ABSTRACT

DEVELOPMENT OF A NUTRITION-RELATED CURRICULUM FOR SUSTAINABLE FOOD WASTE MANAGEMENT FOR FOODSERVICE OPERATIONS

By

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August 2015

The purpose of this directed project was to develop a sustainable food waste management curriculum to reduce waste in landfills and to alleviate food insecurity within Los Angeles County. The goals of this curriculum were to reduce food waste in landfills, thereby reducing greenhouse gas emissions from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and food insecure in Los Angeles County.

The curriculum was created addressing perceived barriers of establishing a long-term, sustainable waste management program, tailored for foodservice operations in Los Angeles County.

The curriculum consists of six sessions relating to topics discussed in the literature reviews. An expert-review panel assessed the literature review, evaluated the curriculum content, and provided feedback. Evaluation forms for the curriculum were created to assess the efficacy and value of the program.

DEVELOPMENT OF A NUTRITION-RELATED CURRICULUM FOR SUSTAINABLE FOOD WASTE MANAGEMENT FOR FOODSERVICE OPERATIONS

A PROJECT REPORT

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Master of Science in Nutritional Sciences

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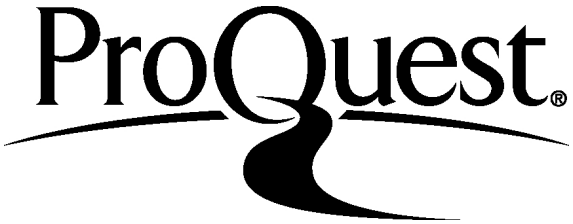

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CHAPTER 1

INTRODUCTION AND STATEMENT OF THE PROBLEM

Introduction

Food insecurity, a household-level economic and social condition of limited or uncertain access to adequate food (United States Department of Agriculture [USDA], 2014), is a global and national issue. According to the Global Food Security Index of 2014, the United States is ranked as the most globally food secure country in the world, yet 14.5% of the U.S. population is food insecure in approximately 17.6 million households. Of the 49 million Americans living in food insecure households, 33.1 million are adults and 15.9 million are children (Feeding America, 2012). While food insecurity is often associated with specific neighborhoods or cities across the nation, unemployment tends to be a stronger predictor of food insecurity than poverty (Feeding America, 2012).

The main components of food insecurity include: (1) affordability, (2) access, (3) quality, (4) safety, and (5) utilization of food. Without the money or means to access food, one is unable to have a secure and consistent food supply. Kirkpatrick and Tarasuk (2008) found that within an insecure household, adults and adolescents have a higher tendency to develop nutrient inadequacies—particularly protein, vitamin A, many B vitamins, magnesium, phosphorous, and zinc. Food insecure participants of their Canadian study had inconsistent intake of plant and animal protein sources due to

financial constraints. A significant number of individuals have inconsistent access to food and must choose between paying a bill or eating.

According to the USDA's Dietary Guidelines for Americans 2010, individuals are encouraged to consume a balanced variety of foods from all food groups: fruits, vegetables, whole grains, lean meats and/or plant proteins, and low-fat dairy products while minimizing intake of saturated fat, trans fat, cholesterol, sodium, and added sugars. Researchers of a Canadian study found that food insecurity is associated with a higher consumption of energy dense foods, typically higher in calories, carbohydrates, and fat. In addition, food insecure children aged 1 to 3 and males aged 14 to 18 both consumed fewer fruits and vegetables. Further, food insecure children aged 1 to 8 also consumed fewer servings of milk products (Kirkpatrick & Tarasuk, 2008).

While food accessibility for the hungry and needy remains an issue, 40% of food available in the United States is disposed of into a landfill; globally, 30-50% of all food grown and produced is wasted (National Geographic, 2014). The wasted food, equivalent to $165 billion, could be utilized to feed and nourish the food insecure; however, it currently negatively impacts consumer finances and the environment. The natural breakdown of food produces a greenhouse gas (GHGs) emission known as methane gas. These emissions are 21 times more potent than carbon dioxide which significantly reduces air quality (Harvard Law School, 2014).

One established method of reducing methane emissions from food breakdown is composting— a biological process during which naturally occurring aerobic (oxygen-requiring) microorganisms break down organic materials (such as food waste) into humus, a nutrient-rich material (compost) that can be used to improve soil quality.

During the composting process, the microbes use inputs of oxygen, moisture, and organics to generate heat, water vapor, and carbon dioxide as they transform organics into humus (Harvard Law School, 2014). The process of composting allows the organic matter to decompose naturally, with oxygen. Carbon dioxide is the only emission from the composting process, whereas the same organic matter would produce methane due to decomposing without oxygen (i.e., in a landfill).

Another component of environmental waste is the trail off of materials into the ocean. According to the Scripps Institute of Oceanography at University of California, San Diego (UCSD; 2012), 10 metric tons of plastic fragments are carried into the Pacific Ocean daily in Los Angeles alone. Properly managing food and material waste can be a major solution for alleviating food insecurity and creating a healthier environment.

Statement of the Problem

There is a need for a long-term, sustainable food waste management solution to minimize food waste, responsibly manage food resources, and properly divert excess food and food scraps from landfills. This curriculum provides foodservice operations with tangible solutions for reducing food and material waste, lessening its impact on the environment and alleviating food insecurity in their local community.

The current production of food contradicts the reality of food insecurity in 17.6 million households nationally while deteriorating the environmental resources available. Because 40% of America's food is thrown away, an increase in 25% more carbon GHGs are released into the air from wasted food. Furthermore, the production of unconsumed food results in wastes of 32% of fresh U.S. irrigation water, 20% of U.S. land usage, and 4% of the U.S. energy budget (Gunders, 2012). With the average person discarding 20

pounds of food into the landfill per month, the amount of food waste can be significantly reduced while feeding those in need (Sustainable America, 2012). The issue of food insecurity is multi-faceted; however, by responsibly managing food waste, the hungry and food insecure can be connected with the excess food.

Incorporating ways for local foodservice operations to better utilize their resources, distribute excess food, and sustainably dispose of food can reduce environmental hardship, use less resources and alleviate food insecurity. With an ever-growing population, the issue stands in linking the excess food to the hungry and needy.

Purpose Statement

The purpose of this directed project is to develop a sustainable food waste management curriculum to reduce waste in landfills and to alleviate food insecurity within Los Angeles County. The goals of this curriculum are to reduce food waste in landfills, thereby reducing GHGs from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and needy in Los Angeles County. These changes also lessen the environmental impact of producing, harvesting and transporting unconsumed and wasted excess food.

Project Objectives

The specific objectives of this sustainable food waste management curriculum are to:

1. Conduct a literature review regarding current environment conditions of the ocean, landfills, forests, and air quality along with established food waste management programs;

2. Create a curriculum in a format that will benefit foodservice operations while adhering to government regulations for excess food distribution and minimizing food waste;

3. Support foodservice operations in reducing food and material waste to landfills by linking excess food to the food insecure;

4. Promote an environmentally—conscious and mindful approach to food usage and waste along with material disposal techniques;

5. Evaluate the curriculum materials and delivery of presentation.

Definition of Terms

Composting

Composting is defined as the biological process during which naturally occurring aerobic (oxygen-requiring) microorganisms break down organic materials such as food waste into humus, a nutrient-rich material that can be used to improve soil quality. During the composting process, the microbes use inputs of oxygen, moisture, and organics to generate heat, water vapor, and carbon dioxide as they transform organics into humus (Harvard Law School, 2014).

Food Insecurity

Food insecurity is defined as: "Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (as in "…And Food Insecurity?").

Recycling

Recycling (2014) is defined as converting waste into a reusable material.

Sustainable

Sustainable (2014) is defined as relating to or being a method of harvesting/using a resource that does not deplete or permanently damage.

Limitations

This curriculum is intended to reach foodservice operations in Los Angeles County. While obtaining a precise account for the number of food insecure is difficult, this curriculum utilizes organizations working with the food insecure to understand the demand for food in their community.

Because this curriculum is based in Los Angeles County, the resources and state regulation protocols cannot be generalized for use in other jurisdictions. Furthermore, recycling and composting availability will differ on residential municipality; therefore, recommendations for proper waste-free disposal will differ.

Assumptions

First, it is assumed that those involved in using this curriculum will use the material appropriately, according to instruction and to the best of their ability. Second, it is assumed that the potential recipients of this curriculum are willing and interested to make these changes. Third, it is assumed that upon implementing these practices, the goals of the curriculum will be achieved, hence proving its effectiveness in reducing food and material waste in landfills. Fourth, it is assumed that the expert-review panel consisting of the researcher's committee— Lee Blecher, Ph.D., Wendy Reiboldt, Ph.D. and Cheryl Rock, Ph.D.— are experts in the field of sustainability, food waste management and curriculum, and their review is accurate, relevant and applicable in the real world.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of this directed project is to develop a sustainable food waste management curriculum to reduce waste in landfills and to alleviate food insecurity within Los Angeles County. The goals of this curriculum are to reduce food waste in landfills, thereby reducing GHGs from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and food insecure in Los Angeles County. These changes also lessen the environmental impact of producing, harvesting and transporting unconsumed and wasted excess food.

This review of literature provides an overview of the prevalence of food waste and food insecurity in the United States, along with the current environmental conditions of landfills, the Pacific Ocean, forests, trees, and air quality as a result of poorly managed waste. Furthermore, the review also evaluates the practices of established food waste management programs, including: composting, commercial food waste management, food recovery, and food bank distribution. Commonly perceived barriers in establishing a sustainable food waste management program are also identified.

Food Insecurity Concerns: Past, Present and Future

Food insecurity remains a major public health concern with 5.7% of American households experiencing a "disruption of normal eating patterns due to limited resources," (Garrone, Melancini, & Perego, 2014). Economic instability within

developed countries contributes to the increasing poverty rates, with an increase from 12.3% in 2006 to 15% by 2011 (Giuseppe, Mario, & Cinzia, 2014). In 2010, approximately 49 million individuals within the United States lived in a food insecure household— 16% of the total population (Coleman-Jensen, Nord, Andrews, & Carlson, 2011). Food insecurity is a major issue that demands the attention of public health and nutrition professionals to ensure adequate nourishment of the general population, particularly the food insecure. According to the United Nations, the growing, global population is anticipated to reach 9.6 billion inhabitants by 2050. In order to adequately feed and nourish the global population, one must reconsider current food waste management practices and look to redistribute food to areas in need.

Dissecting Food Waste: Prevalence, Causes and Concerns

Although 16% of the U.S. population struggles to nourish adequately on a regular basis, food waste continues to be the single largest component of municipal solid waste (Buzby & Hyman, 2012). Ironically, there is a large surplus of edible food, but rather than being consumed, it ends up in a landfill. Hall, Guo, Dore, and Chow (2009) report that more than 1,400 calories per person worth of food waste is sent to a landfill each year, resulting in a total of 150 trillion calories from the United States population. More specifically, the top three food groups of wasted food include meat, fish and poultry, vegetables, and dairy products, while the food insecure tend to lack these very foods (Buzby & Hyman, 2012). The wasted, edible food can be redistributed to the food insecure. In turn, the reduced waste allows for the edible food to serve its purpose of consumption and nourishment (Stuart, 2009).

When evaluating the reasons for such alarming food waste rates, researchers Lebersorger and Schneider (2014) found that apparent flaws in the product (i.e., discoloration/non-uniformity of fruit) and the date stamp (i.e., approaching the "best by" date for dairy and bread products) contribute most to wasted edible food. Similar to previously cited research, the most commonly discarded food groups are fruits and vegetables, dairy products, and breads and pastries. When measuring food waste in amounts of monetary loss, 53% is from fruits and vegetables, 25% is from bread and pastries, and 22% is from dairy (Lebersorger & Schneider, 2014). Furthermore, it is important to note that the wasted food includes otherwise edible food, lacking any physical or sensory indication of being inedible.

Current waste management practices commonly overlook the long term financial losses exhibited when wasting food. The economic impact alone causes unnecessary strain and demand on each area of food production and foodservice (Buzby, Hyman, Stewart, & Wells, 2011). The abundance of food waste represents the significant loss of money and countless resources used to produce, store, transport, prepare, and serve food that will not fulfill its intended purpose (Buzby & Hyman, 2012). In order to improve the health status of the food insecure, the fruit, vegetable, grain, and protein sources produced must reach those in need and serve its purpose.

Redistributing Food through Donations

Before resorting to discarding food into a landfill, foodservice operations have the option of donating edible food to social service operations, such as food banks, homeless shelters and clinics for repurposing. Suppliers, manufacturers, and wholesalers tend to donate excess food to non-profit organizations and food banks more regularly than

retailers (Giuseppe et al., 2014). Researchers speculate that suppliers, manufacturers, and wholesalers can donate excess food much earlier in their shelf life, allowing for greater leeway in distributing prior to the date stamps.

Efforts to donate excess food have been limited by financial and logistical constraints, and also out of the fear of mishandling food safety procedures in the process (Kantor, Lipton, Manchester, & Oliveira, 1997). Contrary to popular belief, donators of leftover food are protected by law under the Bill Emerson Good Samaritan Act of 1996 (Public Law, 104-210, 1996). It was established to encourage food donations to non-profit organizations while minimizing liability in accordance with Model Good Samaritan Act. Gross negligence is the only form of liability.

Local Food Banks in Los Angeles County

Within Los Angeles County, there are established food banks and food recovery programs available to redistribute excess food. Local food banks include: Los Angeles Regional Food Bank, Westside Food Bank, and Food Bank of Southern California. Each food bank serves specific areas within Los Angeles County and offers various services to feed the food insecure.

The Los Angeles Regional Food Bank, located in Los Angeles, seeks to feed the food insecure through three programs: rapid food distribution, mobile food pantry and "Extra Helpings." The goal of rapid food distribution is to link fruits, vegetables, and other perishable foods to agencies for distribution before spoilage. The foods are distributed to nearby agencies via a refrigerated beverage truck. In addition, there are sixteen mobile pantries that provide food to 250 to 300 households with each pantry distribution. The food provided is primarily USDA commodity food and donated

perishables and produce. The mobile pantry feature meets the needs of food insecure areas within Los Angeles County. The "Extra Helpings" program links excess food from foodservice operations, caterers, hotels, bakeries, and restaurants with partnering agencies for redistribution. Food recovery representatives are easily notified when excess food is available, and coordinate a scheduled pick-up of the food (Los Angeles Regional Food Bank, 2014).

The Westside Food Bank, founded in 1981, is located in Santa Monica, and serves over seventy social service agencies in Santa Monica, Venice, Culver City, West Los Angeles, West Hollywood, Inglewood, and the Los Angeles International Airport area. Westside Food Bank does not provide food directly to individuals; however, it annually distributes 4.5 million pounds of food to agencies for distribution with an emphasis on providing nutritious foods. Of the food distributed to agencies, approximately half is purchased from wholesale vendors, one-third is sourced from excess donated food from foodservice operations, and the remainder from public donations (Westside Food Bank, 2014).

