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Using Toolkit Activities to Reduce Household Food Waste

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USING TOOLKIT ACTIVITIES TO REDUCE HOUSEHOLD FOOD WASTE

by

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GLOSSARY

Definition Of Key Terms

Community-based social marketing. CBSM is a strategy that "draws heavily on research in social psychology, which indicates that initiatives to promote behavior change are most often effective when they are carried out at the community level and involve direct contact with people" (McKenzie-Mohr, 2010, n.p.).

Compost. A mixture that consists largely of decayed organic matter and is used for fertilizing and conditioning land (Merriam-Webster, 2015).

Food-insecure. When the food intake of one or more household members is reduced, and eating patterns are disrupted at times during the year because the household lacks money and other resources for food (Coleman-Jensen, Gregory & Singh, 2014).

Food loss. see Food waste.

Food rescue. Surplus food, such as fresh produce, is collected from farmers, vendors, restaurants, stores to be distributed to food shelves and meal programs (The Food Group, n.d.).

Food waste. There are many definitions of food waste and food loss as determined by such entities as the Food and Agricultural Organization of the United Nations and the U.S. Department of Agriculture's Economic Research Service. For the purposes of this capstone, only the term food waste will be used, and its definition will be edible food that goes unconsumed (U.S. Department of Agriculture, n.d.).

Garbage. Non-recyclable and non-compostable waste, e.g. diapers, packaging such as chip bags and candy wrappers.

Organics and organic waste. Food waste and food-soiled paper products (towels, napkins, plates, pizza boxes) *plus* non-edible (to humans) parts of food such as banana peels, egg shells,

and bones. Organics also includes compostable items such as wooden stir sticks, facial tissues, cotton Q-tips, pet and human hair (Hennepin County Environment and Energy, 2015; USDA Office of the Chief Economist, n.d.).

Source separation. Recyclables such as food waste are separated from garbage at the point where they are generated, e.g., the person separates his/her food waste from his/her non-compostable garbage at his/her place of residence.

Trash. See garbage.

CHAPTER ONE

Introduction

Food waste is a significant problem with environmental, economic, social and ethical consequences. According to the Natural Resources Defense Council, as much as 40 percent of U.S. food produced for human consumption, valued at $165 billion annually, goes uneaten. Worldwide, one-third of food is wasted. Wasting food wastes energy, water, fuel, and land that go into producing, packaging, and transporting food. Additionally, the agriculture-related release of pesticides and greenhouse gases into the air, soil and water makes wasting food an environmental hazard. Meanwhile 1 in 6 Americans is food-insecure, meaning one or more household members doesn't have enough to eat because the household lacks money and other resources for food (Coleman-Jensen, Gregory & Singh, 2014), and worldwide 980 million people go hungry every day (Barrett, 2014).

On a personal level, food going to waste disturbs my conscience. This concern has compelled me to work on solutions to reduce household food waste. There are many reasons why people throw away food, and changing people's behavior is challenging. But there are campaigns that are having success addressing the issue. My contribution to that effort is creating educational toolkit activities that focus on raising people's self-awareness with the goal of reducing household food waste.

Project Motivation

Reducing food waste due to the environmental, economic, social and ethical implications is not a new idea. I concur with the findings of reports from such agencies as the U.S. Environmental Protection Agency (EPA) (2009, 2015), the Natural Resources Defense Council (NRDC) (2012, 2013), and the Food and Agriculture Organization (FAO) of the United Nations

(2014) that wasted food is a far-reaching problem. In my own corner of the world, I want to offer tangible solutions that can potentially reduce the amount of household food that is wasted.

I work as a waste reduction and recycling specialist for Hennepin County's Department of Environment and Energy. At my workplace, increased attention and effort is being directed toward diverting food waste for composting and directing unused food for donation, but not much emphasis is placed on *preventing* that waste. For this project, I created research-based activities to supplement Hennepin County's environmental-education toolkits that aim to increase individual self-awareness and spur residents to take small steps to reduce their food waste. These beginning actions, done in groups in a workshop format, can lead to long-term behavioral changes that people carry into their daily lives. In community-based social marketing, McKenzie-Mohr states that engaging in small actions increases the likelihood that a person will engage in a larger action (2015). Thus, these actions to reduce food waste will have a cumulative and positive impact on preserving the environment.

Description of Project

My department has an Environmental Education and Outreach Unit, which created environmental-education toolkit activities for such things as recycling, toxicity reduction, energy conservation, and water quality. The toolkits are well-structured and have been used since 2005 by hundreds of community groups. However the toolkits have just a small section specifically focused on reducing food waste at the household level. This is a gap that I intend to fill.

Drawing on community-based social marketing strategies, I created five toolkit activities:

- Toolkit Activity 1/Appendix A: Creating a Food Waste "Buffet" (University of California, Davis, n.d.)

- Toolkit Activity 2/Appendix B: Storage and Freezing Tips to Reduce Wasted Food, including Recipes using Leftovers (Eureka Recycling, n.d.; Natural Resources Defense Council, n.d.; West Coast Climate & Materials Management Forum, n.d.)
- Toolkit Activity 3/Appendix C: Making an "Eat Me First" sign for a section of the refrigerator (West Coast Climate & Materials Management Forum, n.d.)
- Toolkit Activity 4/Appendix D: Deciphering Date Labels (Natural Resources Defense Council, 2013)
- Toolkit Activity 5/Appendix E: Tracking your Food Waste at Home (West Coast Climate & Materials Management Forum, n.d.)

Environmental Problem

Food waste is a significant environmental problem. According to the U.S. Environmental Protection Agency, more food goes to landfills and incinerators than any other single material in municipal solid waste (n.d.). As food rots in a landfill, it produces methane, a greenhouse gas with 21 times the global warming potential of carbon dioxide (EPA, 2014). The EPA further reported that landfills are a major source of human-related methane in the U.S., accounting for more than 20 percent of all methane emissions (2014). Food waste creates 3.3 billion tons of greenhouse gases annually, according to the Food and Agriculture Organization (FAO) of the United Nations, which tracks what is eaten and grown worldwide (Gardiner, 2014). The FAO also noted that, "if food waste were a country, it would be the world's third-largest emitter of greenhouse gases, after China and the United States" (Gardiner, 2014, n.p.).

The EPA also reported that more than 36 million tons of food waste was generated in the U.S., with only five percent diverted for composting (2012). Wasting food also wastes energy, water, fuel, and land that go into producing, packaging, and transporting food (Gunders, 2012;

Stuart, 2009). The agriculture-related release of pesticides and greenhouse gases into the air, soil and water makes wasting food an environmental hazard. A 2009 U.S. EPA report entitled "Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices" found that about 13 percent of greenhouse gases in the U.S. are associated with growing, manufacturing, transporting, and disposing of food. Commercial food production also contributes to soil erosion, habitat destruction and deforestation (Stuart, 2009).

Economic Problem

Economically, food waste has a significant financial cost for households and businesses. The Food and Agriculture Organization reports that one-third of food produced worldwide is never consumed, which is about 1.3 billion tons of waste per year (Gardiner, 2014; Royte, 2014). In Britain, which has some of the most comprehensive data on food waste available, each family, on average, throws away $1,170 worth of food a year (Gardiner, 2014). In the U.S., uneaten food is worth an estimated $165 billion annually (Gardiner, 2014; Royte, 2014). An American family of four trashes an average of $1,484 worth of edible food a year, and U.S. food retailers typically experience in-store losses of 43 billion pounds of food a year (Royte, 2014).

Social And Ethical Problem

In 2013, 49.1 million Americans lived in food-insecure households (when food intake of one or more members is reduced or disrupted) (Coleman-Jensen, Gregory, & Singh, 2014) out of a total population of more than 305 million. When one in six Americans is food-insecure (Feeding America, 2015) and the production of food is so resource-intensive, it pains me that people throw away so much food. I would love for the edible food that is now going to waste to get eaten by those who bought the food, or into the mouths of those who do not have enough to eat.

In my job as a waste reduction and recycling specialist with Hennepin County, I work with businesses and residents to help them divert their organic waste from the garbage so it can be composted. However, preventing and reducing wasted food is an area of solid waste's educational arsenal that I believe needs more attention and more resources directed toward it.

Awareness And Solutions

Around the world, food waste is increasingly seen as a serious issue. With the global population growing each year, governments are paying attention as they become aware of the resources that are wasted to produce food that is never eaten (Gardiner, 2014). Encouragingly, innovative solutions exist for the reduction of household food waste, and many groups, individuals, industries, and government agencies – often in collaboration – are working on the problem. As Royte (2014) notes, "if there's anything good about the shocking scale of global food waste, it's the huge number of opportunities it presents for improvement" (n.p.).

Because there are many reasons why people throw away food in their households, such as lack of meal planning, overbuying, impulse buying, and confusion over date labels, changing their behavior is challenging. And then there are consumers who believe wasted food is an issue but do not see themselves as the cause (Watson, 2014). But there are campaigns effectively addressing the problem. The West Coast Climate & Materials Management Forum's "Food: Too Good to Waste" initiative of strategies and tools has been linked to a 19 to 28 percent reduction in household wasted food among participants in two pilot groups (West Coast Climate & Materials Management Forum, n.d.). The Forum is a U.S. Environmental Protection Agency-led partnership of western cities and states. "Food: Too Good to Waste" uses community-based social marketing (CBSM), an approach where initiatives are carried out at the community level to encourage behavior change. In the UK, avoidable food and drink waste dropped from 5.3

metric tons to 4.2 metric tons between 2007 and 2012 (WRAP, 2013) “due to millions of consumers doing things differently in the home … Consumers are more aware of how to store and use their food more effectively with advice from Love Food Hate Waste,” a consumer educational campaign that provides advice, tips and recipes (WRAP, 2013, n.p.).

The news media regularly reports about the environmental and economic problems of food waste, and how countries, states, cities and citizens are working to reduce the amount of wasted food. Also drawing attention to the issue are authors writing books about the problem of food waste (*American Wasteland* by Jonathan Bloom, *Waste: Uncovering the Global Food Scandal* by Tristram Stuart) and filmmakers making movies to raise public awareness of how much food is wasted and its environmental impacts, as well as what can be done about the problem (*Just Eat It*, a 2014 documentary by Grant Baldwin and Jen Rustemeyer, *Dive!* by Jeremy Seifert (2010), and *Taste the Waste* a 2010 film by Valentin Thurn).

Businesses also are realizing how much money they’re losing through wasted food, and many are forming collaborations such as the Food Waste Reduction Alliance, which involves grocers, retailers, and the food service industry (Nixon, 2015). Through programs such as The Garden Gleaning Project, Food Rescue, and Gleaning Network, food-gleaning events are being organized in which people harvest crops that would otherwise go to waste in the fields. The U.S. EPA has put considerable resources into researching the impact of food waste and developing tools such as its Food and Packaging Waste Prevention tracking spreadsheet to help institutions measure their food waste and find solutions (EPA, 2015). The efforts are evolving, and I want to do my part by helping households reduce the amount of food they throw away.

Summary

Wasting food has significant environmental, economic and social impacts. While diverting food waste for composting is a solution, and more communities are utilizing the practice, more emphasis on prevention is needed because this area is where the most environmental and economic benefits can be attained. Food is wasted at many levels along the supply chain, but I will focus on the issue with individuals in their households.

CHAPTER TWO

Literature Review

Introduction

This chapter details the reasons why food waste is a problem with environmental, economic, social, and ethical consequences. A review of the literature and existing research provided background information on the definition of food waste, the implications of wasting food, reasons why households waste food, increased attention to the issue, and innovative waste-reduction strategies that are occurring before food reaches the consumer. But consumer behavior cannot be left out of the equation. This chapter will then explain community-based social marketing, an approach rooted in social psychology that is key to bringing about behavioral changes around sustainability, including food waste. Then, three approaches aimed at reducing household food waste will be covered: raising self-awareness, household tips, and the toolkit activities created for this project. Finally, the pros and cons of using toolkit activities will be discussed.

What Is Food Waste?

There are many definitions of food waste and food loss as determined by such entities as the Food and Agricultural Organization of the United Nations and the U.S. Department of Agriculture's Economic Research Service. For the purposes of this capstone, only the term food waste will be used, and its definition will be edible material intended for human consumption that goes unconsumed (Buzby, Wells & Hyman, 2014).

Some wasted food is inevitable because food is perishable. Fortunately, there is an environmentally beneficial processing option for organics, which includes food waste, inedible parts of food such as banana peels, eggshells and bones, and non-recyclable paper: recycling into

compost. An intriguing benefit of using compost emerged in Marin County, California, when it was discovered that applying layers of compost to a parcel of ranch land substantially increased the soil's ability to store carbon (Lochhead, 2014). Carbon stored in the soil keeps it from being released into the atmosphere to contribute to greenhouse gas emissions (U.S. Environmental Protection Agency, 2010; Lochhead, 2014). Composting is an excellent option for food waste, inedible food, and non-recyclable paper, but the maximum environmental and economic benefits are gained from the prevention of wasted food (See the EPA's Food Recovery Hierarchy in Appendix F).

