



ZERO WASTE REVOLUTION

2016-2017 School Year

MONTHLY REPORT • OCTOBER

Mylar Monster exposed!

Four Big Island schools participated in a mylar upcycling project last year that inspired a similar effort at Lanikai. Far worse than its predecessor cellophane, mylar is made of polyester and aluminum, and is quintessentially non-biodegradable. Sadly, the aluminum component, which has the molecular chops to be recycled indefinitely, is lost forever as landfill or incinerator trash

What can you do with this ubiquitous stuff, now used to package everything under the sun? Surely it is a valuable resource for which a use has not yet been discovered. We decided we had enough brain power to come up with viable solutions during this one-year upcycling pilot project.

Sort-It-Out Sam was modified to collect mylar in his belly bag. The contents were collected weekly and stashed away to be addressed in one big batch during Fall Break, the week of October 10th. In only 45 days of school at that point, a staggering 17,889 pieces of mylar were collected, an average of nearly 400 pieces per day which multiplies to 2,000 per week, **80,000 pieces of mylar per school year.**



School Director Mr. Ed Noh's Evil King Mylar costume was constructed from 400 pieces of mylar packaging, the average number of mylar pieces collected per day at Lanikai School. October's discovery of the horror of the mylar monster among us made for a very scary Halloween.

Global mylar upcycling

Upcycling defined

Upcycling, also known as creative re-use, is the process of transforming by-products, waste materials, useless and/or unwanted products into new materials or products of better quality or for better environmental value.

Wikipedia



A company called TerraCycle upcycles a number of waste products – mylar included – collected from over 83,000 schools on the mainland. Discussions with their corporate headquarters indicated that they were not interested in working with Hawaii schools.

Container loads of mainland mylar are likely shipped to third-world countries for upcycling into household items such as the colorful placemats pictured here, created by craftswomen in African villages. Someone is obviously making money selling these items. One wonders whether talented third-world craftspeople are well compensated. Lanikai School's mylar upcycling goal was to find local uses, avoiding shipping costs and additional carbon emissions. Beyond expense and environmental degradation, the slightest whiff of third-world exploitation in the mylar upcycle market invigorates the development of better uses of this material locally.

Intricately woven mylar placemats from Africa.

Local crafters step up

The mylar upcycling challenge was announced at Assembly on the first day of school and described in the *Lanikai Parents' Guide to the Zero Waste Revolution* handbook that was distributed to all Lanikai families. Within days, grandmother **Lily Pu** got in touch to offer help in exploring ideas. She and her friends **Lynn Lundquist** and **Adele Wilson** are the ringleaders of a group of experienced and creative crafters who call themselves the Lanikai Grannies. They took a bag of mylar samples home and went to work.

They quickly whipped up hats and crowns, leis, pen flowers, jewelry, barrettes and other general decorative pieces, as well as practical items such as mylar-lined reusable sandwich bags, hotplates, rugged woven cell-phone/tablet cases, juice pouch tote bags, pinwheels, even a hanging lamp shade!



Modeling their spiffy headgear, mylar mavens Lily, Lynn, and Adele oversee the Lanikai Grannies creative team.

For Halloween, they designed shiny reflector cuffs for safe trick-or-treating, even offering a workshop for parents and kids to make the cuffs (not unexpectedly, no one responded). Constructing Mr. Noh's shiny and shimmery Evil King Mylar costume built up a repertoire of both technical and creative skills. Parents were both impressed and dismayed that this formidable costume was assembled from only a single day's collection of mylar.

Now, quote, “*obsessed*” the Grannies are working on Christmas decor, wearables, bags, wreaths, and other colorful, silvery craft pieces that they believe will fetch some serious fundraising dollars.

Many mahalos to the Lanikai Grannies for their time, energy, and infectious enthusiasm for this project. We hope to see upcycled mylar take the place of store-bought Christmas decorations and stocking stuffers in many Lanikai School homes.



Recyclables & upcyclables only, please! No more garbage for me...

Over the summer, Sort-it-Out Sam's belly bag slot was modified from general litter disposal to the place to deposit clean mylar packaging only. Thanks for your usual cheerful optimism, Sam, but **CLEAN MYLAR** is an oxymoron!

There is some residue on all packaged snacks that is to some degree greasy, salty, chocolaty, sugary, peanut-buttery, yogurty, cheesy, sticky, faux-fruity and tainted with preservatives. The worst items are the juice, yogurt, milk, and other drink packets that – unfinished – leak chemical-infused high fructose corn syrup and soured dairy protein liquid all over everything. Handle this material for a few hours and your hands are burning.