The Food Bank of Southern California, established in 1975, seeks to serve the "poorest of the poor" living in Watts, Compton, North Long Beach, San Pedro, South Central and Downtown Los Angeles. Their services reach approximately 250,000 individuals weekly as the largest food bank distributor of fresh produce in California (Food Bank of Southern California, 2014). Located in Long Beach, providing sustenance and nutritious foods are their main goals. Currently, their food supplies over 700 community-based agencies throughout Los Angeles County with over 6.5 million pounds of fresh produce sourced from the Salinas, Ventura County, and Imperial Valley areas.

The Environmental Impact of Wasted Food and Materials

The environmental impact of wasted food and excessive use of materials contribute to overflowing landfills, a plastic-filled ocean, deforestation and impaired air quality, which are individually discussed.

The Environmental Impact of Waste on Landfills

Landfills, a storage place for waste housed in neighborhood cities, received 251 million tons of solid waste in 2012 alone. Furthermore, only 87 million tons were recovered for further use via recycling and composting (U.S. Environmental Protection Agency [EPA], 2012). While this curriculum focuses primarily on food waste, materials such as: plastics, paper/paperboard, aluminum cans, and glass jars are also common forms of waste in foodservice operations.

Methods of recovering edible food are commonly used to reduce carbon dioxide emissions produced from waste in landfills. The EPA estimates that 168 million tons of carbon dioxide emissions were saved from recovery methods alone in 2012. After the solid waste was sorted for recoverable items, the leftover waste consisted of: 21% food waste, 18% plastics, 15% paper/paperboard, and 4% rubber, textiles, and leather.

While food does biodegrade over time, food waste decomposing in landfills releases significant amounts of methane gas, which contributes 25% more GHGs than carbon dioxide (Hall et al., 2009). Carbon dioxide is the natural byproduct of food breakdown after human consumption or when in the presence of enough oxygen and nitrogen, as seen in composting, which is discussed further in the review (Harvard Law School, 2014).

The Environmental Impact of Waste on the Pacific Ocean

The ocean covers 70% of the earth's surface and is the home for countless marine and plant life. It also provides a main food source for humans and animals, particularly varied protein sources from fish, shrimp and shellfish (National Aeronautics and Space Administration [NASA], 2014). While the ocean is an abundant food source, it also acts as a "natural carbon sink" by capturing one-fourth of the carbon dioxide released by humans into the air. The photosynthesis of plankton (an ocean plant) allows for oxygen release from the ocean, acting as a crucial oxygen source for human life (NASA, 2014).

Despite the important role the ocean plays in the livelihood and nourishment of the human population, it is also drastically impacted by the amount of waste accumulated over the years. According to the Scripps Institute of Oceanography at UCSD, 10 metric tons of plastic fragments enter the Pacific Ocean daily from material waste on beaches and nearby streets in Los Angeles County alone. Moreover, the impact of plastic in the ocean also impacts the animal wildlife inhabitants, for plastic fragments are mistaken for food and ingested. Overall, the lack of proper waste management of non-biodegradable materials like plastic negatively impacts the food system, enabling animals to consume non-nutritious or pseudo food-like substances— altering marine habitats (Scripps UCSD, 2012).

Agricultural production of crops also heavily relies on the earth's precious freshwater resource. It is estimated that agriculture requires 70% of the freshwater supply; more than one quarter of that resource is used for wasted food (Hall et al., 2009).

The Environmental Impact of Waste on Trees

Trees, another important part of the ecosystem, contribute towards a healthier environment for humans and animals alike. Unlike humans, trees produce oxygen via photosynthesis and absorb carbon dioxide, providing the air needed for human survival. In addition, they act as natural air conditioners and water pumps by providing shade and recycling water. Trees absorb water from the soil as nourishment, which is held in the leaves. Upon receiving sunshine, water is released into the atmosphere with heat (i.e., evaporation and air-drying). The sun collects water until the clouds are heavy, producing rainfall (Ecokids Canada, 2014).

Trees also provide a viable food source of cinnamon, tree nuts (e.g., walnuts, cashews, almonds, brazil nuts, pecans and macadamia nuts) and fruits like apples, peaches, cherries, pears, and coconut (Academy of Nutrition and Dietetics [AND], 2014). Most commonly, trees are utilized as paper products and daily supplies, including: pencils, paper plates, books and firewood. According to the EPA, overuse of paper products contributes 27.4% of all waste in landfills. All forms of paper are recyclable, yet 14.8% of all paper products are still discarded post recovery from being soiled by other waste (EPA, 2014).

Natural regulation of air quality is significantly impacted by trees, particularly in urban areas. Trees allow for temperature reduction, removal of air pollutants, absorbance and production of volatile compounds, and reduced energy demands on buildings (Nowak, 2002).

The Environmental Impact of Waste on Air Quality

The environmental impact of wasted food contributes to poor air quality, as discarded food in landfills produces methane into the air (Hall et al., 2009). Five major pollutants in the air are measured by the Air Quality Index (AQI): ground-level ozone, particle pollution, carbon monoxide, nitrogen dioxide and sulfur dioxide (County of Los Angeles Department of Public Health [LADPH], 2014). The index is ranked on a scale of 0 to 500; the higher the number, the worse the pollution. Numerical values fall into six different categories, indicating level of health risk: good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy and hazardous. Los Angeles County is currently at 57 AQI, indicating moderate health risk. An hourly forecast and breakdown of numerical values is available for each major pollutant (AirNow, 2014).

Established Food Waste Management Programs

A review of current food waste management programs encompasses composting, city-wide commercial food waste recovery programs, transferring unused food to those who need it and the barriers to implementing a sustainable food waste management program.

Composting

Composting is a major form of food waste management, for it enables the breakdown of organic materials (i.e., food waste) for use in improving soil. Furthermore, it allows for food to naturally break down without methane production with the majority of emissions in carbon dioxide form. Composting is a waste alternative solution that produces less GHGs than landfilling (Lou & Nair, 2009).

Currently, Los Angeles County lacks a commercial-sized composting facility to accommodate large volumes of food waste. While there are options for composting at local urban gardens within the Los Angeles County area, many composting sites do not have transportation services to pick up compostable items from the public. Individuals seeking out composting services can bring items to compost; however, urban gardens do not have the capacity to accommodate a commercial-grade volume of compost. Alternative methods of composting are backyard composting, in-vessel composting systems and vermi-composting, otherwise known as worm-bin composting (CalRecycle, 2014).

Commercial Food Recovery in New York City

New York City's Commercial Food Waste Recovery Program arranges for the pick-up of ~1,040 tons of inedible food waste at commercial facilities and the donation of 135 tons of edible, leftover food to food recovery programs, such as City Harvest NYC. The excess, usable food is distributed to the hungry (Greer, 2012). Their findings include an illustrated report, breaking down commercial food waste contributors: 53% from restaurants and hotels, 20% from other foodservice establishments, 14% from retail food establishments, 9% from medical facilities, and 4% from colleges and universities. The biggest barriers to establishing this program are proximity of compost/sorting facilities to commercial pick-up locations and cost of transport, sorting and compost tipping fees. Tipping fees are charged whenever contents are dropped off at a waste facility, and are determined by the hauler.

In this case, the closest compost/sorting facilities to the New York City area are anywhere from 80 to 130 miles away. Considering the labor and fuel required to haul the

food waste back and forth, additional monetary resources must be allocated. The average cost of collecting and disposing commercial waste to a landfill is $103 to $160 per ton. The evaluated costs of landfilling versus composting food waste are comparable. After consideration for collecting, transporting, and disposing food waste, there are three possible options: (1) distribute all waste to a landfill (no sorting), ranging from $103 to $160; (2) compost waste via collection of all waste, sorted to remove food waste at a consolidated transfer station to 20 ton haul trucks for delivery to a composting site, ranging from $113 to $212 per ton; or (3) collection of food waste and delivered directly to the compost site, ranging from $115 to $233 per ton.

The lack of commercial composting sites available in and near the New York City area poses a significant barrier to reducing fuel and labor costs when composting waste. The city of New York is looking to establish food waste recovery centers in neighboring areas to reduce the traveling required for waste delivery to composting sites.

Commercial Food Recovery in San Diego, California

The food recovery program in San Diego, California "focuses on source reduction, diverting food for reuse and composting the remains to reduce food waste to landfills," (Carvalho, 2013). This food recovery program justifies the need to not only lessen environmental impact of landfilling and wasted natural resources, but also to feed the food insecure. Instead of sending unused food directly to the landfill, utilizing reusable food lessens costs for compost and landfill transportation and tipping, reduces methane emissions from landfilling, saves significant money and demand for more agricultural crop production, and provides food for those in need.

While the current food recovery program has 60 participants, scaled estimates for expansion propose a significantly influential initiative to compel additional foodservice operations and cities to participate in food recovery. With 15% of wasted food in San Diego still edible, an estimated 666 tons of food can be diverted to food banks, saving $14,652 in composting and landfilling tipping fees while saving landfill space and reducing methane production from landfilling. In addition, it can create over 1.1 million meals (at 1.2 pounds per meal), feeding approximately 2.5 meals to 448,000 individuals each, valued at $2,973,363 at $2.68 per meal (Carvalho, 2013). With major concerns about the additional costs of managing food waste properly, focusing on source reduction, improving management of food supply and utilizing all edible food in some way and avoiding the landfill can significantly reduce environmental impact and redistribute the food supply to those in need.

Commercial Food Recovery in Los Angeles County

Food Finders, a well-established food bank and food rescue program in Signal Hill since 1989, collects excess food from local restaurants, grocery stores, bakeries, produce markets, and other foodservice operations for distribution to the food insecure. A total of 161 agencies receive food donations from Food Finders, reaching the impoverished and needy of both Los Angeles County and Orange County. Food Finders sources excess food quickly with volunteers picking up donated food on a same-day basis. Due to the highly efficient process of picking up and distributing excess food, 39,000 meals are served, lessening food waste and the prevalence of food insecurity. Since established, approximately 108 million pounds of food has been rescued, serving 210 agencies and shelters in Southern California (Food Finders, 2014). While Food

Finders seeks to reduce waste by linking excess food with the food insecure, it does not address effective ways of managing spoiled food and food scraps from production and storage or material waste.

Summary

There are established food recovery programs within the United States with similar goals of reducing food waste in landfills and responsibly utilizing food resources to feed individuals; however, many of the current programs are in the beginning, trial stages. Many municipal governments have yet to establish a sustainable method of managing food and material waste. The major barriers of transportation, tipping and collection costs remain at the forefront of the issue. This curriculum focuses on establishing a sustainable, long-term solution for reducing food and material waste in landfills through composting and food recovery programs.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this directed project is to develop a sustainable food waste management curriculum to reduce waste in landfills and to alleviate food insecurity within Los Angeles County. The goals of this curriculum are to reduce food waste in landfills, thereby reducing GHGs from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and needy in Los Angeles County. These changes also lessen the environmental impact of producing, harvesting and transporting unconsumed and wasted excess food.

Prospective Participants

This sustainable waste management curriculum will be designed for all types of foodservice operations, including restaurants, commercial, and non-commercial foodservice operations. This target demographic is in need of a sustainable waste management program due to the significant volume of waste generated on a daily basis (Greer, 2012). The curriculum will be adapted to specific foodservice operations according to their specific services and needs. While this program is tailored towards foodservice operations in the Los Angeles County area, it can potentially be implemented in other areas around the country.

Curriculum Development

This curriculum will be developed in three phases. The first phase will include a literature review of the prevalence of food insecurity and food waste, current environmental conditions of oceans, landfills, forests and air quality as a result of poorly managed waste, and established food waste management programs in Los Angeles County. In the second phase, the researcher will identify the necessary components for establishing a sustainable waste management program. Specific food recovery programs and composting techniques will provide ideas for diverting food waste. During the last phase, the comprehensive sustainable food waste management program will include reference materials to aid in implementing this program.

Curriculum Design

Food Waste Management Curriculum

This curriculum is intended for foodservice operations to implement into company protocol as a routine method for diverting food waste from landfills, saving money, and feeding the food insecure. It is built upon current food waste recovery programs, such as New York City's Commercial Food Waste Recovery Program (Greer, 2012), San Diego's Food Recovery Program (Carvalho, 2013) and Los Angeles County's food distribution program, Food Finders (Food Finders, 2014). The focus of the curriculum is to provide a long-term, sustainable solution for foodservice operations and suppliers.

Curriculum Structure

This research-based curriculum partly models after current food waste management programs with similar waste diversion techniques. If appropriate, the

researcher will request permission to utilize some of the implemented waste diversion techniques, like composting and setting up food donation procedures.

The curriculum will be implemented as two training sessions with three topics each, which can be taught in one day. Each session will include a background on an environmental issue, complemented by a module on corresponding solutions. The curriculum can be given to foodservice managers/operation representatives to implement in their facility, which would relay applicable components of the curriculum to the operational staff. Ideally, each session would have no more than thirty individuals at a time. Following the teaching sessions, the individuals will break up into smaller groups of five. The foodservice managers/operation representatives will discuss their thoughts and observations on the discussed issues, the barriers to implementing the proposed solutions, and other suggestions. To conclude each session, every group will have a representative share their conclusions about the issue and provide at least one critique and one solution for improvement. The discussion allows each individual to share their preferences in the proposed changes, motivating them to remain proactive and involved throughout the curriculum implementation. Following the completion of the curriculum, participants will receive a certificate of completion and materials for implementing the curriculum at their facility.

Curriculum Topics

The six curriculum topics to be covered are as follows:

1. Introduction to the Prevalence of Waste
2. Impact of Waste on the Environment
3. Proactive Steps to Reduce Waste

4. Reusing and Repurposing Ingredients
5. Food Recovery: Skip the Trash, Feed Someone Fast!
6. Avoiding Landfills with Composting and Recycling Techniques

Evaluation Tools

An evaluation tool will be included in the curriculum to measure the effectiveness and accomplishments of the program. The evaluation tools that will be used for assessing the overall effectiveness of the curriculum will include: (a) a form that assesses the participant's knowledge, attitudes, and beliefs on proper food waste management techniques prior to and after receiving the curriculum training and (b) a survey form that evaluates the presentation speaker, content, and visual aids. Evaluation tools A and B will be administered to participants immediately after the curriculum training is complete and returned to the presenter.

Procedures

Upon agreement between the researcher and the foodservice operation authorities, the curriculum will be taught to the foodservice managers/operation representatives. The sessions will be given offsite and categorized by facility type, i.e., restaurant operations, hospitals, schools, etc. Each session will be given in its entirety, but the delivery of the curriculum can be spread over one or two trainings. The teaching and discussion components will be a part of each training module. At the end of the curriculum, the sustainable food waste management program will be implemented at their facility.

Throughout the literature on food waste management programs, each one incorporates a food recovery program and waste diversion techniques, like donating food and composting. Not only do food recovery programs make use of excess prepared food,

but also reach the hungry and food insecure in local communities (Carvalho, 2013). Moreover, when composting food scraps, it diverts food waste from landfills and reduces the amount of carbon methane emissions released into the air (Lou & Nair, 2009).