How Much Food Is Being Wasted?

According to Gunders, 40 percent of food produced for human consumption in the U.S. today goes uneaten, which "is more than 20 pounds of food per person every month. Not only does this mean that Americans are throwing out the equivalent of $165 billion each year, but also 25 percent of all freshwater and huge amounts of unnecessary chemicals, energy, and land" (2012, p. 4). The U.S.' per capita food waste has increased 50 percent since 1974 (Hall, Guo, Dore, & Chow, 2009). A 2011 report from the UK government's Foresight team, "The Future of Food and Farming: Challenges and Choices for Global Sustainability," concludes that, without change, the way in which food is produced will compromise Earth's capacity to produce enough food for all people (Buttriss, 2011), which by 2050 is projected to exceed 9 billion (Bloom, 2010; Stuart, 2009).

Environmental Consequences

The environmental impact of food waste is primarily in the depletion of resources. Agricultural production uses 80 percent of consumptive water, and moreover, uses more than half of all land, releases pesticides, nitrous oxide and methane, and contaminates rivers and

streams (Gunders, 2012; Hall, Guo, Dore, & Chow, 2009). The provision of food is responsible for 13 percent of U.S. greenhouse gas emissions, and traditional waste management represents 1 to 5 percent of U.S. greenhouse gas emissions (EPA, 2009). Cutting food waste by 50 percent would result in a 25 percent reduction in environmental impacts through reduced landfill use, soil depletion, and applications of fertilizers and pesticides (Harrison, 2004).

In terms of climate change, dealing with food waste (transporting it, landfilling it, composting it) consumes one-fourth of U.S. freshwater and 300 million barrels of oil per year (Abdulla, Martin, Gooch & Jovel, 2013; Hall, Guo, Dore & Chow, 2009). Said Hannah Johnson from Resource Futures, a UK consultancy that led the UK government-sponsored Foresight project's report, "Global Food and Farming Futures," research into global food waste:

> If you compost this waste rather than putting it into landfill, you save around one tonne of carbon dioxide per tonne of food. But if you prevent the food waste from happening in the first place, you save 4.3 tonnes of carbon dioxide per tonne of food [compared with landfill]. (Pool, 2012, p. 40)

In a landfill, due to its high moisture content, food scraps decay more rapidly than other organics because soil gas exchange is limited, leading to low oxygen concentrations and potentially anaerobic conditions (University of California, Davis Department of Land, Air and Water Resources, n.d.). This anaerobic process results in food scraps giving off disproportionately large amounts of methane (a potent greenhouse gas) before landfills are capped (Gunders, 2012). The water content in food waste also creates leachate, which can absorb chemicals in a landfill and then contaminate groundwater, the air, and surrounding soil (Shore, 2012).

Economic Consequences

Economically, the cost of wasting food is significant. About 10 percent of the U.S. energy budget goes to bringing food to our tables, (Gunders, 2012) which in 2014, was $2.84 billion (U.S. Department of Energy, 2013). Globally, consumer food waste is projected to cost $600 billion a year by 2030, unless actions are taken to reduce waste, a report by WRAP (Waste and Resources Action Programme, a UK anti-waste organization) found (Nixon, 2015). Ironically, food is relatively inexpensive in the U.S. -- Americans spent on average 9.9 percent of their disposable incomes on food in 2013 (U.S. Department of Agriculture Economic Research Service, 2014) vs. 18 percent of their incomes in 1966 (Gunther, 2010). By comparison, in 2013, the British spent 12.8 percent, Germans 15.2 percent, and Japanese 16.2 percent of their disposable incomes on food. Low food costs for Americans is possible because in the U.S., external environmental and social costs related to producing and distributing food are rarely factored into the price of food (Pirog, Van Pelt, Enshayan & Cook, 2001). According to the U.S. Department of Agriculture, the savings on food production began with "the remarkable success of one crop: corn … A study in the American Journal of Clinical Nutrition found that a dollar could buy 1,200 calories of potato chips or 875 calories of soda but just 250 calories of vegetables or 170 calories of fresh fruit" (Walsh, 2009, p. 4). Farm price supports, inexpensive fossil fuels and the low cost of water also contribute to the low cost of food (Gunther, 2010).

When food does cost more, consumers take notice. WRAP in 2013 found that an increase in food prices decreased food waste by 21 percent in the UK between 2007 and 2012. The link between cost and throwing away food may turn out to be a self-correction: people will waste less food when food becomes more expensive.

Social And Ethical Implications

The issue of wasted food is often juxtaposed with the phenomena of hunger and food insecurity. Every day worldwide, 980 million people go hungry even though there is no shortage of food (Barrett, 2014). Northern Ireland's minister for the environment called the wasting of food disgraceful in light of the wasted energy and water, coupled with poverty, malnutrition, and global hunger (WRAP, 2013). Alice Waters, founder of Berkeley, California, restaurant Chez Panisse said, "It's shameful to be wasteful around food when someone else is hungry. And I think we all know it" (Bloom, 2010, p. 33). Bloom discusses a familiar parental tactic, the guilt-tripping "clean your plate, there are children starving in (pick a country)" (2010). The adage is useful in its message (value your food because there are those who are less fortunate), but not useful in that children know that what is on their plates cannot be sent to a starving person in another country (Bloom, 2010). Because of logistical issues and the perishable nature of food, most excess food in the U.S. cannot be sent to other countries in need. But the take-away is that people can be aware, respectful, and thankful for food (Stuart, 2009), and by extension be more responsible with food in their own households because people change the world by changing themselves (Jewish Nature Center as cited by Bloom, 2010).

Why Household Food Waste Happens

There are many phases along the food chain where food is wasted, including growing, processing, transporting, distributing, retail, food service, consumers. At the consumer level, according to the USDA's Economic Research Service, the top three groups of food that contributed to the total value of food loss were meat, poultry, and fish (30 percent, $48 billion); vegetables (19 percent, $30 billion), and dairy products (17 percent, $27 billion) (Buzby, Wells & Hyman, 2014). Consumers waste food because of:

- Lack of awareness and undervaluing of foods (Gunders, 2012)

- Confusion over date labels (see definitions in next section)
- Food spoilage
- Impulse and bulk purchases
- Poor planning
- Cooking too much at once (Gunders, 2012)
- Forgetting to eat leftovers (West Coast Climate & Materials Management Forum, n.d.)
- Not knowing how to cook with small amounts of random ingredients (Love Food Hate Waste, 2012)

An example of several of these factors (poor planning, impulse and bulk purchases, and spoilage) leading to wasted food could be consumers who go to a food warehouse club, where food is sold in large quantities, without a shopping list. The warehouse stores purposely do not label their aisles so shoppers spend more time wandering to find their items, and therefore, walking past hundreds of potential purchases with seductive marketing techniques (Business Review USA, 2014; Stuart, 2009). Under this scenario, consumers make impulse purchases, buying more than they need and also more than they can eat before perishable foods spoil.

Date Labels. The confusion over "sell by," "display until," "best before" and "use by" labeling is an important factor in household food waste (Biologist, 2009; Stuart, 2009). The term "sell by" is the manufacturer's suggestion for when the grocery store should pull the product from the shelf, "best if used by" and "best by" are the manufacturer's estimate of a date after which the food will not be at its highest consumable quality, "use by" in the UK is reserved for highly perishable pre-packaged foods that can be a danger to human health but in the U.S. is also a manufacturer's estimate of when to use a product for peak quality, and "freeze by" is a guide

for consumers to know when to freeze a product (Natural Resources Defense Council, 2013; Rahelu, 2009; Stuart, 2009).

Within the 40 percent of food grown for human consumption that gets wasted, on average, American households waste 14 percent of the food purchased; 15 percent of that includes products still within their expiration date but never opened (Harrison, 2004). A Food Standards Agency survey on Consumer Attitudes to Food Issues from 2009 found that only 49 percent of respondents correctly identified the "use by" date as the best measure of food safety, while 26 percent said they would never eat cereal after its "best before" date even though it would still be safe to eat. Rahelu offers that a large-scale consumer education plan on food date labels would produce environmental and economic benefits as well as protecting public health (2009).

Consumer confusion and lengthy consultations have led the UK government to release guidelines on how food packaging should only carry a "best before" or "use by" date, and WRAP is also pressing to change "freeze on day of purchase" labels to "freeze before the date marked" (Pool, 2012, p. 40). Research shows that 59 percent of respondents thought they could only freeze food on the day of purchase, and that they would throw away unopened food if it had been in the refrigerator for only a few days (Pool, 2012).

Working On The Issue

Encouragingly, consciousness around the issue of wasted food has been growing globally, nationally and locally. The news media often draws attention to the seriousness of food waste. Moreover, many U.S. schools and teachers have focused on the impacts of wasting food. Other examples of work being done to address food waste:

- European groups such as WRAP and Love Food Hate Waste have been working to reduce awareness of food waste for several years, and have seen success reducing food waste. The UK government has developed Food 2030, a comprehensive plan to create a sustainable and secure food system by focusing on six core issues, one of which is the reduction of food waste (Department for Environment, Food and Rural Affairs, 2010).
- The West Coast Climate & Materials Management Forum, a U.S. Environmental Protection Agency-led collaboration between western states and cities, has developed a comprehensive toolkit called "Food: Too Good to Waste" and a Food Recovery Challenge to help people and food services, respectively, waste less food (Zanolli, 2014). Pilot studies in King County, Washington, and Honolulu, Hawaii, found that participants who separated, weighed, and recorded their household food waste weekly for several weeks reduced their food waste by 28 percent in King County and 19 percent in Honolulu (West Coast Climate & Materials Management Forum, n.d.).
- Reducing food waste ranked ninth among the top 20 food trends on the National Restaurant Association's "What's Hot in 2015," based on a survey of nearly 1,300 chefs (Severson, 2015). Restaurant chefs and cooking teachers are basing menus on food discards (such as vegetable pulp and broccoli stems) and teaching classes that focus on wasting less food (Severson, 2015).
- Businesses are realizing how much money they are losing through wasted food and utilizing software such as LeanPath to cut waste (Gunders, 2012).
- New technologies such as ozone-based treatments to halt mold, coatings to inhibit spoilage and a compound to slow ripening during shipping are being developed to help fruits and vegetables last longer (Fireovid, 2013).

Locally, the Minnesota Pollution Control Agency and Eureka Recycling have contributed to education and awareness around food waste, including developing environmental curriculum ("Recycling Guide for Minnesota Schools") and resources for households ("A to Z Food Storage Guide"), respectively. The Hennepin County Department of Environment and Energy's initiatives include earmarking funds for businesses to reduce food waste in 2015.

School strategies. Colleges and universities are at the forefront of using creative food-waste reduction strategies. For example, the University of California, Davis, utilizes innovative measures such as Try-a-Taste, in which diners can try a sample before taking an entire serving of food, and LeanPath software, which records production losses through weight measurement (University of California, Davis, n.d.). Arizona State University uses "green captains" who watch for substantial amounts of wasted food. If they detect excessive waste at any location, they strategize about how to reduce that waste (American School & University, 2014).

Dining facilities where trays are not available is a growing trend among colleges and universities. When diners do not have a tray to use, they only take as much food as they can carry, resulting in 32 percent less food being wasted and 27 percent fewer dishes used (Kim & Morawski, 2012). The authors note that eliminating food trays is a simple way to reduce food waste, as well as the water and energy spent washing dishes and trays.

Food packaging. New techniques are also being used for food packaging. Tesco, the first British supermarket chain to publish its waste figures, found that bags of lettuce are its most frequently wasted item (Gardiner, 2014). To respond to this problem, Tesco packages lettuce in bags with two compartments, so consumers can use one half while the other stays fresh (Gardiner, 2014).

The way food is packaged and how it relates to waste can be complicated. A 2014 Harris Poll commissioned by Sealed Air found that shoppers choose vegetables that are unwrapped (73 percent) over those that are shrink-wrapped in plastic (27 percent), believing that less packaging is the more environmentally smart choice (Hower, 2014). But if shelf-life information is provided (a shrink-wrapped cucumber lasts almost two weeks longer than an unwrapped one), 60 percent of shoppers choose the wrapped, while 40 percent choose the unwrapped (Hower, 2014). Given the shelf-life information, consumers can choose the packaging option that results in longer-lasting produce, or they can choose the unwrapped option and plan to eat it promptly.

