg-releases-2013-em-plan-ny-em-progress-report-city-track-meet-all](http://www1.nyc.gov/office-of-the-mayor/news/195-13/mayor-bloomberg-releases-2013-em-plan-ny-em-progress-report-city-track-meet-all)

**NYC is meeting its targets in over 100 measures found in the city’s sustainability plan (2013 Report)**  
**Yet the recycling rate in New York City remains flat at about 15%, unlike other sustainability measures.**

**On average, cities on the west coast have higher diversion rates than in the rest of the U.S:**

**San Francisco** is the first in the nation to mandate that all residents, all businesses (including restaurants) and all multi-dwelling units separate their waste for recycling and composting.

**Los Angeles** had a diversion rate of 76.4% in 2013. This city of 3.8 million people banned single use plastic bags in 2012.

**Portland’s** recycling rate is 60%. The city’s standard garbage pick-up service is every other week.

**Seattle** residential recycling rate is over 71%, with mandatory food waste collection service for houses, apartments and condominiums. All food service take out containers have to be either compostable or recyclable.

### **Discussion and Debate: Understanding NYC’s Complex Waste Issue**

How does a recycling rate reflect the community's collective values?

Do New Yorkers value the benefits of the throwaway society more than sustainability?

Do the businesses in NYC create disproportionately large amounts of packaging material?

Are New York's elected officials disinterested in waste as a political issue? If so, why?

Does the service economy promote the idea that someone else will take care of recycling?

Residents in the State of California on average *use half* of the energy than the national average, and have high recycling rates. NYC residents also use much less energy than the national average but have low recycling rates. Why is there a difference?

### **Recycling Rates at or below national average:**

Philadelphia 37%

Boston 30%

Atlanta 30%

Baltimore 27%

NYC 15%

Houston: 14%

Chicago- >12%



# Waste: The is NO "Away" An Environmental Justice Issue

Economically depressed communities have a disproportionate number of landfill sites, older incinerators, trash transfer stations and import more landfill trash and e-waste.

These communities can suffer from increased truck traffic, foul smells, groundwater contamination, and other air and water pollution, which increase public health problems.

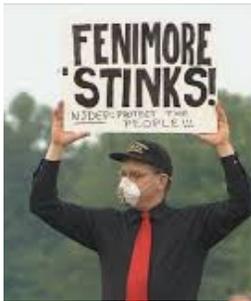
## Discussion and Debate:

Urban environmental justice issues, like air pollution that increases asthma, and lack of access to green space, impact many residents in NYC's neighborhoods. All of NYC's trash is exported to landfills elsewhere, mostly through transfer stations in the Bronx and Brooklyn. Why is there no "away" for NYC's trash? Is it fair to export an entire city's waste?



What looks like mountains in the South Carolina landscape are actually landfills well above the tree line.

In 2008, 94% of Marlboro County, SC residents voted against a proposed mega-dump in their county. Their vote had no effect on construction of the landfill.



NJ residents concerned about landfill health risks in 2013



Bronx residents protesting excessive trash transfer stations in 2013.



E-waste is a special concern as the electronics industry continues to update technology at a rapid pace.

What happens to all the discarded phones, PC's, TV's, VCR's, CD players, and old school headphones? Most e-waste is unaccounted for-which means it is winding up in landfills. Much of the material recycled gets shipped to China, Africa, and India, where local residents sort through the material with little protection. When opened, there are toxic materials in electronics.

In NYC, Manhattan produces 40% of the city's trash, but currently has no waste stations.

More than 60% of the city's garbage goes through: The South Bronx (13 waste transfer stations) Brooklyn Sunset Park/Newtown Creek area (19 waste transfer stations)

NYC's Solid Waste Management Plan includes plans to reopen a transfer station previously located on the Upper East Side, but has been met with resistance by neighborhood residents.

Read more: <http://www.nydailynews.com/new-york/brooklyn/north-brooklyn-south-bronx-residents-pushing-new-waste-stations-lift-trash>



## Become an Recycling Champion

Increasing recycling is a great way to start “Going Green” at home, in school and in the community. Even the youngest child can learn how to sort recycling, no expensive capital investments are needed, and improvements can be seen and measured. Improve recycling at your school is a great way to teach sustainability, satisfy community service requirements, and demonstrate your communication and organizational skills.

### Effective communication in recycling campaigns:

1. Get to know your audience – who can bring about the change?
2. Keep your message simple and brief – make sure the information can be easily understood by someone who does not know the subject
3. Use real life stories and quotes –  
Quotes and personal stories can have a big impact
4. Use powerful language, active verbs
5. Use clear facts and numbers creatively
6. Present a possible solution –  
what you propose to solve the problem.

Remember, effective messages often are:

- Humorous
- Use popular expressions
- Adaptation of popular songs, metaphors, stories or poetry
- Brief, rhythmic, and witty



### Activity: School Recycling Advocacy

- Develop a classroom presentation
- Organize a pledge campaign
- Host a classroom or grade level contest
- Create songs, poetry slams, films or skits about recycling
- Conduct a bin audit & classroom survey to label all trash bins.
- Make Posters & Banners
- Organize a School Town Hall with a microphone in the cafeteria
- Make an up-cycled art display using repurposed items
- Create a recycling webpage
- Publish an article with interviews in the school newspaper
- Conduct a Waste Audit & Display board to convey findings
- Organize cafeteria recycling monitors for community service credit
- Write letters to the Next Generation about your efforts

For more ideas and information about how to organize a recycling campaign in your school, visit [www.grownyc/rcp](http://www.grownyc/rcp)