The evaluation component will be designed to assess the effectiveness and accomplishments of the program through a survey and comparison of waste data. By evaluating the participant's knowledge, attitude, and beliefs on waste management prior to and after the curriculum implementation, it will provide insight into whether the discussions and teaching methods are appropriate for the target audience. Because facilities will implement the curriculum at a varied pace, the researcher will not evaluate the post implementation results within the realm of this project. Future projects can evaluate the post implementation results and data pertaining to changes in landfill waste and financial spending for tangible intervention markers.

CHAPTER 4

RESULTS

Introduction

The purpose of this directed project was to develop a sustainable food waste management curriculum to reduce waste in landfills and to alleviate food insecurity within Los Angeles County. The goals of this curriculum were to reduce food waste in landfills, thereby reducing GHGs from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and needy in Los Angeles County. These changes also lessen the environmental impact of producing, harvesting and transporting unconsumed and wasted excess food.

Meeting the Objectives of the Project

Five main objectives were stated at the beginning of this project:

1. Conduct a literature review regarding current environment conditions of the ocean, landfills, forests, and air quality along with established food waste management programs;

2. Create a curriculum in a format that will benefit foodservice operations while adhering to government regulations for excess food distribution and minimizing food waste;

3. Support foodservice operations in reducing food and material waste to landfills by linking excess food to the food insecure;

4. Promote an environmentally-conscious and mindful approach to food usage and waste along with material disposal techniques;

5. Evaluate the curriculum materials and delivery of presentation.

These five objectives were accomplished with completion of this directed project.

Addressing Current Issues and Perceived Barriers

During the literature review, the significant amount of food and material waste in landfills was shown to negatively impact the environment, including valuable natural resources— the ocean, forests, and air quality. Overall, landfilling was used as the primary form of waste disposal. Furthermore, perceived barriers that prevent the implementation of a sustainable food waste management program were identified as: (1) interest of staff involved, (2) composting locations, (3) transportation and tipping fees, and (4) ability to maintain the program long term (Greer, 2012). Addressing these challenges was important for the development of this sustainable food waste management program.

Interest of Staff Involved

Prior to the curriculum implementation, each participant is given a survey to assess their knowledge, attitude, and beliefs on waste management. At the completion of the curriculum, the same questionnaire is given to reevaluate their opinions (see Appendix for sample questionnaire).

Each training module is accompanied by a focus group session in which participants can discuss their thoughts, observations, concerns, and perceived barriers to the proposed changes. A representative from each small group may share their group's collaborative findings and present at least one critique and one proposed solution for any

perceived issues. The focus group component allows participants to contribute additional ideas to the class. Additional learning tools were included to engage the participants, such as video clips and forming new recipe ideas with leftover food.

Composting Locations

Throughout the literature review, foodservice operations wanted to divert food from landfills, but lacked accessibility to composting facilities. This curriculum focused on linking local foodservice operations with the resources to better manage food waste. While locating a composting site was a challenge for many new waste management programs, opportunities were available in Los Angeles on a smaller scale. Food waste programs in New York City struggled to find an accessible composting location less than fifty miles away suited to divert food waste from all the hotels in New York City (Greer, 2012). For the purposes of this curriculum, each individual foodservice operation's food waste may be managed locally— utilizing composting opportunities at urban farms until the development of a city-wide composting facility. In addition, this curriculum encompassed other food waste diversion methods to minimize the amount of composted food.

Transportation and Tipping Fees

Depending on the amount of compost generated from food waste, the costs for transportation and tipping fees may differ. The foodservice operations participating in this program have the potential for a smaller amount of food scraps after donating leftovers to food recovery programs and food banks; therefore, requiring smaller transportation and tipping fees. Since local landfills include both fees, the reduction of food and material waste as a result of the program can significantly reduce the amount of

money spent on landfilling. The cost of composting may primarily be from transportation to the local urban farms, without any tipping fees (see Appendix for listing of urban farms within Los Angeles County).

Maintaining Long-term Implementation

Because this curriculum invested in educating the foodservice managers/operation representatives, the intention of the implementation was for the long haul. The focus groups encourage participants to share their own ideas for improvement, which facilitates an interactive approach to the issues. The training modules may also educate participants on the need for change, empowering them to be proactive at their facility. In addition, the program addresses the general needs and concerns of foodservice operations, while equipping each facility with hands-on, specific methods of implementing sustainable practices.

Creating the Curriculum

Each training module incorporated different examples and solutions geared towards foodservice operations, relevant and applicable for a variety of foodservice operations. The curriculum was developed to meet the guidelines and protocol required by the California Health and Safety Code. Composting, recycling, and rubbish service locations were assigned based on the facility's location.

The curriculum format was designed to reach the foodservice managers/operation representatives attending the training at an offsite facility. The standard format included a PowerPoint presentation with educational material on the slides. Each participant will receive handout materials electronically to minimize paper usage. Double-sided printouts were given at the request of participants.

Each training session begins with an educational background on the waste management issue at hand, complemented by a module on corresponding solutions. The session is followed by a focus group session where participants may discuss their thoughts, concerns, and additional suggestions for improvement. Each session also includes either electronic or printed PowerPoint slides for later reference and reinforcement, along with a record of their personal suggestions and goals for improvement. At the end of each session, each participant was given an evaluation form to rate: (1) the class material and presentation, (2) changes in their knowledge of waste management, and (3) motivation levels to make behavior changes.

Six key education topics were identified in the literature review, including: (1) Introduction to the Prevalence of Waste, (2) Impact of Waste on the Environment, (3) Proactive Steps to Reduce Waste, (4) Reusing and Repurposing Ingredients, (5) Food Recovery Opportunities, and (6) Avoiding Landfills with Composting and Recycling Techniques. These core curricula topics were determined as the foundation for implementing an effective sustainable food waste management program.

Session One: Introduction to the Prevalence of Waste

In this first session, participants fill out a questionnaire to assess their knowledge and current waste management practices. The instructor presents a PowerPoint lecture, providing background information on the prevalence of food and material waste in the United States and common disposal methods. The lecture is followed by a video clip from MSNBC: "America's Food Waste Problem." pertaining to the topic. Participants are asked to reflect on the video's content and their facility's current practices, such as the origin of waste and disposal methods. Each participant will share at least one origin

of waste and disposal method at the facility. Further reflection on how participants perceive the impact of food waste is also discussed. See Appendix for Session One.

Session Two: Impact of Waste on the Environment

In this second session, participants will gain an understanding of the importance of natural resources, specifically the ocean, trees, and air quality. Participants are informed on how common waste practices negatively impact natural resources and the harmful consequences. Part two of MSNBC's "America's Waste Problem" is shown to participants, followed by an open discussion, encouraging participants to critically evaluate their facility's practices and possible alternatives. After, participants from each group may contribute further solutions and resources for improving waste management practices and habits to the class. See Appendix for Session Two.

Session Three: Proactive Steps to Reduce Waste

In this third session, participants are introduced to frequent sources of waste within foodservice operations and ways of reducing facility waste, inventory management, and water conservation. The brainstorm of tangible solutions and ideas allows participants to create alternatives for their facility's specific needs. Then, participants discuss ways to incorporate new ideas at their facility along with perceived barriers to implementation during a guided group discussion. See Appendix for Session Three.

Session Four: Reusing and Repurposing Ingredients

In this fourth session, the focus is on production waste management through menu planning and standardizing recipes. Participants are informed on the value of food and ingredients, along with proper ways to utilize, reuse, and repurpose ingredients in

compliance with the California Retail Food Code, an excerpt from the California Health and Safety Code. Following the lecture, time is given to participants to reflect on common sources of leftovers at their facility and more sustainable alternatives. Participants are given a list of leftover food and are encouraged to create new recipe ideas for repurposing the items. Further discussion on meeting California Retail Food Code regulations will follow. See Appendix for Session Four.

Session Five: Food Recovery: Skip the Trash, Feed Someone Fast!

In the fifth session, participants learn about opportunities to reduce food waste and alleviate food insecurity through food recovery. Participants are shown how leftover food can be utilized to feed the hungry and food insecure in their local community as an alternative to landfilling. Participants are encouraged to discuss potential barriers and concerns about this method of reducing waste with the group during a guided group discussion. See Appendix for Session Five.

Session Six: Avoiding Landfills with Composting and Recycling

In the sixth session, participants learn about alternative methods of waste disposal with a lower environmental impact. The concepts of composting and recycling in place of landfilling are discussed, along with how to responsibly dispose of food and material waste. Participants are encouraged to discuss their facility's current waste disposal methods and the potential challenges with implementing alternative methods during a guided group discussion. See Appendix for Session Six.

Program Review

The committee, consisting of three faculty members from California State University, Long Beach, reviewed this curriculum and provided feedback and

suggestions on ways to improve it. The curriculum was evaluated on its applicability to its target audience, relevance of content material, overall appearance, and ease of use. Main areas of feedback were based on the slide content, as reducing the number of words on the PowerPoint slides would prevent the presenter from reading off the slide during the training. In addition, incorporating a more directed activity during discussion periods was encouraged.

Applicable changes were made to the curriculum based on the committee's feedback. Specifically, slides with smaller font and higher word count were distributed across multiple slides where appropriate. The curriculum included both slides and notes for the presenter to reference. The slide content was also minimized by moving elaborative details from the slide itself to the notes section. The guided activities were altered to facilitate discussion in which participants engage in a reflective discussion for enhanced interaction with the group. Specifically, video clips were incorporated to add an interactive activity. Participants will also be given a scenario with leftover food to safely repurpose instead of throwing away. Overall, the committee confirmed that the sustainable food waste management curriculum was appropriate for its target audience, provided relevant content material and was easy to navigate through; therefore, would be appropriate for future use in foodservice operation based trainings.

CHAPTER 5

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

Introduction

The purpose of this directed project was to develop a sustainable food waste management curriculum to reduce waste in landfills and to alleviate food insecurity within Los Angeles County. The goals of this curriculum were to reduce food waste in landfills, thereby reducing GHGs from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and needy in Los Angeles County. These changes also lessen the environmental impact of producing, harvesting and transporting unconsumed and wasted excess food.

Program Challenges

A significant barrier to long term, sustainable food waste management is the lack of commercial-sized composting sites and transportation services local to the Los Angeles County area. Without large composting sites, compost accessibility is limited to the number of urban farms or community gardens in the area. Most small scale farms and community gardens lack the capacity to manage and utilize large amounts of compost. As this curriculum training expands to more foodservice operations, composting facilities must grow simultaneously to meet the demand. Another challenge lies in coordinating the storage of compostable materials at each respective facility in between pick-ups. Each facility must order a sealed compost container to prevent

developing odors or rodents. In addition, with the major changes in waste disposal techniques, consistent behavioral change and compliance from staff can be challenging.

Program Evaluation

In order to evaluate the efficacy of the sustainable food waste management curriculum, three evaluations were made and would be distributed to participants. The 6 modules are divided into two blocks, each with a pre-session and post-session questionnaire to evaluate the participant's knowledge and understanding of the topic before and after the training. An evaluation to examine the effectiveness of the curriculum was also included for distribution to participants at the end of the training. Feedback received can aid in improving future projects building upon this curriculum.

Recommendations for Future Research

Because food insecurity is an ongoing public health concern in the United States, further research on how to effectively reach the food insecure is recommended (Garrone, Melancini, & Perego, 2014). Additionally, developing ways of incorporating recycled materials into products used at foodservice operations can not only reduce waste, but allow staff members to see a product of their sustainable waste management practices.

Recommendations for building upon this curriculum can include: #3$establishing long-term contracts between foodservice operations, food recovery programs, and local soup kitchens and advocacy for composting facilities in Los Angeles County. Advocating for the development of a city-wide composting facility to accommodate larger volumes of compost can address the barrier to composting accessibility in Los Angeles County.

Committee members provided their feedback on the curriculum and suggested incorporating more activities throughout the curriculum for improved participant engagement. Additional ideas to explore include: visiting a city-wide waste facility with recycling services or touring a facility that has implemented the curriculum as a model example.

Summary

This curriculum for a sustainable food waste management program addressed the current and recurring issues of wasted food and material resources going to landfills. The immediate and long-term effects of these wasted resources documented in the literature must be addressed, for the impact on natural resources, the environment, and GHGs have already experienced detrimental effects (Lou & Nair, 2009). Primary solutions were implemented in the curriculum to address these issues. This curriculum provides an opportunity for foodservice operations to responsibly utilize their food and material resources while minimizing waste output to landfills. The practical and realistic sessions can equip facilities to revamp their waste management procedures.

APPENDICES

APPENDIX A

INTRODUCTION AND CURRICULUM POWERPOINT

A sustainable food waste management program

for foodservice operations

Photo by: UrbanEcoDevelopment.com

Developed by

Courtney Dair

Department of Family and Consumer Sciences

California State University, Long Beach

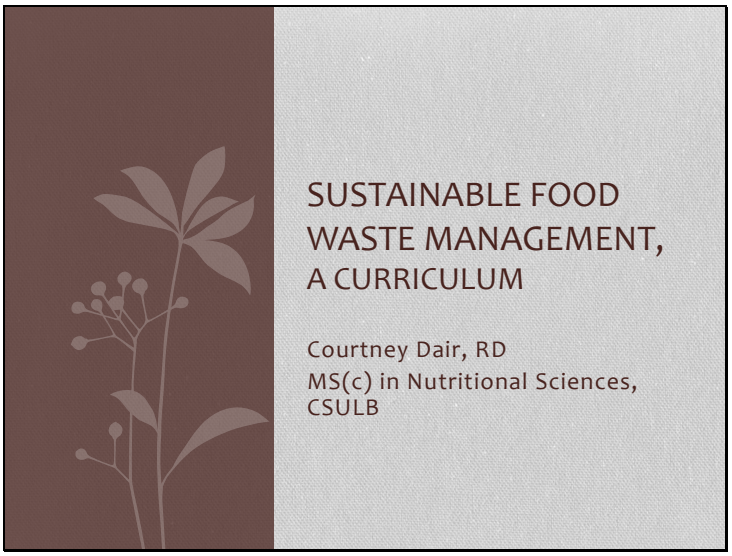
Table of Contents

Appendices:

Orientation to the Curriculum

This Sustainable Waste Management Curriculum is intended for foodservice operation managers or supervisors for implementation at their respective facilities. The curriculum is presented in a classroom setting, equipped with a PowerPoint lecture presentation and handout materials for note taking. The presentation contains six modules, broken up into two blocks with one lunch break in between. Participants will learn about a topic related to sustainable waste management, then break off into focus groups of 2-3 for interactive activities and discussions facilitated by the instructor. The class will then corporately discuss the focus group findings for further class discussion. Three sets of evaluations will be distributed throughout the course: (1) Pre-Test, (2) Post Test, and (3) Curriculum Training and Content Evaluation.