Food rescue. Only about 10 percent of available, edible wasted food is recovered from producers and institutions such as grocery stores each year in the U.S. (Gunders, 2012). Barriers to recovery include liability concerns, logistical challenges of distribution and storage, and funding constraints. The Bill Emerson Food Donation Act of 1996 protects donors from food-safety liability when giving food to a nonprofit organization in good faith, but many donors do not know the law exists (Gunders, 2012).

Phillips, Hoenigman, Higbee & Reed concluded that food recovery can be a sustainable enterprise if there are a large number of businesses participating as donors, which helps with the efficiency of food pickups (2013). Fareshare is a UK-based charity that redistributes food from supermarkets and food manufacturers to community food shelves. Fareshare's mission is to address food poverty and food waste simultaneously (Pool, 2012). The transportation component is a hurdle for many food-rescue organizations. Fareshare's solution is to charge businesses for the food pick-ups (Pool, 2012) since those businesses are saving on waste-hauling costs. Waste Not Orange County, a public/private partnership in southern California, has found a solution to

the transportation hurdle by partnering with Food Finders and Yellow Cab Co. to pick up donated food and transport it to food shelves (Waste Not Orange County, 2015).

Another way food is being rescued rather than wasted is through programs such as The Garden Gleaning Project, Food Rescue and Gleaning Network. These groups organize food-gleaning events in which volunteers harvest crops that would otherwise go to waste in the fields. These efforts enable food shelves such as Hunger Solutions Minnesota to get produce at the peak of freshness, thereby giving food shelves more time to get the produce into people's hands (S. Lenarz-Coy, personal communication, March 8, 2015).

The Consumer's Role

Consumers play an important role in the food-waste equation and must be part of the solution because so much food is wasted at the household level (Caswell, 2008). While Evans calls for industry and government to step in to help consumers, who, as he says, do not lack guilt or conscientiousness but are just trying to feed their picky kids and get dinner on the table (2011), Sharp, Giorgi & Wilson (2010) and Coward (2015) assert that individuals are an important factor in reducing food waste, and that their behavior can change. They further assert that the problem of why and how food gets wasted is such a complex one that it needs an assortment of tools to have a collective impact (Coward, 2015; Sharp, Giorgi & Wilson, 2010). Finn advocates for a global network of shared responsibility around wasted food (2014), and Stuart likewise invokes a sense of responsibility to use resources carefully (2009). Said Coward:

> Our big environmental groups don't pay enough attention to individual behaviour … Yet some lifestyle choices are crying out to be challenged. … It seems that where there's a choice that feels good, converges with financial and social advantages, and is seen to

have environmental benefits, individual behaviour can change, and industry will follow. (2015, p. 33)

Community-Based Social Marketing

Community-based social marketing (CBSM) is a pragmatic approach based on research in social psychology that operates at the community level with direct person-to-person contact to bring about desired sustainability behaviors (McKenzie-Mohr, 2011). These initiatives help remove barriers to environmentally beneficial behaviors while at the same time enhancing those behaviors' advantages over less-desirable ones (West Coast Climate & Materials Management Forum, 2013).

CBSM includes five steps:

1. Identify desired behaviors
2. Identify barriers and benefits of desired behaviors using literature search, observations, focus groups and surveys
3. Develop behavior-change strategies and messaging
4. Conduct pilot program
5. Implement broad-scale program and evaluate program (McKenzie-Mohr, 2011)

Many studies have shown that concern for the environment in a general sense does not lead to specific environmentally-friendly behaviors (Gillilan, Werner & Olson, 1996; Stets & Biga, 2003). McKenzie-Mohr (2011) cites extensive research that demonstrates that information-intensive campaigns that seek to foster behavior change are usually ineffective because they don't address people's barriers. Initiatives designed largely around economic self-interest also do not work (Harper, 2011). In contrast, social rewards have been effective at increasing and maintaining environmental-sustainability behaviors (Cialdini, 1985; Cook & Berrenberg, 1981,

as cited by Gillilan, Werner & Olson, 1996). For example, for reusable-bag use, if grocers give money to recycling projects rather than to the customer directly, the reward is more abstract and socially motivated (Gillilan, Werner & Olson, 1996). When grocery clerks praise customers for using reusable bags rather than giving them five cents off their grocery bill, the social recognition reinforces the behavior (Gillilan, Werner & Olson, 1996). When others in the check-out line hear the person being praised and start to think they should use reusable bags, too, social norms are created (McKenzie-Mohr, 2011).

CBSM is effective because it bridges the gap between understanding of issues related to sustainability and changing peoples' behavior to be more sustainable (McKenzie-Mohr, 2011). McKenzie-Mohr gives the example of an anti-engine idling campaign at schools in Sudbury, Ontario, in 2003. Signs that encouraged people to turn off their engines for health and air-quality reasons had no effect. Upon researching the barriers, McKenzie-Mohr discovered that most motorists would simply forget, so window clings were created to help them remember. Additionally, motorists at Sudbury's 49 schools were approached by hired staff who spoke about the importance of not idling their vehicle and asked for their help through making a commitment not to idle and placing a window cling on their windshield. The cling served as both a reminder and a visible cue to other motorists that they, too, should not idle their vehicles. McKenzie-Mohr calls this social diffusion. The intervention not only reduced the frequency of idling, it also dramatically reduced the duration of idling (McKenzie-Mohr, 2003). Similarly, positive social norms around food behaviors could be fostered and rewarded by students publicly sharing one sustainable food choice they made recently and being applauded by their peers and teachers for said behavior (Redman, 2013).

The West Coast Climate & Materials Management Forum's "Food: Too Good to Waste" initiative utilizes community-based social marketing. In all, 17 pilot projects took place nationwide using the Forum's program, which proved highly effective. Post-pilot surveys found 93 percent of participants reported they were more aware of food waste, and 96 percent said they would continue to use the food waste reduction tools (Johnston, 2015). The program's lead researcher found that measuring household food waste activated participants' natural tendency to reduce waste (Johnston, 2015).

When the initiative was piloted, implementers successfully engaged households through participant gatherings/workshops, often with free food and beverages (West Coast Climate & Materials Management Forum, n.d.). These gatherings reinforced the social nature of the pilot, thus encouraging behavior change through membership and network commitment (West Coast Climate & Materials Management Forum, n.d.). Workshop participants were encouraged to share personal experiences around food waste, which is a form of social learning (West Coast Climate & Materials Management Forum, n.d.).

Solutions

Innovative solutions exist for the reduction of household food waste, and many groups, individuals, industries, and governmental bodies are working on the problem. The following three categories that focus on how households can reduce food waste will be covered: increasing self-awareness, household tips, and the toolkit activities that tie self-awareness and household tips together to reduce food waste.

Increasing self-awareness. Increasing individual-level self-awareness is an integral step in reducing food waste, and many strategies incorporate or build a foundation for behavior change upon that self-awareness. There is a historical basis for raising awareness around waste: In the

1970s at the University of Arizona, archaeologists studied garbage to see what was being thrown away, and discovered that people were not fully aware of what they were using and discarding (Harrison, 2004).

WRAP's 2008 survey titled, "The Food We Waste," found that consumers generally have a very poor awareness of the amount of food they throw away, usually underestimating how much they discard (Caswell, 2008). Indeed, the West Coast Climate & Materials Management Forum found that, before households participated in the exercise of weighing and tracking their wasted food, many even questioned that they waste food (2013). Through measuring the amounts of food thrown out, households become aware of how much food they are wasting (West Coast Climate & Materials Management Forum, 2013). The Forum's pilots indicate that households with higher incomes can especially benefit from measuring their food waste (2013). Measuring food waste at educational institutions consistently results in increased self-awareness, and often, through social diffusion and social norms, consumption behaviors change. For example, the University of California, Davis Dining Services conducts waste audits with diners sorting their own waste. As a result of these audits, food waste decreased by 30 percent from 2.31 ounces per person in fall 2012 to 1.74 ounces per person in fall 2014 (University of California, Davis, n.d.).

At the McDowell Environmental Center in Nauvoo, Alabama, a program called Food For Thought was created to address the lack of awareness among children about food (Montgomery, 2005). Students are taught where food comes from, how the food distribution system works, and all food waste is weighed after each meal. Soon, the food waste of 150 people from one meal dropped from more than 15 pounds to half a pound, and the implications look promising: "This conservation education program works because students have their hands on the subject matter,

they have control of their choices, and they see that their actions make a difference" (Montgomery, 2005, p. 9).

Similarly, at IslandWood environmental education center on Bainbridge Island, Washington, diners sort the remains of their meals into "Wade," a wooden scale shaped like a life-sized person with buckets attached. On a chalkboard the meal's food waste is recorded. This system keeps the waste visible and diners mindful of their role in IslandWood's low-waste goals (Benson, 2009). (See Appendix G) And at the Audubon Center of the North Woods in Sandstone, Minnesota, schools compete to see which group has the least amount of ort (a scrap or remainder of food from a meal). Each day's totals are recorded on a dry-erase board and include comments such as: "ZERO!" "14 oz (frown face)" "NO ORT. Nice job!" and "Still no ORT (smiley face)" (Audubon Center of the North Woods, 2015). (See Appendix H)

Thomashow notes that many people are in denial about their social and environmental responsibility, claiming they have no control over events that led to the planet's situation (2002). But eating is universal (Montgomery, 2005), and food choices are something people have control over. When self-awareness is increased through food waste reduction exercises in schools and elsewhere, people realize how much food they're wasting and do change their behaviors.

Household tips. Households can reduce food waste by considering the following suggestions:

- Shop wisely: plan meals, use shopping lists, and avoid impulse buys and marketing tricks that can lead to overbuying (Gunders, 2012).
- Understand what date labels indicate about food quality vs. food safety.

- Be willing to buy imperfect-looking produce. In 2014, French retailer Intermache, the country's third-largest supermarket, launched a playful Inglorious Fruits and Vegetables campaign to highlight the beauty of ugly produce (Godoy, 2014).
- Freeze unused ingredients, and know what is in your refrigerator and freezer.
- Serve smaller portions and save (and eat) leftovers (Gunders, 2012; Harrison, 2004; Stuart, 2009).

Toolkit activities. While consumers alone cannot solve the problem of wasted food, they are an important part of the equation since so much food is wasted at the household level (Caswell, 2008). The toolkit activities created for this project aim to increase individuals' awareness of the food they waste to influence behavioral changes. For example, the West Coast Climate & Materials Management Forum's "Food: Too Good to Waste" initiative includes strategies and tools that have resulted in a 25 percent reduction in household wasted food among pilot participants (2013).

The "Food: Too Good to Waste" tools are:

- Measuring How Much Food Your Family Wastes
- Smart Shopping: Buy What You Need
- Smart Storage: Keep Fruits and Vegetables Fresh
- Smart Prep: Prep Now, Eat Later
- Smart Saving: Eat What You Buy (West Coast Climate & Materials Management Forum, 2013)

The best results from the Forum's initiative came when a group or community of households used it in groups because the participants could support each other and learn together (West Coast Climate & Materials Management Forum, 2013).

Pros And Cons Of Creating Toolkits

The environmental education toolkits created by Hennepin County and others include activities that feature hands-on, experiential learning. The toolkits help users develop knowledge, skills, and self-confidence, and are a way to express creativity through developing solutions (Hennepin County Department of Environmental Services, 2011). There are both pros and cons to using toolkit activities.

Pros.

Reach a larger audience. Hennepin County's toolkit activities are a way to reach a large audience with a relatively small staff (A. Reckinger, personal communication, March 16, 2015). By using a 'train the trainer' model, the goal is to enable community members to serve as environmental educators.

Engage audiences. Since people tend to learn better from someone they know and trust, the toolkit activities allow Hennepin County environmental education staff to share their expertise with educators who already have a connection with their audiences and know what types of activities will interest them (A. Reckinger, personal communication, March 16, 2015). According to CBSM, the most persuasive type of interaction to bring about behavioral changes is face-to-face contact with people (D. McKenzie-Mohr, personal communication, June 8, 2015; Johnston, 2015).

Share effective activities. The toolkits were originally created because Environmental Education and Outreach staff members were seeing a lot of similarities among Hennepin County environmental-education grantees of activities that engaged multiple audiences (A. Reckinger, personal communication, March 16, 2015). The toolkits were created in order to share those

activities and make it easier for groups to do environmental education without needing to "re-create the wheel" (A. Reckinger, personal communication, March 16, 2015).

Cons.

Less control over the message. The toolkits are intended to give enough background information so that an educator can learn a topic well enough to teach its basic components. However, an educator may not be an expert in that topic so s/he could potentially give misinformation or not be able to effectively answer participants' questions (A. Reckinger, personal communication, March 16, 2015).