Each piece must be cut open for cleaning. Pieces chosen for crafts were hand-wiped with a soapy cloth. All others were opened, wiped, then laundered in a top-loading machine with hot water and Dawn dishwashing liquid on regular cycle. Then in the dryer 12 minutes on the delicates setting. Laundering wrinkles the smooth shiny surface and weakens the springiness of the pieces only slightly.

It took over 40 hours to process the backlog accumulated from August 1st. The revised protocol is to clean mylar in one-week batches that take 4-5 hours of handling and only an extra half-hour at the laundromat on laundry day. Manageable, but still extremely icky, labor intensive and time consuming. Eventual **reduction** or even **elimination** of mylar would be a better Zero Waste solution.

High-volume/industrial uses

The crafts are charming, but no way do they absorb the tremendous volume of mylar pieces generated. There must be some industrial use for tens of thousands of pieces of mylar. The particular attributes of the product are:

- reflective, colorful
- will not degrade
- when crushed, springs back
- virtually weightless

If crushed and stuffed into an air space under a roof, would packed mylar work as an effective insulator against heat? (Science Fair experiment).

Would it insulate against sound? Would it absorb noise?

The Lanikai School cafeteria is a painfully noisy room, with nothing but hard surfaces that bounce voices around. What if the multitudinous every-which-way surfaces and air pockets created by crushed mylar could be employed to capture and soak up sound waves?



Sam comes up with a way to use a lot of mylar to improve the acoustics in the caf. Let's try it!

KUPU intern Samantha Luhn devised an acoustic apparatus – a beach-ball-size sphere of mylar pieces crushed and folded through the pukas of bird netting – that looked like it might do the trick. The balls are easy and relatively quick to make. Could hundreds of these suspended from the ceiling kill the sound? It would be a relief for all to get some quiet in there, plus, it would serve as a festive art installation that shines and shimmies in the wind. Fun!

Mr. Sawyer will acquire a decibel meter and his Science Fair candidates take readings for a week both at lunch and A-Plus. As the balls go up, we can determine if the decibel level goes down.

If it works, we will have successfully upcycled and sequestered the total accumulation of the mylar generated this year.

The numbers don't lie

It is the kuleana of the Resource Recovery team to collect and process all waste materials, as well as collect and report data. We cannot influence policy, only give information that may be useful.

The 2016-2017 data so far shows that Lanikai students generate daily 400 pieces of non-biodegradable packaging from processed salty and/or sugary snack foods. (That number does not include the pudding, Nutella, milk drinks, Pringles, popsicles and other snacks packed in rigid plastic or cellophane, nor snacks packed by parents nor party foods such as cupcakes).

The 2016-2017 data so far also shows that Lanikai students throw away on average daily over 72 pounds of uneaten nutritious lunch, both home and school-provided. Four times so far this year that number exceeded 100 pounds.

For a school that claims to take seriously the health of students and aims for Zero Waste, these numbers show a real disconnect. Perhaps the snack policy deserves a round of serious scrutiny.

Community outreach

Kainalu Elementary School

After a rocky start over a year ago, Kainalu Elementary's tiny, starved worm colony has exploded to eight pounds of robust, vigorous, ravenous squirmy wormies, ready to take on 25-35 pounds of fruit/veggie/grain waste a week to kick off Kainalu's Zero Waste journey.

Parent volunteer **Fe Bailey** headed up the stunningly successful turnaround project. The Worm Team at Kainalu had initially been misinformed about preparing bedding for a box bin and providing sufficient worm nutrition. After a disappointing harvest back in February, they started from scratch with correct instructions based on the Lanikai model, and came through eight months later with flying colors.

Instead of moving the worms into a donated worm bin that was well-intentioned but unsuitable for vermicomposting, their new colony was transferred on October 28th into the recommended Pipeline bin acquired through a Kokua Hawaii Foundation grant.

KUPU interns Samantha and Jordan were trained earlier in the week in Pipeline bin set-up and did a perfect job on their first installation. They also demonstrated the procedures and protocols for lateral-flow bin operation and returned to assist with feeding the next week. It is important that we establish a commitment to on-going professional support. With extended paid staff through KUPU, Ka'elepulu Elementary has been able to maintain their daily composting program very successfully. Kainalu has potential to be the *third school* on the Windward side with a viable, measurable Resource Recovery program in progress.

