NEWTON

Where does your trash go?

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Ever thought about where all your garbage goes after it's pick up off the street? It goes here.

Garbage has become a hot topic in Newton. With the town abuzz about what to do with all of its waste, few people actually think about where it all goes. It just so happens that I visited the refuse incineration plant that all of Newton's garbage goes to. Here is that story: I pulled off Route 20 into the unmarked driveway that belonged to Wheelabrator Technologies' Millbury facility-a plant that disposes of refuse from around the area, including what we ship from Newton. Trash you throw out onto your curb ends up in this facility. The only reason I knew that I was heading to the garbage-to-energy plant was because I was following a big, blue Allied Waste Services truck. The truck-outfitted with a yellow and black sign that read "caution" and nine blinking red, orange and yellow lights-cruised easily over a speed bump. My 1997 Toyota Camry had more trouble, its undercarriage scraping against the ridge of yellow pavement. Clearly this road was designed with trucks, not midsized sedans, in mind.

The Waste Services vehicle stopped on an in-ground scale for its initial weight measurement. (It would return after dumping its garbage to be weighed again and charged for the difference.) Not planning on dumping any of my own garbage here, I drove around and pulled up to a large, gray building, steam and smoke mixing into the already crepuscular air. The facility was made up of three multi-storied cubes, a series of four one-story cylindrical cooling towers and a 300-foot tall smoke stack. In the shadows of the building, the dump trucks that rumbled by looked as though they were made by Tonka.

The waiting room in the administrative building held clues to the principles of the company. A trophy case greeted visitors with nearly 30 artifacts: two keys to the city of Millbury for public service (1993, 1995), plaques for supporting various community sports teams, a thank-you note from the fire department, a statue of a cardinal from the Massachusetts Audubon Society, a plaque from the Millbury Council on Aging, numerous tablets and certificates from the Lion's Club and a 2002 Environmental Merit award from the U.S. Environmental Protection Agency.

An array of magazines and newspapers lay strewn atop the coffee table-Construction Equipment Guide, Power Engineering, Waste News, Earth Preservers and Business and Industry-demonstrating a confluence of environmental and business concerns.

Ronaldo Peña, a soft-spoken man with a dirty white hard hat (think Manny Ramirez's tar-covered batting helmet) and a neon yellow vest entered the room and greeted the group as our shift supervisor. Peña, seemingly unenthused about giving a tour, took us up through the facility with the impatience of a father trying to guide his family out of an airport. Our first stop in the waste incinerator-cum-power plant was the dumping pit-a room with the capacity to hold 6,000 tons of garbage.

"We can hold enough garbage in the pit to tide us over for weekends and holidays," Peña said. "Even when trucks stop delivering, we are burning garbage. We've got refuse burning 24/7."

Five stories above the piles of trash, a man sat in the most badass chair I have ever seen. Located inside a glass-encased deck that overlooked the pit, the chair connected to a metal track that slid forward and back like a rowing machine, allowing the occupant to move about and see every section of the room. A joystick controlling a 5,000-pound crane that plunged into the heap, each time lifting six tons of the

garbage in two arms. The crane, which when open resembles a giant metallic spider, mixes the trash around before picking it up and dropping it all onto an incinerator-bound conveyer belt.

"You must be pretty damn good at winning stuffed animals," a touring student from Clark University said.

"Not yet," the operator said, swaying back and forth in the seat, his twisting wrists causing the crane to swing five feet from the glass directly in front of us and drop thousands of pounds of municipal waste. "I just started a couple of weeks ago."

We turned out of the room and walked down two flights of stairs. We soon discovered that the only smell more putrid than 1,500 tons of garbage was 1,500 tons of burning garbage. The aroma in the dimly lit hallway that surrounded the two gas-powered burners caused some members of the tour to put earplugs into their nostrils. Peña took us to a small window that looked into the belly of the incinerator. Through the thick glass I saw an expansive inferno of flaming refuse burning at 2,000 degrees Fahrenheit.

This fire, fueled partially by Newton's' own trash, is used to boil water, turning it into steam, which travels into a turbine generator. The pressure of the steam is converted to electricity, producing 46,000 kilowatts of energy a day, 5,000 of which go to powering the entire plant while the other 41,000 are sold to the New England Power Company. It sells enough energy to power 41,000 homes. Metals in the garbage are sorted out by a magnet and recycled, and ash from the fire is brought to a landfill that Wheelabrator owns down the road. In the end, this process reduces the volume of incoming garbage by more than 90 percent.

As I retraced my steps through the building en route to the exit, I noticed a sign. "71 days without an accident," it read. Going a fifth of a year without an accident didn't seem so bad. Then I remembered the 5,000-pound crane and the 2,000-degree heat. I was glad to only be visiting.

Where our trash gathers

Scientists say they believe plastic trash blobs bigger than most countries are forming in the middle of the world's oceans. The debris is slowly brought there by circular ocean currents called gyres that sweep up debris and bring it to their centres. Think water funneling down the toilet.

BY THE GAZETTE (MONTREAL)NOVEMBER 15, 2008

What are plastic garbage patches?

Scientists say they believe plastic trash blobs bigger than most countries are forming in the middle of the world's oceans. The debris is slowly brought there by circular ocean currents called gyres that sweep up debris and bring it to their centres. Think water funneling down the toilet.

The Great Pacific Ocean Garbage Patch is the only one that scientists have studied up-close. It's estimated to contain 100 million tonnes of garbage and its size is estimated at anywhere from 700,000 square kilometres (half the size of Quebec) to 15 million sq. km. (10 times Quebec's area) and at least 60 metres deep. Some scientists say it might actually be two trash vortexes - one between Hawaii and California, the other between Hawaii and Japan.