Less control over the messenger. Users of the toolkit activities can vary widely; some may be new to environmental education or have minimal teaching experience. Other users may have a great deal of teaching experience as in Early Childhood Family Education (ECFE), one of Hennepin County's target groups, which features licensed teachers providing parenting education to families (Minnesota Department of Education, 2015). Thomashow stated that environmental practitioners and environmentally responsible citizens must be able to effectively communicate and collaborate with others (2002).

Summary

This chapter discussed why household food waste is a widescale problem with environmental, economic, social, and ethical consequences. Abdulla, Martin, Gooch & Jovel assert that the answer to the problem of food waste lies in prevention (2013). Moreover, Gunders stated that Americans waste 50 percent more food than they did in the 1970s but that citizens can make changes and get back to a time of valuing food (2012).

A review of the literature and existing research provided background information on the definition of food waste, the negative impacts of wasting food, increased attention to the issue,

why consumers waste food, and waste-reduction strategies that are being used before food reaches the consumer. The solutions discussed for reducing the amount of food consumers throw away were raising awareness, household tips, and the creation of interactive toolkit activities. An integral concept to those solutions is community-based social marketing, which is effective in changing behavior because it identifies barriers and benefits of behavioral changes, works at the community level and directly with people. The literature helped inform the creation of toolkit activities focused on reducing household food waste, which will be discussed in the next chapter.

Conclusion

The most successful approaches to reducing wasted food appear to be a combination of government intervention and consumer responsibility. When laws are passed, people are legally bound to respond, and then the food-waste situation shifts. For example, in May 2015, France passed a law that makes it illegal for grocery stores to throw away edible food (Ferdman, 2015). As of July 2016, large supermarkets in France will face hefty fines if they do not donate edible food to charities or divert it toward animal feed (Ferdman, 2015). As this law is written, it could have a significant impact on reducing food waste.

Closer to home, when the U.S. Department of Agriculture had a coordinator of food recovery and gleaning from 1996 to 1998, all of the department's 30 agencies had to come up with ways to reduce wasted food, and as a result 3.6 million pounds of food were recovered in that two-year period. (Bloom, 2010).

Massachusetts is requiring any institution that has more than a ton of food waste each week to compost it instead of throwing it away (Gardiner, 2014). A similar rule took effect in July 2015 in New York City (Gardiner, 2014; New York City Food Policy Center, n.d.). Again,

these efforts divert food waste for composting, but prevention of wasted food has much great environmental, economic, and social benefits.

At the household level, participants in the “Food: Too Good to Waste” (again, a government initiative) pilot programs became aware of how much food they were wasting, and as a result changed their habits. Consumers play an important role and must be part of the solution because so much food is wasted at the household level but also because everyone eats and therefore shares responsibility for reducing wasted food.

CHAPTER THREE

Methodology

Introduction

This chapter focuses on the process of developing the environmental education toolkit activities that will help prompt Hennepin County residents to reduce household-generated food waste. The previous chapter summarized and synthesized relevant information on the definition of food waste and its environmental, economic, social, and ethical consequences. Innovative strategies and solutions, including those that utilize community-based social marketing, also were presented. In preparation for creating the toolkit activities, techniques from various organizations, such as the U.S. Environmental Protection Agency, Minneapolis-based Eureka Recycling and the Natural Resources Defense Council, and environmental-education curricula from such institutions as the McDowell Environmental Center in Nauvoo, Alabama, and the University of California, Davis, were examined for their effectiveness and creativity. Five that seemed to build self-awareness and lead to behavioral changes through engaging and interesting activities were chosen to be integrated into Hennepin County's environmental education toolkits.

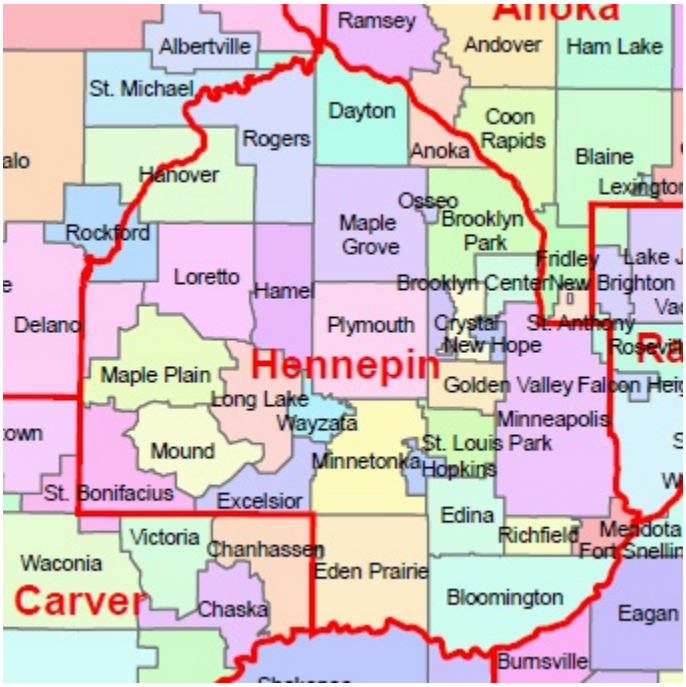
This chapter discusses the following:

- Description of Hennepin County
- Project description
- Structure of toolkit activities, which includes background information, goal, main ideas to reinforce, age group, types of activities (parent/child, adult lessons), duration, materials/supplies/resources, optional materials, preparation, procedure, discussion/reflection questions, extensions, and free supporting materials/resources.
- Target population

- Data process
- Underlying philosophy of toolkit-activity design
- Tools

Description Of Hennepin County

Hennepin County is the most populous county in the state of Minnesota with a population of 1.19 million (U.S. Census Bureau, 2015). More than 1 in 5 Minnesotans live in Hennepin County. Its county seat is Minneapolis, the most populous city in the state. Hennepin County is the 34th most populous county in the United States. According to the U.S. Census Bureau, the county has a total area of 607 square miles, of which 554 square miles is land and 53 square miles is water (2015). Hennepin County is bordered by Anoka County to the northeast, Ramsey County to the east, Dakota County to the southeast, Scott County to the south, Carver County to the southwest and Wright County to the northwest.



Credit: http://wiki.radioreference.com/index.php?title=Hennepin_County_(MN)&oldid=56399

The racial makeup of Hennepin County is 86.2 percent white, 5.7 percent black, 1.3 percent American Indian, 4.5 percent Asian, .1 percent Pacific Islander, 2.3 percent from two or more races and 5.0 percent Hispanic or Latino (U.S. Census Bureau, 2015). Also, according to the U.S. Census Bureau, in 2013 there were 2,107,232 households, median household income was $59,836 and 11.5 percent of people were living below the poverty level.

Project Description

Meyers states that a valid curriculum must focus on objectives that are worthwhile, including promoting responsible citizenship (2005). Few would disagree that responsible citizenship includes taking care of the environment and Earth's natural resources. With the above factors in mind, five environmental-education toolkit activities were created to increase self-awareness among children and adults on food waste, wasted food's environmental, economic, social and ethical consequences, and simple techniques that people can adopt to reduce food waste. The activities are designed for youth program leaders as well as educators from varying backgrounds including community educators, congregational leaders, K-12 teachers and university educators.

Structure Of Toolkit Activities

Hennepin County's environmental-education toolkits are tailored for four groups: congregations, community groups, ECFE (Early Childhood Family Education) and youth. These toolkits are available online at http://www.hennepin.us/business/work-with-henn-co/environmental-education-resources, and are also available in print format by request. The purpose of these toolkits is for users to become familiar with environmental issues and implement environmental education lessons (Hennepin County Department of Environmental Services, 2011); the toolkits are not unique to Hennepin County or its residents and should be

replicable in other large urban communities. Each toolkit activity is meant to be done in groups in a workshop format.

Background information. This conveys what the issue is, why it is a problem, and relevant information to our region (Minnesota). The background information on a particular topic can help educators determine whether this is an activity they want to do with their group. Informing the group of the background information also gives participants a foundation of knowledge on which to build understanding.

Goal. This is a one- to two-sentence summary about the purpose and desired outcome of the activity. Under Madeline Hunter's lesson plan, this is the Objective/Purpose, in which participants are informed about where they are headed and allows them to know what they are supposed to accomplish (Wilson, 2015).

Main ideas to reinforce. This list helps educators keep in mind concrete goals and desired outcomes for the activity. Gestrin (2009) called this section Competencies, which are the observable skills or behaviors participants gain from an activity. These competencies allow participants to understand and resolve complex sustainability problems (Redman, 2013).

Age group. This explains the targeted ages for a particular activity. Some activities are better suited for certain age groups than others, which can help educators determine whether this is an appropriate activity for the age make-up of their group.

Types of activities (parent/child, adult lessons). Some activities are more appropriate for certain age groups, or certain pairings such as parent and child, than others. This description helps educators determine whether this is an activity they want to engage in with their group.

Duration. This information can help educators decide whether this is an activity they want to do, based on the amount of time available.

Materials/supplies/resources. This list of the supplies and resources needed to implement a particular activity includes materials that are readily available and free or low-cost. This information can help educators decide whether this is an activity they want to do with their group, based on whether the necessary supplies are available or readily obtainable. The list also helps educators prepare for their activity through the gathering of supplies.

Optional materials. These are materials that are not necessary to do a particular activity but that can enhance it.

Preparation. This section gives information to educators on what is needed to prepare for an activity.

Procedure. This is the way in which the activity is conducted. The procedures incorporate several elements of Hunter's lesson plan template: Anticipatory Set, Modeling and Guided Practice (Wilson, 2015). The Anticipatory Set is the first step in getting participants into a mindset of anticipation and setting up initial expectations about the lesson's purpose through an activity such as a game, video clip, field trip, or reflective exercise (Wilson, 2015). In Modeling, educators shows participants how a particular activity is done through first demonstrating it themselves. Then the participants engage in Guided Practice while educators observe the task and give timely feedback (Wilson, 2015). An example for food-waste reduction would be that members of the group create a shopping list with meal-planning in mind, and then go to a grocery store and shop for the list of items in pairs while the educator gives feedback if there are areas for improvement.

Discussion/reflection questions. These questions encourage critical thinking and self-awareness, and help determine whether the participants understand what they have learned. The questions also give participants a chance to reflect on what they have learned, how it impacts

them, and what if any actions they want to take as a result of their new learning. Hunter called this reflective component Checking for Understanding, in which participants' responses are observed in order to determine if they comprehended the material (Wilson, 2015). Thomashow also notes that reflection involves mindfulness, introspection and deliberation about the personal meaning of what has been learned (2002).

Extensions. These are activities beyond the main one that can provide expanded learning opportunities, or build on what has already been practiced in the learning environment. In Hunter's lesson plan format, this element is the Independent Practice component. After participants seem to understand the new material, they get a chance to practice what they have learned in a group setting on their own (Wilson, 2015). An example from Toolkit Activity 2/Appendix B is that after participants learn how to properly store food, they are given a few weeks to try out some food-storage techniques at home. Participants later come back together as a group, discuss changes they have made, and share successes and challenges they continue to encounter.

The Extensions component is also the point at which inquiry-based learning can be appropriate because this type of knowledge acquisition involves participants taking the lead in their own learning (Education Development Center, 2012). If one of the toolkit activities prompted them to want to learn more or share with others what they learned, participants can get involved in the planning, development, and evaluation of projects and activities, with the educator as a guide in the learning process (Education Development Center, 2012). Cornelia Brunner of the Center for Children and Technology lists four parts to the inquiry process: Posing Real Questions, Finding Relevant Resources, Interpreting Information and Reporting Findings,

all of which can be utilized in the Extensions component of the activity (Education Development Center, 2012).

Free supporting materials/resources. Supporting materials provide websites and additional information that can enhance activities that have already been practiced. If participants want to delve deeper into what was covered in the activity or if the activity piqued their interest, the supporting materials and resources can provide additional information. The supporting materials and resources can also help educators of the toolkit activity learn more about the topic, perhaps for a future activity.

Target Population

Although the toolkit activities were created for residents of Hennepin County, from school-age children to adults, the activities are not unique to this county or its residents. The activities' universal content means they could be used by residents of any U.S. county. There are no specific Hennepin County target populations such as age, socioeconomic class or race/ethnicity. Rather the toolkit activities will join the range of environmental-education options that Hennepin County residents can use with various groups (e.g., church, club, neighborhood group, school group).

Hennepin County can translate the toolkits and their activities into other languages upon request. If it is determined that ethnic groups need these activities tailored to cultural aspects around food preparation, food's significance and food waste, the toolkit activities can be modified.

