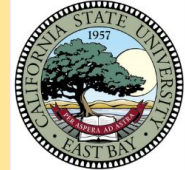


Attitudes Toward Organic Waste Disposal and Composting

Fall 2016

Department of Philosophy

PIONEERS FOR SUSTAINABLE COMMUNITIES REPORT



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About Pioneers for Sustainable Communities

Pioneers for Sustainable Communities (P4SC) is a year-long partnership between Cal State East Bay and a community partner that represents local or regional government. P4SC is one of a network of campuses nationwide—the EPIC-N Network—that have adopted a model of using course-based, faculty-lead, student research to support the sustainability goals of local communities. P4SC focuses on sustainability, social justice, and quality of life in the San Francisco East Bay region. It leverages the expertise of faculty and the enthusiasm, time, and innovative ideas of students, providing thousands of hours of research to support local partner sustainability programs including: data acquisition and analysis, stakeholder surveys, geo-spatial mapping and referencing used to establish socio-environmental baselines, track progress, and facilitate planning and communications.

- **P4SC Reports** present the final results of one or more full-time equivalent courses devoted to a single P4SC project.
- **P4SC Mini-Reports** present the results of partial courses devoted to a PSC project, typically used for projects in progress.

About Cal State East Bay

Cal State East Bay's beautiful main campus is located in the Hayward hills with panoramic views of the San Francisco Bay shoreline. Situated above the city of Hayward, the campus offers an ideal setting for teaching and learning and yet easy access to the many cities along the bay. The University has a satellite campus in Concord, a professional development center in Oakland, and a significant presence online. Founded in 1957, Cal State East Bay is one of 23 universities of the California State University system (CSU). With an enrollment of over 15,800 students, Cal State East Bay is recognized as a regionally engaged and globally oriented university with a strong commitment to academic innovation, student success, engaged service learning, diversity, and sustainability.

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With support from Jillian Buckholz, Director of the Office of Sustainability



About the City of Hayward

The City of Hayward was incorporated in 1876. With a population of 150,000, Hayward is the sixth largest city in the Bay Area and proudly the second most diverse City in California. A Charter City, Hayward operates under the Council-Manager form of government with a directly elected Mayor and six member City Council. Hayward is a full service City comprised of thirteen departments providing services ranging from public safety and public works to library and community services. The City strives to be a safe, clean, green, and thriving community for all of its residents. To learn more about the City of Hayward, visit www.Hayward-ca.gov.



Attitudes Toward Organic Waste Disposal and Composting

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Pioneers for Sustainable Communities: Attitudes Toward Organic Waste Disposal and Composting

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OBJECTIVES

The City of Hayward has identified composting as a route toward greater sustainability. They are partnering with California State University, East Bay to help meet these ends. To establish solid foundations for this strategy we are starting with a course in environmental ethics. The course will target ideas and behaviors as they relate to composting, first at the ideological and global level and gradually getting less abstract and more specific down to the food waste bins in Hayward.

METHODS

The students for this class were asked to research and reflect at the same time. Rather than just report on others' work or deploy a pre-defined methodology, students were asked to refine their own process as they worked and produce information that they perceived as valuable based on the understanding that they gleaned from the process. The students were not completely free however, they were trained in methods to find, filter, organize, categorize, and present with an emphasis on being useful and valuable. They were also tasked with identifying and exploring the theoretical basis of claims. With these methods the students were set loose on the world to discover and explore as many sources as they could. This was supplemented by visits from experts as well as a survey of organic waste bins in the City of Hayward, the results of which were submitted



to the city. This report is a refinement of the results that this process produced, often in the various students' voices.

COMMENTARY ON THE CITY OF HAYWARD WEBSITE

CONTENT AND IMPRESSIONS

The overall page is very attractive, the subcategories are clear and understandable, and it is easy to navigate and find the information about composting when looking for it, but there are some issues that the students found. The comprehensive list from Waste Management about what to sort into the organic waste curbside bin is available:

http://www.wm.com/location/california/bay_area/hayward/index.jsp

but the link for the Alameda County Recycling Rules:

<http://www.recyclingrulesac.org/city/city-of-hayward/>

is displayed, but it does not work. This might be impeding education of residents because the information is not reliably accessible. The website does not have legislation information available, though waste management does here:

http://www.wm.com/location/california/bay_area/hayward/index.jsp

Stating the information on what should be sorted into residents' organic waste curbside bins, explicitly, on the website instead of having links to the information might make it more accessible without having the link problems.

The graphics on "Green Your Life" and "Green Your Business" are the same, even though they discuss different ways to be green; this repetition in graphics may make residents feel that the information available on the website is repetitive, and make them feel like they don't need to keep reading to find out more, new information, when the two sections do have fairly different information to offer.

According to the survey conducted by StopWaste, in 2005, throughout Alameda County, some residents may (still) feel they are doing their part for sustainability and caring for our environment. The city states the awards that it has received on the website, and this, alone, may be solidifying residents' rationale for not composting their organic waste. Stating the immense efforts the city went through to qualify for receiving those awards may help residents build a more accurate perspective, and adding a small section on what residents can do to continue the City's hard work may also be effective in addressing this attitude.

The "environment" link is specific to Hayward and does not give reasons as to why residents, or anyone else for that matter, should be composting. There is no encouragement for small families or businesses to compost, from the information



available of the site. There is no section outlining reasons why residents, who aren't required by law, should be composting or sorting their organic waste at all. The City of Hayward and StopWaste both fail to give ethical or financial incentives for composting; Waste Management does, somewhat, but residents may not think to look there.

Much of the information available on the City website is available anywhere and everywhere else with the help of a search engine. This is especially problematic because the majority of the information available online is geared towards home composting, and people are less likely to compost at home rather than simply sorting their organic waste into their organic waste curbside bins, because composting at home is more work. By not offering, outright, that our residents can do their part simply by sorting their waste into their correct curbside bins, and the rest will be taken care of for them, the chances of residents actually doing so diminishes. This method may just not be something the resident has thought of on their own.

The "4-R's," "Reduce, Reuse, Recycle, Rot" makes the "Rot" part (composting) easier to remember because we all already know the first three "R's." This is catchy and can help serve as a prompt, or get people to think about composting, generally. The only issue with this slogan is that the term 'rot' may help contribute to the "ick" factor for why people say they don't compost. This may turn some residents off of composting, or help solidify their reasoning in not doing it; but it is doubtful that this is a majority, or that it is an important determining factor in residents' rationale or attitudes.

ORGANIC WASTE DISPOSAL

AN INTRODUCTION TO ORGANIC WASTE

One of the research methods for this class was to catalog the students' knowledge of, and attitudes toward, organic waste disposal. In doing so, a baseline was developed for modelling the average resident while giving us an opportunity to better track what the students learned. Initially students' knowledge was scattered at best. Everyone had a vague sense that disposing of organic waste correctly was a good thing. However, for many, that positive evaluation was merely an implication of accepting that there was a way to dispose of organic waste 'correctly'.

Beyond that, the students' knowledge of organic waste disposal was haphazard and undeveloped. Students had heard some terms ('anaerobic digestion', 'methane') and made some associations (climate change) but were often unsure of the implications beyond 'it's bad'. Occasionally, a student would have very specific knowledge of one narrow piece of the waste process. This was where the students first realized that a lack of standardization might be a problem for educating people about organic waste. With this in mind the students were sent out to learn all that they could. They were tasked to identify and summarize sources as well as look for patterns in those sources. Some key sources are highlighted below.



The US Composting Council offers a factsheet (PDF) online that outlines many benefits of composting, including improving nutrient and biota content, while reducing the rate of plant disease in plants that have finished compost added to their soil. The factsheet also discusses physical and chemical benefits, such as improved structure and moisture management, and improved capabilities for pH balance and management, binding of contaminants such as heavy metals, degradation of compounds such as microbes and their toxic byproducts, wetland restoration, and erosion and weed control.

Link: <http://compostingcouncil.org/wp/wp-content/uploads/2015/06/compost-and-its-benefitsupdated2015.pdf>

The Santa Barbara County Resource Recovery & Waste Management Division describes composting as, “Nature’s way of recycling.” Their webpage offers that some benefits of composting are to reduce waste in the landfill, and that the product of composting is great for yards and gardens. They state that composting at home can save you money, because you can make healthy soil at home, and gives elementary instruction on how to compost at home. They do not mention their organic waste curbside bin as a good place to put their organic waste if they are not interested in composting at home.

Link: <http://www.lessismore.org/materials/72-benefits-of-composting>

MyGreenLid.com is a site that offers “4 Key Benefits to Home Composting,” and lists them as: “improving your garden,” “containing landfills and reducing pollution,” “educational opportunities,” and “saving money.” This website also sells products to help make composting at home easier, and more contained. Their focus is composting at home.

Link: <http://www.mygreenlid.com/single-post/2015/06/22/4-Key-Benefits-to-Home-Composting>

Much of the information on the benefits of composting the students found were on home composting, and focused more on how composting at home can help your garden and save money. It seemed to offer waste reduction at the landfill as a cheap secondary, and most didn’t offer the reasons as to why organic waste reduction in landfills is important; Now that the students had a better idea of what organic waste is, why it is important to keep it out of our landfills and the benefits of composting, the students wanted to know what they could do to keep it out of landfills. In class, the students found a few articles that helped them to figure out and understand the available options for proper disposal.

The EcoCycle organization is “building zero waste communities,” so their focus is more on composting for sustainability on the individual to community level, which includes more home composting, but their website offers a lot of good information about composting, such as guidelines and tips, “how to know if your product is compostable,” resources available in Colorado, and “combating fruit flies.” This website does offer guidelines for curbside pickup of compostable materials as well, with an available info-graphic.



Link: <http://www.ecocycle.org/recycle-compost-reuse/compost>

Recyclebank is a home and garden journal that discussed that the particles from garbage disposal of organic waste are treated as any other solid waste at your local water treatment facility.

Link: <https://livegreen.recyclebank.com/because-you-asked-what-happens-to-garbage-disposal-waste>

EcoMyths is an educational site that focuses on ecologically relevant information. They provide an article that discusses how using the garbage disposal in the sink is only slightly more ecological than sending it to a landfill, but that it is still a better option, but we should really try to compost, and above all else, reduce the amount of waste that we create in the first place.

Link: <https://ecomylths.org/2014/08/25/sink-disposals-vs-trashcans/>

Expired is a documentary about how one of the biggest contributors of food waste is due to confusion about expiration dates, and how sell by dates are often confused for expiration dates. The website for the film reports that 90% of consumers throw away their food when they see the date label thinking that it's the expiration date. This number seems a little high and may be inflated, but it is a good point to make as it pertains to our abundance of food waste. It would be interesting to know how many grocers also throw away their food waste without trying to make use of it first, by donating the usable, but unsellable products to shelters, or donating to other food distribution programs.

Link: <http://notreallyexpired.com/the-problem/>

With all of the research that the students did, it seemed evident that much of the available information is to help people start and maintain their compost piles at home, but very few offer using their organic waste curbside bin as an alternative to composting at home. It is unclear if this is because infrastructure for proper organic waste disposal is available everywhere, although it is not offered for free with landfill service in some places across the country. Some students in class, and presumably many residents, were/are not aware that it is recommended to put other compostable items such as food waste and food soiled paper products in with their yard waste into their organic waste.