Ms. Mindy met with Principal **Sheri Sunabe** and VP **Kau'i Tanaka** who are very interested in taking the next step. They meet several of the key criteria: 1) they have enthusiastic administrative support, 2) Kainalu is an AINA school, with a garden program at each grade level firmly established, 3) their custodial staff spontaneously pitched in to help us move mulch and expressed a keen interest in learning to build soil for their extensive landscaping, and 4) they already have a worm colony up and running! The tenacity of the teachers and parent volunteers in rehabilitating their worms was impressive, and shows the kind of grit that is necessary for the long road of change ahead.

The biggest challenge at Kainalu will be the size of the school – 460 students – with 220 participating in the National School Lunch Program, so there will be considerable food waste. Next month we will schedule and conduct a Food Waste Audit, then meet with Kainalu stakeholders to design a workable hot compost program based on the data collected and the resources available to manage the volume generated.



Worm Team Tiffany Petty, Emily Selph, and Fe Bailey with their new Pipeline lateral-flow system, now housing several pounds of healthy composting worms.

Community outreach, cont.

Hawaii Nature Center

Environmental Educators typically possess a lot of academic credentials and field experience but may know little about resource recycling. It is only recently that agricultural practices such as composting became part of environmental curriculum, categorized as Sustainability or Sustainable Practices.

The Green House Hawaii pioneered and developed this evolution. Some Sustainability topics have been adopted by the Hawaii Nature Center with varying degrees of success.

Hawaii Nature Center staff requested a consultation for their worm system, which they reported as “not doing so well.” It was, in fact, totally crashed and no one had any idea of how to collect food waste properly nor care for a worm colony. Ms. Mindy spent an afternoon at the HNC campus in Makiki breaking down their current two dead worm bins and setting up a standard box bin for them, more appropriate for the volume of food waste generated on site. HNC purchased equipment and worms from Lanikai School.

The following week a workshop was scheduled for staff covering the basics of residential worm systems, and exploring the details of setting up a biannual program to present home vermicomposting to the public. Ms. Mindy will present the first series to train their educators. The Hawaii Nature Center is the ideal venue for such classes. It’s a wonderful place to visit and a tremendous community resource with whom to partner.



Hawaii Nature Center staff members love their new right-sized box bin and Lanikai-School-supplemented worm colony. This is the same system most appropriate for residential use. HNC will soon be offering Worm Workshops for home vermicomposting

Observing how to vermicompost with a lateral-flow system on a large scale as practiced at Lanikai School is not particularly useful for those wanting to set up a simple box bin at home for the 5-8 pounds of food waste typically generated by a household of four, for example. *It was suggested that in exchange for worm consulting services for HNC, that Lanikai faculty and families could sign up for Worm Workshops offered to the public at the Hawaii Nature Center for no fee for one year.* Parents have asked for this opportunity in the past but it was difficult to attract enough of them to justify a workshop, whereas the Hawaii Nature Center advertises its programs to a huge audience. Lanikai families could attend the worm class FREE and enjoy a beautiful hike in the rainforest!

Scheduled Worm Workshops at Hawaii Nature Center will begin in April of 2017.

Hawaii Public Radio – Zero Waste Pledge Drive

Lanikai School sponsored the Zero Waste management once again for HPR’s Fall Pledge Drive, lending supplies and equipment for collecting and processing waste food (via bokashi), coffee grounds, paper and cardboard for ten days generated by over 1,000 volunteers who eat, drink, and take pledges over the phone to raise money for operations and programming.

HPR staff expressed deep gratitude for this service. Since the last drive, on our recommendation, the station purchased their own washable plates, cups, bowls, and utensils – the same IKEA items we use as classroom party sets. Three staff members started bokashi buckets at home.

HPR promises a story on our EPA national award when the press release comes out next month.