Slide 1

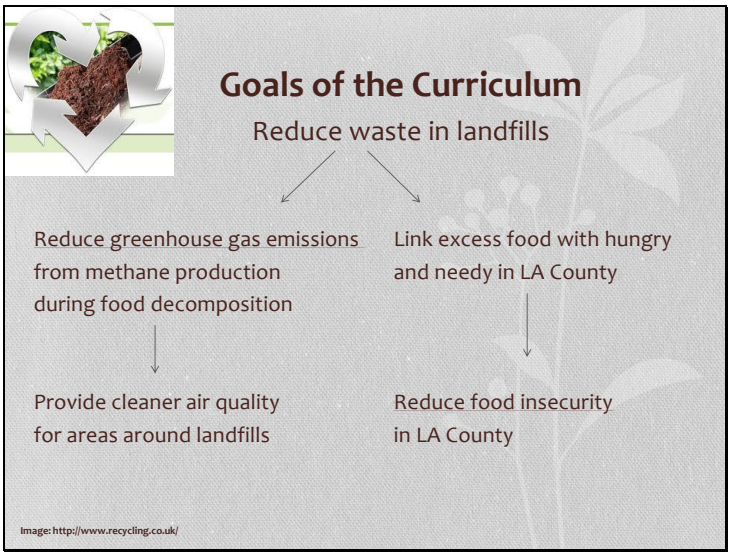


***Distribute Pre-Test to evaluate participant's knowledge prior to training.**

Purpose of the Curriculum

- Reduce waste in landfills
- Alleviate food insecurity in Los Angeles County

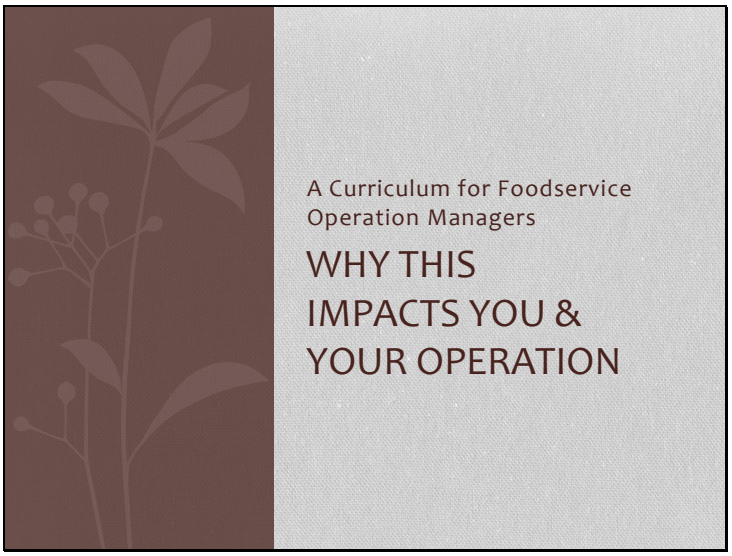
Slide 2



Introduction:
The goals of this curriculum are to reduce food waste in landfills, thereby reducing GHGs from methane production during food decomposition and providing cleaner air quality for areas around landfills, and to link excess food with the hungry and food insecure in Los Angeles County. These changes also lessen the environmental impact of producing, harvesting and transporting unconsumed and wasted excess food.

Image: http://www.recycling.co.uk/

Slide 3



Why it's important and relevant

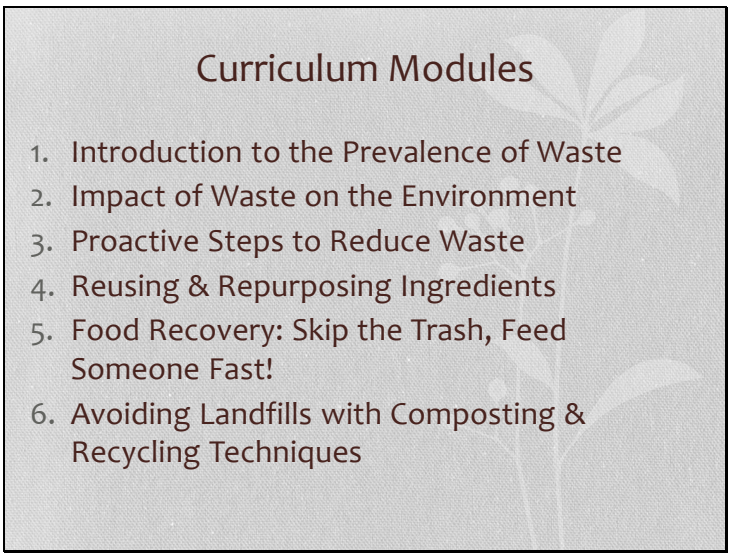
There is a need for a long-term, sustainable food waste management solution to:

- Minimize food waste
- Responsibly manage food resources
- Properly divert excess food and food scraps to landfills

According to the United Nations, the growing, global population is anticipated to reach 9.3 billion inhabitants by 2050. In order to adequately feed and nourish the global population, one must reconsider current food waste management practices and look to redistribute food to areas in need.

Incorporating ways for local foodservice operations to better utilize their resources, distribute excess food, and sustainably dispose of food can reduce environmental hardship, use less resources and alleviate food insecurity.

Slide 4



Today we will be going through 6 key topics that will provide information and insight into implementing a sustainable food waste management program at your facility.

Slide 5

State Curriculum Objectives.

Image: http://www.zazzle.com/love_care_for_the_earth_classic_round_sticker-217580613692749710

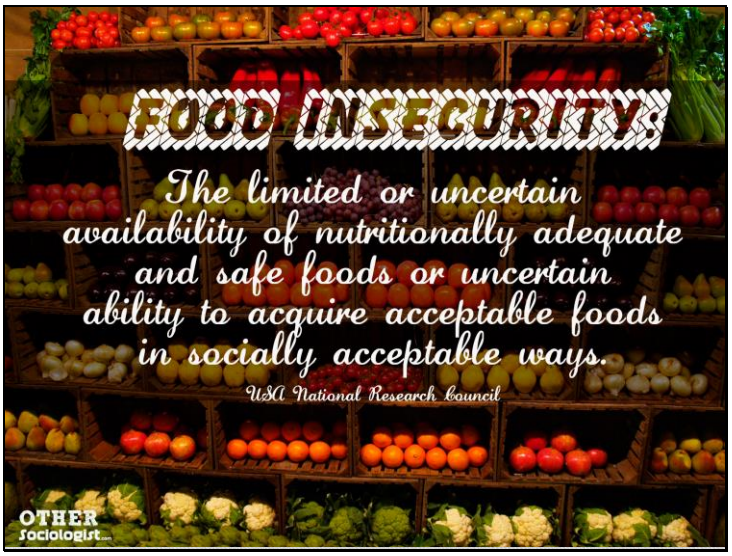
Slide 6

Introduction:
Today's curriculum addresses 2 major over-arching themes: sustainability and food insecurity.
In my literature review of past and current food waste management programs, the most significant barrier was creating a *sustainable* one for the long haul.

<u>Sustainability</u>
What do I mean by sustainable? [read definition] We are addressing ways to utilize and properly dispose of excess food and materials in order to lessen our negative impact on the environment. This does not just mean finding ways to recycle more bottles and cans. Sustainable, on-going.

Image: http://7-themes.com/6986358-grass-background.html

Slide 7



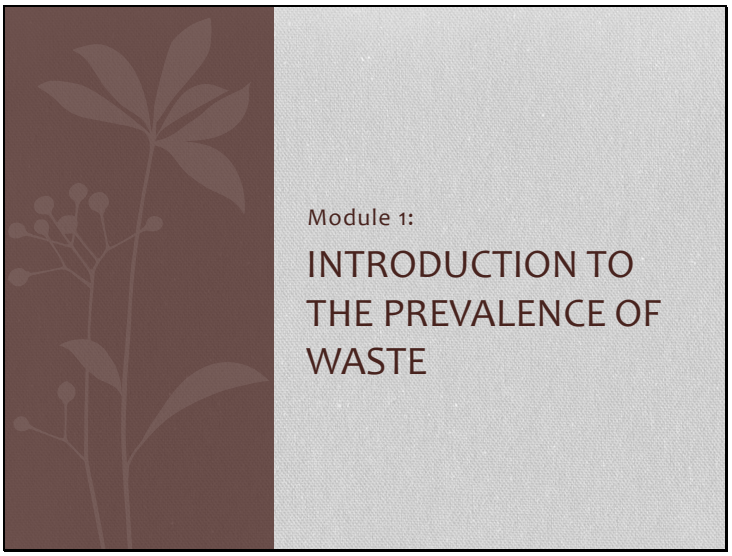
The second over-arching theme of this curriculum is food insecurity.

Food Insecurity

- While the US is ranked as the most globally food secure country in the world, 14.5% of the US population is food insecure— approximately 17.6 million households (Global Food Security Index, 2014).
- Of the 49 million Americans living in food insecure households, 33.1 million are adults and 15.9 million are children (Feeding America, 2012).
- While food insecurity is often associated with specific neighborhoods or cities across the nation, unemployment tends to be a stronger predictor of food insecurity than poverty (Feeding America, 2012).

Image: http://othersociologist.com/2014/01/26/sociology-of-diabetes/

Slide 8



Introduction:
In our first module, we will be learning about the prevalence of waste in the US.

Slide 9

Valuing our resources and making use of what we have without overconsumption is key for managing food waste!

30 to 50% of food produced globally is NOT CONSUMED! There is a bountiful amount of food, but it is not reaching those who need it most. Managing food waste is a major solution to alleviating food insecurity.

<u>Ways to Decrease Food Waste & Minimize Food Insecurity:</u>

—Making use of ingredients and food is one of the best ways to alleviate food insecurity. By incorporating ingredients throughout the week into multiple meals and snacks, you can stretch out the ingredients to last longer.

—Proper storage of food can also help lengthen shelf life. (i.e., putting sliced bread & produce in refrigerator; freezing meats until ready to use, etc.)

—Giving food away if you will not use it → allowing someone else to make use

<u>Transition</u>: It's common to view wasted food as leftover scraps or unappetizing food. On the contrary, the most wasted foods are from food groups that the food insecure lacks the most (Buzby & Hyman, 2012).

Foley, J. (2014). A five-step plan to feed the world. *National Geographic Magazine.* May 2014
National Geographic Food Forum: Exploring the Issues Behind Food Insecurity & Sustainability

Image: http://www.sustainableamerica.org/blog/a-new-nrdc-study-shows-that-america-wastes-40-of-its-food/

Slide 10

Top 3 most wasted food groups (Buzby & Hyman, 2012):

- Meat, fish & poultry
- Vegetables
- Dairy products

Dairy Image: https://www.sciencenews.org/blog/science-public/dairy-foods-may-cut-heart-attack-risk
Vegetables: http://followgreenliving.com/organic-vegetables-vs-non-organic-whats-difference/
MFP: https://www.couponcabin.com/meat-fish-poultry/coupons/

Slide 11

Although 16% of the US population struggles to nourish adequately on a regular basis, food waste continues to be the single largest component of municipal solid waste (Buzby & Hyman, 2012); however, there isn't a shortage of edible food. The unconsumed, wasted food is going to landfills instead of feeding and nourishing individuals.

How much food goes to a landfill?

- 1400 kcal per person worth of food waste is sent to a landfill annually.
- The wasted food = equivalent to $165 billion → negatively impacts consumer finances & environment.

Image: Justin Sullivan/Getty Images, http://globalnews.ca/news/833753/870-million-people-go-hungry-but-tonnes-of-food-wasted-a-year/

Slide 12

Introduction:
In a similar study investigating the reasons behind such alarming food waste rates, researchers found that fruits and vegetables, bread and pastries and dairy products are the most wasted food groups (Lebersorger & Schneider, 2014).

The top discarded food groups results in significant money losses: 53% from fruits and vegetables, 25% from breads and pastries, and 22% from dairy products. Research is showing that the most common reasons for discarding food are the 1) apparent flaws in the product and 2) date stamp. The discoloration of the food product is unappealing to the average consumer, as there may be something "wrong" with it. Furthermore, any non-uniformity in fruit tends to deter consumers from purchasing, as it is often viewed as a sub-par produce item. The "best by" date stamps listed on dairy and bread products are the greatest factors contributing to significant dairy and bread product waste.

Image: http://www.pomona.edu/administration/dining/health-wellness/macronutrients.aspx

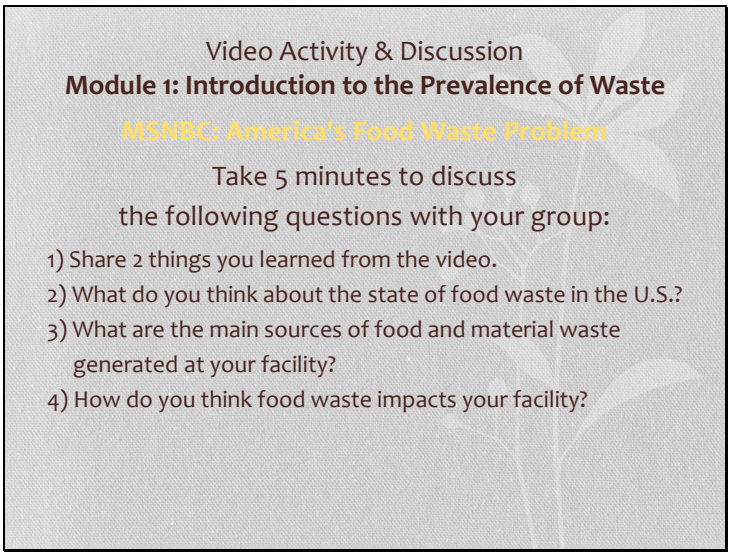
Slide 13

Introduction:
Food waste significantly impacts foodservice operations since wasted food results in wasted money. The money spent on food and labor costs does not fulfill its intended purpose.
The economic impact also causes unnecessary strain & demand on each area of food production & foodservice (Buzby et al., 2011).

The wasted food can be utilized to improve the health status of the food insecure, particularly the fruit, vegetable, grain and protein sources.

Image: Getty Images/http://blog.lifeinsurancethinktank.com/how-much-money-is-wasted-in-health-care-each-year/

Slide 14



Introduction:
We will be watching a video from MSNBC to further our discussion on the prevalence of waste. **[Video clip: 1:00 to 3:56]**

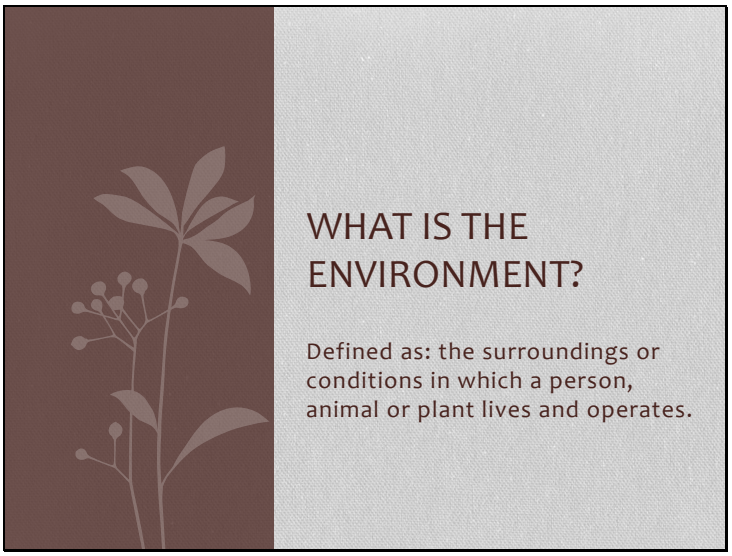
Please break up into groups of 2-3. Take 5 minutes to discuss your thoughts on the video using the questions stated above. Please be prepared to share an answer for any of the 4 questions above.