CURBSIDE PICKUP OF ORGANIC WASTE

The focus of the course was on curbside pickup of organic waste. Definitions of different receptacles are important to standardize the way we talk about the technology we are using. It was found that, in discussion, the term 'bin' was being used interchangeably to mean any of the four receptacles that were being discussed. Standardizing the language being used allowed for more effective communication. This is what was decided upon:

Countertop Bin: initial receptacle used for organic waste only; found in kitchen (on counter). Generally 1-2 gallon capacity.



Bin: initial receptacle; found in kitchen, dining hall, etc. Generally 8-12 gallon capacity.

Curbside bin: secondary receptacle for home use. Generally 30-80 gallon capacity.

Dumpster: secondary receptacle for disposal for more than a single family; found in schools, restaurants, and apartment complexes. Generally 350-7000 gallon capacity; measured in cubic yards.

Links: <http://www.losaltosgarbage.com/index.php/for-businesses/city-of-cupertino-commercial-compost-recycling-garbage#containers>

<https://www.wm.com/store/dumpster-rental/small-business-landing.jsp>

Livermore Sanitation offers countertop bins for food scraps to be collected. This is a smart practice because it provides easy and clean transport from the source to the organic waste curbside bin. Offering a countertop bin to residents may help motivate their efforts in sorting out their organic waste. Their website is fairly comprehensive and simple to navigate. It is easy to find what should be going into the organic waste curbside bin, according to their waste management service. Link: <http://livermoresanitation.com>

It is understood that organic waste curbside bins are offered for free (with Waste Management services), but the pricing on the website was not very easy to find and is not explicit in saying that it is free with landfill services. There were reports from students of multi-family dwellings not having a dumpster for organic waste. There were also reports from students explaining that multi-family dwellings that residents were not sorting their garbage correctly – using the landfill dumpster much more than necessary. Part of the problem of multi-family dwellings and the lack of proper sorting (especially due to lack of the option) could be due to the fact that organic waste dumpsters along with recycling dumpsters are not free with landfill service. Waste Management charges multi-family dwellings for both recycling and organic waste pick up, so some complexes may not offer recycling or organic waste disposal, or both. If issues of pests from organic waste dumpsters for multi-family dwellings arise, they may be solvable by increasing the rate of pickup per week. These issues are also applicable to businesses.

Waste Management rates for multi-family dwelling services link:

<http://www.cvsan.org/content/residential-services-multi-family-monthly-rates>

Waste Management rates for commercial services link:

<http://www.cvsan.org/content/commercial-services-rates>

In January of 2016, Costa Mesa, California, launched a program, which includes new organic waste curbside bins for its residents that are taking its organic wastes to a \$25 million facility. According to OC Register, within the first 6 months of this program's initiation, 7 million lbs of food waste and clippings have been saved from



going to landfills. Although this program seems to be based off of making organic waste curbside bins available to single-family homes, which Hayward has done, there are real statistics than may help gauge how much money the city might save by adding organic waste pickup for multi-family dwellings, and also the effectiveness of stating explicitly that food scraps, food-soiled paper products, and other compostables outside of yard waste should be added to organic waste curbside bins.

Link: <http://www.ocregister.com/articles/recycling-700324-food-mesa.html>

HOME COMPOSTING

Home composting, though not a primary focus, is important to touch on, as the goal is to reduce organic waste that would, without intervention, reach our landfills. More than that, the amount of information available on home composting is so much greater than the amount available on curbside pick up, that it actually hindered efforts made to find information on curbside pick up.

People with gardens at home are the primary target for home composting, as they could use the final product of composting. Making available a very simple, how-to breakdown for home composting - what should and should not be composted at home, and why you should consider composting at home – may be able to motivate people with use for their finished compost, to begin composting at home.

There are different strategies for composting at home. The first of those is a process called aerobic digestion, where compost is made in the presence of fresh air (or oxygen). The second is ‘vermicomposting’, where certain species of earthworm are introduced to enhance the process of organic waste conversion, producing a better end product. The third is called ‘in-vessel’ composting, where large amounts of wastes are composted in the smallest amount of space possible to promote anaerobic digestion.

Links: <http://www.bioenergyconsult.com/composting-strategies/>
<https://www.epa.gov/sustainable-management-food/types-composting-and-understanding-process>

SARE is an organization that stands for Sustainable Agriculture Research and Education. This website is best explained by its organization’s name. It focuses on sustainable agriculture – healthy soil - much of the information here can be useful for home composting. This organization offers some grant opportunity that will be explained in further detail later.

Link: <http://www.sare.org>

The website also displays a few books available for purchase, or for free; almost all are downloadable.

Link: <http://www.sare.org/Learning-Center/Books>



One book available for free on their website offers detailed information about composting including the advantages, nutrient cycles and flows, managing for high quality soil, crop rotation, and making use of compost.

Link: <http://www.sare.org/Learning-Center/Books/Building-Soils-for-Better-Crops-3rd-Edition/Text-Version>

The EPA has a simple breakdown of “Composting Basics”, “Benefits of Composting”, and “How to Compost at Home.” The “Composting Basics” section makes available information on “What To Compost” and “What Not To Compost And Why.”

Link: <https://www.epa.gov/recycle/composting-home>

When researching in class, the students found that some people are confused about if pet and human waste can be composted. They found that pet waste is compostable, and that composting this waste is a more environmentally friendly way of disposing of it, but that the compost that is made with, and/or has been in contact with the pet waste should not be used with any food-producing plants, because it can cause the spread of disease. This compost can be used for aesthetic plants, such as a lawn and landscaping.

Link: <http://www.plantea.com/dog-waste-compost.htm>

Here is a website that offers a specific device marketed to compost pet waste separately.

Link: <http://www.compostinstructions.com/poop-or-no-poop/>

There are ways to compost human waste, as well, but they are less convenient, as one can imagine. Here is a link to a composting toilet that can be purchased on Amazon.com. Link: https://www.amazon.com/Natures-Head-Contained-Composting-Quarters/dp/B009Z7EKIC/ref=as_li_ss_tl?ie=UTF8&qid=1438096811&sr=8-1&keywords=composting+toilet&pebp=1438096843105&perid=0QoN4HJK1NoC6GXYoGVT&linkCode=sl1&tag=cleanairgarde-20&linkId=829d4551ad0d7f1f9c6e18685f82272c

Students also found some rather interesting information on human urine being introduced to home compost. The article stated that urine has many nutrients that are beneficial to compost and sites that urine has yielded more than four times the amount of tomatoes than plants that had not been exposed to urine, as seen in one study. There are some health concerns about using compost that has been introduced to human urine (or urine of any other animal, for that matter). There are some problematic chemicals found in urine such as hormones, and traces of narcotics, but as long as the levels of these are minimized, there should be no problem in using compost with urine with your food-producing plants. Urine as it is concerned with composting has sometimes been called ‘liquid gold,’ which makes it sound nicer.

Link: <http://www.care2.com/greenliving/pee-on-your-compost.html>



Two things that hinder people who could composting at home are not knowing how to compost at home and/or concerns about smell, pests, or money. To motivate people to compost at home, addressing these concerns in ways that are simple, yet helpful and informative could prove to be beneficial. Here is that information and one of the many ways that it can be organized:

Concern: Composting is complicated.

Response: Composting may have its intricacies, but it doesn't have to be complicated if you don't want it to be. All you need to create compost at your home is a hole, turning barrel, or bin with an opening on the bottom. Adding a variety of wastes that you already make everyday, like fruit and vegetable peels, yard clippings, egg shells, sticks, coffee grounds, leaves, and paper filters, will create a nutrient-dense compost that you can add to your garden soil to make your plants happy and healthy. As for what you should and should not put in your compost, here are some links (or a list) to help you to learn what products will grant you the healthiest yield: (insert links for or list of compostable and non compostable items here). This website contains an organized list of what is compostable.

<http://www.smallfootprintfamily.com/100-things-you-can-compost>

Links:

<http://www.recycleworks.org/compost/methods.html>

http://www.cvswwmd.org/uploads/6/1/2/6/6126179/dirt_on_composting.pdf

Concern: Worried about bugs.

Response: Many bugs will help with your composting efforts; so don't be so quick to get rid of them! Fruit flies, worms, and grubs all help transform your organic waste into compost that will help your garden thrive! On top of the benefit they have on your compost, bugs may be more inclined to stay out of your house with a more accessible and open food source outside!

Links:

<http://www.recycleworks.org/compost/methods.html>

http://www.cvswwmd.org/uploads/6/1/2/6/6126179/dirt_on_composting.pdf

Concern: Turning compost is hard, and is very smelly.

Response: Turning your compost doesn't have to be difficult. With a turntable barrel, it is virtually effortless, and if you do not want to spend the time turning your compost, you can add layers of sticks periodically to make pockets of air that the good bacteria use to break down your scraps into nutritious compost. If your compost is smelly, it probably is too wet, giving it a good turn and watering it less should fix the smell.



Links:

<http://www.recycleworks.org/compost/methods.html>

http://www.cvswmd.org/uploads/6/1/2/6/6126179/dirt_on_composting.pdf

Concern: It costs too much to compost with all the bins, starter worms, and maintenance chemicals.

Response: You can make nutritious compost at home with just a shovel. You do not need to purchase a bin to compost properly, though some may choose to do so. A simple pile or hole outside will do just fine. To jumpstart the digestion of your compost, you can simply add garden soil, yogurt, or even water from a washed milk carton to help start the process.

Links:

<http://www.recycleworks.org/compost/methods.html>

http://www.cvswmd.org/uploads/6/1/2/6/6126179/dirt_on_composting.pdf

Resources:

<http://davesgarden.com/guides/articles/view/3942>

<http://gogardenguides.com/guide/what-not-to-compost/>

<http://www.cvswmd.org/did-you-know.html>

http://www.cvswmd.org/uploads/6/1/2/6/6126179/dirt_on_composting.pdf

<http://www.recycleworks.org/kids/index.html>

<http://www.recycleworks.org/compost/methods.html>

<http://www.noble.org/ag/horticulture/backyard-composting/>

<https://www.epa.gov/recycle/composting-home>

<http://www.care2.com/greenliving/pee-on-your-compost.html>

<http://www.mnn.com/lifestyle/recycling/stories/30-things-you-should-never-compost-or-recycle>

<https://www.kcet.org/home-garden/the-lazy-gardeners-guide-to-composting>

<http://www.urbangardencenter.com/how-to-compost/how-to-compost.html>

<http://www.compostinstructions.com/poop-or-no-poop/>

<http://www.plantea.com/dog-waste-compost.htm>



ORGANIC AND OTHER WASTE

ORGANIC WASTE AS A PART OF WASTE

One of the comparisons that students often relied on was comparing organic waste to recycling. Since the students were relying on this comparison so much we decided to look into it.