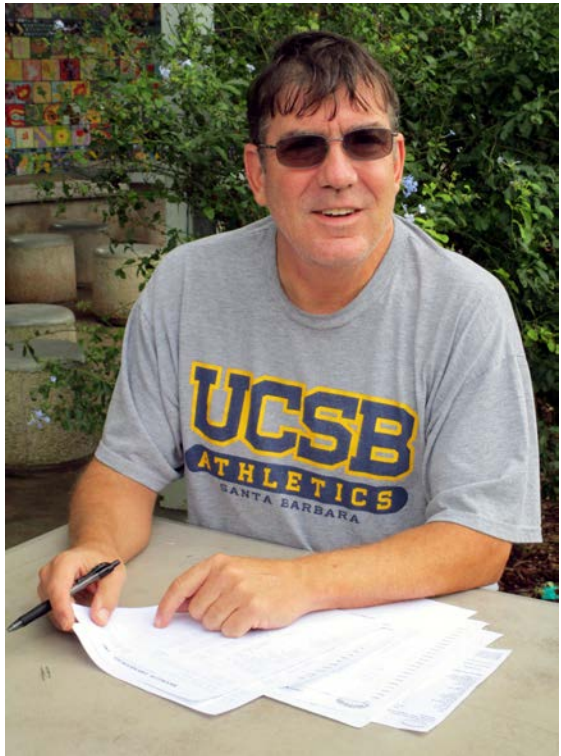
Compost & vermicast nutrient analysis completed

Pete Bunn explains it all to you...

Certified Agronomist Peter Bunn of **Crop Nutrient Solutions, Inc.** graciously offered to run analyses on both our thermal compost and vermicast. We see excellent results with proper use of either amendment but have not – until now – been able to answer customers’ questions about specific nutrient balance. Since we are selling more and more product to professional growers, this information is critical. Most pros have had their soil analyzed and know exactly what they require to complete the nutrient profile for the crops they are planting.

They also know how to read and interpret the data on the following four pages. Since this Monthly Report is the official document of record, these reports are duplicated in their entirety.

With some practice, both Mr. Sawyer and Ms. Mindy will become fluent in the language of soil nutrients. In the meantime, we will go with Pete’s overall assessment: **“This is really good stuff.”**



Pete Bunn will be working with Mr. Sawyer and his science students to design projects that explore soil nutrient composition and sustainable ag issues. Pete’s interest and involvement is deeply appreciated!



General Guidelines for Compost (Total acid digest)

Suggested Optimum Ranges:

Moisture (%)	30-40%
OM - Lost by ignition (%)	20-35%
Organic N - Dry Weight (%)	1.0-2.0%
NO3-N (%)	.025-.035
NH3-N (%)	< 0.01
Extract pH (1:1 water)	6.5-8.5
C:N Ratio	15-20
Cation Exchange Capacity	> 60cmols/kg

Conductivity or EC (ms/cm):	
Top-dress Most Crops	< 3.0
Soil-incorporated	< 6.0
Particle Size:	
Top-dress Specialty Crops	< 1/2"
Top-dress Turf	< 1/4"

BROOKSIDE LABORATORIES, INC.

** COMPOST ANALYSIS REPORT **

Crop Nutrient Solutions, Inc.
P. O. Box 40
Waimanalo, HI 96795

File Number: 40541
Date Received: 9/29/2016
Date Reported: 10/3/2016

Submitted By: Crop Nutrient Solutions, Inc.

Lab Number 14736
Description Compost

	% Dry Basis	% Wet Basis	lbs/Ton
Moisture		77.07	1541.40
Mineral Matter	18.10	4.15	83.00
Lost By Ign (Org M+)	81.90	18.78	375.60

Total Nitrogen	3.73	0.856	17.12
Ammonium-N (NH4-N)		< 0.010	
Nitrate-N (NO3-N)	0.07	0.017	0.34
Organic-N	3.66	0.839	16.78
Phosphorus (P)	0.55	0.125	2.50
Phos. as (P205)	1.25	0.286	5.72
Potassium (K)	0.27	0.061	1.22
Potassium as (K20)	0.32	0.073	1.46

Calcium (Ca)	3.55	0.813	16.26
Magnesium (Mg)	0.48	0.109	2.18
Sodium (Na)	0.08	0.019	0.38
Sulfur (S)	0.48	0.109	2.18
Carbon	49.98	11.46	229.20

	ppm Dry Basis	ppm Wet Basis	lbs/Ton
Boron (B)	44.05	10.10	0.020
Iron (Fe)	5451.37	1250.00	2.500
Manganese (Mn)	158.31	36.30	0.073
Copper (Cu)	25.99	5.96	0.012
Zinc (Zn)	81.55	18.70	0.037

pH 7.13
C/N Ratio 13.39

Reviewed by:



BROOKSIDE LABORATORIES, INC.