Data Process

Evaluation is an essential part of the development of the toolkit activities because it measures whether an activity was effective and whether participants gained knowledge and awareness

(Meyers, 2005). The process of gathering feedback on the food waste activities will be informal, and will consist of asking groups the following questions:

- What were your successes with the toolkit activities involving food-waste reduction?
- What concerns, problems or issues (if any) did you have with the food-waste reduction toolkit activities?
- How effective were the food-waste toolkit activities with your participants? Did anyone tell you about increased education or awareness, or a plan to change a future behavior or take a future action?

Before the food-waste toolkit activities were made available to the public, Hennepin County Department of Environment and Energy's Environmental Education and Outreach staff members reviewed the activities and gave feedback on modifications and areas for improvement. I then made changes and additions to the toolkit activities. After feedback is received from members of the public who use the toolkit activities, further modifications will be made. The toolkit activities will be a fluid resource, undergoing periodic updates to adapt to new information and the changing needs of Hennepin County users.

Underlying Philosophy of Toolkit-Activity Design

Principles and techniques from community-based social marketing are found throughout Hennepin County's environmental-education toolkit activities. CBSM has shown that "by successfully implementing one or two sustainable food or waste strategies of their choosing, students are more likely to adopt other, similar strategies in the future" (Thøgersen, 2004, as cited by Redman, 2013).

To encourage people to experiment with new strategies, Hennepin County's toolkits offer the following suggestions, all of which are elements of CBSM:

- Offer relevant incentives or prizes

- Use pledges or commitments
- Use prompts
- Create social norms
- Publicly announce and celebrate how people are making changes
- Use existing communication channels
- Use existing events
- Build upon existing small groups (Hennepin County Department of Environmental Services, 2011)

The food waste-reduction activities and their CBSM elements are listed below in Table 1:

TABLE 1

Appendix	**Toolkit Activity**	**CBSM elements**
A	1: Creating a Food Waste "Buffet"	Use existing events
B	2: Storage and Freezing Tips to Reduce Wasted Food, including Recipes using Leftovers	Celebrate how people are making changes
C	3: Making an "Eat Me First" sign for an area of the refrigerator	Use prompts
D	4: Deciphering Date Labels	Use commitments
E	5: Tracking your Food Waste at Home	Use pledges, publicly announce and celebrate how people are making changes

Tools

Successful curriculum involves participant input in the learning process (Meyers, 2005). The food-waste reduction toolkit activities encourage active participation. For example, with the West Coast Climate & Materials Management Forum's food waste measurement tool (used in Toolkit 5/Appendix E, Tracking Your Food Waste at Home), participants separate, weigh, and record their food waste weekly for several weeks. This level of participation increases

individuals' self-awareness and helps solidify behavioral changes, as indicated in multiple pilot studies (D. McKenzie-Mohr, personal communication, June 8, 2015; West Coast Climate & Materials Management Forum, n.d.).

CHAPTER FOUR

Results and Discussion

This chapter provides a summary of the design of the food waste-reduction toolkit activities. The textual research and literature review for this project provides support for the creation of toolkit activities and their ability to increase awareness around wasting food at the household level and motivate consumers to take small steps to reduce the amount of food they waste. In this chapter, the following topics are discussed: curriculum design, elements of the toolkit activities, and survey questions to determine the effectiveness of the toolkit activities. A wide range of solutions is needed to tackle the problem of food waste, and the toolkit activities created for Hennepin County residents are one contribution to the collective effort.

Curriculum Design

The toolkit activities were based on the West Coast Climate & Materials Management Forum's "Food: Too Good to Waste" initiative, with contributions from the University of California, Davis Dining Services' food-waste reduction measures, Gunders' 2012 Issue Paper, "Wasted: How America is Losing up to 40 Percent of its Food from Farm to Fork to Landfill" for the Natural Resources Defense Council and Gunders' 2013 Issue Brief: "The Dating Game: How Confusing Labels Land Billions of Pounds of Food in the Trash" for the Natural Resources Defense Council.

The curriculum consists of five activities that will be integrated into Hennepin County's Environmental Education and Outreach unit's existing toolkits designed for congregations, ECFE, youth and community groups. See Appendices A through E for the full-length toolkit activities.

Environmental educators could use the structure and outline of these toolkit activities to create lessons around other environmental topics such as land and species conservation, farming, climate change, environmental health, and pollution.

Elements Of The Toolkit Activities

Each toolkit activity has a specific waste-reduction focus, and the five activities are:

- Toolkit Activity 1: Creating a Food Waste "Buffet" (Appendix A)
- Toolkit Activity 2: Storage and Freezing Tips to Reduce Wasted Food, including Recipes using Leftovers (Appendix B)
- Toolkit Activity 3: Making an "Eat Me First" sign for an area of the refrigerator (Appendix C)
- Toolkit Activity 4: Deciphering Date Labels (Appendix D)
- Toolkit Activity 5: Tracking your Food Waste at Home (Appendix E)

Each activity includes the following components: background information, goal, main ideas to reinforce, age group, duration, materials/supplies/resources, optional materials, preparation, procedure, discussion/reflection questions, extensions, and free supporting materials/resources. Most of these components are described in detail in the previous chapter, but several components need further elaboration in this chapter for their content. Those components are: goal, age group, preparation, and discussion/reflection questions.

Goal. This one- or two-sentence summary about the purpose and desired outcome of the activity tells participants where they are headed and prepares them for what they are supposed to accomplish. The five toolkit activities and their goals are listed below in Table 2.

TABLE 2

Appendix	**Toolkit Activity**	**Goal**

A	1: Creating a Food Waste "Buffet"	Participants see wasted food that is normally out of sight in a garbage container.
B	2: Storage and Freezing Tips to Reduce Wasted Food, including Recipes using Leftovers	Help participants learn how to properly store, refrigerate and freeze food for maximum longevity and palatability.
C	3: Making an "Eat Me First" sign for an area of the refrigerator	Participants create a visual prompt to help remind them what foods need to be eaten sooner to prevent them from going to waste.
D	4: Deciphering Date Labels	Help participants learn what terms on date labels mean so they can make informed choices about whether or not to throw away certain food items.
E	5: Tracking your Food Waste at Home	Raise participants' self-awareness regarding how much food they waste weekly.

Age group. Some toolkit activities are more appropriate for certain age groups, or certain pairings such as parent and child, than others. This description helps educators choose an activity appropriate for their group. The five toolkit activities and their suggested age groups are listed below in Table 3.

TABLE 3

Appendix	**Toolkit Activity**	**Age Group**
A	1: Creating a Food Waste "Buffet"	Adults or adults/youth
B	2: Storage and Freezing Tips	Adults
C	3: Making an "Eat Me First" sign	Adults or youth
D	4: Deciphering Date Labels	Adults
E	5: Tracking Food Waste at Home	Adults or adults/youth

Preparation. Each toolkit activity gives information to educators on what is needed to prepare for an activity. The five toolkit activities and their preparation are listed below in Table 4.

TABLE 4

Appendix	Toolkit Activity	Preparation
A	1: Creating a Food Waste "Buffet"	Choose a site for the activity. Recruit volunteers.
B	2: Proper Storage and Freezing Tips	Become familiar themselves with the informational material. Gather food examples.
C	3: Creating an "Eat Me First" sign	Gather materials.
D	4: Deciphering Date Labels	Become familiar themselves with the background information.
E	5: Tracking Food Waste at Home	Gather supplies. Determine length of time for tracking household food waste.

Discussion/reflection questions. These questions, and the ensuing discussion the questions can generate, offer a chance for participants to identify their personal barriers to wasting less food. The questions ask:

1. What do you think are peoples' barriers to wasting less food?
2. What do you think are the benefits of reducing food waste?
3. What strategies could be used to help address these barriers and benefits?
4. What are the top three reasons for why food goes to waste in your household?
5. What would motivate you to waste less food? For example, receiving prizes, cash incentives, receiving recognition.

Survey Questions

In order to determine the effectiveness of the toolkit activities, educators will be asked to reflect on the following questions:

1. What were your successes with the toolkit activities involving food-waste reduction?
2. What concerns, problems or issues (if any) did you have with the food-waste reduction toolkit activities?

3. How effective were the food-waste toolkit activities with your participants? Did anyone tell you about increased education or awareness, or a plan to change a future behavior or take a future action?
4. What suggestions do you have, if any, for improving the food-waste reduction toolkit activities?

Summary

This curriculum-based project offers concrete measures to encourage people to reduce household food waste. The toolkit activities were created to increase self-awareness around food waste and prompt people to take small steps toward waste reduction because these beginning actions should grow into long-term, deeper commitments that will have a positive impact on the environment.

CHAPTER 5

Conclusion

Review of the Curriculum

My scholarly contribution to the effort to reduce household food waste is five toolkit activities that aim to raise self-awareness of wasted food and suggest small steps that people can take to reduce the amount of food they throw away. The activities were based on initiatives by the West Coast Climate & Materials Management Forum, the University of California, Davis, and the Natural Resources Defense Council. My toolkit activities will be put into use starting this fall by my department's environmental education and outreach unit.

Limitations of the Curriculum

There are many levels at which food is wasted (growing, processing, transporting, distributing, retail, food service, consumers), but this project focuses only on food waste at the consumer level, in peoples' households. Also, food-related packaging waste is a significant solid-waste management issue, which this capstone does not address.

Recommendations for Future Research

The scope of the problem of wasted food and its accompanying waste of resources and environmental impacts of production and disposal make it a significant problem, and my toolkit activities can only do so much. An army of people working on the problem is needed. Food waste is a problem where a sizeable impact can be achieved with some changes in attitudes and behaviors and production practices. Food waste at all levels needs to be addressed. More needs to be done about the issue of hunger and improving distribution so that surplus food can reach those who need it. These are substantial goals, but given the proper attention and resources, the situation can improve dramatically.

An interesting question came up during this project: do immigrant households waste more or less food than U.S.-born residents? How well would these toolkit activities work in Hennepin County's ethnically diverse communities? As food is so intertwined with culture, I raise the question about how culturally relevant aspects can be infused into meal planning. For example, would using photos of ethnic foods and including recipes for ethnic dishes enhance the toolkit activities for ethnically diverse communities?

The Policy-Action Gap

There seems to be no shortage of governmental awareness of the need to address the problem of food waste worldwide. Governments have it on their radar, and they are changing policies and enacting legislation. For example, this month France passed a law that makes it illegal for grocery stores to throw away edible food. People know what needs to be done, but *more* people need to *do* what needs to be done. The "Food: Too Good to Waste" pilot studies revealed which community-based social marketing methods work best in order to widen the number of communities participating. The study results should be applied on a broad scale across the country to raise the population's collective awareness and begin to change behavior around food waste.

Challenges To Reducing Food Waste

From a sociocultural standpoint, reducing food waste is challenging because Americans generally have an overabundance of food. In our consumer-oriented society, we have too many choices and too many "junk" food options so that we learn to devalue our food. Author Jonathan Bloom visited a school in Quitman County, Mississippi, where in 2007 50 percent of the county's children lived below the poverty line (Bloom, 2010). Nearly all of the students get a free lunch. Bloom observed that although these children regularly experience hunger in their

households, many of them were throwing away their lunch. This observation left me reeling because I had always thought if a person was hungry, they would eat what was available to them. Bloom's observation made me realize that in order for people to waste less food, they need to learn to appreciate food, where food comes from, how to prepare it and how to eat it, the earlier in life the better.

Author's Reflections and Future Agenda

The scope of the food-waste problem is vast in the U.S., let alone in the world. In doing this project, I became overwhelmed with the daunting problem of food waste. The more I read, the more aware I became of the enormity and complexity of the situation. Especially daunting was food waste's impact on the environment. What makes the situation worse, for me, is thinking of all the perfectly edible food going to waste. More self-awareness and education can help. With date labels on food in particular, I know many people who throw away food that is still good because they think the food is "expired." Participants in the "Food: Too Good to Waste" pilot studies, which included education about date labels, did increase their self-awareness of how much food they waste, and as a result did change their habits.

I still think one person can make a difference, and one person can affect change, but the breadth and seriousness of this problem warrants a large-scale effort. We need to revisit the days when the U.S. Department of Agriculture employed a coordinator of food recovery and gleaning, who oversaw the recovery of 3.6 million pounds of food from every one of the USDA's 30 agencies. The government needs to put its tremendous resources toward this problem, and everyone who eats needs to be involved, too.

In the future, through my work on recycling and waste reduction with Hennepin County businesses, I plan to steer food waste-rich businesses such as restaurants, event centers and

grocery stores to measure and reduce their food waste by using the EPA's Food and Packaging Waste Prevention toolkit and tracking spreadsheet. As a result of working on this project, I have become involved in food rescue through The Food Group, a hunger relief nonprofit that collects surplus produce from Minneapolis Farmers Market vendors to donate to Twin Cities metro area food shelves and meal programs. I will encourage others to participate, too. Eating is universal so let us unite in our efforts to waste less of our precious food.