Currently, materials from Hayward's residential recycles are sent to Union City. Commercial recycles, organic waste, and trash are sent to the Davis Street Resource Recovery Complex. The organic waste is diverted to Redwood recycling Center in Marin County or a facility near Modesto, while the trash is sent to the Altamont Landfill. All of this information can be found on the city's website. Some time was spent looking for the exact amount of waste that different sectors in Hayward make to get a better idea as to where the students should be focusing their efforts, but nothing was found.

Students, and residents alike, may feel that waste reduction has been part of environmentalist culture for a long time, as recycling has been an environmentalist value, consistently, since 1970. But it was only just recently passed into legislation, effective last year, that businesses are required to collect recyclables, and as of 2015, "all businesses and multi-family properties are required to collect food scraps and compostable paper separately from garbage." California has created legislation to continue to motivate sustainability efforts and strive for progress that requires 75% reduction of waste entering our landfill by 2020 that will require us to increase our composting efforts and master our waste sorting skills. This percentage amounts to an estimated 23 million tons of waste that needs to be recycled or composted instead of being introduced into our landfills, in just three years.

Link to "75 Percent" legislation website: <http://www.calrecycle.ca.gov/75Percent/>

As food waste makes up an estimated "10 percent by weight of the total municipal waste stream and can be a higher portion of commercial sector wastes," it is a very important piece to consider in waste reduction as it applies to mandates and environmental responsibility. According to CalRecycle, much of the effort to increase the proper disposal of organic waste has been geared towards the commercial sector, but there have been some minor efforts in the residential sector. It is a safe assumption that grocers create massive amounts of food waste, and these places specifically should receive a lot of focus on improving their waste-sorting accuracy. CalRecycle published an in depth model for local government recycling and waste reduction which has an immense amount of useful and acute information.

Link:

<http://www.calrecycle.ca.gov/Publications/Documents/LocalAsst%5C31002001.pdf>



The expansion of the well-known “reduce, reuse, recycle” to “reduce, reuse, recycle, rot” is a simple and clever way to remind people that composting their organic waste is just as important as the three other “R’s” when it comes to waste management and sustainability. This slogan shines a clear light on composting as an equal priority, and simply an integral part of our waste management.

Link to Hayward’s page on Waste Management’s website:

http://www.wm.com/location/california/bay_area/hayward/index.jsp

Resources:

<http://www.library.hayward-ca.gov/your-environment/green-your-community/garbage-and-recycling>

<http://www.calrecycle.ca.gov/75Percent/>

http://www.wm.com/location/california/bay_area/hayward/index.jsp

<http://www.calrecycle.ca.gov/Publications/Documents/LocalAsst%5C31002001.pdf>

THE THREE STREAM SYSTEM

The three-stream system includes landfill, recycling, and organic waste and is the currently favored system. This is replacing the two stream system that has become the accepted norm. However, it was not so long ago that we lived in a one stream system. The current dispute is not the sorting, but where it should be done, before or after pick-up from the consumer.

At least some of the Hayward’s waste passes through the Davis Street Resource Recovery Complex, where it is sorted into three streams and diverted to a waste facility that is equipped to deal with that type of waste. Davis Street is responsible for diverting more than 2 million pounds of waste, processes more than 7 million pounds of waste every day, and employs more than 300 people.

Link: <http://davisstreet.wm.com/index.jsp>

Currently, as much of our community’s organic waste gets introduced to our landfills and microbes digest it through aerobic means, as it is open to the air.

Links: <http://www.hayward-ca.gov/your-environment/green-your-community/garbage-and-recycling>

<http://forsolutionsllc.com/aerobic-vs-anaerobic-digestion/>

If anaerobic digestion methods are used to break down our organic waste and create methane gasses on the community level in local waste facilities, it may be beneficial to harvest that gas to use as a green fuel source if we can. Some waste facilities have received funding to create and implement infrastructure to capture this methane byproduct.



The Altamont Landfill in Livermore is equipped to capture the methane byproducts from anaerobic digestion of organic waste. It claims to have a 93% capture rate of methane. With a grant, Hayward may be able to donate to this facility to expand to service its organic waste, if the facility is not currently able to handle the entirety of Hayward's volume in addition to the volume they currently process. If Hayward can divert any of its waste to this facility, this could help cut fuels costs and emissions from the trucks transporting the waste to Notavo and Tracy, while helping reduce greenhouse gasses that would otherwise be entering our atmosphere, and harvesting them to make an efficient, green fuel source.

Link: <http://altamontlandfill.wm.com/green-energy/index.jsp>

Houston, Texas received \$1.05 million from the Bloomberg Philanthropies Mayors Challenge to help support their fan-favorite entry of returning to a single-stream system, that they named 'One Bin', where the waste would be sorted after curbside pickup, to improve accuracy in sorting and ease for the residents. Their infrastructure needed an overhaul to do this, so they switched from Materials Recovery Facilities (MRFs) to mechanical biological treatment with advanced resource recovery (MBTARR) systems that made more accurate sorting possible, while also allowing for recycling of certain wastes, such as food soiled paper products, to be recycled into other FDA approved paper products, and collection of compressed natural gas from their organic waste, like what is in place at the Altamont Landfill in Livermore. Houston's One Bin progress report offers infographics and further details about how their MBTARR facilities operate. There is also information on the financial impacts on the city, and how their contract minimizes the financial risks taken by the city over the contract's lifetime, as well as a 'Procurement Process', and some information on 'stakeholder engagements and legislative outreach'. Link:

http://www.houstontx.gov/onebinforall/OBFA_Progress_Report-20151231.pdf

Resources:

<http://www.wm.com/federal/case-studies/altamont.html>

https://www.wm.com/location/california/bay_area/hayward/single-family/index.jsp

https://www.wm.com/location/california/bay_area/hayward/images/large-hw-trash.jpg

https://www.wm.com/location/california/bay_area/hayward/images/large-hw-organics.jpg

<http://www.tri-ced.org/union-city-single-family/>

<https://wefuturecycle.com/2015/07/15/waste-management-in-germany-87-recycling-rate/>

<https://www.eia.gov/tools/faqs/faq.cfm?id=73&t=11>

<http://altamontlandfill.wm.com/green-energy/index.jsp>



<http://www.hayward-ca.gov/your-environment/green-your-community/garbage-and-recycling>

COMPARING ORGANIC WASTE WITH RECYCLING

The comparison between organic waste and recycling was an obvious one. One approach that the students came up with in class, was to see what lessons could be taken from the adoption of recycling to help understand the adoption of proper handling of organic waste.

Historically, the first time recycling was encouraged or needed was in World War Two, but the concern for diminishing resources ended with the war, and didn't return until the first celebration of Earth Day, in 1970. Environmentalists have been working to influence people to recycle, now, for nearly five decades. During that time, there have been many attempts made by private and institutionalized entities (such as government programs and subcontracted companies) to improve recycling efforts. Hayward has forty-seven years worth of data to work with on how to influence change on people's sorting habits.

Link: <http://www.citylab.com/city-makers-connections/recycling/>

Almost immediately after the call for recycling efforts was made nationally (1971), the first legislation, the Beverage Container Deposit, was passed to encourage recycling, but the first legislation producing direct fines for incorrect sorting behaviors were not introduced until 1980, which was enacted at a local level in Woodbury, New Jersey, and continues to enforce, what is now, up to a \$1,000 fine for breaking the city's trash and recycle ordinances. Woodbury claims to have a solid waste diversion rate of more than 50 percent, currently.

Link: <http://www.woodbury.nj.us/city-departments/public-works-department/trash-recycling/>

In 2002, San Francisco published a total solid waste reduction goal of 75 percent by 2010, then revised it, to 100 percent by 2020, the next year. This is the first mention of organic waste as something that poses it as an area of concern in the CityLab article, and their 2006 entry on Seattle's introduction of fining improper sorting is this article's last mention of waste in a way that addresses recycling, organic waste, and garbage as separate waste. Beginning with their 2008 entry, waste is referred to as a whole, which emphasizes the amount of waste that is produced, as a whole, as the problem. This change in reference also encourages the reader to associate the issues with organic waste disposal with the necessity of recycling that is already widely recognized and accepted.

Link: <http://www.citylab.com/city-makers-connections/recycling/>

Adding a second stream seemed a lot to ask at the time, but now, it is the expectation, so, it should not be too difficult to add a third if Hayward adopts some of the marketing and educational tactics used for recycling that generated positive and



desired changes in residents' sorting behaviors. It is important to note that different tactics to alter or initiate sorting behaviors may vary depending on the area's demographics, mainly income and genuine concern for the environment, as will be shown later.

There is more research on recycling than composting, as the recycling effort has been long ongoing as compared to composting. Because of these reasons, references to research conducted on recycling in addition to research on composting will be used in context to its application for composting.

The students agreed, in class, that the recycling effort took about ten years from a stronger, more serious, or active initiation, until it was canonized, and that because of this, the goal of making accurate organic waste sorting habits the norm in 2018 seems a bit far fetched. Thanks to the follow up studies that have been done on recycling, we can figure out what pro recycling efforts that were made were most effective to initiate and fine-tune good sorting behaviors.

An article, titled *Behavioral Determinants of Household Participation in a Home Composting Scheme*, uses research composed on recycling to gain some insight as to what they should be keeping in mind to fuel their composting efforts. They state that common demographic variables might be considered while thinking about recycling and composting behaviors; the specific demographics of importance they found were income, age, and education level. Their research suggests that older, wealthier, and more educated people are more inclined to recycle reliably. These are some of the same demographics that showed to be of interest in the 2005 StopWaste survey for Alameda County as well, though age was not a very determining factor. The reasons for these demographics to be more inclined to incorporate two (or three) streams of waste disposal could be due to a sort of cost-effectiveness. People that are not educated about the importance of composting will be less inclined to find it to be important. Those that are educated and still don't sort properly probably don't find it to be worth their effort for some reason or another. Time could be a factor for some people; they could be too busy to care about composting, or too busy to look up if something they use should be going into their organic waste curbside bin. In the end, the studies do not indicate a strong enough correlation due to demographics, as we might like to find. The study states that attitudes about things like the inconvenience and unpleasantness of composting play a major role rather than demographic variables in differentiating between people who compost and non-composters.

Link to article discussed above:

<http://journals.sagepub.com/doi/pdf/10.1177/0013916507311900>

In class, the students also discussed what motivated them to start recycling reliably, and some suggested "Garbage Island" – the floating mass of garbage the size of Texas in the Pacific Ocean. They all seemed to remember hearing about Garbage Island, and it was agreed that Garbage Island was a motivator because it was scary. This was something tangible that the student could see pictures of, they could do research on, and they all shared an element of personal responsibility for its existence,



and could admit to such responsibility, with regret. Learning about Garbage Island was one of the real motivators to change the behavior of the students, in fear of making it worse. Then, the students became curious as to what the Garbage Island equivalent was for composting, as this could be a useful motivator for residents. Methane and methane emissions were discussed, shortly, but those did not seem hold the same weight, because we, as a society, hear about those all the time, and have become somewhat normalized to it, not to mention that there are larger contributors to greenhouse gasses that should be focused on in terms of greenhouse gasses. After some contemplation, the students arrived to the conclusion that the composting equivalent to recycling's Garbage Island could be nutrient depletion in soil used for agriculture. As consumers, they created a nutrient depletion cycle by exporting so much of locally grown foods, especially being in California, and those nutrients are not being reintroduced back into our soil. This problem will continue to get worse, causing an increase in the cost of produce because the cost of farming it is going to increase. Rectifying this issue not only has the potential to stop this cycle and reduce the cost of produce, but if we reintroduce the nutrients of more of our organic waste to the places that we grow our food, our produce is guaranteed to increase in nutrient density. This issue seems to provide a balance of ethical and economical importance, while also serving as a personal motivator that is time sensitive.