** COMPOST ANALYSIS REPORT **

Crop Nutrient Solutions, Inc.
P. O. Box 40
Waimanalo, HI 96795

File Number: 40541
Date Received: 9/29/2016
Date Reported: 10/3/2016

Submitted By: Crop Nutrient Solutions, Inc.

Lab Number 14737
Description Vermicast

	% Dry Basis	% Wet Basis	lbs/Ton
Moisture		73.20	1464.00
Mineral Matter	36.27	9.72	194.40
Lost By Ign (Org M+)	63.73	17.08	341.60

Total Nitrogen	2.88	0.771	15.42
Ammonium-N (NH4-N)		< 0.010	
Nitrate-N (NO3-N)	0.29	0.078	1.56
Organic-N	2.59	0.693	13.86
Phosphorus (P)	1.06	0.285	5.70
Phos. as (P2O5)	2.44	0.653	13.06
Potassium (K)	0.23	0.062	1.24
Potassium as (K2O)	0.28	0.075	1.50

Calcium (Ca)	13.09	3.508	70.16
Magnesium (Mg)	0.27	0.072	1.44
Sodium (Na)	0.05	0.014	0.28
Sulfur (S)	0.55	0.147	2.94
Carbon	38.02	10.19	203.80

	ppm Dry Basis	ppm Wet Basis	lbs/Ton
Boron (B)	47.39	12.70	0.025
Iron (Fe)	1473.88	395.00	0.790
Manganese (Mn)	364.55	97.70	0.195
Copper (Cu)	55.97	15.00	0.030
Zinc (Zn)	282.84	75.80	0.152

pH 7.00
C/N Ratio 13.22

Reviewed by:



BROOKSIDE LABORATORIES, INC.
MEDIA ANALYSIS

Crop Nutrient Solutions, Inc.
P. O. Box 40
Waimanalo, HI 96795

File Number: 40541
Date Received: 9/29/2016
Date Reported: 9/30/2016

Submitted By: Crop Nutrient Solutions, Inc.

Lab Number	0001	** SUGGESTED RANGE **	
Description	COMPOST	Most Media And Plants	Most Pine Bark Media And Plants
pH	6.7	5.5 - 6.6	5.0 - 6.0
PARTS PER MILLION (ppm)			
Soluble Salts *	844	600 - 2000	500 - 1400
Nitrate (NO3-N)	94.3	70 - 200	60 - 135
Ammonium (NH4-N)	1.4	3 - 20	0 - 20
Phosphorus	28.37	6 - 11	0 - 20
Calcium	99.29	80 - 230	15 - 50
Magnesium	38.81	40 - 120	15 - 50
Potassium	99.31	80 - 250	30 - 80
Sodium	56.18	0 - 40	0 - 50
Sulfur as Sulfate	45.05	30 - 150	
Boron	0.14	0.08 - 0.4	
Iron	0.42	0.5 - 2.5	
Manganese	0.10	0.05 - 2.0	
Copper	0.07	0.003 - 0.35	
Zinc	0.07	0.25 - 2.0	
Aluminum	0.51	0 - 5	
Molybdenum	< 0.05	0.03 - 0.1	

* Soluble Salts: mmhos/cm = ppm / 640

BROOKSIDE LABORATORIES, INC.
MEDIA ANALYSIS

Crop Nutrient Solutions, Inc.
P. O. Box 40
Waimanalo, HI 96795

File Number: 40541
Date Received: 9/29/2016
Date Reported: 9/30/2016

Submitted By: Crop Nutrient Solutions, Inc.

Lab Number	0002	** SUGGESTED RANGE **	
Description	VERMICAST	Most Media And Plants	Most Pine Bark Media And Plants
pH	6.5	5.5 - 6.6	5.0 - 6.0
PARTS PER MILLION (ppm)			
Soluble Salts *	2976	600 - 2000	500 - 1400
Nitrate (NO3-N)	445.1	70 - 200	60 - 135
Ammonium (NH4-N)	3.6	3 - 20	0 - 20
Phosphorus	6.14	6 - 11	0 - 20
Calcium	651.14	80 - 230	15 - 50
Magnesium	86.56	40 - 120	15 - 50
Potassium	154.01	80 - 250	30 - 80
Sodium	48.78	0 - 40	0 - 50
Sulfur as Sulfate	103.19	30 - 150	
Boron	0.10	0.08 - 0.4	
Iron	< 0.01	0.5 - 2.5	
Manganese	0.03	0.05 - 2.0	
Copper	0.03	0.003 - 0.35	
Zinc	0.02	0.25 - 2.0	
Aluminum	0.10	0 - 5	
Molybdenum	< 0.05	0.03 - 0.1	

* Soluble Salts: mmhos/cm = ppm / 640

Still no dishwasher – but we are getting closer...

