

reduce > reuse > recycle

2015 Trash Trek Challenge Research

Identify a Problem

How does society, especially school systems, deal with Food Waste?





Problem Statement:

Excess, uneaten, and out of date foods within schools needs to be collected and recycled.

Research Questions:

- Does someone collect this item from you, or do you need to take it somewhere? In Monongalia County and within the city of Morgantown, WV there currently is not a recycling or collection company that takes food items. Some business, such as restaurants, schools and homeowners may collect foods for composting. Only one school in Morgantown is taking great strides to be green and collect uneaten foods for composting.
- Could you follow the path your trash takes (either in person or through websites, books, and magazines)?
 Yes, our initial research began by learning what food items are currently reused, recycled, and collected in Monongalia County.
 https://mcswa.wordpress.com/disposal-information/ The Monongalia County Solid Waste Authority has some information on the items that can be disposed by donating or taking to a recycling center. We tried to trace where recycled or trash items are taken in the county. The Waste Authority mentions several service organizations that collect non-disposable food items for reuse or donations for the poor. However, there is no mention of collecting food waste for recycling or composting for soil enrichment or prior to putting in a landfill.
- What happens to the trash in the end?
 - Most of our trash rots, dissolves, molds, and is thrown into garbage bags. Some items, such as plastic, metals, glass, and paper, are being collected at the various drop-off recycle bin locations and separated by the Monongalia County Community Recycling Center. However, most of our trash is bagged and picked up by the trash company, Republic Services Inc. (formerly Allied Waste). We learned about the Mon County Landfill, http://www.dep.wv.gov/dlr/oer/LCAP/Pages/MonCoLF.aspx, to find out what items they collect and/or put into the landfill. The landfill is located at US 119 near Little Indian Creek, but according to their website, it appears that it was covered and closed in 2001. We discovered that in Monongalia County, we do not have an actual landfill. We have a transfer station. The trash is collected at the transfer station and does not stay there. Trash is delivered to an actual landfill Ohio County or to a landfill in Harrison County. In November of 2011, the transfer station in Monongalia County moved from behind the Glenmark Centre (near IHOP) to the Industrial Park in Westover.
- Do you notice any parts of the process that could be better more efficient, cleaner, or better in some other way? Look for these problems as you research.



Reducing Collection Frequency, Automatic Collection, Decreasing Fleet Size with Dual Collection, Increasing Employee Productivity, and Contracting and Competition are proven ways to make trash collecting more efficient, cleaner, and overall better. We have already implemented competition into our solution of recycling food waste and limiting the food that goes into landfills. **Conclusion:** There is no current collection or recycling in Monongalia County or Morgantown, WV for food waste. Our team's mission is to start with the county schools and develop a program called, **STEMtists Go Green**, an *Eco-School Food Recycling Plan*.

Problems

Food Waste in Schools

Uses of Food Waste

- Collect uneaten foods from trays
- Eat (if not too rotten)
- Gather uneaten food waste in bin for recycling
- Composting and use in soil
 - Use soil and build a garden (like North Elementary)
 - Spread soil on a green roof (new school annex at SMS)
 - Bag and sell composted soil at Vegetable Market (fund raising)

School Food People Never Eat, But Still Edible

Note some people simply take too much food, then not eat

- Pizza Crust
- Carrots
- Broccoli
- Potato Skins
- Bread Crust
- Celery
- Apples
- Bananas
- Meat (occasionally)
- Cauliflower
- Soft Tomatoes
- Rotten Stuff

Preparations of non-eaten Food



- Repurpose and make into other food items (apples into applesauce, ripe bananas into banana bread, chicken into chicken salad, broccoli into broccoli casserole)
- Donate to food banks (Christian Help, Catholic Charities, Salvation Army)
- Collect foods for local animal shelters (meats for dogs and cats)
- Collect foods for local farms to feed to animals (veggies & breads for pigs, goats, sheep and cattle)

"Food Waste is a Big Problem. 31% or 133 billion pounds of food from U.S. retail food stores, restaurants, cafeterias, and homes goes uneaten. All of the resources that went into producing that wasted food -- including the land, labor, water, chemicals, and fertilizers -could have been saved or gone to uses of higher value to society."