Video link: http://www.msnbc.com/politicsnation/watch/inside-americas-food-waste-problem-432503363759

Slide 15

Introduction:
Not only is food waste wasteful in general, it also negatively impacts the environment. Here we will explore how food and material waste impact the environment we live in.

Slide 16

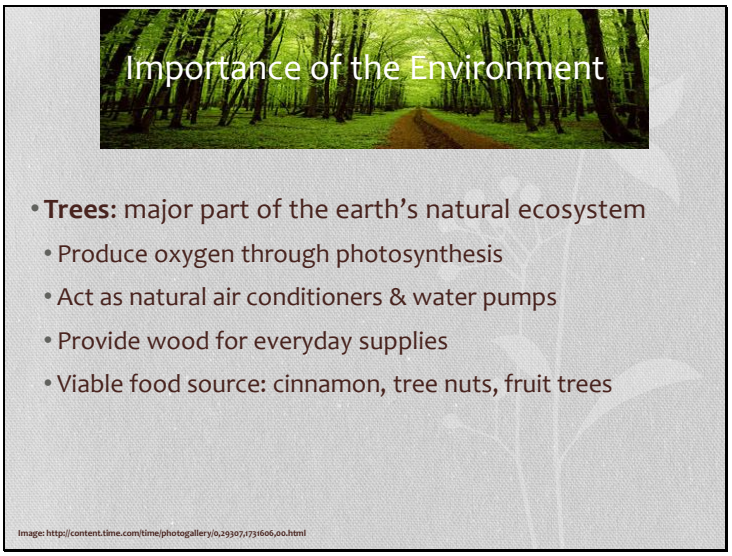


Introduction:
When you think about the environment, what comes to mind?
—Trees, air quality, plants, animals, smog

Definition:
http://www.oxforddictionaries.com/us/definition/american_english/environment

Transition: We will briefly explore 2 important aspects of the environment to fully understand why sustainable waste management is needed.

Slide 17



Trees are all around, yet we often take them for granted. Not only do they provide shade when looking for a cool spot to park your car, but they also contribute in many other ways.

<u>Trees</u>

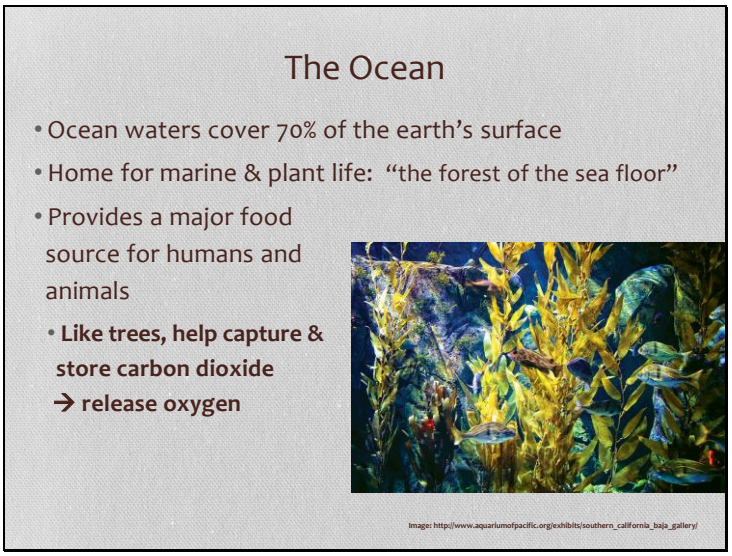
- Unlike humans, trees breathe in carbon dioxide and produce oxygen (absorb CO2) → providing the air humans need for survival
- Cleans the air— making it more breathable for humans and animals
- Keeps the earth cool by providing shade
- Recycling water: trees absorb water from the soil as nourishment → held in the leaves and upon receiving sunshine, water is released into the atmosphere with heat (evaporation, like air-drying) → sun removes energy from earth's surface → water collects into clouds until heavy rainfall
- Provides wood for every day supplies: paper, pencils, books, firewood

http://www.ecokids.ca/pub/eco_info/topics/forests/benefits_of_trees.cfm
Image: http://content.time.com/time/photogallery/0,29307,1731606,00.html

Tree Nuts: walnuts, almonds, cashews, macadamia nuts, coconut, brazil nuts, pecans **(NOT peanuts→ considered a legume)**
http://www.foodallergy.org/allergens/tree-nut-allergy

Fruit Trees: apples, peaches, cherries, coconuts, pears

Slide 18



The ocean is another huge aspect of the environment that we often take for granted.

- Home for marine & plant life: Fish, coral reef, ocean plants, dolphins, sharks
- "Forest of the Seafloor" : kelp, plankton, seagrass (ocean plants)
- Major food sources from: Salmon, tuna, crab, oysters
- Natural "carbon sink" by capturing ¼ of the CO2 humans release into the air
- Photosynthesis of plankton allows for oxygen release

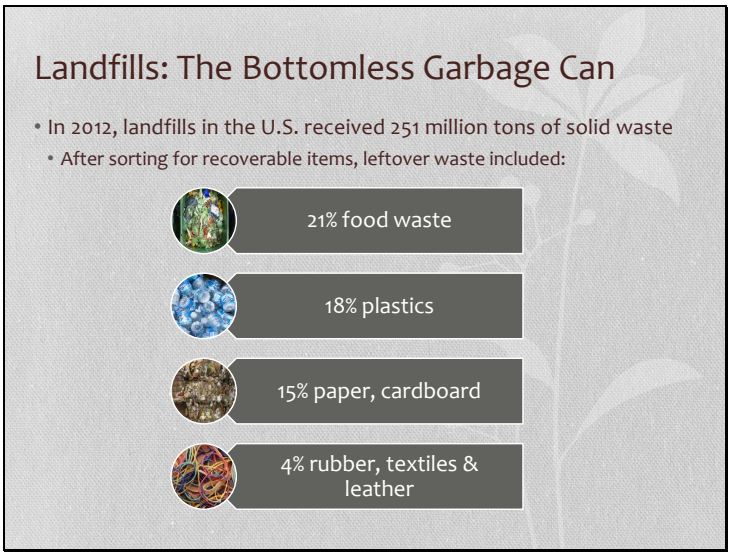
http://www.ecokids.ca/pub/eco_info/topics/oceans/index.cfm
http://www.biologicaldiversity.org/programs/oceans/index.html
Image: http://www.aquariumofpacific.org/exhibits/southern_california_baja_gallery/

Slide 19

The environmental impact of wasted food, excessive material use & lack of proper recycling and composting contribute to overflowing landfills, a plastic-filled ocean, deforestation and impaired air quality.

Image1: http://usgreentechnology.com/world-green-news/page/8/
Image2: www.greensteve.com
Image3: http://www.dailymail.co.uk/news/article-2041107/Californian-cities-revealed-Americas-smoggiest-dangerous-levels-air-pollution.html

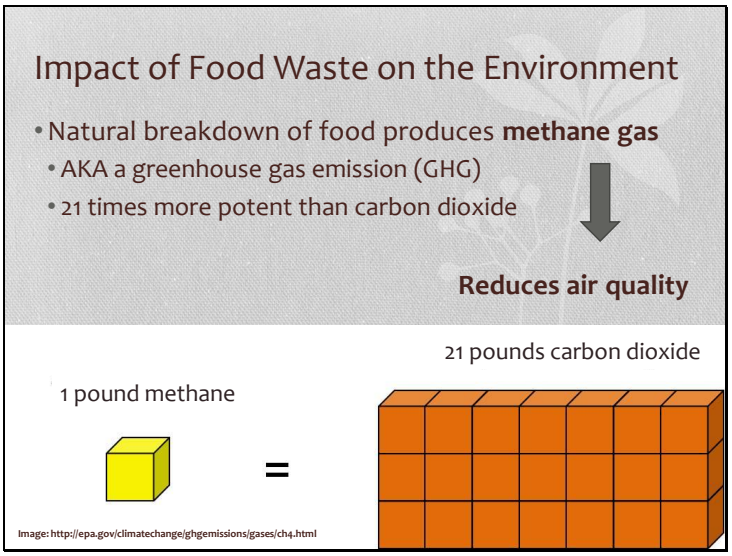
Slide 20



Introduction:
Landfills are a storage place for waste housed in neighborhood cities (EPA, 2012). While this curriculum mainly focuses on food waste, materials such as: plastics, paper/paperboard, aluminum cans, and glass jars are also common forms of waste in foodservice operations.

Important to note that plastics, paper and cardboard are regularly accepted recyclable items. Textiles are recyclable through special recycling programs in select areas.

Slide 21



Introduction:
Although food waste breaks down naturally, it does not breakdown without negative consequences. While food waste is inevitable, wasted food dumped straight into a landfill can be reduced significantly through food recovery and composting, which are discussed later.

The comparison of GHGs is illustrated above. The drastic gravity of methane emissions is concerning and further shows the need for sustainable, less harmful methods of food waste management.

Image: http://epa.gov/climatechange/ghgemissions/gases/ch4.html

Slide 22

Introduction:
Where do we use plastic? What are some plastic products you use?
—A commonly used material, it can be seen in forms of: grocery bags, food packaging: dairy tubs, juice containers, straws, pens, bottles, etc.

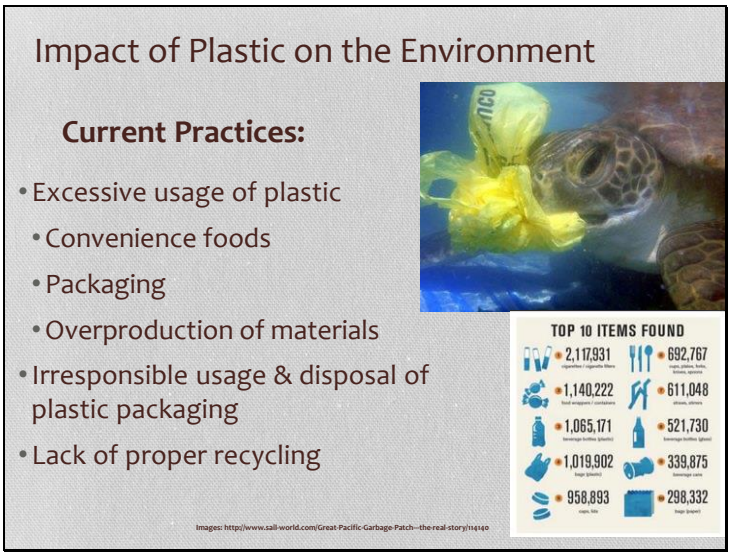
- All plastic is made of carbon. Man-made plastic uses carbon derived from oil, while biopolymers or bioplastics use carbon derived from natural materials.

- Petroleum is another name for crude oil, an unprocessed oil that comes from the ground. It is considered a fossil fuel since it is made naturally from decaying plants and animals living in the sea in ancient times.
- Hydrocarbons in crude oil provide large source of energy → ideal base for gasoline, diesel fuel, etc.

- Because plastic doesn't react chemically with most other substances, it doesn't decay or breakdown naturally.

http://plastics.americanchemistry.com/Plastics-FAQs
http://science.howstuffworks.com/plastic.htm

Slide 23

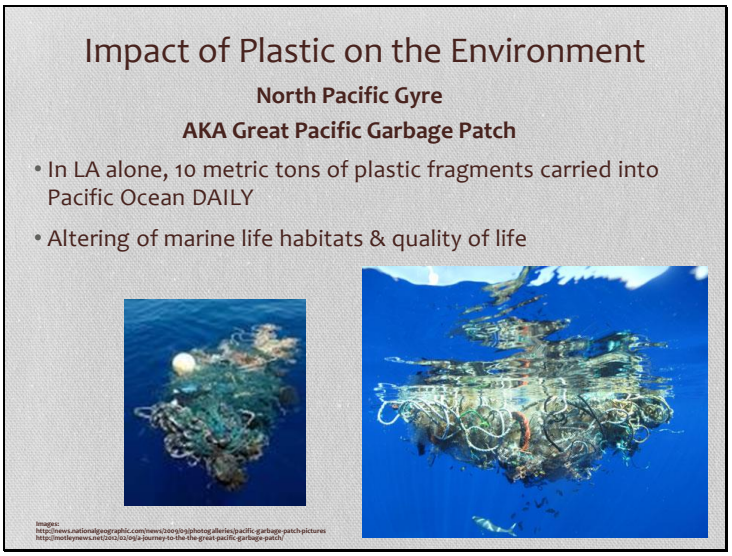


Introduction:
Why would plastic cause issues for the environment? Why is the ocean affected by plastic?
Ocean pollution happens d/t: garbage starts on land → blown by wind → ends up in ocean and stays there

What are they finding? [Discuss top 10 items found]

Scripps Institute of Oceanography, UCSD: https://scripps.ucsd.edu/news/1847
Image: http://www.sail-world.com/Great-Pacific-Garbage-Patch-the-real-story/114140

Slide 24



Introduction:
As a result of current practices, a significant amount of trash is ending up in the ocean. Over time, the amount of trash has accumulated into a literal floating island of trash, otherwise known as the Great Pacific Garbage Patch. The North Pacific Gyre/Great Pacific Garbage Patch is 2x the size of Texas & growing with more garbage (mostly plastic).