Yet another month has gone by and still we have no dishwasher, but Mr. Noh had an epiphany while showering in the secret shower behind the cafeteria: Instead of cutting through concrete to install a new drainage pipe underground, why not have the dishwasher simply drain externally into the custodian’s big floor drain, where the mop water is poured out? No one could think of a reason why this wouldn’t work, so the sticky plumbing issue was rendered moot and the dishwasher is now on order from the mainland. Space will have to be found to accommodate all the custodial equipment to convert this valuable real estate into a Dish Room, but where there’s a will.....

Identifying the point of diminishing returns

The delay of the dishwasher and the frustrating extension of school-sanctioned single-use food service items postponed a planned campaign to encourage parents to switch from single-use packaging to reusable, washable containers. Every indication is that it would not have been worth the effort anyway – parents have responded to our initial request with total indifference – there are more disposables than ever. Lanikai parents live squarely in the modern world, and *will not* give up the convenience. If Oahu were Sweden, Austin, Australia, Portland, Seattle, Ottawa or a dozen other progressive pro-recycling locations, it would be worth a good try, but not here, and not now. So the “Pulverize the Packaging” idea is hereby abandoned.

Instead, we will focus on our strengths – setting up turn-key, proven systems to collect and sort food and other organic waste for on-site composting and vermicomposting operations that create high-quality soil amendments. Our time and energy will be spent passing this knowledge and practice to other schools who want to see the same benefits we enjoy at Lanikai – less waste, healthier gardens and grounds, increased campus biodiversity, and more environmentally-aware students.

Pumpkins a monster hit!



The Pumpkin Patch was a terrific addition to our schoolyard transformation that should definitely rank as an autumn tradition. The vigorous vines produced three carving pumpkins for Jack O’ Lanterns and eighteen beautiful cooking pumpkins, a variety called Bliss. Not bad for our first try! After the vines run their course, the row will be heavily amended again with compost and vermicast and planted with tomatoes.

Bottom line for October 2016

This report covers the period from October 1 through October 30, 2016. Fall Break was October 10-14. There were 16 school days during this period – data from October 31, falling tail-end on a Monday – will be included in the November numbers.

During this interim **1,815 pounds** of food waste was collected and processed via vermicomposting and hot composting technologies. The total so far this year is **5,913 pounds**, and represents a 100% landfill diversion rate.

- 100% of all HI-5 cans and bottles were collected and redeemed.
- 100% of all green waste was recovered.
- 95% of all paper and cardboard waste was diverted from the dumpster.

Halloween was the usual horror show of plates and plates and plates and plates of overly-frosted cupcakes, cookies, doughnuts (who on earth slathers chocolate and orange icing on Krispie Kremes! How redundant can you get?), sticky popcorn balls, tacos, pizza, etc., all served at post-lunch class parties. Total food waste that day was the year's record of 118 pounds; lunch waste 53 pounds and **65 pounds was greasy, fatty, sugary JUNK.** Who will stop this expensive, mindless, stupid insanity? **STOP IT. Just STOP IT.** I think parents would be relieved not to be expected to provide yet more treats for Halloween parties, much of which is discarded. It is deeply disturbing on so many levels for this school to condone endless unregulated, unhealthful, wasteful,

meaningless, excessive junk food consumption. It is embarrassing. If people want to behave this way on Halloween, they are welcome to do so at home, not at Lanikai School.

We are supposedly the grown-ups and we make the rules and set the standards. We can do far better.

Food Waste Data: The Numbers Don't Lie.

The costume parade is abundant with creativity; the children are absolutely charming and having a blast. Several teachers came up with fun, active games, crafts, movies and music for the afternoon. They are to be commended and encouraged to continue along this line. Keep the fun and celebration! Drop the food and food waste.

If it weren't for this 2nd grader's spot-on Ms. Mindy impersonation, complete with jeans, polo shirt, boots, a bag of gummy worms and kid-made mini Sort-It-Out Sam, Ms. Mindy would have devolved before your eyes on October 31st into a bloody monster screaming banshee.