Resources: <http://journals.sagepub.com/doi/pdf/10.1177/0013916507311900>

COMMUNITY EDUCATION

COMMON INFORMATION AVAILABLE

When the students began this project, they were sure that people weren't composting because they (as well as us) were lazy. Everyone knows that composting is an option, but people just don't do it. As the students continued their research, they found many of the same, and frankly, useless articles saying that everyone should compost because it is good for home gardens and for the environment, but most of the students didn't have gardens, and it wasn't well understood how home composting was different from using our landfill curbside bin to dispose of 'other' types of organic waste (it seemed that most people were using their organic waste curbside bins for yard waste, but only yard waste). There were two things that became clear when the students discussed the problem as being one of laziness. First, it was an unhelpful explanation in that it did not provide any solution, merely a vague criticism. Second, the students often had reasons why it did not apply to them. Much of the understanding of organic waste was shaped by people's justifications to charges of laziness.

There were areas where education was required. Many of the students either didn't know, or hadn't realize that organic waste curbside bins should also be used to compost those things such as food scraps and food-soiled paper; some of the students didn't even know that pizza boxes could be composted, and should be instead of recycled



– this seems like something *every* college student should know. If a resident were to do a quick Internet search on composting, to find out what to compost, or how it works, etc., the majority of the information they would find would be on home composting and articles on pop culture sites telling them to ‘get over’ their woes about pests and the smell when it comes to composting and to ‘just do it’ because it’s the right thing to do. This tactic is, not only, not helpful, but it also makes it difficult for residents that are actually interested in composting to get valuable or useful information.

With enough searching, residents will find comprehensive information about composting at home, along with abstract incentives, such as ‘going green’. None of this information is helpful for those that are curious as to what they could be putting in their organic waste curbside bin. After a fair amount of research, and a presentation from the City of Hayward, the students, finally had a better understanding of what they *should* be doing as compared to what they *were* doing.

Once all of that was sorted out, the students ran into other questions about what should and should not be put into organic waste curbside bins. They had questions about pet waste, banana peels, ‘compostable’ straws and forks, Sun Chip bags, and biodegradable bags. They had no idea what to do with these things. They found that they weren’t alone here, either. During a Google search on banana peels by typing in the search bar “can banana”, the autofill suggested, “peels be composted.” There were also 218,000 ‘hits’ on this search. The students came to the conclusion that either this meant that lots of people didn’t know where to put their banana peels, or that at least that many people knew what to do with them. After some reflection, the students realized that these questions were only relevant to home composting, and that an authority available to them, and the residents to answer these hard questions about what should go into our organic waste curbside bins; Waste Management. However, this lack of education was only an issue for a small portion of organic waste and not grounds for the vast majority of organic waste going to landfills.

RESIDENT RATIONALITY FOR NOT COMPOSTING

It is important to understand the reasons people claim to not be composting, so Hayward can invalidate those reasons. If Hayward invalidates the reasons that people claim to be not composting, and does so in a very subtle way, residents may rethink their reasons themselves, rather than if the City outright invalidate those reasons, residents may feel that they are being attacked, and become defensive, and therefore solidify themselves into those reasons. The term invalidate may seem a bit unduly harsh, but it is necessary. People will stick to their reasons until those reasons no longer seem rational. Making these reasons irrelevant, *and* pointing out that irrelevance to residents may remove their established foundation of not composting.

There are two kinds of reasons people state for why they aren’t composting - both of which are addressed in the 2005, *Summary of Composting Survey*; (1) the ‘ick’ factor, which would include pests, smells, and general aversion to handling food waste, and (2) the ‘difficult’ factor, which would include physical (“It’s a lot of work to turn a compost pile all the time”) financial (“I can’t afford to buy a lot of composting



equipment”) or educational (“I don’t know where my banana peels should go”) difficulties. Through these complaints, it is fair enough to assess that many residents are not aware that they can use their organic waste curbside bins for food scraps and compostable items rather than just yard waste. All of these concerns can be, at the very least, eased, if not completely nullified by the use of their organic waste curbside bin for the entirety of their organic waste disposal.

Link to 2005 survey:

<http://www.stopwaste.org/sites/default/files/Documents/compostsurveysummary.pdf>

There are multiple reports stating that education rather than apathy seems to be the prevailing issue among Hayward residents and their (lack of) composting habits. Giving residents comprehensive information on not just why they should compost using their organic waste curbside bins, and what they should and should not be putting into those curbside bins could help influence residents to use compost via curbside pickup. Explaining that home composting is not what we are asking of them, but also supporting the residents that wish to endeavor in that the support that they need in education and tips and tricks are both important factors in this endeavor.

Link to article discussing reasons people claim to keep them from composting:

<http://www.sustainableamerica.org/blog/i-want-to-compost-but/>

Other, somewhat outlying reasons residents may have for not sorting their organic waste are that they feel they are already doing their part in sustainability efforts by recycling and using their organic waste bins for yard waste, while some people reported not having any reason to not compost, or that they simply weren’t interested in sorting their organic waste, according to the 2005, *Summary of Composting Survey*. The City addressing this group of issues with some sort of incentive, whether it be educating them on the benefits of composting, and the consequences of their organic wastes going to landfills, to create an ethical incentive, or creating some sort of financial incentive, may be effective. Both are in use in other cities offering informational campaigns or fines for improper sorting behaviors.

Link to 2005 survey:

<http://www.stopwaste.org/sites/default/files/Documents/compostsurveysummary.pdf>

Some students, in class, admitted they were not aware of what composting was, how it was done, or what should be sorted into their organic waste curbside bins, and that a single presentation given by city officials on the environmental benefits and consequences of composting, in detail, was enough to motivate them to change their habits, and their motivation and efforts to begin to sort out his organic waste from the rest of their daily waste, and that they were actively trying to motivate others to do the same. These students may be biased, as they are in an environmental ethics course (at this time), so they obviously care enough to choose this course over another, but the majority of people care about the environment, and giving them comprehensive, comprehensible information on the benefits and consequences of sorting and not



sorting one's organic waste could be enough on its own to motivate people to change their sorting behaviors.

There doesn't seem to be enough easily accessible information about why residents should be composting. This could be motivating information to post on the StopWaste website or the City website. StopWaste also has a few videos available online and on YouTube, but their food disposal videos carried the lowest amount of views; despite some important information being presented to residents, people are still not gaining access to it. This (video on the StopWaste website) method of education doesn't seem to be effective so far. Link to StopWaste website on composting:

<http://www.stopwaste.org/preventing-waste/residents/start-with-your-soil>

Though the students initially thought laziness was the largest factor in people not composting, it is more evident, upon further research and analysis, that the real issue is a lack of education on composting and organic waste disposal as a whole. When the City emphasizes its expectations (sorting organic waste into residents' organic waste curbside bin), they are not only communicating a standard (that composting is expected behavior), but they are also alleviating many of the concerns with composting (lessening the "ick" and "difficulty" factors). The way that Hayward wants residents to compost is much easier and cleaner than the residents' (presumed) assumption of wanting them to start their own home compost system (this assumption seems fair enough to make because the majority of the composting information available is focused on home composting). As we have deduced that 'laziness' is not a significant contributing factor, especially considering that even lazy people recycle. The students have also found that residents need more information on (1) what we now expect them to do, and (2) how do meet those expectations. As will be mentioned later, incentives on an intrinsic and basic extrinsic level can serve as motivations to change one's habits or normalized behavior. New tasks are naturally uncomfortable to an extent, but offering incentives can reduce this sense of discomfort. Because there is not enough supporting evidence to show that laziness is a major factor in people's lack of composting, this factor will be removed from focus, as it has not proven to be helpful. People's efforts in recycling, though may be faulted in application by lack of proper sorting techniques, show that people care about the environment, or at least care about sorting their waste 'correctly' according to the popular behavior. Both or either sorts of caring (by the residents) will do for Hayward's purposes.

Resources:

<http://www.sustainableamerica.org/blog/i-want-to-compost-but/>

<http://www.stopwaste.org/sites/default/files/Documents/compostsurveysummary.pdf>

<https://cohCA.maps.arcgis.com/apps/dashboard/index.html#/941fe585c7b944b38f62fe16b13aa128>

<http://www.stopwaste.org/preventing-waste/residents/start-with-your-soil>



WHAT WASTE MANAGEMENT WANTS

There are lots of articles on what can and cannot be composted, but most of these articles, whether they state it explicitly or not, are geared towards home composting. This is fairly helpful for those that are interested in home composting; but not so much for those that are motivated to do their part in sustainability efforts through composting of organic waste via curbside pickup. As it concerns the latter, the only opinion that matters for composting organic waste using organic waste curbside bins in Hayward is that of Waste Management and the disposal facility, as they are the ones that dispose of the waste. Their list of items that should be sorted into the organic waste curbside bin is as follows:

- Fruits and vegetables
- Meat, poultry, seafood (bones and shells)
- Bakery items and ingredients
- Eggs and paper egg cartons
- Milk, juices and cartons
- Plants, cut flowers, potting soil
- Coffee grounds, filters, tea bags
- Paper products (napkins, paper towels)
- Ice cream, yogurt, and cottage cheese

It should be noted that there are some items that are advertised as compostable by other groups, such as biodegradable utensils and waste bags, that Waste Management does *not* want in the organic waste curbside bins, and that educating residents on this information may influence residents to not put these items in their organic waste curbside bin, which may, in turn, improve efficiency at the Davis Street sorting and diversion facility.

One way that companies have been appealing to environmentalist consumers is by advertising their product or product packaging as compostable. The Federal Trade Commission (FTC) has regulations of the term ‘compostable’ that state, explicitly:

A marketer claiming that an item is compostable should have competent and reliable scientific evidence that all the materials in the item will break down into, or otherwise become part of, usable compost (e.g., soil-conditioning material, mulch) in a safe and timely manner (i.e., in approximately the same time as the materials with which it is



composted) in an appropriate composting facility, or in a home compost pile or device.

The most prominent issue with how this legislation affects curbside composting is that if the item that is claimed to be compostable in any of the aforementioned excerpt, is that legal use of the term ‘composting’ is met on commercial products and product packaging if it meets only one of the means listed (“appropriate composting facility, or in a home compost pile of device”). This is also subject to the other types of material that are being composted with the product or product packaging which claims to be compostable; as different organic waste materials require varying amounts of time to be effectively be digested into a useable compost. This means that items labeled and advertised as compostable, including BioBags, may not meet the requirements necessary for curbside composting and therefore should not be sorted into the organic waste curbside bin.