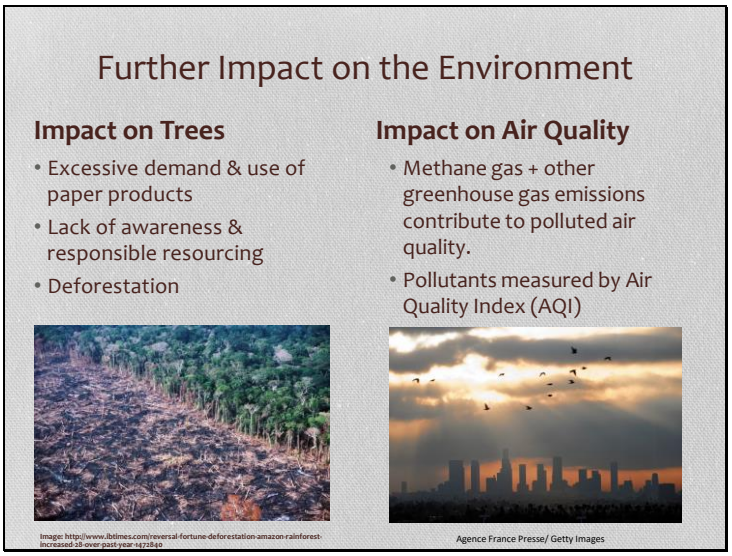
- An accumulation of garbage in the middle of the Pacific Ocean.
- It circles endlessly about 1,000 miles off the coast of CA http://latimesblogs.latimes.com/lanow/2012/06/great-pacific-garbage-patch-tsunami-debris.html

Scripps Environmental Accumulation of Plastic Expedition examined the GP Garbage Patch:

- Amount of trash increased 100x over past 40 years leading to changes in marine habitats
- 9% of all fish collected in the study had plastic in their stomachs North Pacific region fish ingest ~ 12,000-24,000 tons of plastic annually

Image of Great Pacific Garbage Patch:
http://news.nationalgeographic.com/news/2009/09/photogalleries/pacific-garbage-patch-pictures/
Image: http://motleynews.net/2012/02/09/a-journey-to-the-the-great-pacific-garbage-patch/

Slide 25



Introduction:
Furthermore, trees and air quality are significantly impacted by excessive waste.

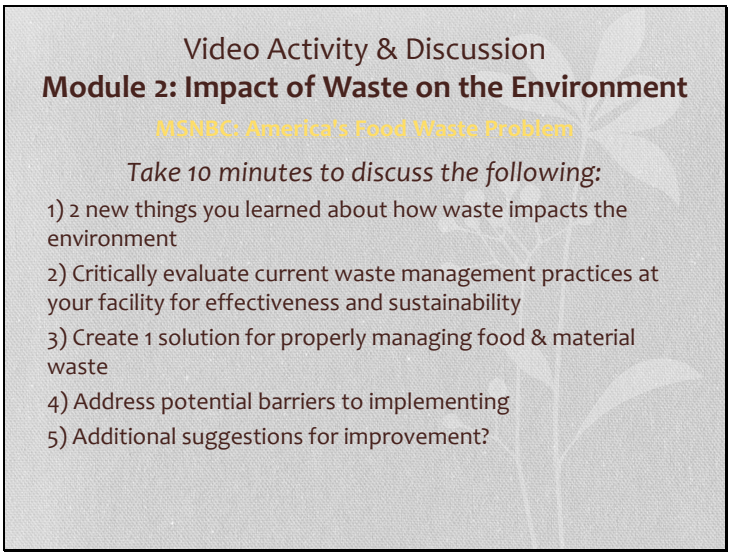
Trees:
The excessive demand and use of paper products puts harsh demands on tree resources. The irresponsible sourcing and lack of awareness contributes to long-term deforestation.

Air Quality:
The air quality is measured by the Air Quality Index (AQI): ground-level ozone, particle pollution, carbon monoxide, nitrogen dioxide and sulfur dioxide (LADPH, 2014). The methane gas and other GHGs contribute to polluted air quality. The index is ranked from 0 to 500; the higher the number, the worse the pollution. Numerical values fall into six different categories, indicating level of health risk: good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy and hazardous. Los Angeles County is currently at 57 AQI, indicating moderate health risk.

Responsible resourcing: With the excessive demand for paper materials, not all paper products are sustainably sourced. As pictured above, deforestation often occurs as a result of increased demand without consideration for available resources.

Deforestation Image: http://www.ibtimes.com/reversal-fortune-deforestation-amazon-rainforest-increased-28-over-past-year-1472840
Air Pollution Image: Agence France Presse/Getty Images;

Slide 26

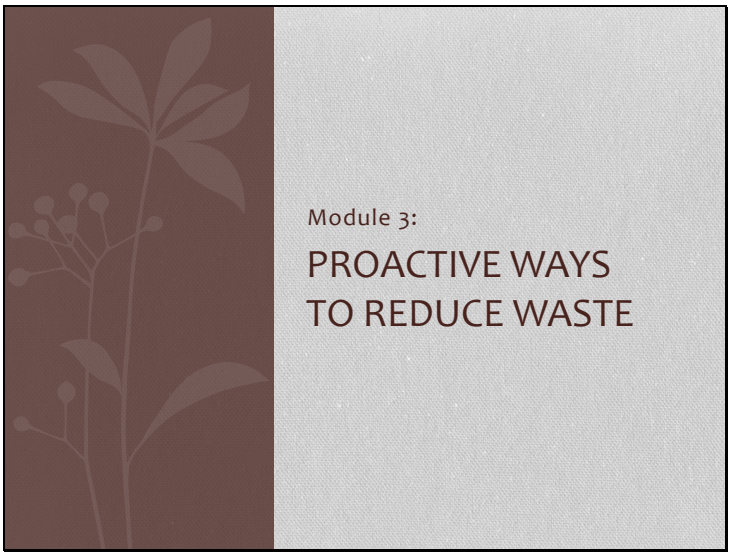


Introduction:
We will be watching a video from MSNBC to further our discussion on the impact of waste on the environment. **[Video clip: 4:00 to 5:17]**

Please break up into the same small groups as before. Take 10 minutes to discuss your thoughts on the video and module using the questions stated above. Please be prepared to share an answer for any of the 5 questions above.

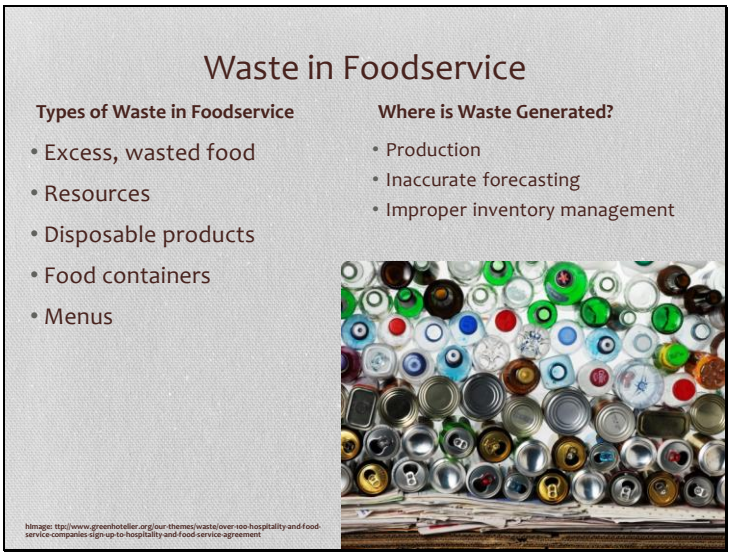
Video link: http://www.msnbc.com/politicsnation/watch/inside-americas-food-waste-problem-432503363759

Slide 27



Introduction:
Module 3 will discuss tangible ways to proactively reduce waste at your facility.

Slide 28



Introduction:

There are many sources of waste in a foodservice setting. It's inevitable to have some waste; however, it is important to responsibly manage the waste generated and reevaluate current practices for less wasteful solutions.

Here are a list of the items commonly found in the trash of a foodservice facility. These items are typically generated from production, inaccurate forecasting and improper inventory management.

- Excess, wasted food: Edible food, Food scraps
- Resources: Water
- Disposable products: Utensils, cups; Styrofoam
- Food containers: Cans & Boxes
- Menus: Paper menus/orders

Image: http://www.greenhotelier.org/our-themes/waste/over-100-hospitality-and-food-service-companies-sign-up-to-hospitality-and-food-service-agreement/

Slide 29

Introduction:

The first step to reducing waste is to use less and refrain from excessive product demand. While it is important to ensure adequate food and materials for unpredictable demand, note that the excess food and material product purchased requires extra funding. If the food and materials are not needed or will not be used, the money will be wasted.

- Less food & material demand, less $$ spent!
- Maximize current inventory

Reusable items are a great way to reduce waste at your facility. The waste generated from disposable products can be reduced significantly with reusable utensils and dishware. If you have the capacity to wash utensils and dishware, this is an option to consider. Even converting to reusable utensils can make a huge difference.

- Use silverware instead of disposable utensils in cafeteria
- Encourage reusable products in staff lounge

Promoting proper recycling practices can drastically reduce waste going to landfills. By setting up a descriptive recycling station next to the garbage cans, waste can be disposed of responsibly.

- Educate staff on proper recycling practices
- Beyond aluminum cans & plastic bottles

http://www.epa.gov/osw/conserve/materials/plastics.htm

Slide 30

Introduction:

Managing your facility's inventory is one major way you can reduce waste. While the "First In, First Out" (FIFO) approach is commonly discussed at foodservice operations, the execution is variant. A food rotation protocol can aid in implementing the "First In, First Out" principles to maximize the usage and value of the ingredients.

There are many posted dates on packaged foods. It is imperative to manage inventory based on these dates to avoid spoilage, foodborne illnesses and law suits. The food rotation protocol must include the following:

- Inventory must be stored and used in the order it was received. Product shipments stored in inventory must reflect this, i.e., lining up the juice shipments based on when it was received (FIFO).
- In and Out stickers are recommended to keep track of when inventory arrived at the facility. Upon opening the item, staff members must write an "opened on" date.
- Opened food must be stored in proper containers and properly noted with the date it was opened.
- Use up the opened container BEFORE opening up another unit.

Image: http://blog.hubert.com/resources/food-safety-2/food-safety-factors-consider/

Slide 31

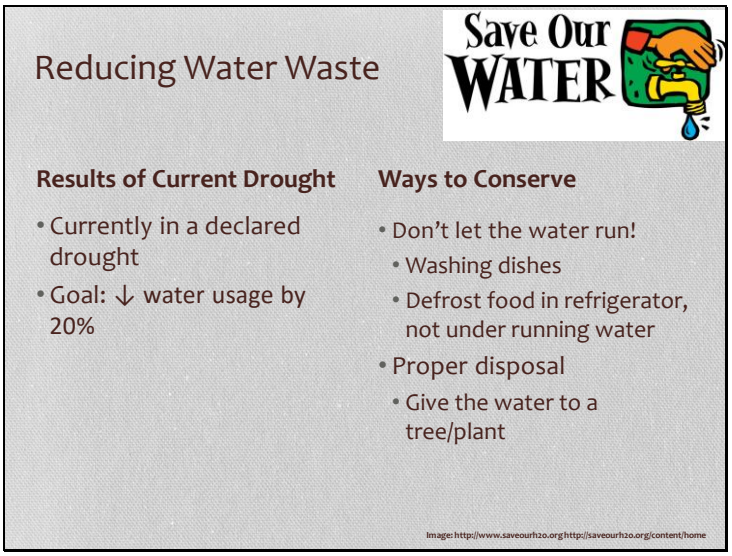
Introduction:
Waste diversion is another way to reduce waste going to landfills. Realistically, there will always be some form of waste at your facility. The crucial component to explore is where that waste goes. Here we will introduce proper ways to divert waste from landfills. The last module of this curriculum goes into detail about these methods.

Because plastic, metal or Styrofoam do not breakdown naturally or decay, the best way to dispose of plastic is the properly RECYCLE it. Paper and cardboard are also recyclable and do not belong in landfills.

The image on the left-hand corner illustrates the recycling process. The plastic container goes through a process in which the materials are broken down and remade into another product. Although the recycling process is not commonly seen from start to finish, it lessens the material demand on our resources and help create a more sustainable environment.

Images: Bareek Sudan for Plastic Recycling, http://bareeksudan.com/about.html

Slide 32



Introduction:
Water is necessary for human survival, animals, plants, trees, activities of daily living, etc. Even in normal conditions, it's difficult to meet the water needs of CA d/t the extensive demand of resources for its growing population of residents, visitors and businesses, etc. Extremely important to be aware of our water usage and conserve all the time— not just during drought season. It's a part of being responsible with our resources!

2013 was the driest year in CA history and we are still in a drought in 2015.

Snowpack typically provides 1/3 of CA's water supply after melting and contributing towards streams, reservoirs & aquifiers. With only 1/5 of its normal amount, CA officials are concerned about meeting the water needs of the state.

Ways to Conserve

- When washing dishes, set up a 2 wash basins: 1 for wash water/soaking & another for rinse water.
- Soak pots & pans instead of letting water run when scrubbing
- By defrosting meat a couple days prior instead of under running water can save 10 gallons of water/d

http://www.saveourh2o.org http://saveourh2o.org/content/home

Slide 33

Introduction:
We will discuss 4 components used for changing facility culture to reduce waste.

Image: http://www.people-results.com/caterpillars-hate-change/

Slide 34

Introduction:
With any movement for change, there will be resistance or lack of support for the cause. In order to effectively implement changes at your facility, it is imperative to change the culture of the facility environment for long term results. By thoroughly educating your staff on why the changes are important, necessary and effective, it allows for better understanding and hopefully, increased acceptance and compliance.

Step #1: Inform

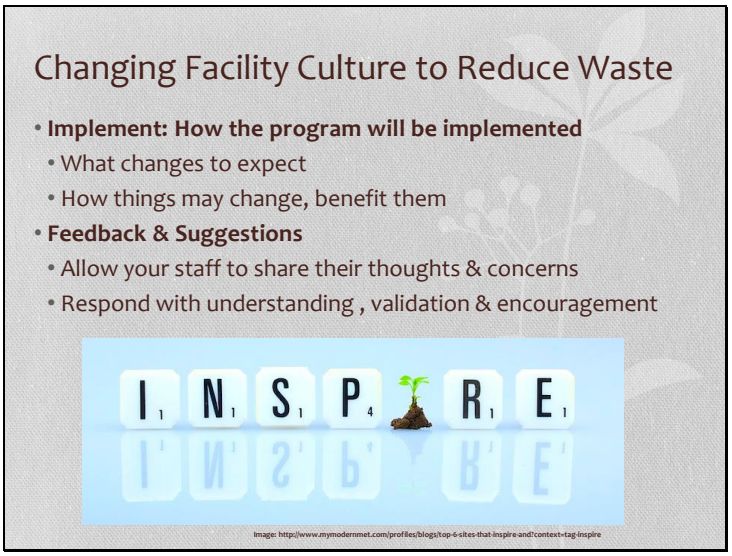
- By discussing the amount of waste generated from the facility on a weekly basis, it brings the waste problem to light.
- Then, linking the waste generated with its impact on the financials and environment further reinforces the need for change.