USDA 2015 Green.gov Conference on Sustainability



School lunch fruits and veggies often tossed in trash, study finds

Food waste in some school cafeterias has increased 35 percent since the passage of the USDA mandate requiring students to take a fruit or vegetable, according to a new study.

http://www.cbsnews.com/n ews/school-lunch-fruitsand-veggies-often-tossedin-trash-study-finds/



Aug 26, 2015

The study reports:

New federal guidelines requiring healthier <u>school lunches</u> have made headlines in recent years, but that does not mean kids are eating them up.

In fact, a study conducted soon after the Healthy, Hunger-Free Kids Act went into effect found what many parents suspected: many school-age children were taking the required fruits and vegetables and throwing them directly into the trash.



Researchers from the University of Vermont used digital photography to capture images of students' lunch trays after they selected their food, as they were leaving the lunch line, and again at the end of their <u>lunch</u> as they passed the food disposal area. They found that while children placed more fruits and vegetables on their trays - as required by the USDA mandates put in place in 2012 - they consumed fewer of them. The amount of food wasted increased by 56 percent, the researchers found.

"We saw this as a great opportunity to access the policy change and ask a really important question, which was, 'Does requiring a child to select a fruit or vegetable under the updated national school lunch program guidelines that came into effect in 2012 correspond with increased fruit and vegetable consumption?'" lead study author Sarah Amin told CBS News. "The answer was clearly no."

Many Items currently are not being recycled, which is a cause for our team's concern. What CANNOT go into the recycling bins?

- Broken glass
- Garden waste
- Food scraps (not being collected)
- Plastic bags
- Diapers
- Pizza boxes
- Building waste
- Car parts
- Plastic motor oil containers
- Plastic toys
- Plastic household items
- Syringes and medical waste, including dialysis equipment
- Clothing
- Ceramics or ovenware
- Gas cylinders
- Batteries











Recycling bin inspections

Council undertakes regular inspections of recycling bins. Any recycling bin that is found to contain garbage, garden waste, food scraps, diapers, building waste, car parts, plastic toys, plastic household items, syringes, clothing or gas cylinders will not be collected.

What are schools currently doing with food waste if it cannot go into recycling bins?

Proposed Solution:

Focusing on Food Waste in schools is our mission for the Trash Trek Challenge.



The STEMtists Go Green Team is proposing to implement a successful in-school food-recycling program to educate staff, teachers, and students about the ill effects of tossing food waste in the trash and not properly collecting, reusing, or recycling these items. STEMtists Go Green Team compiled a list of links, lesson plans and how-to's to help teachers introduce these topics into their classrooms and schools.

If other schools are interested in implementing a food waste diversion or composting program, please request help on the **contact form** or **email** the STEMtists Go Green Team. We have resources to help you start a compost program, request free bins, and offer expert technical assistance. We would love to help you go green too!

Motivation for our team: Excerpt from Food Foolish, by John M. Mandyck & Eric B. Schultz (2015)

- One-third or more of the food we produce each year is never eaten. Some 800 million
 people remain chronically hungry and more than 2 billion malnourished even though we
 produce enough food today to feed everyone.
- The carbon footprint of **food waste totals 3.3 billion metric tons** enough to rank as the third largest country in the world in terms of greenhouse gas emissions, behind China and the United States.
- Wasted food means wasted fresh water, threatened national security and increased competition for land. The **\$1 trillion global financial loss** is staggering. Wasting less food and donating more could unlock a solution that feeds the world and preserves its resources.

Potential solutions:

- 1. Collect and donate food to local food banks or farms for animal consumption
- 2. Composted food-waste to create rich soil and used to fertilize and grow more produce.
- 3. These healthy fruits and vegetables are then served in the school cafeterias.