Links: <https://www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguides.pdf>

<http://biobagusa.com/about-biobag/regulations/>

For any additional questions as to what should or should not be composted in the organic waste curbside bin, Waste Management should be contacted directly. Link:

<https://www.wm.com/myaccount/reportProblem.do?action=getOverview&segment=cu stsvc>

Other Resources:

<http://www.wm.com/enterprise/food-and-retail/Retail-Solutions/organics-recycling.jsp>

<https://www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguides.pdf>

<http://biobagusa.com/about-biobag/regulations/>

ADDITIONAL OR SUPPLEMENTARY EDUCATION FOR THE COMMUNITY

Educating residents of Hayward on the harms of disposing of their organic waste with their garbage and generally not minimizing their waste that will go into landfills, as we will discuss later, is an important part of rationalizing the extra effort that the City is asking of its residents. Part of this education may include details of landfill usage, and visualizations of the sheer mass of the waste that residents create on average, methane and carbon dioxide emissions from the degradation of organic waste in landfills, as well as the consequential nutrient depletion of farming soil due to a lack of efforts to reintroduce unused nutrients from organic wastes back into agricultural soil.

Informing residents on their options of methods for organic waste disposal allows them to make an informed decision as to what kind of disposal would best serve their



lifestyle. With the majority of general composting information readily available through search engines online, there are people that may assume that composting at home is the only way to compost their organic waste, especially if they aren't conscious of the option for using their organic waste curbside bin for organic wastes other than just their yard trimmings. With more options to better suit their individual lifestyle, residents may be more inclined to take action and alter their waste sorting behaviors.

There may be residents that are interested in doing their part, but are finding that their bad sorting habits are so deeply ingrained into their daily lives, that they are having a hard time remembering to sort out their organic wastes; maybe they are simply interested in making their sorting habits better or more consistent. Providing tips and tricks to break and make habits may be very beneficial to these residents. An elementary study in habits, as they pertain to waste sorting, will be shown later, in more detail, but having some of this information available to residents would help those that find themselves in situations like this.

Even with the best education, residents will still have some questions due to new products or packaging on the side of manufacturing, and evolving technologies and opportunities on the side of infrastructure. Making comprehensive and easy to use resources available to residents that make available the most up-to-date information on what should and should not be composted may be a great fallback system for residents that aren't confident in their sorting knowledge. Making these kinds of resources readily available will be great for immediate questions, but if this kind of communication is not possible or practical, the other option of encouraging residents to contact someone that might be able to oversee these resources could be a great alternative. This type of resource would be efficient on the city website, or possibly on a text messaging, or other mode of hotline. It is important to make these resources as effortless and anonymous as possible so people are able to ask their questions without feeling inconvenienced or judged.

The facts that composting is good for the environment (stated that loosely), it can, sometimes, be 'gross' (and that people should just get over that), and the benefits of composting at home are already widely available in popular media; more specifically, popular news media. The New York Times, the LA Times, Huffington Post, and Fox News all have articles published on home composting, while NPR, Huffington Post, CNN, and Fox News all have articles on legislation regarding compost. NPR also has an article relating to agriculture and adding (the farmer's) urine to compost to introduce unused nutrients from foods; but this seems not to be terribly informative rather than putting people off to composting. Huffington Post offers several articles related to composting, on coping with change and "The Solace of Honest Work," that could be helpful to future composters, but also may turn people off as composting is portrayed as being difficult. Finally, Yahoo News has an article on curbside composting in Montréal, but focuses on how to prevent flies and a foul odor; which could be helpful, but also shines a negative light on composting. It is important to be giving residents all of the information that may be useful to them, but the organization of that information is also important. Emphasizing the information commonly available is repetitive and



redundant, especially as it pertains to home composting, and repeating this information is of limited value. Offering the commonly available information, in the form of links, may be beneficial as it would create an easy access-point to the information from a singular portal, while it would also keep clutter from the base page, and only people that are interested in the information, would be accessing it.

It does not seem helpful for the City to address legislations that do not pertain to Hayward's residents, and any information given on home composting might be placed, organizationally, after any information needed for curbside composting, as those residents interested in home composting are already willing to put in more work than those that are not interested in home composting. It may be of the City's interests to emphasize the information that the popular media is not offering. Popular media is making no attempt to explain, in enough detail, why composting is important, and most people do not seem to be consciously aware of the issues regarding the abundance of waste and landfill usage, let alone seeing how disposing of organic wastes in this manner creates a negative effect on the environment, let alone that there are other, simple options (curbside composting) than managing their own compost pile at home.

Links:

<http://www.cnn.com/2013/06/20/opinion/nutter-san-francisco-composting/>

<http://www.cnn.com/2014/09/24/politics/seattle-composting-law/>

<https://ca.news.yahoo.com/composting-tips-avoid-flies-stinky-013225640.html>

<http://www.foxnews.com/real-estate/2016/08/24/how-to-make-compost-homemade-fertilizer-made-easy.html>

<http://www.foxnews.com/food-drink/2015/01/29/seattle-now-shaming-residents-for-not-composting-food-waste.html>

<https://www.nytimes.com/topic/subject/compost>

<http://articles.latimes.com/keyword/compost>

<http://www.npr.org/tags/182017318/compost>

<http://www.huffingtonpost.com/news/compost/>

<http://www.huffingtonpost.com/news/composting/>

CHANGING COMPOSTING BEHAVIORS

BREAKING DOWN BAD HABITS AND BUILDING NEW ONES

Making composting a habit is important to not only increase the rate of the behavior, but to, also, increase the rate of *correct* behavior and decreasing the rate of



incorrect behavior. Residents already have habits for disposing with organic waste, though, the majority of residents, about 75% according to the GIS survey, are not exhibiting the desired habits. Changing habits entails two parts, breaking down ‘bad’ habits and building ‘good’ habits. While these two can happen together, it is worth discussing them apart because they produce unique problems.

Breaking habits is harder than implementing new ones, but there are things that we can do to help residents tackle this issue. Visual cues and changing context can be very helpful in breaking habits, or to help create a new environment to build habits upon.

Changing the context of one’s bad habit would also be helpful to create a (functionally) new environment for the habit to take place. Habits are best maintained within the same context in which they have been learned. Therefore, the inverse should also be true. Asking residents to change the location of their waste collection bins, for garbage, recycling, and adding one inside for composting, will create a new environment in which they will have to learn where their three different bins are located to dispose of their waste. This gives more theoretical room to add a third bin that will be considered more actively or consciously, as they will be re-learning where to dispose of all of their waste.

A visual cue that the City could help with could include adding a countertop bin; this would be helpful to add a visual reminder to use it; if it is aesthetically pleasing, maybe there could be different styles to match residents’ kitchens, or maybe even with built in air fresheners, or simple air filters to keep the possible smells from radiating, so people will be more likely to keep the bin on their counter as a constant reminder to sort out their organic waste. Another possible visual cue the city could help with is removing availability of the largest size of landfill curbside bin for residents, but this will be explained more, later, when we discuss prompting.

Link: <http://charlesduhigg.com/how-habits-work/>

People learn and create habits by practicing them. It may not be very realistic to find ways to get adults to practice sorting their waste, especially in a way that is fun or entertaining, but maybe there could be activities that we can make available during community events, like fairs, festivals, or farmer’s markets. Adults may not be very likely to participate in these activities, even if they are made available, but with the addition of small incentives, or by creating a competitive aspect of the activity, people may be more inclined. Making the incentives, if we can afford them, related to the venue in which the activity is being held in would be important. At a fair, a small plush toy with a “sustainability” t-shirt a prize for winning would be appropriate, and we could encourage the family to keep the toy in the kitchen; when the winner of the challenge sees this toy, they will probably be more inclined to dispose of their waste properly, and with confidence, purpose, and with happy memories. At a festival, maybe a t-shirt, drink cozy, or even a coupon for their waste management bill could serve as a prize; for a farmer’s market, a piece of fresh fruit or reusable produce bag would probably suffice. The problem with this type of incentive is the monetary cost, but it may be worth an



investment, depending of the cost of not meeting the mandated percentage of waste reduction; and these activities would not be something that would be done daily, but rather only when there is a larger community event.

Though the idea of having people practice their sorting habits in a fun activity would definitely get them to think about their composting habits, it really takes an initiative to commit to change, by each individual, to bring about that change. When creating new habits, one must make a dedicated commitment, but this commitment will take time to manifest. Lasting habits are best formed with gradual commitments. LifeHack.org gives 18 points in making a habit. That may sound like a lot, but many of them are conceptually repetitive. The basics are to learn what you can about what you want to do, then, make a daily commitment that you can hold yourself to, or have someone else hold you to, that makes progress with small steps. Create an environment where you have reminders of your commitment, and do your best to stay consistent, but don't let failures to be consistent break your commitment. Link to this article:

<http://www.lifehack.org/articles/featured/18-tricks-to-make-new-habits-stick.html>

Links to other habit related articles: <http://www.briantracy.com/blog/personal-success/seven-steps-to-developing-a-new-habit/>

<http://jamesclear.com/three-steps-habit-change>

<http://99u.com/articles/17123/5-scientific-ways-to-build-habits-that-stick>

PROPERTIES OF OPERANT CONDITIONING AND THEIR APPLICATIONS FOR COMPOSTING

Though the responsibility and power of changing residents' sorting behaviors lies on residents, the City can help enable the process of modifying these behaviors. One method of behavior modification that has lots of research and verifiability is operant conditioning. According to an article on SimplyPsychology.org, operant conditioning can be defined as, "changing of behavior by the use of reinforcement which is given after the desired response." A basic breakdown of operant conditioning would be rewarding desired behavior and/or punishing undesired behavior. For the purposes of standardization, the definitions of important terms in operant conditioning according to this article are as follows:

- Reinforcement: the application or removal of a stimulus to increase the occurrence of a behavior.
- Punishment: the application or removal of a stimulus to decrease the occurrence of a behavior.
- Reinforcer: a reward.
- Positive Stimulus: an added stimulus.
- Negative Stimulus: the removal of a stimulus.
- Primary Reinforcer: something valuable on its own.
- Conditioned Reinforcers: those reinforcers that are paired with primary reinforcers to the point where they have the same meaning as the primary



reinforcer – this happens through classical conditioning. SimplyPsychology.org also has a short, but thorough section on educational applications. They discuss praise, behavior shaping, reinforcement schedules, and feedback.

Link to article stated above: <http://www.simplypsychology.org/operant-conditioning.html>

The actual disbursement of rewards is important as well, studies have shown that variable ratio reinforcement and variable interval reinforcement are the two schedules of disbursement of rewards that have the quickest response to reinforce behavior while also having the longest lasting effects. Variable ratio reinforcement is when behavior has been rewarded after an unpredictable number of times correct behavior has been exhibited. Variable interval reinforcement is when behavior is rewarded after an unpredictable amount of time, assuming that behavior has been correct within that time frame.