Step #2: Educate

- After highlighting the problems at hand, begin to introduce solutions to address them. Providing small—scale ideas initially can help ease the transition.
- For example, starting a recycling program to reduce waste or by improving inventory management to reduce unnecessary costs

Image: http://pragmaticcompendium.com/2014/02/27/facebook-fragments-02814-021414-one-floor-done-dependent—tasks-scooba/be-brave-enough-to-start-a-conversation-that-matters/

Slide 35



Step #3: Implement

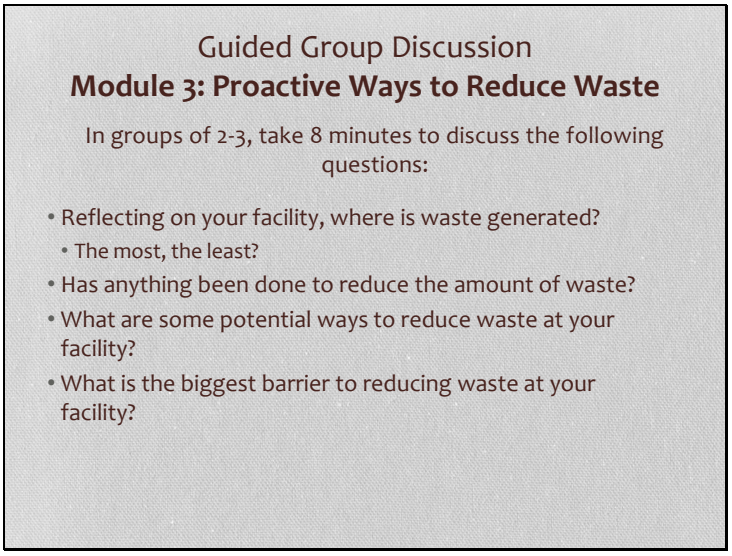
- Discuss how the program will be implemented, changes to expect.
- The more information and clarity there is, less room for ambiguity or confusion
- Point out how the changes will benefit them

Step #4: Feedback & Suggestions

- Allowing a time for discussion and thoughts from your staff can help ease the transition.
- Enable staff to voice their concerns, share their questions
- Address concerns with understanding, validation & encouragement

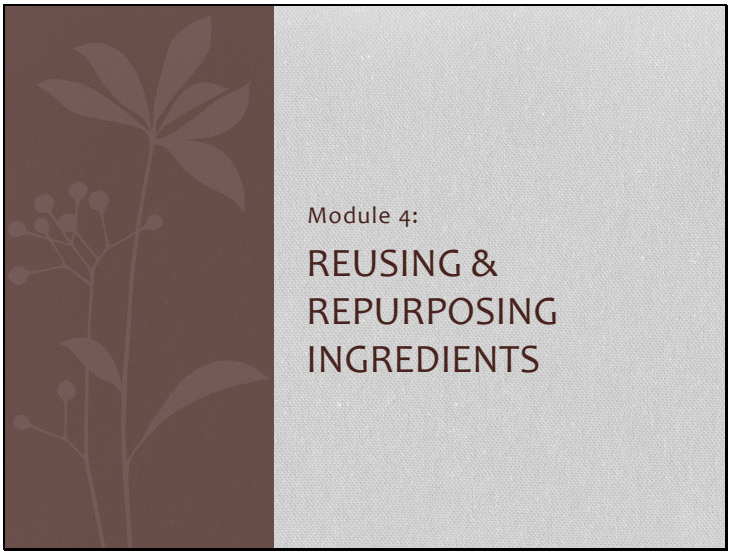
Image: http://www.mymodernmet.com/profiles/blogs/top-6-sites-that-inspire-and?context=tag-inspire

Slide 36



Introduction:
Please break up into groups of 2-3 and take 8 minutes to discuss your thoughts on the module using the questions stated above. Please have at least 2 answers to share with the class.

Slide 37



Introduction:
Another way to reduce waste at your facility is to maximize your ingredients.

Slide 38

Introduction:
Sustainable management of food and material waste will help reduce waste and costs at your foodservice operation, specifically through reusing and repurposing ingredients to maximize their value. Each of these will also be discussed individually.

<u>Incorporating standardized recipes</u>

- Actually following recipes
- Measuring out ingredients
- Utilizing ingredients in timely fashion to avoid spoilage

<u>Menu Planning</u>

- Precise recipe scaling
- Accurate forecasting of needs & demands

<u>Example of repurposing ingredients:</u>

- Leftover salad bar items can be used in stews or soups
- Leftover rotisserie chicken in chicken salad mix

Image: http://www.epa.gov/foodrecovery/fd-reduce.htm

Slide 39

Introduction:

According the USDA's manual, *A Tool Kit for Healthy School Meals: Recipes and Training Materials,* a standardized recipe is one that "has been tried, adapted, and retried several times for use by a given foodservice operation and has been found to produce the same good results and yield every time when the exact procedures are used with the same equipment and the same quality and quantity of ingredients," (USDA).

<u>Benefits of Standardized Recipes</u>

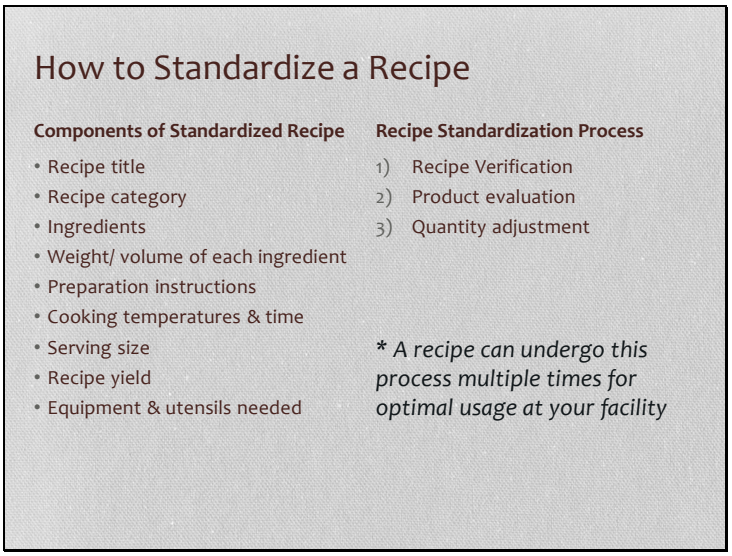
- Consistent food quality, nutrient content:
- With standardized recipes, consistency is easier to achieve, particularly with food quality and nutrient content. The menu will be consistent during each meal service, which can reinforce customer satisfaction. Establishing customer loyalty relies upon a consistent product.
- Predictable yield
- Having a predictable yield is crucial for fulfilling the planned number of servings. It also aids in reducing leftover, excess food and ensuring adequate servings for forecasted need.
- Control of inventory, food & labor costs
- After determining the specific amount of ingredients needed in a recipe, it allows for clearer control of inventory, food and labor costs due to the precise, calculated needs. By knowing how long it will take to prepare a dish, the amount of ingredients required and how much to purchase, it leaves less room for excess purchasing or error.
- Increased employee confidence

- Employees tend to execute their jobs better when they are well-trained and informed of their job expectations. Less ambiguity in their work liberates them to follow the recipe and feel confident about producing a quality product.
- Efficient purchasing procedures
- Standardized recipes also provide a clearer, easily calculated quantity of food needed for each recipe, resulting in more efficient purchasing methods.

United States Department of Agriculture. (n.d.) Recipe standardization process. *Making Success with Standardized Recipes.* 3-23.

Image: http://www.myfirstrestaurant.com/the-value-of-standardized-recipes-why-use-them-how-to-create-them/

Slide 40



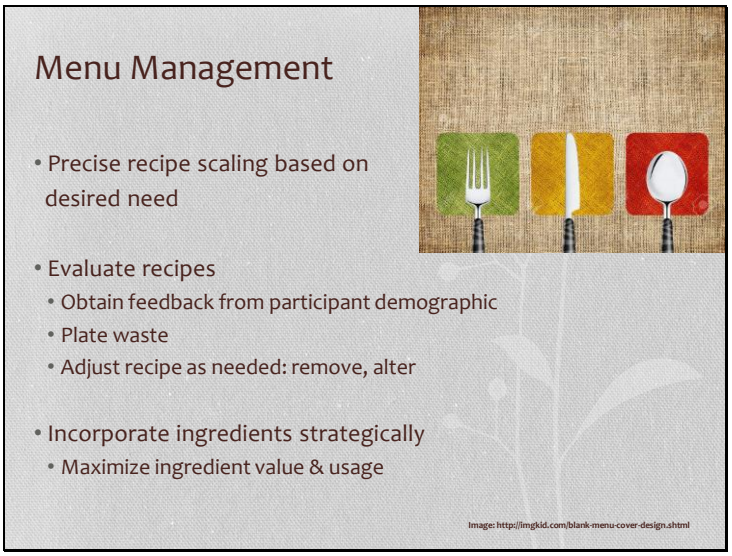
Introduction:
Now that we have discussed the importance of incorporating standardized recipes, let's discuss how to standardize a recipe. These guidelines are provided by the USDA.

Here we have the components of a standardized recipe. Each component is necessary to effectively and consistently prepare the recipe as intended.

The recipe standardization process has 3 main phases: recipe verification, product evaluation and quantity adjustment.

- Recipe verification: thoroughly reviewing the recipe, testing it out, verify that it makes its intended yield, and recording any changes to be made.
- Product evaluation: focuses on determining whether or not the product is palatable, acceptable and tasty, particularly for the population it will serve.
- Quantity adjustment: changing the recipe directions and amount of ingredients based on the changes recommended throughout the standardization process.

Slide 41



Introduction:
Whether your facility's menu is in cycle, daily or seasonal form, these helpful tips can help you proactively reduce waste.

1. When preparing for service, it is important to scale the base recipes to the desired need. Having a standardized recipe as your foundation provides a known, precise yield. Additional servings as backup in case of a shortage can also be calculated into the desired yield. Overall, precise recipe scaling reduces excess leftovers that would otherwise be wasted.

2. In order to evaluate whether a recipe is appetizing, tasty and successful is to evaluate its popularity, consumer feedback and plate waste. The frequency of which consumers order a particular dish can indicate interest, while plate waste can show how the food was received. Consumer feedback is also helpful if there is an issue with execution or positive feedback. Recipes can be altered or removed from the menu accordingly.

3. Maximizing ingredient usage can be a cost-effective and waste-free method to menu management. In the menu planning process, consider the following:

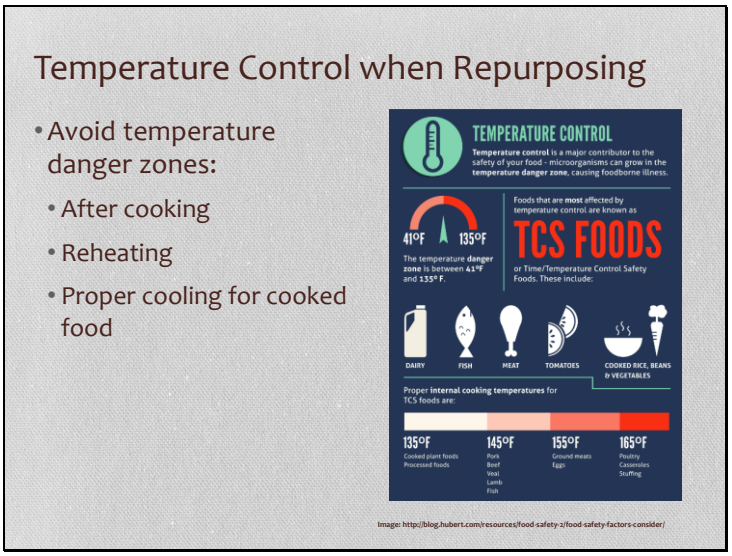
- What does this recipe call for?
- How much of each ingredient is needed?
- Will there be leftover ingredients after making this dish?
- If so, what else can this ingredient be used for?

- This applies to raw ingredients, like leftover sprigs of parsley or chicken stock. Utilizing the leftover ingredients maximizes the money spent, rather than throwing it away.

Leftover food can also be repurposed into new dishes with proper temperature monitoring through the critical control points.

Image: http://imgkid.com/blank-menu-cover-design.shtml

Slide 42



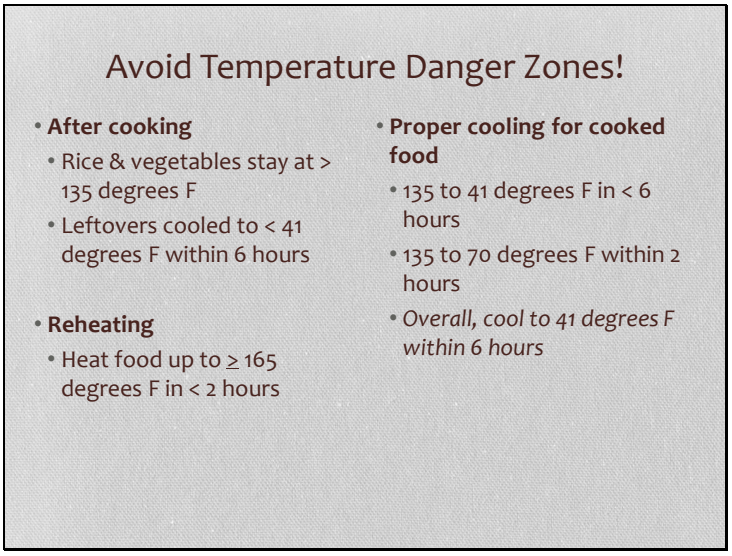
Introduction:
Again, repurposing leftover ingredients is a cost-effective method of reducing waste. When repurposing leftovers, it is important to comply with all food safety standards to prevent foodborne illness. Particularly, do not mix food with repurposed ingredients with fresh food.

Maintaining temperature control to avoid the temperature danger zones is important for preventing foodborne illness and overall safety of food. Crucial points in the food preparation process and afterwards are: 1) after cooking 2) reheating and 3) proper cooling for cooked food.

The infographic highlights the proper internal cooking temperatures for time/temperature control safety foods. The temperature danger zone is between 45 and 135 degrees F.
[Go through list of proper ways to manage temperature control when repurposing]

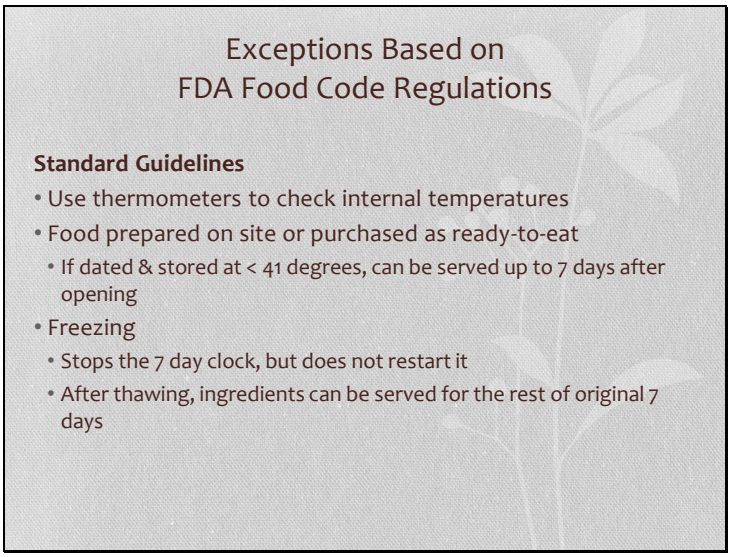
Sources: California Retail Food Code
Snyder, O.P. (2006). Food HAACP processes. *Food HAACP.* 1-5.
Image: http://blog.hubert.com/resources/food-safety-2/food-safety-factors-consider/

Slide 43



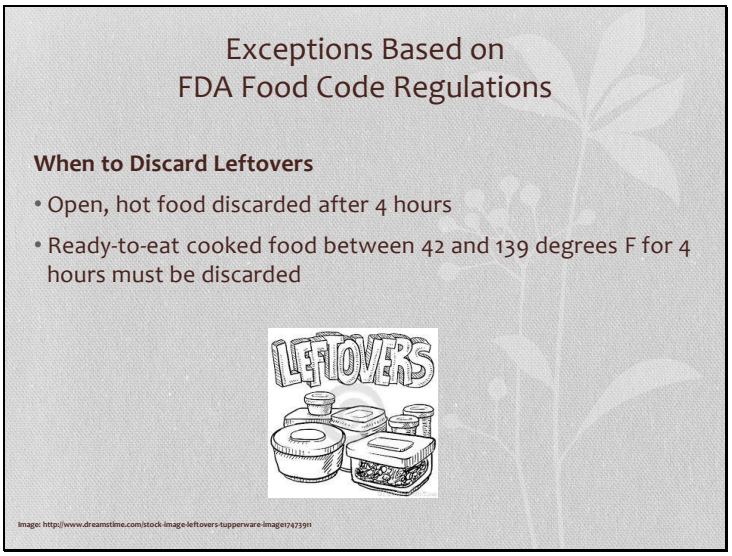
[Go through each example of temperatures to be mindful of.]