APPENDICES

This is the introduction to the food-waste reduction toolkit activities.

Reducing household food waste

The Basics

About 36 million tons of food waste are generated in the United States each year. According to the Natural Resources Defense Council, as much as 40 percent of food produced in the U.S. for human consumption goes uneaten. Worldwide, one-third of food is wasted. Food waste has increased significantly in recent years. Food waste per capita in the U.S. increased 50 percent from 1974, the National Institutes of Health reported in 2009.

According to the U.S. Environmental Protection Agency, food waste is the single largest component of municipal solid waste being sent to landfills and incinerators. Locally, food scraps and non-recyclable paper make up about one-third of what we throw in the garbage at home.

Environmental and economic impacts

Wasting food wastes energy, water, fuel and land that go into producing, packaging and transporting food. Additionally, the agriculture-related release of pesticides and greenhouse gases into the air, soil and water makes wasting food an environmental hazard. Food disposed of in a landfill quickly rots and becomes a significant source of methane – a potent greenhouse gas with 21 times the global warming potential of carbon dioxide, states the U.S. Environmental Protection Agency. Landfills are the largest source of human-related methane in the United States, accounting for more than 20 percent of all methane emissions.

According to the Natural Resources Defense Council, wasted food in the U.S. is valued at $165 billion annually, representing a significant waste of money for households and businesses.

Households are responsible for throwing away approximately $43 billion worth of food, and this does not include plate scrapings, garbage disposal waste or composting. On average, American households throw away 14 percent of the food purchased, which is an average of $1,484 worth of edible food a year for a family of four.

Social and ethical impacts

The issue of wasted food is often juxtaposed with hunger and food insecurity. Every day, 980 million people go hungry in the world even though there is no shortage of food. According to the Food and Agriculture Organization of the United Nations, if food were distributed equally, there would be more than enough to feed the global population. In the U.S., 1 in 6 people deals with issues of not having enough food.

Sources of food waste

Food waste is generated from many sources, including food manufacturing and processing facilities, supermarkets, institutions such as schools and hospitals, restaurants and households. Because so much food is wasted at the household level, consumers play an important role in the food-waste equation and must be part of the solution. According to the Natural Resources Defense Council, the reasons consumers waste food include: lack of awareness and undervaluing of foods, confusion over date labels, impulse and bulk purchases, poor planning, cooking too much at once, and forgetting about leftovers. By increasing self-awareness and taking some simple steps, households can significantly reduce the amount of food and money wasted every year.

Web resources

U.S. Environmental Protection Agency

http://www.epa.gov/foodrecovery/

Natural Resources Defense Council

http://www.nrdc.org/food/files/wasted-food-ip.pdf

West Coast Climate & Materials Management Forum

http://westcoastclimateforum.com/food

Food and Agriculture Organization of the United Nations

http://www.fao.org/home/en

APPENDIX A

Toolkit Activity 1: Creating a Food Waste "Buffet"

Background

About 40 percent of food produced for people to eat in the United States today goes uneaten, which is more than 20 pounds of food per person every month. That means Americans are throwing out the equivalent of $165 billion in food each year, which for a family of four is an average $1,484 worth of edible food a year. The food we throw out also uses huge amounts of water, chemicals, energy and land. Wasted food accounts for about 25 percent of all the freshwater used in the United States. Food is wasted for many reasons, such as preparing too much, poor planning, spoilage, and lack of awareness of how much is thrown away. This activity aims to increase self-awareness to help reduce the amount of wasted food.

Goal

Allow participants at schools/colleges, special events such as church luncheons, picnics, farmers markets or any other public/private event to see the amount of food that is regularly put into a garbage container, where it is out of sight (and out of mind). By taking the waste out of the garbage can and displaying it on a table, the wasted food has a much more visible presence to motivate participants to reduce their food waste.

Age group

Grades 4-12 and adult

Time for activity

30-90 minutes, but also depends on the length of the event

Materials

- 1-2 long rectangular “banquet” tables
- Tablecloth/s
- White board or chalkboard
- Marker or chalk

Main ideas to reinforce

1. Americans waste about 40 percent of the food that is produced in the U.S. for human consumption each year.
2. Wasted food equate to wasted resources – water, fuel, energy. It also contributes to pollution, soil erosion and deforestation. And wasted food costs a lot of money -- $162 billion annually in the U.S. alone.
3. If all the food that is now wasted was instead directed toward those who are food-insecure, there would be no hunger in the world.

Preparation

This activity must take place in conjunction with an event involving food, such as lunch at a school, a potluck at a church, a farmer's market that serves prepared food, or a meal at a college dining hall. Make arrangements with a site that is interested in partnering with you before the dining event. And have your students/participants join you at this event.

Once you have made arrangements with the site to hold the activity there, select a location for the food waste "buffet." Choose a location in the room or area that is highly visible but not obtrusive for the flow of traffic; for example near the trash containers or dish room or room exits. Recruit two to four volunteers (depending on the length of time for the event) to re-direct people with their plates of leftover food.

Procedure

Before the event, set up one or two tables, depending on the number of people eating, covered with a white tablecloth. As the event is taking place, have the volunteers collect plates of leftover food and place the food on the food waste "buffet" tables. Food can be combined with other food to create full plates (see photo above). Be prepared to answer questions about the purpose of doing this exercise (raising awareness about food waste by making it visible). After the event, calculate the amount of food waste by weighing or counting the number of plates of food, and report the results to the event's attendees or organizer. If, for example, your waste buffet is taking place over lunch at a college campus, results of the buffet can be posted on a dry-erase board or chalkboard for people to see during dinner. Write a description such as "measuring our food waste" on the whiteboard. Another possibility is to calculate the amount of leftover or wasted food generated in the kitchen (back of house), such as if the event takes place at a church, school or person's house.

Discussion/reflection questions

1. What new things did you learn from this activity?
2. What was your reaction to seeing the leftover food? Did you expect to see more? Less?
3. Was there any item in particular that people seemed to throw away a lot? What can be done about this?
4. Thinking about food waste in your household, overall how much food would you say you throw away in general? A lot (regularly throw away food), a reasonable amount, some, a small amount, hardly any (try to eat all purchased food, leftovers, etc.), none.
5. What reasons do you think lead to food getting wasted?
6. Thinking about when you throw food away, to what extent does it bother you? A great deal, a fair amount, a little, not very much, not at all. What is one thing you can do to throw away less food?
7. What do you want to learn more about?

Extensions

Participate in a food gleaning/food rescue event

Gleaning is the practice of picking excess crops from a farmer's field with a group of volunteers and donating that fresh produce to a food shelf. Food Rescue involves collecting surplus produce from an event such as a farmer's market and donating the food to food shelves or meal programs. Visit the Garden Gleaning Project, administered by the Minnesota Project, http://www.mnproject.org/food-GardenGleaningProject.html, Gardening Matters, http://www.gardeningmatters.org/garden-gleaning, or The Food Group, http://thefoodgroupmn.org/programs/, for more information and opportunities to participate.

Food Waste Challenge

If this meal is a regular event, such as a church potluck, neighborhood National Night Out or family reunion, challenge guests next time to reduce their food waste by only taking what they think they will eat, knowing they can go back for more food if they wish. Compare the results of this food waste "buffet" with those of the next event.

Volunteer at a food shelf

Volunteering at a food shelf can put a face on those who are hungry. One in nine Minnesotans struggles with hunger. You can help by volunteering at a food shelf. To find a food shelf near you, go to http://www.2harvest.org/get-involved/volunteer/ or http://salvationarmynorth.org/community/twin-cities-metro/community-pages/volunteering-21/.

Useful websites

- U.S. Environmental Protection Agency: http://www.epa.gov/epawaste/conserve/pubs/food-guide.pdf, http://nerc.org/documents/Organics/Natl%20Organics%20Mgmt%20PPT_Zanolli.pdf,
- Natural Resources Defense Council: http://www.nrdc.org/living/eatingwell/saving-leftovers-saves-money-resources.asp, http://www.nrdc.org/food/files/wasted-food-IP.pdf
- University of California Division of Agriculture and Natural Resources UC Food Blog http://ucanr.edu/Food_-_nutrition/?blogtag=sustainable&blogasset=10743
- The Minnesota Pollution Control Agency's Environmental Practices Inventory – a survey of Minnesota Grocers: http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/waste-reduction/environmental-practices-inventory-a-survey-of-minnesota-grocers.html
- Hunger-Free Minnesota: http://hungerfreemn.org/

- Prevent Wasted Food from Eureka Recycling: http://makedirtnotwaste.org/at-home/prevent-wasted-food

APPENDIX B

Toolkit Activity 2: Proper storing and freezing, and using up leftovers

Background

Much of household food waste is generated because we buy too much, let it spoil or put more on our plates than we can eat. About two-thirds of food waste is due to food spoiling because it is not used in time, whereas the other one-third is caused by people cooking or serving too much. Certain types of food, such as produce, tend to get thrown away because it spoils before it can be used. Learning how to properly store food can significantly reduce food waste.

Goal

Participants will learn how to store, refrigerate and freeze food to reduce food waste.

Main ideas to reinforce/learning objectives

1. Properly storing food can make it last longer and reduce wasted food.
2. Use leftovers to make delicious meals. There are many recipes designed around using up leftovers and bits of food remnants hanging around in the fridge.
3. Wasting food is costly for your pocketbook and the environment. It takes energy, water and other natural resources to produce food and to dispose of food waste.

Age group

Adult

Time for activity

30-45 minutes

Materials/supplies/resources

- Charts
- Eureka Recycling's A to Z Food Storage Guide (online)

- Examples of food items, including fresh fruits and vegetables, meats, dairy, dry goods, and spices
- Storage supplies: Paper towel, cloth towel, glass jar, plastic bag, airtight container, paper bag (for mushroom storage), chef's or other kitchen knife, wax paper, grater

Optional materials

- Leftovers as a base for creating new dishes
- Thermometers for people to check the temperature of their refrigerators

Preparation

Familiarize yourself with the informational material before you present it to participants. Gather examples of food items.

Procedure

Review the following food waste storage tips with participants:

To keep your produce fresh for longer:

- Set your refrigerator a few degrees cooler. Food needs to be stored between 33-41 degrees Fahrenheit for maximum freshness and longevity. Check that the seals on your fridge are good and check the fridge temperature, too.
- Place food in appropriate packaging (for example, do not put mushrooms in plastic, but instead something breathable). Vegetables that are starting to wilt can be made into soup.
- Do not leave fruit out on the counter because it lasts longer if refrigerated.
- Prep food and put into storage containers right away so food can be consumed conveniently.
- Freeze food if you can't eat it in time. Quite a few fruits freeze very well, such as strawberries, blueberries, and bananas, and can then be used for smoothies or baking.

Visit www.usda.gov and search “freezing food” to see how long certain foods last in the freezer. Or purchase frozen foods instead. Frozen foods retain their nutrient value and are less likely to go to waste.

Look up specific storage instructions for the food examples in Eureka Recycling’s A to Z Food Storage Guide, and share with participants.

Ask participants to complete a food storage planning sheet and commit to trying a few actions. (see planning sheet below) If possible, give participants a few weeks to try out some food storage techniques. Discuss the changes participants have made, sharing both successes and challenges they continue to encounter.

Discussion/reflection questions

1. What did you learn from this activity that was new?
2. What specific food items do you have questions about proper storing? Give an example of one item, such as an apple, for which you learned the proper storage technique.
3. What foods do you buy most often?
4. What foods do you often find yourself throwing away? Why do you think this happens?
5. How often do you shop for food? Do you plan meals before you go to the grocery store? Do you find it helps you waste less food? Other benefits to meal planning?
6. What is your most common reason for throwing out food?
7. What do you want to learn more about?

Extensions

1. *Take an inventory* of your refrigerator, freezer and cupboards to see what foods you have. Keep a list of the contents of each to remind yourself to use them up before buying more or before they spoil/become stale.

2. *Donate food* if you have non-perishable and unspoiled perishable food that you don't want or don't think you'll use. Local food banks, soup kitchens, pantries and shelters can always use donations.

3. *Have a potluck* in which only dishes using leftovers are served. Foods such as chili, stew and soups taste better as leftovers because the flavors have had time to meld.

Free supporting materials/resources

- Eureka Recycling's A to Z Food Storage Guide http://makedirtnotwaste.org/at-home/food-storage-tips
- The Refrigerator Demystified, from the Natural Resources Defense Council http://www.nrdc.org/food/files/dating-game-infographic.pdf
- West Coast Climate Forum's "Food: Too Good to Waste" campaign http://westcoastclimateforum.com/food/wasteless

Recipes for using leftovers and bits of "this and that"

- Casseroles, frittatas, soups, meatloaf, and smoothies are great ways to use leftovers and other food odds and ends. Search for websites that provide suggestions for using leftover ingredients.
- Love Food Hate Waste's recipes for using leftovers: http://england.lovefoodhatewaste.com/recipes
- Supercook unlocks the potential of your pantry and fridge: http://supercook.com/#/recipes/All%2520recipes

Food storage planning sheet

Think about the most commonly wasted foods in your household. Using the food storage tips and the food preservation guide, make a plan for how you will reduce those foods that commonly get wasted.