Link to supporting article: <http://www.clickersolutions.com/articles/2001/ocguide.htm>

The application of operant conditioning for the purposes of helping residents improve their sorting behaviors can be very simple. It is important to remember that the value of primary and conditioned reinforcers will vary between individuals; this is why it is important to offer several kinds of reinforcers or incentives. Positive reinforcers can be as easy as giving someone a discount on their Waste Management bill if they reduce their waste by a certain percentage. This can be done on the (small) community or neighborhood level if the individual level is not possible. The community aspect would add a level of social pressure that could potentially be beneficial. If reducing people's bills is not an option, there are other ways to get a similar incentive, with positive reinforcement, such as making coupons available for local businesses that are interested in sponsoring 'a greener community' or through positive punishment, by raising the garbage prices for those that do not reduce their landfill volume.

As far as incentives go, for adults in the Bay Area, ethical incentives tailored towards environmental health and sustainability may be enough to suffice, as the Bay Area is a fairly liberal area. These moral incentives would be easier to administer and may be more cost effective as it would only entail an informational ad campaign. We can get local businesses involved here as well if we can get discounted, or free, advertising space. Businesses might be interested in participating in this exchange because they will have the image of being 'environmentally conscious' as well as being known for investing in their community and the ethical high ground those labels imply. Relying solely on reinforcement rather than implementing a punishment in addition is generally recommended for some situations, but for Hayward's purposes, as the residents and the city officials don't have constant direct contact to make a lack of recognition of bad behavior influential, introducing a positive punishment may also be a good incentive.



ETHICAL AND SOCIAL INCENTIVES

For those residents that genuinely and actively care about the environment, there are certain ethical incentives that, if brought to their attention, may be enough to motivate, and sustain said motivation. Sustainability is of importance to many of these people. One university that implemented a composting program in their dorms conducted a survey of the students living in the dorms before the program began and after the program had been in place for about a year. They describe their findings on proper sorting techniques as “improving.” The article that describes this program and survey states, “If you provide the opportunity and you do the appropriate amount of education, can you change behavior?” Prosser asked. “It appears, at least on some levels, that we can.” They attribute their lack of a “high level of composting” campus wide, specifically to a lack of space for the infrastructure and technology, as well as the recognition that not all students will be interested. Sustainability is not just ‘good for the environment,’ but it is also a lifestyle that is culturally important to strive for. Sustainability relies on everyone, and those that find it to be of value, and find composting to be part of living sustainably, will compost if they have the opportunity and education to do so.

Link to article: <http://www.dbknews.com/2016/04/12/umd-compost-on-campus/>

Most people probably don’t know just how much waste they make individually, as a household, or especially as a nation. An interactive article, called *Land of Waste*, expresses, explicitly, how much waste we are making as a country, and really shows the nation’s lack of attention to the environment. The article states that the United States makes “roughly 728,000 tons of daily garbage,” and that California has the fourth highest ‘tons of weight per person’ in the nation. The site also offers an activity where you can enter in an address, and it will show the statistics to the nearest landfill of that address. Addressing these astronomical numbers in the programs the city intends on implementing may help residents to realize the weight of the problem with waste disposal into landfills.

Link to interactive article: <https://www.saveonenergy.com/land-of-waste/>

The EPA offers some, more detailed reason why composting is important. Their website states that composting “reduces methane emissions, reduces and in some cases eliminates the need for chemical fertilizers, promotes a higher yield of agricultural crops, aids in habitat restorations, can be used to remediate soils contaminated by hazardous waste, capture and destroy 99.6 percent of industrial volatile chemicals in contaminated air, and provide cost savings over conventional soils.” These details may help residents see the importance of composting instead of just being told that it is “good for the environment.”

Link to the EPA website: <https://www.epa.gov/sustainable-management-food/reducing-impact-wasted-food-feeding-soil-and-composting#benefits>



FINANCIAL INCENTIVES

For those residents that the ethical incentives don't quite reach, the City of Hayward can offer financial incentives. This sounds expensive, but doesn't have to be. Another reason that this kind of financial incentivizing might work quite is because coupons and discounts from certain retailers can be of a high incentive to some residents. The students have found, in their research, that there is a certain income demographic variable for people that are not composting that might be greatly inclined to alter some of their behaviors to save money.

There is an emphasis on legislations for fining improper sorting behaviors as it pertains to the history of recycling. An article on How Stuff Works explains, "The success of recycling traces to wide public acceptance, the improved economics of recycling, and laws requiring recycling collections or enforcing recycled content in certain manufacturing processes."

Link: <http://science.howstuffworks.com/environmental/green-science/recycling1.htm>

Fee-based legislation as a method of positive punishment for residents not adopting required behavior as it pertains to composting has been in places within the United States since about 2009, and has been in place for recycling in the U.S. since 1980. This method, as it is being implemented by more cities across the nation, must show some sort of return, whether it be in changing residents' behaviors, or by collecting extra revenue that has benefitted sustainability efforts, by those cities, in some form or another, or both.

Link: <http://www.citylab.com/city-makers-connections/recycling/>

Instead of discounting Waste Management bills for residents that do compost, the City can create a fee for those that do not. This fee could bring money to advertising or community outreach programs, or even to infrastructure to help deal with the added effort in sorting for those that aren't sorting at home. Making businesses completely liable for their waste disposal is something that may initially take a little while, but could pay off in the end. Either way, there are ways to offer financial incentive with investments and without investments. This has been a way that some areas have increased their residential composting efforts, and even though some studies suggest that financial rewards are not a great incentive because they are generally not long-term, we really only have to keep some of the incentives around until residents build better habits. According to Mercury News, Hayward garbage rates are set to increase 10% by 2018 and with a max of 6% annually till 2021. Offering lower rates for those residents that are exhibiting the ideal sorting techniques could give residents motivation to be more mindful of their sorting. There could even be a tiered system, where there are several set fees for degrees of variation from the ideal sorting behaviors that might look something like:

Ideal Sorting: 0\$; Mostly Sorted: X\$; Some Sorting: 2X\$; Not Sorted: 3X\$



Some benefits of this approach would be that this could be simple and straightforward and that it can be used for residents and businesses alike. Some cons of this approach could be that it may require legislative action depending on how the fees were added, and if those fees were to be distributed to the city for community outreach or advertising, or if they were collected and kept by Waste Management.

Link to Mercury News article: www.mercurynews.com/2015/01/03/hayward-garbage-rates-could-go-up-10-percent-in-march/

Hayward has successfully enacted pieces of legislation to help the recycling and composting causes. Vermont has also enacted some pieces of legislation. They have made recycling food waste (or composting) universally mandatory by 2020. Their website offers a lot of information on what organic waste is, what composting is, what residents' composting options are, and why it is important; all in one webpage.

Link to Universal Recycling legislation: <http://dec.vermont.gov/waste-management/solid/universal-recycling>

Link to Organic Waste webpage for the legislation: <http://dec.vermont.gov/waste-management/solid/materials-mgmt/organic-materials>

The city of Cleveland gave their residents new curbside bins that are equipped with RFID chips in their recycling bins to see if they are at the curb; if bin is not making it to the curb, city workers examine landfill bin to check for recyclables. If recyclables are present over 'x'%, that residence is subject to fine of \$100. "The chips will allow city workers to monitor how often residents roll carts to the curb for collection. If a chip shows a recyclable cart hasn't been brought to the curb in weeks, a trash supervisor will sort through the trash for recyclables. Trash carts containing more than 10 percent recyclable material could lead to a fine..." A positive punishment of \$100 seems as if it is a high enough fine to deter that behavior. This fine might be unrealistically high for some of Hayward's lower income residents, but anything less may not be effective for Hayward's higher income residents. It also might not be seen as fair to charge residents different fines for the same infraction, even if it is based on income. This fine would definitely serve as an incentive.

Link to RFID program: http://blog.cleveland.com/metro/2010/08/city_of_cleveland_to_use_high-.html

Recycling or composting "points" may be offered to individual residents or neighborhoods that are exhibiting proper sorting behavior. These points can be redeemed as a sort of coupon at certain retailers. These retailers would be incentivized to participate because this program would bring them business and be a source of advertising for them, but would also showcase them as a company that is willing to invest in their community and sustainability, generally. This is a pretty simple and straightforward program that could be easily tailored to Hayward residents, and could be helpful for small and local businesses that could use the publicity. Some cons of this program might be a lack of interest by companies in Hayward, or this might look like a sort of mailing list, to where the residents don't find it useful, because their coupons or



discounts don't apply to them in a useful manner. Link to recycling points idea origin: <http://www.recyclebank.com/>

Random, small prizes given by representatives and corporations to people that are seen sorting their waste properly in public places could be a good method for providing a sort of (mainly financial) incentive. Having a 'task force' of city employees or volunteers going to different businesses that create a lot of waste, or that have a habit of not sorting properly, and giving out small prizes, such as gift cards and the like, to people that are seen sorting properly can not only benefit that person receiving the prize, but all those who witness the transaction and hear about it. An extravagant transaction may also draw more attention. This may add up quickly, but it doesn't have to. Finding key prizes for key areas, with appropriate extravagance could go a long way. Word of mouth goes a very long way, and hearing about how the city is giving back to residents that are doing their part in waste reduction would be very good publicity. This has been done through a program called "Caught Green Handed" and has been used in a town called Charlotte (not specified as Charlotte, NC, or otherwise) as well as in Cleveland, Ohio. The program advertises itself and its effective time frame, then has about three active months of giving back to some community members that are seen sorting correctly.

Link to "Caught Green Handed": <http://earth911.com/inspire/undercover-prize-patrol-on-the-lookout-for-green-handed-acts/>

ADVERTISING AND PROMPTING

Advertising an informational campaign is a good way to target certain demographics with current information available on who is more likely to already be composting, and who we want to target to increase composting efforts. StopWaste has published an advertising campaign, but it is unclear with the research done, when the campaign was circulating. San Francisco is also running an ad campaign similar to the StopWaste Campaign. Both use basic humor to tell people that they should be composting; but none of these ads are telling residents *why* they should be composting. Some general advice on advertising states that ads should be focused on positive emotions, which these ads do, but students in class recall the 'scarier' information as being an actual, and more effective motivator for both recycling and composting. These personal reflections may be biased, but the bias will reach a certain demographic of people. The students were not able to find StopWaste ads on the StopWaste website, but there are many images available on Pinterest; they are the ads where food scraps and organic waste curbside bins are 'talking' to each other. San Francisco has two kinds of humor ads out, one is a plain green background with black and white text, while the other has some imagery of foods with text. Examples of each are shown below.

Link to some StopWaste ads on Pinterest: <https://it.pinterest.com/pin/44191640066871741/>



Link to San Francisco's advertising campaign company, Singer Associates:
<http://singersf.com/projects/sunset-savenger-company-recycling-and-composting-advertising-campaign/>



It may be risky to go against what advertising specialists state is 'best,' but the Truth campaigns for anti-tobacco products have been largely successful, and this campaign uses negative information as a part of their campaign. Hayward may be able to have a similar success because in an informational ad campaign, advertisers are looking to increase awareness, knowledge, and to alter behaviors, not to sell products (which is what most advertising is geared towards, and therefore, probably research oriented towards). When researching what kind of ads to run for Hayward's composting, it is important to account for the fact that our ads do not have an intention to sell a product, the City has the intention of changing behaviors, and looking at advertisements that have the same focus, and seeing which succeed and which fail from there will give



them more accurate information to make better informed decisions about which ads to run.