Steps taken to research the potential solutions

The STEMtist Go Green team contacted and met with the following Experts.

1) Suncrest Middle School Principle: Mr. Jim Napolillo



Suncrest Middle School Principal Jim Napolillo (left), health teacher Sean Watson, WVU doctoral student Ishonté Allar and Assistant Principal Christy Lynch-Burkhart hold a banner awarded to Suncrest Middle School through the Healthy Schools Program.

On Monday, Oct. 5th, the STEMtist Go Green Team met with Mr. Napolillo to discuss their ideas and plan to implement a food-waste recycling program at SMS as a pilot program. The team developed a PowerPoint presentation and reviewed their ideas and plans to implement a food-waste recycle and compost program at their school. He thought it was a good idea and suggested the team meet with the WV state department or county health board.

2) Monongalia County Health Department: Sanitarian On Wednesday, Oct. 7th, STEMtist members spoke with Mr. Joseph Lawson, R.S. (registered sanitarian) with the Monongalia County Health Department environmental division. He answered questions about the recycling

programs in place within the city of Morgantown, but not across the entire county. According to Mr. Lawson, various items are not collected for recycling, including food waste products. He agreed that composting food waste was a good idea, and suggested students locate a specific collection and composting area on the school grounds. Other suggestions include identifying people and places, such as farms, gardeners or greenhouses, who may be interested in receiving the compost for their plants.

3) Met with Jen Arnold (who currently works for SustainU) and shared information about our STEMtist team's mission to reduce food waste in schools.





In order to be green, the STEMtist team met with SustainU on Oct. 13th to learn more about their recycled shirts and organic paints. The STEMtist team ordered our shirts from SustainU to support a local shirt company that takes steps to be green and preserve the environment.

STEMTISTS' Research on Food Waste

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While at SustainU, they met Jen Arnold who worked on a research study at WVU. This study looked at the WVU Dining Services and formalized a commitment to reduce food waste in all residence halls use recycled materials. One initiative involved the conversion of two of WVU facilities to tray-less dining in the fall of 2008, and this initiative expanded in the fall of 2009 to include three more dining halls.

Other initiatives include donating excess food to local charities, donating our cooking oil to a biodiesel processor, using trans fat-free oils in our fryers, switching to compact fluorescent lighting (CFL), and recycling cardboard and steel cans. All of the paper napkins in the dining halls are an Eco-Logo certified, chlorine free, 100% recycled product that is dispensed in order to cut down waste. WVU is testing Green Seal cleaners and incorporating them into our purchasing agreements. We are currently researching local and regional product sources as well as biodegradable disposable tableware.

WVU's Catering Services has begun using an ecotainer hot cup made of paper and sugarcane, Taterware plates made from potatoes, and Greenware cold cups made from plant resins. Four oncampus coffee shops are using Greenware cups, biodegradable straws, Starbucks 10% postconsumer fiber hot cups, and Genpak deli containers. Coffee shops at WVU also offer organic and shade-grown coffee options.

4) WVU Farm Representatives (Organic and Animal Sciences)



On Oct. 27th, the STEMtists contacted Dr. Joe Moritz, professor at the WVU Farm, to talk about how food items collected from the school's cafeteria can be donated to animals as feed or composted. Two of the students that are majoring in animal sciences talked with our team about what specific diets their animals have because they are used for research.

They also shared information about the composting that takes place at the farm, using animal waste (feces), bedding, and other materials that break down into soil. They said that a local company called Bate contracts with the farm and hulls this material away to compost it. The organic & horticulture farm at WVU would be interested in receiving the students composted materials to fertilize their gardens; however, the animals are on a strict diet. While at the farm, the students visited with the animals on site.