Food item	**Storage technique**	**Details/notes**

APPENDIX C

Toolkit Activity 3: Make an Eat Me First sign for your refrigerator

Photo credits: http://www.thekitchn.com/make-an-eat-me-first-basket-in-your-fridge-lifehacker-164680
http://www.appliancepartspros.com/diy/blog/make-refrigerator-life-party/
http://www.westcoastclimateforum.com/sites/westcoastclimateforum/files/related_documents/eatmefirstFINAL.pdf

Background

About 20 percent of the food we buy gets thrown out, which amounts to more than 20 pounds of food per person every month and for a family of four is an average $1,484 worth of edible food a year.

Food is wasted for many reasons, such as buying too much, poor planning and spoilage, and some people aren't aware of how much they throw away. This activity aims to help reduce the amount of food wasted in households by helping participants prioritize what food needs to be eaten soon.

Goal

Participants will create an 'Eat Me First' sign to label a box, container or area of their refrigerator as a prominent visual reminder that certain foods need to be eaten sooner to avoid them spoiling and going to waste.

Main ideas to reinforce/learning objectives

1. Food gets wasted when it's forgotten about in the back of the fridge or a new product is opened while some product still remains in the fridge (e.g., opening a new jar of spaghetti sauce when a half-used one is already in the fridge).
2. Use up perishable foods before they spoil to avoid wasting money and the resources that went into growing and producing the food.
3. Make your perishable foods more visible by designating a specially labeled place for them in your fridge.

Age group

Ages 5-18 and adult

Types of activities: parent/child, adult lessons

Parent and child, adult lessons

Time for activity

30-50 minutes

Materials/supplies/resources

- Shoe box or shoe box-sized plastic container
- Large, flat pieces of old wrapping paper, colored paper, newspaper, old maps, old posters, brown paper bags cut open, or any other reusable paper (size must be large enough to wrap around the box/container you're using)
- Scissors
- Glue stick or tape
- Markers or crayons

Optional materials

- Paints, fabric scraps, buttons, etc. for decorating the box
- A computer and printer if participants want to design a sign on the computer

Preparation

Gather materials for signs, decoration, and gather the containers themselves. Provide a shoebox or other shoe box-shaped container for each person, or have each participant bring one.

Procedure

Have each person make a sign that says “EAT ME FIRST”. The signs can be creative/decorative, but the wording should remain clear. Make sure the signs are the right size for the shoe boxes or containers. Tape or fasten the signs onto the boxes, and ask participants to specify where in their refrigerator makes sense to put this container.

Discussion/reflection questions

1. What types of foods will you put into your “Eat Me First” box?
2. What are other ways you can try to help foods get eaten? (rotate things forward – old in front, new in back)
3. What are some other containment ideas? (low-profile trays, Lazy Susans)
4. What are some other ways you can reduce the amount of food you waste?
5. How does reducing food waste help the environment?

Extensions

- Cooking challenge: Choose five ingredients that you already have in your fridge, freezer or cupboards. Look online to find a recipe or brainstorm to create a recipe that incorporates those five ingredients. Prepare a dish, and then share it with other participants, who will rate each others’ creations to choose a winner of the cooking challenge.

- Have participants make “Eat Me First” stickers that can be placed on individual food items.
- Pack a No Waste Lunch: Many parents pack lunch items in single-use plastic bags, or they purchase single-serving items that come in their own disposable package. These products are extremely convenient, but create a lot of waste. You can pack a no-waste lunch by using a reusable lunch bag, putting sandwiches and other main dishes as well as fruits and vegetables in reusable containers, using a reusable beverage bottle, utensils and cloth napkin. You’ll be reducing packaging waste and saving money, too.
- Help your business/place of worship/school/community center reduce its waste by diverting organics for recycling into compost. Help is available at http://www.hennepin.us/businessrecycling
- Tour a commercial composting facility to see what happens to food waste.

Free supporting materials/resources

- Natural Resources Defense Council http://www.nrdc.org/food/files/wasted-food-ip.pdf
- U.S. Environmental Protection Agency’s “Food: Too Good To Waste” http://www.endfoodwaste.org/food-too-good-to-waste-by-the-epa.html
- Great videos from King County, Washington. http://your.kingcounty.gov/solidwaste/wasteprevention/too-good-to-waste.asp
- Pack a No Waste Lunch http://www.wastefreelunches.org/what-is-a-waste-free-lunch-program.html#what-does-it-look-like and http://www.epa.gov/osw/education/lunch.htm

APPENDIX D

Toolkit Activity 4: Deciphering Date Labels on Food

Background information

Confusion over date labels, multiple dates, inconsistent usage, and lack of education around date labels can cause consumers to throw away food prematurely. In the U.S., **“**sell by” and “use by” dates are not federally regulated and do not necessarily indicate food safety, except on certain baby foods or infant formula. Rather, they are manufacturer suggestions for peak quality. Most foods can be safely consumed well after their use-by dates. Consumers also often bypass foods that have an odd shape or a few cosmetic blemishes, even though these foods are still good-quality and nutritious. Understanding the true meaning of “use by” and “sell by” dates and being okay purchasing foods that aren’t quite perfect can help reduce food waste.

Goal

Participants will learn about food product date labels such as: “sell by,” “use by,” “best by,” “best if used before,” “guaranteed fresh until” and “freeze by” to make informed choices about food. They also will gain a new appreciation for the usefulness and good quality of imperfect-looking fruit and vegetables.

Main ideas to reinforce/learning objectives

1. “Use by” and “sell by” dates on food labels don’t necessarily indicate food safety. They are often manufacturer suggestions for peak quality. When a food item is beyond peak

quality, it may lose a little texture or flavor but will not usually become inedible or unsafe immediately.

2. Understanding what date labels mean can help you reduce the amount of still-good food you throw away.
3. Imperfect-looking fruit and vegetables can still be delicious and nutritious.

Age group

Adult (older children would benefit from knowing what the date labels mean even though it's unlikely they do much of the grocery shopping)

Types of activities

Adult lessons

Time for activity

30-45 minutes

Materials/supplies/resources

Bring in some samples of food products that contain different date labels, such as canned foods and condiments from the cupboard, dry pasta or cereal, bread, produce, cheese, meat, etc.

Preparation

Review the date-label terms and definitions before the activity to be well-versed on what the terms mean.

Procedure

Explain to participants what each date label means. Then have participants take an inventory of the dates on some of the food in their households. Ask them to choose foods stored in a variety of locations, such as in the cupboard, in the refrigerator, in the freezer, etc. Ask participants to record the "use by," "sell by" or other date on the food product and then think

about how they would know if the food was safe to eat beyond looking at the date label. Have participants discuss their findings and what they will do differently as a result.

Dates meant for businesses to communicate with each other:

1. "**Production**" or "**pack date**": the date on which the food product was manufactured or placed in its final packaging.
2. "**Sell by**" date: the manufacturer's suggestion for when the grocery store should no longer sell the product. This information helps stores with their stock rotation. The "sell by" date is often misinterpreted to mean a product is unsafe to eat, but in fact, "sell by" dates are typically designed as a way for the manufacturer to ensure the grocery store that if a product is sold by that date, it will still be of good quality for a reasonable amount of time after it's purchased.

Dates meant to communicate directly with the consumer:

1. As explained by the FDA, "**use by**," "**best by**," "**best if used before**," and "**guaranteed fresh until**" dates are typically manufacturer suggestions for peak quality. These are loosely used to mean:
2. "**Best if used before**" or "**best by**" date: the manufacturer's estimate of a date after which food will no longer be at its highest quality. After this date, food may lose a little texture or flavor but will not become inedible or unsafe immediately.
3. "**Use by**" date: also typically a manufacturer's estimate of the last date recommended for the use of the product while at peak quality.
4. "**Freeze by**" date: a guide for consumers to know by when to freeze a product. This date is often used in conjunction with another date, in case the consumer chooses not to freeze the product.

Discussion/reflection questions

1. What did you learn from this activity that was new?
2. The Natural Resources Defense Council has called for standardizing and clarifying the food date labeling system across the United States. Do you think this is a good idea?
3. Can you think of a food item that you have thrown away recently based on the belief that the food was unsafe to eat/no longer fresh?
4. How do you feel about imperfect-looking fruit and vegetables now?
5. What do you want to learn more about?

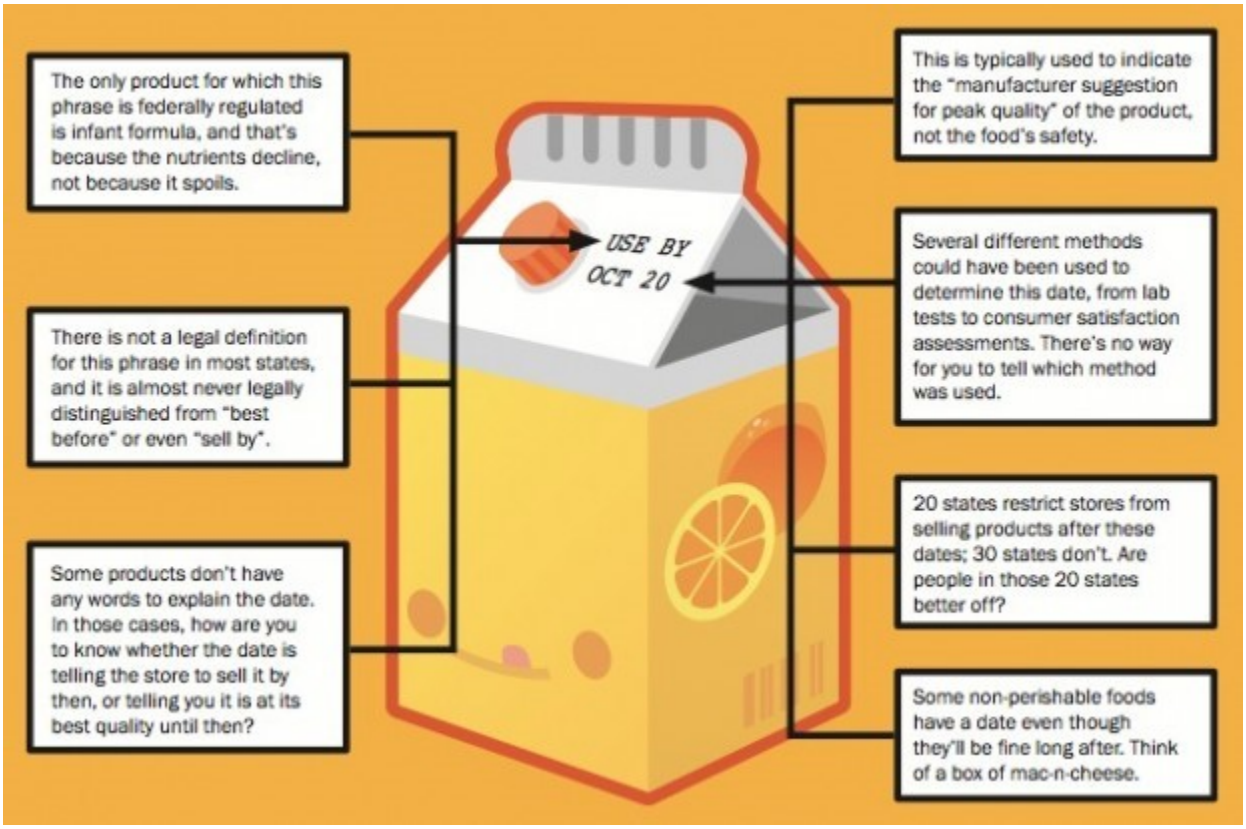
Extensions

1. Go to the grocery store as a group, and once there, split into pairs or groups of three. Visit the different areas of the store to look at the types of date labels commonly found on items such as fresh packaged deli food, packaged produce, canned foods, frozen foods, dairy products, baby food, pet food, household cleaners. Each team should write down the number of different date label iterations they find, and then compare their list with the other teams' lists. Review what the different date labels mean.
2. Commit to telling one friend, family member, neighbor, co-worker about date labels and what they mean.
3. Collect examples of confusing date labels, and send photos of them, along with the product and brand name, to the Natural Resources Defense Council. http://www.nrdc.org/food/expiration-dates.asp
4. Review Intermarche's campaign that aims to change consumers' attitudes toward buying produce that looks less than perfect. Watch the video https://vimeo.com/98441820 and discuss the campaign as well as strategies for knowing when fruits and vegetables are still

fine to eat, when to throw out food, and ways to use produce that is a little overripe (such as using them for baking or smoothies).