Link to informational page about Truth: <https://www.thetruth.com/about-truth>

A symbol that represents composting, such as the three arrow triangle for recycling would be very helpful for residents to successfully sort their organic wastes. The recycling symbol was designed in 1970 with the beginning of what is sometimes called the ‘Environmental Movement’, by an engineering student, Gary Anderson, at the University of Southern California for a contest funded by the Container Corporation of America (CCA). Because the CCA never trademarked the logo, the design “entered public domain as a universally recognizable icon for recycling.” Because the recycling symbol is well established, people have used it as a guide to know what can and cannot be recycled. Obviously, this hasn’t created perfect composting habits, but it has helped guide residents on recycling items they would have, otherwise, thrown away.

Links: <http://www.citylab.com/city-makers-connections/recycling/>

<http://www.businessinsider.com/gary-anderson-the-man-who-created-the-recycling-logo-2012-7>

There is only so much that the City can do about making a composting symbol canon, but there are things that can be done, that would bring attention, and possibly also bring grant money. Recreating a contest to establish a symbol, probably across Alameda County, or the entire Bay Area, could be effective in bringing national attention to this issue with the proper media coverage. Mandating that manufacturers within city limits differentiate on their products and/or product packaging if that item in compostable through curbside composting (as those that are composting at home will probably have more incentive to do their own research about what is best for their compost pile or bin), being persistent in calling for and encouraging larger government or institutional bodies that have more influence to incorporate something similar to the recycling logo for curbside composting, or simply insisting that the FTC changes their regulations on the term compostable to what may be composted through curbside composting. The City is not obligated to participate in composting efforts to this extent, but it may provide a sense of pride in the city and its efforts in its residents, and, therefore, motivate residents to do their part in sustainability efforts. This would take a lot of effort of the City’s part, and is a high-risk, high-reward gamble, on time and money.

Sonoma county set a waste reduction goal as part of an annual event, then reduced the size of available landfill curbside bins, so that both of the recycle and compost bins were significantly larger than the landfill curbside bin, to better represent, visually, what the ideal, and acceptable, waste ratio is. This will be a visual cue, or prompt, each time that person takes out their trash, recycling, or organic waste. Given, this kind of measure would be geared more towards residents in single-family homes, but passersby that may also see the difference in sizes for these curbside bins may also



make the same connections we are hoping for in our residents that live in single-family homes.

Link to article: <http://www.kj.com/blog/tomato-festival-waste-diversion-success>

Other ways to prompt residents may include attaching sorting rubrics or charts to the curbside bins themselves or making aesthetically pleasing countertop bins available, so people would be more likely to leave the bins on their counters as a reminder to compost. Attaching guidelines to the curbside bins may not be as effective, as it will only be seen as the waste is being taken out, but it might get residents to think more about how they are sorting. Making aesthetically pleasing countertop bins could get costly, but the City could also simply just give residents tips on how to decorate their own to match their decorating style. This may take some time and effort, but this kind of information exchange can be done through the mail, and could possibly be incentivized by rewarding citizens a discount for their Waste Management bill, or a chance to win some larger raffle prize, if they share a photo of their decorated container on social media and ‘tagging’ the city in the photo; this also a good opportunity for community-based advertising.

It is important for the city to be providing educational opportunities and resources to improve their knowledge about composting to residents. Advertising is an effective way to do this. Although advertising can become very expensive quickly, recruiting public schools to put in design efforts is an option and it is a great way to increase community awareness of the issues at hand, and how to solve them. The recruitment of local businesses, and working together with them as a large part of the community can reduce these costs dramatically.

COORDINATION

THE IMPORTANCE OF COORDINATION

One thing that might be obvious based on the contents of this report is the lack of coordination. We tried to talk about ‘organic waste’, but ‘compost’, ‘green waste’, ‘food waste’ and a variety of other phrases kept creeping in. The lack of a well-known symbol is discussed above. We also found that there was a lack of coordination on the level of the people working to solve the problem. There was no coordinated language or expectations or behaviors. While we lack the ability to enforce any coordination, we hoped to encourage it.

SOME KEY PLAYERS

To help with coordination efforts, we have done some research to find the contact information of some key players.



Hayward CalRecycle Office of Local Assistance and Market Development

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(916) 322-1848

Kathleen.Strickley@CalRecycle.ca.gov

Kaoru Cruz (Supervisor)

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Kaoru.Cruz@CalRecycle.ca.gov

City of Hayward Contacts

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StopWaste Alameda County Primary Disposal Reporting System (DRS) Contact

Nisha Patel

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Brian Mathews

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BMathews@stopwaste.org

Anette Henderson

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ahenderson@stopwaste.org

StopWaste Alameda County Request for Proposals



Meghan Starkey

(510) 891-6513

mstarkey@stopwaste.org

Hayward Unified School District

Interim Superintendent

Dr. Matt Wayne

mwayne@husd.k12.ca.us

Senior Executive Assistant to the Superintendent

Lisa Cote

(510) 784-2640

lcote@husd.k12.ca.us

Link to Hayward Unified School District, Site Based Decision Making Team:

<http://haywardusd-ca.schoolloop.com/SBDM>

California State University, East Bay

Jillian Buckholz

CSU East Bay

sustainability@csueastbay.edu

(510) 885-3709

Waste Management

Waste Management of Alameda County (WMAC)

Sales: (510) 613-8700

Customer Service: (510) 613-8710

Link to Waste Management site with contact information local for the City of Hayward:

<https://www.wm.com/find-a-facility.jsp?address=94544#/?address=94544%20usa&radius=80500>



GRANTS

“SARE grants fund research and education projects exploring: marketing, sustainable communities, integrated systems, pollinators, and local and regional food systems,” among more, which are not necessarily relevant to Hayward’s interests. It is not apparently evident if Hayward qualifies for any of the grants offered by SARE, but it could be worth doing more research here.

Link: <http://www.sare.org/Grants>

CalRecycle offers multiple grants mainly geared towards improving or creating infrastructure “for aerobic composting and anaerobic digestion and recycling.” The Altamont Landfill was recently awarded a grant from CalRecycle to introduce one of those infrastructures. CalGrant “funds will be used to provide technical training or permitting, inspection and enforcement, to purchase personal protective equipment, supplies, and field equipment for inspectors, and to provide educational materials, professional membership funds, and subscriptions.”

Link: <http://calrecycle.ca.gov/Climate/GrantsLoans/default.htm>

EARLY EDUCATION

THE IMPORTANCE OF EARLY EDUCATION

The Office of Workforce Management of the National Oceanic and Atmospheric Administration (NOAA) states in one of their articles, *Encouraging Health Habits in Your School-Aged Child*, “The health habits your child develops during the school-aged years - the wide span between five and 12 - often become habits for life.” Although this article is obviously geared towards personal health choices, it is still, nonetheless, applicable to composting and other sorting behaviors. An article in *Psychology Today*, titled *Adolescence and the Development of Habits*, it is stated, “practice can make permanent because by repeating ways of acting, a young person forms habits for good or for ill, [and] whether good habits or bad, people are by repetition ruled because human beings are not simply creatures of habit; they are captives of it.” People rely on heuristics and habits for so many of our daily functions, that we wouldn’t be able to identify most of them, and the vast majority, if not all, of our heuristics and habits remain unchecked and untested for their efficacies. As childhood habit are likely to form lifelong habits, it is important to form healthy and productive habits in early childhood, to maximize this effect. As waste disposal is often one of those habits that people are not examining, if young children learn about proper sorting habits in school, it will not only encourage good sorting habits among the children, but may also cause adults (parents, teachers, and other adults in contact with those students’ educations) to examine those habits, and possibly adjust them to something they would find more appropriate. Link



to NOAA article:

http://www.wfm.noaa.gov/workplace/RaisingChildren_Handout_3.pdf

Link to Psychology Today article: <https://www.psychologytoday.com/blog/surviving-your-childs-adolescence/201201/adolescence-and-the-development-habits>

Dr. David Whitebread and Dr. Sure Bingham of the University of Cambridge author an article, titled *Habit Formation and Learning in Young Children*, that discusses, at quite extensive detail, how habits are formed and maintained, and how children learn through different means and methods, specifically with the focus of finance management. Whitebread and Bingham state that the individual child's "beliefs about the intrinsic value of any learning activities they undertake," as well as their emotional responses to the activity, and level of interest in the activity itself, are all influential motivators in the child's active participation of, and therefore learning through, the activity. Whitebread and Bingham also imply that these activities would be most effective as physical games, or things of the like, to create long-lasting sorting behaviors with a longer-lasting and effective understanding of what ought to be sorted, where, as compared to a digital game or activity, performing the same task(s) in real time. These University of Cambridge authors state, "several studies have found that children join in simple 'saving' behaviours not because they understand the concepts behind this form of 'delay of gratification', but because they enjoy participating in "adultlike" behaviour, or wish to comply with parental expectations."

Link: <https://mascdn.azureedge.net/cms/the-money-advice-service-habit-formation-and-learning-in-young-children-may2013.pdf>

All of this not only demonstrates the importance of coordination between the City, its schools, and its residents, but it also shows that it is beneficial for young children to be practicing proper sorting behaviors with a three-stream system, even if the schools are unable to make the change to a three-stream system of waste disposal, and are only capable or willing to maintain a single-stream system. There certainly would be financial benefits for the City of Hayward and the Hayward Unified School District (HUSD) if HUSD were to implement a three-stream system, as much more organic waste would be diverted from landfills, contributing to a higher diversion rate, citywide; lowering the chances of Hayward being fined for not making their mandated waste diversion percentages. HUSD would save money from diverting their waste as well, as an increase in food waste has been found in school that are offering 'healthier' options for their students.

In addition to these economic benefits, the benefits of the students of the institutions overseen by HUSD having reliably accurate and long-lasting sorting behaviors benefits the student, where they live, and the environment as a whole, in ways that cannot be calculated. There are many school districts that have enacted programs in their cafeterias to implement 'Reduce, Reuse, Recycle, Rot.' It may be a mistake to not use waste as an opportunity to teach youth life-long sustainability practices and educate them the relevance of resource conservation and how composting is a part of this equation.



A pilot program in Oakland, California, was propagated at a small, neighborhood level of government and has been greatly supported and encouraged by higher levels of local government. This program has integrated a district wide standard for waste disposal and has established committees to oversee ongoing sustainability efforts as they pertain to Oakland's school district. Link to pilot program:

http://www.stopwaste.org/sites/default/files/Sequ_Peral%20Garden%20Case%20Final_o.pdf

The city of Davis, California, also implemented a similar pilot program, as the one seen in Oakland, in 2012.