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5) North Elementary School (Principal, WVU Professor, and Garden Volunteers)



The STEMtists contacted and met with Dr. Jim Rye, Department of Curriculum and Instruction at WVU to interview him about the Garden Based Learning initiative at North Elementary. The STEMtists also reached out the Mrs. Natalie Webb, the Principal at North Elementary. This garden program to expand the classroom outside was Dr. Rye's vision along with the Mon County Extension Master Gardener program, MTEC, and supportive parents and teachers.

On Oct. 27th, the STEMtists met with Mrs. Webb and Dr. Rye to learn more about their garden program. The garden includes 13 raised beds where students grow and harvest eggplants, chard, tomatillos, tomatoes, lettuce, radishes, and pumpkins (see North Elementary "Panther Pride" School Garden Map in Appendix). Plants grow inside during winter months using recycled milk cartons.





Since North Elementary is a professional development school, they received funding from Claude Worthington Benedum Foundation and Lowe's Educational and Charitable Foundation. The STEMtists learned about the gardens at North; especially how teachers and parents play a major role in keeping this educational program going for the students. The teachers use this garden year around to educate students about science and math, such as comparing the weight, size, and number of seeds, in addition

to the importance of growing healthy crops and to eat healthy diets.





Dr. Rye said that the kids love tasting the vegetables and they can do math exercises with green beans, cook them, or sell them at the farmer's market.

The STEMtists' plan is to acquire grant funding, just as North Elementary has done, to help start their food-waste recycle and composting program. They also want to share their rich soil compost to North's garden.

6) Met with WVU Sustainability, Hilary Kinney, who is instrumental, is starting the Food Recovery Network. On Oct. 28th, the STEMtists met with WVU Sustainability to learn about another food waste initiative that was started by Hilary Kinney, a sophomore journalism and geography student. She spent her summer working to ensure there is less food waste in the state of West Virginia. Now she is bringing her initiative called the Food Recovery Network, and a



food bank identification program, called FoodLink back to campus this fall. Kinney has been working with Dr. Bradley Wilson in the geography department to map food pantries in West Virginia. This work helped spark the idea to start a program where students would help the University donate more of its dining hall leftovers to those in need.



"There is this national organization called the Food Recovery Network, and what they do is they mobilize students at different universities to get together and collect the food that is normally thrown out in dining halls," she said. "They then transport that food to local shelters that are in need."

The STEMtists presented a PowerPoint presentation that details their plan to reduce food waste in schools by reusing, donating, collecting, and composting food. Hilary said that she is excited about

collaborating with a group of young students that are willing to take steps to minimize food waste and reduce the amount of trash going into landfills. Her goal is to work with the team to identify usable food, collect it, and donate to local food banks and homeless shelters. Hilary invited the STEMtists to present their ideas on Nov. 16th at the upcoming National Hunger & Homeless Awareness Week held at WVU.



STEMTISTS' Research on Food Waste





7) Monongalia County Technical Education Center (MTEC)

An additional potential distribution site for the compost was reported in The Dominion Post on Oct. 7, 2015. Monongalia County Technical Education Center (MTEC) in Morgantown, WV received a grant from the Department of Agriculture to design and build a greenhouse. MTEC students and staff plan to build the greenhouse in several architecture programs during the fall and winter months. Once crops are grown, produce will be used in their culinary lessons, in addition to providing fruits and vegetables to the county schools. This program ties directly to the compost that the STEMtist team will be cultivating, if it is used to feed the gardens in the METC greenhouse. The STEMtists reached out to the MTEC and are hoping to schedule a meeting with the staff.

MTEC IN THE NEWS -

The students of the Monongalia County Technical Education Center (MTEC) have a new project to put their collective skills to use.

Representatives of Mon County Schools and the West Virginia Department of Agriculture held a groundbreaking ceremony for a new greenhouse at MTEC Tuesday afternoon, Oct. 6.

When it is completed in the spring, the greenhouse will support a multitude of vegetables and fruits, which will go to the other county schools' cafeterias.