Free supporting materials/resources

- Intermarche, France's third-largest supermarket chain, in 2014 began a campaign called 'Inglorious Fruits and Vegetables' to try to change consumer attitudes about ugly looking produce. https://vimeo.com/98441820
- Issue Brief from the Natural Resources Defense Council http://www.nrdc.org/food/files/dating-game-IB.pdf
- Detailed explanation of date labels from the Natural Resources Defense Council http://www.nrdc.org/food/expiration-dates.asp



Credit: http://www.nrdc.org/food/files/dating-game-IB.pdf

Food date inventory

Take an inventory of the dates on some food items in your kitchen. Include some foods stored in different ways, such as in the cupboard or pantry, in the refrigerator and in the freezer. Record the date on the label, then think about ways you could tell if the food was safe to eat beyond looking at the date.

Food item	**Where stored**	**Date on label**	**What does the date mean?**	**How would you know if the food is safe to eat?**

APPENDIX E

Toolkit Activity 5: Track your Food Waste at Home

Background information

More than 20 percent of the food we buy gets thrown away. That adds up to about 245 pounds per person each year! Calculate how much food you throw out by measuring and tracking all the food you throw away over a week or longer. An average household throws away one pound of food waste for every seven pounds of trash. The average American family of four ends up throwing away an equivalent of up to $2,275 annually in food. This activity has been adapted from the “Food: Too Good to Waste” initiative.

Goal

Participants will increase their awareness of how much food waste they produce each week by weighing their discards for a specified number of weeks.

Main ideas to reinforce/learning objectives

1. The average household throws away a lot of food – about 20 percent of what we buy or about 245 pounds per person per year.
2. There are a lot of simple actions we can take to reduce food waste, which will save money and conserve natural resources.

Age group

Grades 4-12 and adults

Types of activities: parent/child, adult lessons

Parent/child and adults

Time for activity

One hour for the initial set-up, then 1-2 weeks for the measurement exercise

Materials/supplies/resources

- Paper lunch bags, size 5 1/8” x 3 1/8” x 10 5/8”
- Tape or stapler
- Print-outs of the West Coast Climate & Materials Management Forum’s food waste measurement label. Try to get participants to re-use the label for subsequent measurement weeks, but be prepared to provide a few extras.
- BPI-certified compostable plastic bags

Optional materials

- Kitchen scales

Preparation

Gather a supply of paper lunch bags, one or two for each week that you want participants to measure their food waste. Print out copies of the food waste measurement label. Decide how long you want participants to measure their food waste.

Procedure

Tape or staple the labels on the paper bags with the 1/8th volume measure at a uniform distance from the bottom of the bags. Fix the measurement label to the bag so that the 1/8th mark is an even distance from the bottom of the bag as the distance between any two 1/8th markings.

Explain to participants the process, which is from the West Coast Climate & Materials Management Forum's "Food: Too Good to Waste" program:

At the start of each week, line one paper lunch bag with a green compostable bag. Over the course of the week, place all your *preventable* food waste into the bag. Discard *non-edible* food waste such as banana peels, egg shells and chicken bones in the usual manner. (*Preventable* food waste is food you bought to eat but has since spoiled or food that was prepared but was not eaten and then thrown away.)

At the end of each week, measure the volume of food waste in the bag using the fractions on the printed label. Record the volume on the attached worksheet. If you have a kitchen scale at home, you may use that to weigh the food waste for a more accurate measurement.

If the bag fills before the end of seven days, weigh or record the volume of the full bag and record how many days you collected food in that bag. Then begin collection in a new bag. At the end of the week, total your weight and/or volume of food waste for the entire week.

After you record the volume of food wasted for the week, you can place the collection bag, including food, either in your curbside organics cart (if you have this service), backyard compost bin (no meat, bones or dairy), bring it to a city drop-off site or Hennepin County's transfer station in Brooklyn Park, or in your garbage.

Additional waste collection tips:

1. If you are concerned about leakage, use a plastic bag as a second liner.
2. If you are concerned about odor, you can clip the top of the bag shut; or you can start using a new bag midweek, as long as you track the total volume of waste for the whole week.

3. Collect liquid waste such as soup or spoiled milk in a measuring cup and add it to the volume at the end. Do not collect food-soiled paper products.
4. Have participants report the amount of food waste generated. If you are working with a group, considering charting or otherwise tracking and sharing the group's results. Discuss changes participants are motivated to take by measuring the amount of food waste they generate. Consider doing the activity again in a few months to see whether participants have made any lasting changes.

Discussion/reflection questions

1. What did you learn from this activity that was new? Was there anything that surprised you?
2. Did you find the exercise helpful or informative, and how?
3. Can you think of ways to reduce how much food you are throwing in the trash based on what you threw out?
4. Do you think you often buy more food than needed?
5. What do you do if you see an item is nearing its 'best before' date?
6. What are the most common food items that get thrown away in your household?
7. What do you want to learn more about?

Extensions

1. Research the life cycle of a food or food product. What goes into getting your chosen food item from farm to your table?
2. Engage in some of the West Coast Climate & Materials Management Forum's other Food Waste Challenge activities. http://westcoastclimateforum.com/food/wasteless

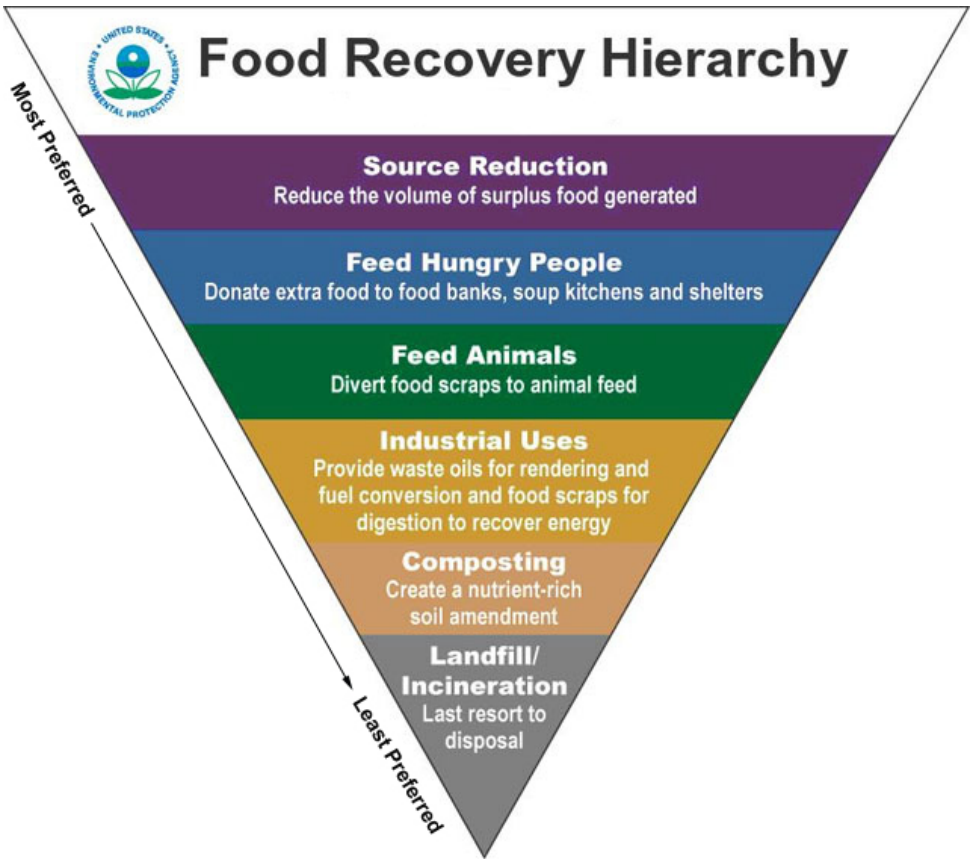
3. Continue the food-waste measurement exercise for six weeks. The first two weeks are spent measuring how much food waste your household throws away, and the third through sixth weeks are spent testing strategies from the “Food: Too Good to Waste” initiative (http://westcoastclimateforum.com/food) to prevent food waste while continuing to measure how much is being thrown away.

Free supporting materials/resources

- West Coast Climate & Materials Management Forum’s link for food waste measurement tool http://westcoastclimateforum.com/sites/westcoastclimateforum/files/related_documents/measureshoppingbag.pdf
- Instructions for West Coast Climate & Materials Management Forum’s food waste measurement tool http://westcoastclimateforum.com/sites/westcoastclimateforum/files/related_documents/takethechallenge.pdf

APPENDIX F

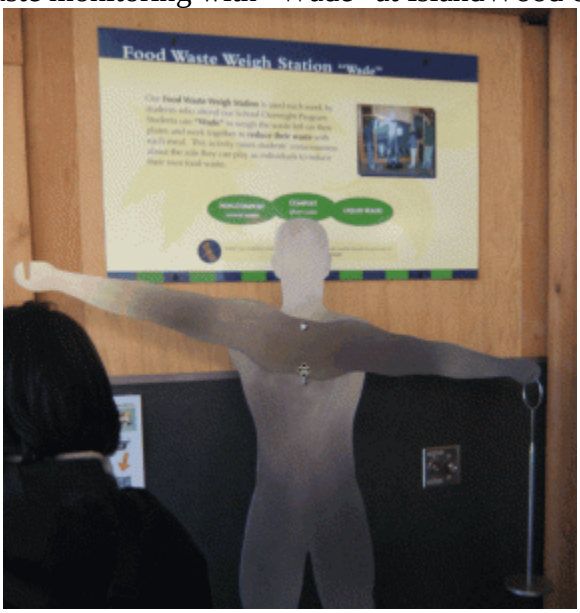
EPA's Food Recovery Hierarchy



Credit: http://www.epa.gov/foodrecovery/images/fd_recovery_hierarchy_lg.jpg

APPENDIX G

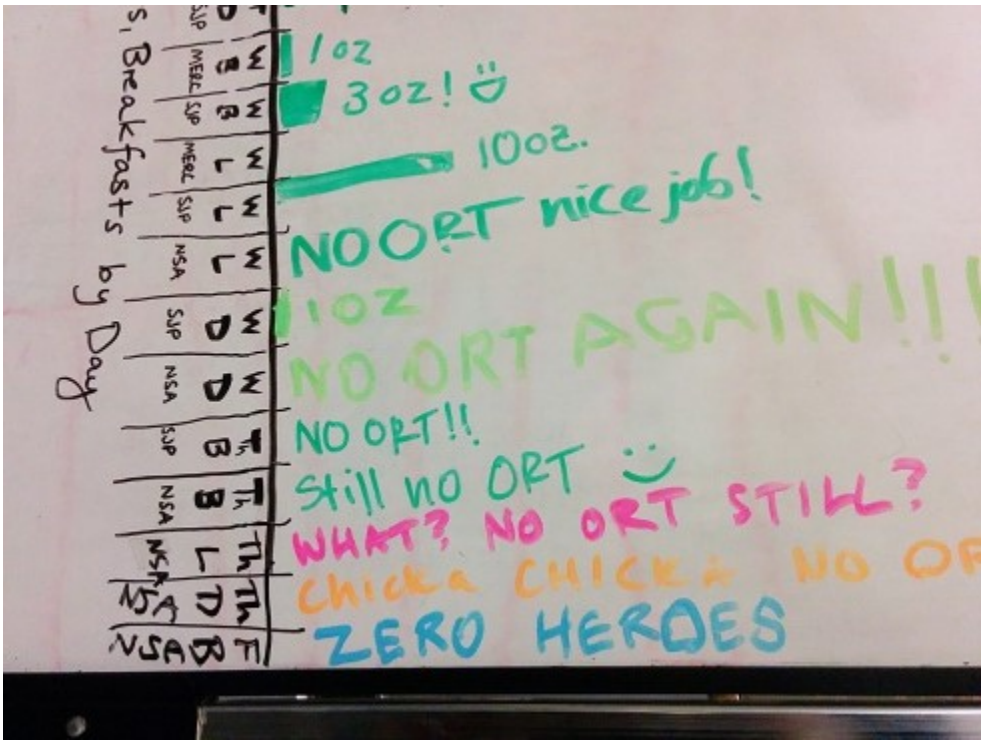
Food waste monitoring with “Wade” at IslandWood on Bainbridge Island, Washington.



Credit: http://www.personalkanban.com/pk/applications/making-waste-explicit/#sthash.Yc0nzkrc.6x857bxn.dpbs

APPENDIX H

Food waste activity at Audubon Center of the North Woods in Sandstone, Minnesota.



Credit: Nancy Lo

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