Link to Davis Farm to School Homepage: <http://www.davisfarmtoschool.org>

Link to analysis and cost statistics of this program:

<http://www.davisfarmtoschool.org/3079-2/school-composting/>

In a report documenting the importance of implementing the importance of operant conditioning in shaping behavior of young students, it is explained, "When a student makes many mistakes it means that one step does not lead logically to the next step or the steps in the process may be too large. The learning situation may become punishing and aversive to the student who is making errors, which often results in a decline of natural motivation to learn." What this means is that if children are going to be taught to compost, the need to be taught in the correct way to maintain a more natural motivation that will be longer-lasting than motivations that are external to them. Although the City of Hayward doesn't have control over HUSD, the City can still encourage HUSD to adopt such a program or programs by creating incentives for the district through grants, free or discounted materials, partnerships, and/or other supporting resources.

Link: <http://files.eric.ed.gov/fulltext/ED085289.pdf>

StopWaste offers a school program that incorporates a three-stream system.

Link: <http://www.stopwaste.org/recycling/schools/school-districts>

Here is a PDF that was originally published by Alameda Waste Management. It is geared toward children to teach them about composting. There is also a helpful table to be printed out and given to children to write down the items in their lunchboxes to help them decide whether they should be composted, recycled, reused, or thrown in the trash.

Link:

http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwmd1.pdf

This is an easy to read slide show for children that explains how to make and place different types of compost bins and piles. The first few slides talk about what composting is and the science behind it. Later on, it explains how to set up a bin or pile. This can be used to teach children how to set up their own piles at home, or in preparation for creating a garden with a compost set up at the school.



Link: <http://aggie-horticulture.tamu.edu/kindergarden/kidscompost/CompostingForKids.pdf>

There is a video on YouTube that is intended for child audiences, that has been made by children. The video explains the importance of composting and gives a lot of examples of what to put in compost bins at school.

Link: <https://www.youtube.com/watch?v=dRXNo7Ieky8>

Composting Council has a PDF that explains, step by step, how to initiate composting behaviors at an early age.

Link: <http://compostingcouncil.org/wp/wp-content/uploads/2015/06/Composting-at-School-0307.pdf>

The School Garden Project is an organization that explains ways to successfully implement a composting plan for school gardens. This PDF offers advice on ways to influence school employees and faculty, as well as the local community involved in implementing composting programs at schools. This document also offers methods to educate children about sorting out their organic waste and how to transform these behaviors into habits. This method advises nominating a ‘compost monitor’ that would be available to the children to help assist them if need be, for about the first two weeks, until students are confident in their sorting behaviors.

Link: <http://schoolgardenproject.org/wp-content/uploads/2013/06/Cafeteria-Composting-Manual-for-printing.pdf>

MISCELLANEOUS RESOURCES

FOR ORGANIC WASTE

Real Foodies Compost – San Francisco

Link: <https://www.realfoodiescompost.com/>

This website is part of an advertisement campaign being organized by the San Francisco Department of the Environment. The name implies a certain urban or environmentalist elitism that can be incentive for certain people to showcase some social hierarchy through consciousness of environmental health and names their target audience as those that would identify, or would like to identify as ‘foodies.’ The website offers ‘cool’ recipes for foodies. The modern website design is minimized and user friendly, making composting seem easy, because the website is easy to navigate - with an intuitive feel. The site gives a lot of specific examples that could clear up a lot of confusion related to sorting (in San Francisco). Other than making it easier, the website does not offer much incentive and is reliant on the reader to already be educated on the



consequences of not composting/the benefits of composting. The site makes it clear that the intention is not to get people to compost at home, but rather to sort the organic waste into their organic waste curbside bins.

Victoria, Australia Non-Profit Webpage

Link: <http://environmentvictoria.org.au/content/organic-waste>

The attitude of this web page is geared toward donations. This assumption comes from a couple of reasons, no matter which page you're on within their site, a large bright colored orange donation tab is always available. On each of their four main tabs at the top that read, "Learn, Act, Give, Share" most begin with a strong attempt to sway you to donate, such as, "Now imagine yourself getting involved in one of the many ongoing campaigns and programs designed to restore and protect Victoria's precious waterways." This phrase is used over and over again throughout their webpage. They also have a pie chart that shows total expenditure: 2,373,663 dollars, 15 percent on fundraising, 13 percent on administration, and 72 percent on campaigns.

There is a lot of good general information, but not a lot of detailed information. For example, one tab that people would be likely to click on, "Get into Composting," would have lots of valuable information. It was surprising to see that it only had a short general paragraph, explaining how greenhouse gasses are bad and that we should start composting. They provided a separate source below the paragraph that goes into more detail but only discusses a small portion of composting. This mainly consisted of encouraging people to buy a compost bin, providing a very small list of some compostable items, and bullet pointing a couple concerns people might have. This is particularly interesting as it claims to be a non-profit site that is selling these bins.

StopWaste Video

Link: <https://www.youtube.com/user/stopwasteorg/about>

StopWaste has a channel on YouTube showcasing the efforts already being put forth by Alameda County. Most of the articles on the Hayward site contain a YouTube video, and although StopWaste isn't on all of them, they still cover a lot of aspects of sustainability. Food disposal videos carried the lowest amount of views, despite the information being there, people are still not seeing it.

Inhabit Movie

Link: <http://inhabitfilm.com/>

This film brings composting full circle. This film could make people want to compost because it shows how composting in other places really helps permaculture thrive on different levels. It is generally more geared to people interested in home composting, but may also be helpful for those that are just interested in composting to initiate the sorting behaviors they are interested in. The film is less than ten dollars to buy or rent, so it is accessible to most people if they are interested.



Waste Diversion in European Countries

Link:

http://ec.europa.eu/environment/waste/studies/pdf/financingmunicipalwaste_management.pdf

This article discusses a weight-based collection scheme for European countries and explains that households introduced to a weight-based collection scheme had improved their organic waste removal by nearly 40 percent.

Link: <http://www.eea.europa.eu/media/newsreleases/highest-recycling-rates-in-austria>

This article goes into depth about a singular trash system that is reported to be very successful.

2005 StopWaste Survey for Alameda County

Link:

<http://www.stopwaste.org/sites/default/files/Documents/compostsurveysummary.pdf>

This is a report from a telephone survey from October of 2005, with reports from all around Alameda County. There were some basic, but seemingly unavoidable issue with the sample population that should be addressed as there issues could have skewed the results from what would have been a more accurate representation of the total population for the county. The 'list' population "[was] selected from a list of users who had purchased a composter worm bin through ACWMA between 1991 and September of 2005," and the Random DigitalDial (RDD) population "was selected using a representative and randomly drawn sample of Alameda County residents," (p. 3). Those from the list population are financially invested in composting, but are only known to be involved with or interested in home composting. Those in the RDD sample had to consent to take the survey, which means that at least some of the people agreed to take the survey were interested in composting, or at least complying with what the county is asking of them; this is not necessarily the population that we will encounter with all of our Hayward residents. It is fair to assume that those in the RDD sample were at least somewhat interested in composting or the environment, generally. It is also important to note that both population samples must have "had a yard or garden at their place of residence," which excludes some residents that composting with the three-stream system wouldn't exclude (p. 3). One way to avoid these issues of conflict in surveying is to include a survey with Waste Management billing and to residents of multi-family residents that offers some sort of financial incentive to complete the survey.

Single Stream Systems

Link: <http://www.container-recycling.org/assets/pdfs/reports/2009-SingleStream.pdf>

This is an article about the economic and environmental impacts of single-stream systems.



Link: www.mdpi.com/2079-9276/4/2/384/pdf

This is an article about single stream systems and their reliance on infrastructure for proper waste sorting, management, and disposal. It is generally presumed that single-stream systems cost less than multi-stream systems, but due to their reliance on infrastructure, the costs are actually higher than multi-stream systems. The article also implies that the efficacy of the multi-stream systems is of better quality than that of the single-stream systems as well. There is a lot of specific data available from 223 municipalities over a ten-year period here.

Excess Food Waste

Link: <http://notreallyexpired.com/the-problem/>

Here is a website that explains the confusion on the "sell by" or "use by" dates on food/milk. It seems to be like an organization to educate or spread awareness on date labels. On their website, it says that it is reported that 90 percent of consumers throw away their food when they see the date label thinking that it is the expiration date. Confusion on date labels is part of why there is so much food waste. Clearing up this confusion on date labels would help decrease the amount of food waste in landfills. The website also offers a video that explains the confusion on milk label.

Costco

No Link

The Costco on Hesperian Boulevard has initiated a three stream system for the waste that the store produces. According to a short discussion that a couple of students had with an assistant manager there, the employees of Costco are enthusiastic about doing their part in sustainability. Although the three stream bins are available, much of the waste is still not sorted properly and an employee is responsible for sorting through each bin to be certain that the waste is sorted correctly. The students that visited this establishment observed 35 people dispose of their waste in the food court, and found that 60 percent of those observed (across children, adults, and seniors) did not sort their waste properly. Those students also observed that the signage available for the waste bins were not detailed, though the 'compostable' bin had an infographic directly on the bin that labeled the bin as 'food and food-soiled paper', which seems as if it should be forward enough. Maybe patrons that are shopping are too distracted to be trusted to even notice signage, let alone notice that there are separate bins for different types of waste.

BioEnergy Consult

Link: <http://www.bioenergyconsult.com/>

BioEnergy Consult is an organization, which has worked on several successful projects on waste management and policy formulation. There are advisors on the website that the city of Hayward could work with in association to waste to energy, solid waste management, waste recycling and composting.



Zero Waste Events

Link: <http://www.ecocycle.org/recycle-compost-reuse/compost>

Here is a link for "zero waste events" which is a great idea in getting the city of Hayward together to participate in composting. There could even be incentives in order to draw a larger crowd in Hayward.

Master Compost and Solid Waste Course

Link: www.recycleworks.org/academy

The county of San Mateo offers a free 8-week course focusing on home composting. More details are available through the link.

For Sustainability, Generally

Real Foodies Compost – San Francisco

Link: <https://www.realfoodiescompost.com/>

The *Real Foodies Compost* website offers environmentally friendly information such as San Francisco's carpooling and business incentives to encourage said carpooling, renewable and efficient energy options (incentives and financing), how to go about recycling more unconventional items like electronics or furniture as well as companies that will pick up these items to recycle them for you.

A Biodegradable Plastic

Link:

<https://www.acs.org/content/acs/en/pressroom/newsreleases/2016/august/edible-food-packaging-made-from-milk-proteins-video.html>

This article discusses the discovery of making plastic from a milk protein called Casein. This is a biodegradable plastic that could be useful for dry packaging (only) as the plastic dissolves with water. With further research and technology, this could be a useful option soon.

Bay Area Sunshares

Link: <https://fremont.gov/2295/SunShares-Program>

Daly City joined nearly 40 cities and employers across the Bay Area to offer discounts on solar systems and zero-emission vehicles

This project would be great for the city of Hayward to get involved to help their composting and clean energy techniques.

CONCLUSION



How do you draw a conclusion from so many sources and so many voices? Perhaps the myriad of voices and ideas is conclusion enough. Hopefully, an expression of some of the voices is a start. Consider how hard it is to focus on the relevant parts of the issue. That might provide more insight than anything into the attitudes toward organic waste and compost.