Walt Helmick, commissioner of the state Department of Agriculture, said the Mountain State consumes \$7 billion in food every year but only produces about \$1 billion, while the state's 55 school districts consume \$110 million of food every year. Only \$1 million worth of locally-made food ends up the cafeterias.

"It's a \$109 million opportunity," he said at the groundbreaking.

8) Presentation of Eco-School Food Waste Reduction and Recycling Plan during the National Hunger and Homeless Awareness Week



The STEMtists Go Green team was invited to present a session during the weeklong event held at WVU. November 16th The STEMtists were presenters at the National Hunger and Homeless Awareness Week to

talk about "The Eco-School Food Waste Reduction and Recycle Program." This event was at 5:30-7:00 pm at the WVU Mountainlair in the Blackwater Room. For their FLL challenge, the team presented a viable solution to a national food-waste problem, which includes their ideas to reduce food waste, recycle produce, and donate usable food to homeless shelters and food banks, in addition to composting foods to make rich soil.





The STEMtists Go Green team is proposing to

collect, reuse, recycle, and compost food waste in schools. An important aspect of our program is to collaborate with the *Food Recovery Network (FRN)* to help them donate usable food to homeless shelters and food banks throughout WV. Using social media, flyers, and emails, we invited friends, family, schools and the community to our session and we welcomed all feedback,

students teach their parents, educate their families, share with their neighbors, and spread the notion of composting across the community. The long-term goal is to establish a county, statewide, and national initiative to teach others to be more green and compost. This is bad when we see bags of leaves picked up every week and thrown in the trash that goes into landfills.

questions, and support to help make our idea a reality (See Appendix C for flyer invitation and Appendix D for the PowerPoint slide presentation.)

9. Met with WVU Green House and Almost Heaven Hydroponics to gather support to help design and grow gardens at Suncrest Middle School and work towards a viable solution to compost food waste:

On Nov. 18th, the STEMtists' spoke to the owner of Almost Heaven Hydroponics to see if they could help Suncrest Middle start a garden program. Jason said he would love to help the school and students start a garden program and teach them about hydroponics. The team also met with WVU Greenhouse manager, Gale Sikorsky, on Nov. 18th to learn about growing plants and ideas for food-waste reduction program to continue to expand their program. The goal is to have other





Don't be a fool, composting is cool! Leaves and food waste can be composted and used to fertilize

school/home-based gardens to grow healthy vegetables and fruits. After our meeting with North Elementary, Mrs. Natalie Webb, the principal said she is definitely interested in receiving our compost for her raised-bed gardens.

The STEMtists see this as a true "**circle of food**" model program where the STEMtist Go Green program collects cafeteria food-waste and creates



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compost, the compost is donated to local gardens and greenhouses, new crops are grown and produce is provided back to the county school cafeterias as food for the students.

Basic Steps

Step 1: School students eat breakfast and lunch.

Step 2: Students separate waste into two bins: fruits & veggies, recycled items (paper, plastic, aluminum), and regular trash materials.

Step 3: Bins are collected and trash waste is taken to landfills and disposed of regularly. Rotten and not edible fruits and veggies are taken to be used as compost and then in the garden. Uneaten fruits and veggies are refrigerated to be reused, repurposed into another meal, or donated for local food banks (members of the FRN will pick up food to donate).

Those are the basic steps to be used for our solution. The next steps are additional steps to make recycling more fun and enjoyable for the students. It allows them to get involved with the environment.

Step 4: Lunch monitors keep track of how many garbage bags are collected for each grade: recyclable waste and regular waste. You want more waste that is recyclable and less regular waste. Full bags of recyclable waste are 5 points, and regular waste bags are -1 points. The food waste collected is donated to food banks or composted. Gardens are grown and produce is used in the school cafeteria or sold at the farmers' market.

Step 5: At the end of each month, total bags are counted for and the grade with the most amount of points will receive a reward, which will change each month. The reward is announced at the beginning of the month, and received at the end. Possible rewards include a free pass to the dance, a pizza party, prizes, etc. Produce sold raises money for rewards.