Where are they?

Plastic garbage patches are believed to be accumulating in five gyres - in the middle of the North and South Pacific, the North and South Atlantic and the Indian Ocean.

What's in them?

All sorts of litter has been found in the gyres - everything from a cargo spill of millions of plastic baggies to bottle caps, Styrofoam, syringes, water bottles, traffic cones, lighters, tires and toothbrushes, beach balls, plastic bags, shampoo bottles and plastic dinosaurs, checkers, highlighter pens, perfume bottles and fishing line.

Where does the trash come from?

One-fifth of the plastic in the oceans is thought to be litter from ships. The rest comes from land: Much of it is litter from city streets that is swept into sewers and gets discharged into rivers and lakes, eventually making its way into the sea. Some can also blow into the water from poorly secured trash bins or get taken there by seagulls having a snack at a garbage dump.

The trash can take years to bob its way to the ocean gyres, where it slowly breaks up into ever-smaller pieces until it resembles dust.

What does it look like?

Some of the plastic debris can be seen bobbing on or near the surface but much of it has broken down into tiny pieces after years of floating in the sea and is barley visible, so the garbage patch is often described as plastic "soup." Most pieces are less than five millimetres across. About a third of the debris floats on or near the surface - 60 metres down or more - while the rest sinks to the sea bottom.

What is the impact of the plastic garbage in our oceans?

Over 260 animal species are known to eat or get caught in the plastic debris. About 100,000 marine mammals are estimated to die from doing so in the North Pacific alone. On Midway Island in Hawaii, 400,000 albatrosses feed their chicks nearly five tonnes of plastic a year, John Klavitter, a biologist with the U.S. Fish and Wildlife Survey, has estimated. A European study found 98 per cent of dead seabirds had plastic in their stomachs.

Scientists fear toxic chemicals in the plastic may enter the animals' bodies. People may also ingest microscopic pieces of plastic when they eat fish.

Trash Collection Lab

Pre-Collection Procedures:

1. Obtain a map of North Campus NAU from your instructor.
2. As a class, divide North Campus into four quadrants.
3. Each person should then be assigned a quadrant and a chaperone.
4. Decide as a class how to choose 6 trashcans located within each quadrant. Examples could be location, amount of trash in each can, randomly, etc.
5. Gather the necessary materials and proceed to the designated area with the chaperone.

Materials:

- Scale
- Clipboards
- Data tables
- Pencils
- Rubber gloves
- 1 trash bag labeled "Recyclables Bag"

Trash Collection Procedures:

1. !!!!!! CAUTION !!!!!! Remember to put on rubber gloves before collecting and separating trash to prevent disease, illness, and the transfer of bacteria.
2. Carefully and respectfully take off the lid (if possible) and remove the entire trash bag using caution not to spill any trash. PICK UP ALL trash that falls out.
3. Place the bag on the scale.
4. If the trash bag fits on the scale and nothing is hanging over the edges, proceed to STEP 5. If the trash bag is so full that some of the trash lays on the ground not the scale, there is weight you are not calculating. Proceed to STEP 6
5. Record the weight of the trash in pounds (lbs) in Table 1 for the appropriate quadrant and trashcan. Be sure to round to the first decimal point (tenths).
6. Stand on the scale without the bag and weigh yourself. Then stand on the scale while holding the trash bag. Now, take the weight of you and the trash bag combined and subtract your weight. Record the weight of only the trash in Table 1 for the appropriate quadrant and trashcan. Be sure to round to the first decimal point (tenths).
7. After you have recorded the total weight of the trash, have one person hold the empty "Recyclables Bag." Based on your new knowledge of recyclables gained from your field trip to the recycling center, carefully separate out any recyclable material from the trash bag and place into the "Recyclables Bag."
8. When ALL of the recyclables have been placed into the "Recyclables Bag," repeat the trash collection procedures 3 and 4 to find a weight of the recyclable material and record in Table 1 for the appropriate quadrant and trashcan. Be sure to round to the first decimal point (tenths).
9. After all data have been recorded, place the recyclables back into the trash bag and replace the trash bag into the trashcan for collection by NAU services. REUSE your "Recyclables Bag" for each trashcan.
10. Proceed to the next trashcan and repeat the trash collection procedures 1-10 until all 6 trashcans have been calculated.
11. Now that the collection is complete, return to your classroom and fill in Table 1 with your classmates' data.
12. Calculate the total weight of trash, total weight of recyclables, and percentage (%) of trash that was recyclable. Be sure to round to the first decimal point (tenths).

Table 1. Weights of Trash and Recyclables Found on NAU North Campus

Trash Can Location	Trash Weight (lbs)	Recyclable Weight (lbs)
Quadrant 1		
Trash Can 1		
Trash Can 2		
Trash Can 3		
Trash Can 4		
Trash Can 5		
Trash Can 6		
Quadrant 2		
Trash Can 1		
Trash Can 2		
Trash Can 3		
Trash Can 4		
Trash Can 5		
Trash Can 6		
Quadrant 3		
Trash Can 1		
Trash Can 2		
Trash Can 3		
Trash Can 4		
Trash Can 5		
Trash Can 6		
Quadrant 4		
Trash Can 1		
Trash Can 2		
Trash Can 3		
Trash Can 4		
Trash Can 5		
Trash Can 6		
Total		
Percent Recyclable	$\frac{\text{Total Recyclable Weight}}{\text{Total Trash Weight}} \times 100 =$	