Resources:



Bloom, J. (2010). American Wasteland: How America Throws Away Nearly Half of Its Food (and What We Can Do About It). Da Capo Lifelong Books.

Evans, D. (2013). Waste Matters: New Perspectives on Food and Society. John Wiley & Sons.

Feeding America, Bill Emerson Food Samaritan <u>http://www.feedingamerica.org/ways-to-give/give-food/become-a-product-partner/protecting-our-food-partners.html</u>

Food Recovery Network

http://www.foodrecoverynetwork.org/#about

Garden Based Learning at North Elementary Grow, Play, Learn: Garden-based learning projects at North Elementary <u>https://northelementarygarden.wordpress.com/page/2/</u>

Garden Based Learning | CEHS-STEM | West Virginia University: STEM Education Initiative http://stemedu.cehs.wvu.edu/funded-projects/gbl

Mandyck, J. & Schultz, E. (). Food Foolish: The Hidden Connection Between Food Waste, Hunger and Climate Change

Ohio State Sustainability Program https://www.ohio.edu/sustainability/programs/compost.cfm

West Virginia University, Office of Sustainability. Adapted from Solomon and Fisher, Association for the Advancement of Sustainability in Higher Education 2008; and Solomon and Fisher, Greening of the Campus Conference 2009. http://wecan.wvu.edu/sustainability/food_and_dining

West Virginia University, WE CAN http://wecan.wvu.edu/

20 Haunting Photos of Environmental Pollutions <u>http://www.geeksvip.com/g/20-haunting-photos-of-environmental-</u> <u>pollution/?ipp=1&utm_source=taboola&utm_medium=dailymail-</u> <u>us&utm_content=PollutionUSDesktopNonMSFT&utm_campaign=WL_Pollution</u>



Appendix A:



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Appendix B:





Appendix C:





Appendix D:



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Research Proves Something Needs to Be Done

- From research we know that 133 billion pounds of lood waste were discarded last year. USDA 2015 Green.gov Conference on Sustainability
 About one third of the lood supplied in the world!
- Schools are a big reason for that
- At school, 15-20 bins of trash (75 lbs.) are thrown away each day! This isn't even including the leftovers
- But... our solution can decrease these numbers and improve many schools recycling program

Our Solution

- Our solution is called the 'Stemtists GO Green' an Eco-School Food Recycling Plan.
- It's a contest for each grade to compete in to encourage food reduce, reuse, recycle, and composting.
- We also came up with this solution because it's a fun and enjoyable way for students to get involved in our world.

Contest

- Students from each grade will compete to have the most "food waste recycling" bins filled and least amount of regular garbage waste.
- Our point system will go as followed: 5 points per recycling bin filled, -1 for regular garbage bin filled.
- The grade that has the most points at the end of each month will get a reward such as a rec day, dance, electronic day, etc.



Contest

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- ▶ We will have volunteer monitors (students) to:
- make sure kids are correctly recycling
- count up points for each grade The grade with most points will earn a reward such as a rec day, dance, electronic day, etc.
- It's a fun and enjoyable way for students to understand and enjoy the importance of not wasting food







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Big Goals

- Spread our idea throughout the state
- Show students and kids the importance of recycling and composting Start a movement to reduce
- food waste





What We've Encountered So Far

- Spoke with WVU Farm on giving them our compost specific compost animals need transportation of compost
- animals consumption of food
- Spoke with Hilary Kinney (Food Recovery Network-FRN) ► transportation of school food
- ▶ gardening
- ► FRN
- ▶ an agreement with them Why is this simple idea not being done?





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Why We Want to do This ▶ We see the problem in the world and want to do something about it ▶ Feel like we are making a difference People doubt that kids can do things which fueled us home.

We want to see our doing in action and it helping people and the environment



What You Can Do

- Don't throw away perfectly edible food!
- Support this program and reduce, reuse, and recycle at
- We aim to start this program soon. Thank you for your support!