Slide 44



Introduction:
The FDA Food Code provides guidance on ensuring the quality of food safety for foodservice operations. The standard guidelines pertinent to food repurposing are: [go through list].
Source: Snyder, O.P. (2006). Food HAACP processes. *Food HAACP.* 1-5. Hospitality Institute of Technology & Management, St. Paul, MN.

Slide 45

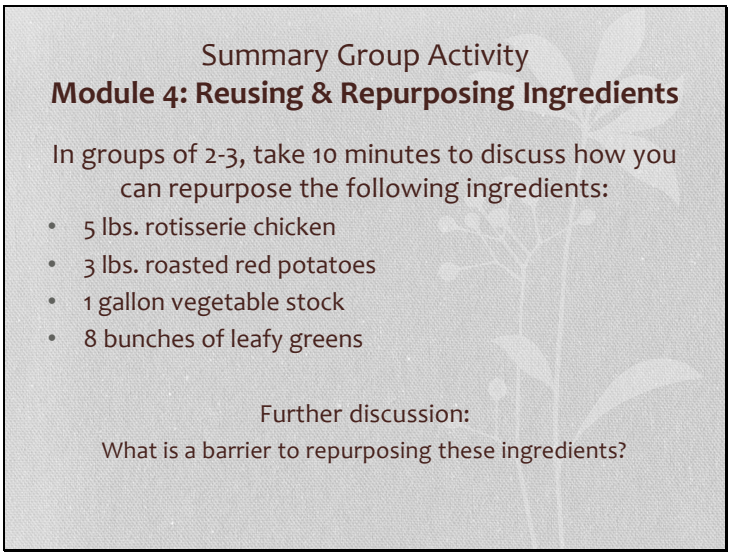


It is also important to know when food must be discarded to prevent foodborne illness [go through list].

Source: Snyder, O.P. (2006). Food HAACP processes. *Food HAACP.* 1-5. Hospitality Institute of Technology & Management, St. Paul, MN.

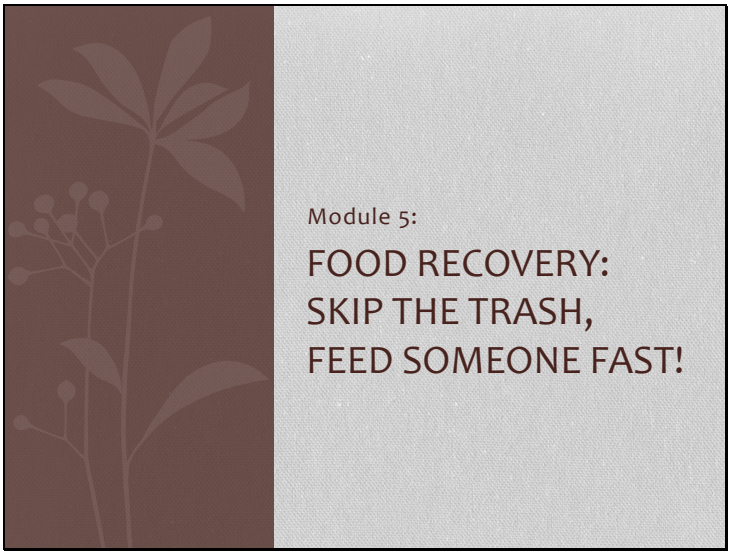
Image: http://www.dreamstime.com/stock-image-leftovers-tupperware-image17473911

Slide 46



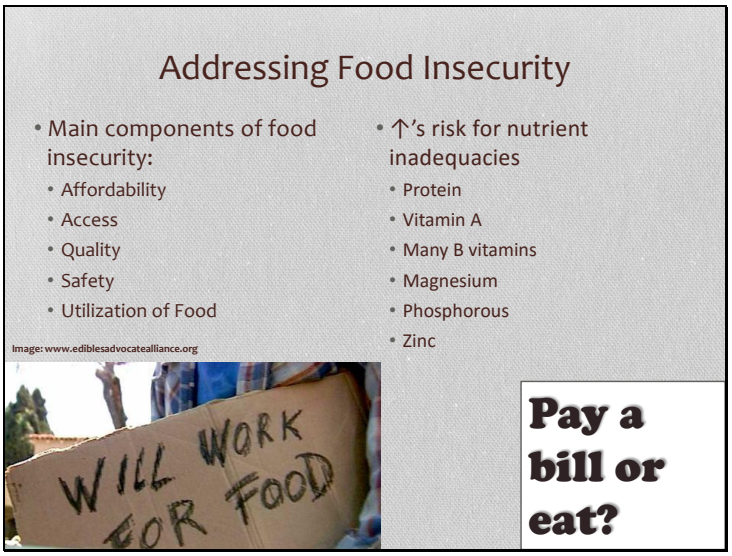
Introduction:
In groups of 2-3, take 10 minutes to discuss how you can repurpose the following ingredients. After coming up with ideas, discuss what barriers there may be to repurposing these ingredients. Please be prepared to share your ideas.

Slide 47



Welcome to Module 5, talking specifically about food recovery.

Slide 48



Introduction:
Food recovery is one solution to addressing food insecurity. [List main components of food insecurity]

Food insecure individuals have an increased risk for nutrient inadequacies, particularly: protein, vitamin A, many B vitamins, Magnesium, Phosphorous and Zinc.

(Kirkpatrick & Tarasuk, 2008)
*Particularly with adults & adolescents → found inconsistent intake of plant and animal protein sources d/t financial restraints

Image: www.ediblesadvocatealliance.org

Slide 49

The amount of food waste generated in the U.S. can be significantly reduced through food donations. By "skipping the trash," it reminds us to think of alternative ways to utilize the food. Redistribution of edible food to social service organizations like food banks, homeless shelters/soup kitchens and clinics ensures that the food can be used to nourish and feed instead of being in a landfill.

Image: http://www.foodbanknega.org/donate
Image: http://mtsifoodbank.org/support-mt-si-food-bank-by-participating-in-the-following-food-drives/

Slide 50

Contrary to popular belief, organizations who choose to donate their leftover food are protected under the Federal Bill Emerson Good Samaritan Act of 1996.

Image: https://morningview.org/news-events/food-donations-for-the-hands-of-christ-ministry/

Slide 51

Introduction:
There are 3 major food banks in the Los Angeles County area: the Los Angeles Regional Food Bank, Westside Food Bank and Food Bank of Southern California.
[Elaborate on each food bank]

LA Regional Food Bank

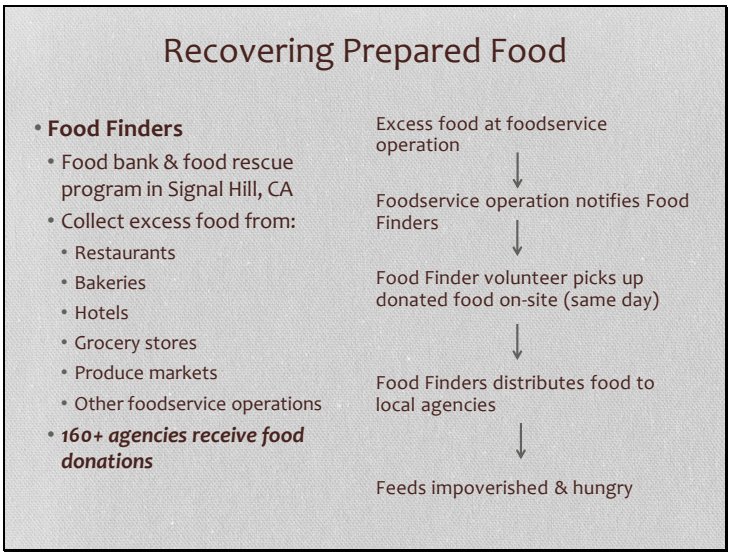
- Rapid food distribution: links f/v & other perishable foods agencies for distribution before spoilage. Foods are distributed to nearby agencies via refrigerated beverage truck.
- Mobile food pantries: provide food to 250-300 households with each pantry distribution
- **"Extra Helpings":** link excess food from foodservice operations, caterers, bakeries, hotels & restaurants while partnering with agencies for distribution.
- Food recovery representatives are notified when excess food is available → coordinate a scheduled pick-up of the food.

Image: http://www.istockphoto.com/vector/fresh-vegetables-15755406

Slide 52

Image: http://chronicleonline.nimbledeals.com/deal/crystal-river/donate-to-the-community-food-bank-of-citrus-county
Image: http://firstlutheranalbany.org/food-pantry-donations/

Slide 53



Introduction:
[Introduction to Food Finders]

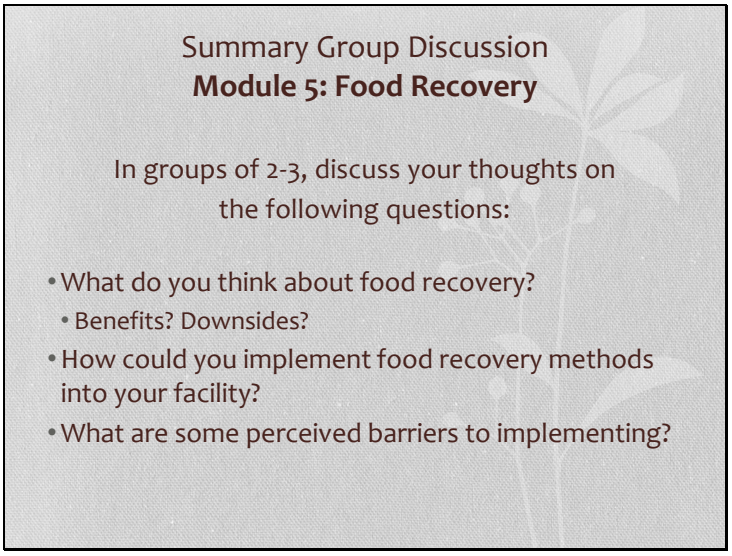
Food Finders:

- Due to a highly efficient process of picking up and distributing excess food, 39,000 meals are served → lessening food waste and alleviating food insecurity.
- Since established, ~108 million lbs. of food has been rescued serving 210 agencies and shelters in Southern CA.

[Explain process of recovering prepared food, as illustrated in flow chart]

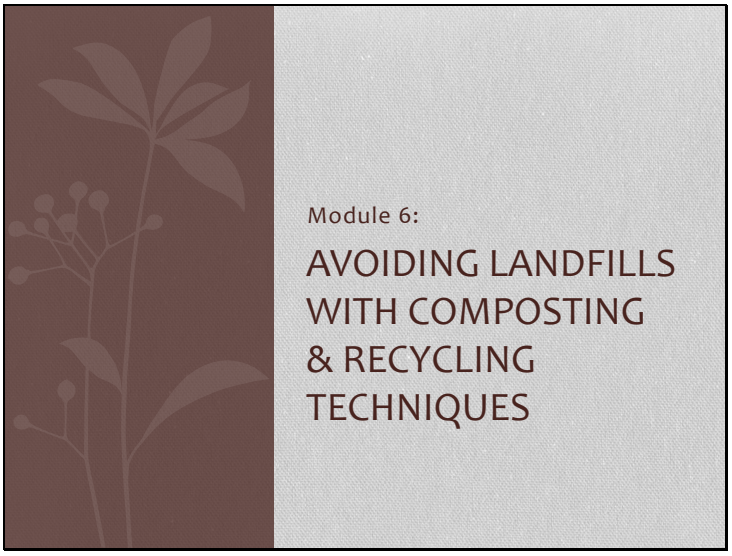
However, it does not address effective ways of managing spoiled food & food scraps from production and storage or material waste.

Slide 54



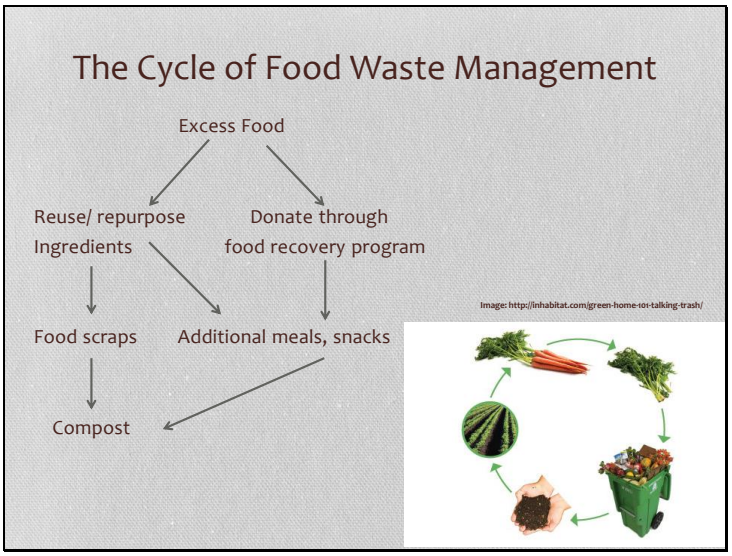
Introduction:
Please break up into groups of 2-3 and discuss your thoughts on the module using the questions stated above. Please have at least 2 answers to share with the class.

Slide 55



Introduction:
Even after the edible food portions are recovered and donated, inevitably, food scraps often remain. Most food recovery programs do not address how to properly dispose of the leftover food scraps or spoiled food. In this module, we will discuss 2 more ways to avoid landfilling.

Slide 56



Introduction:

This flow chart highlights the cycle of food waste management. Excess food can go in 2 different purposeful directions:

- the ingredients can be reused or repurposed → reuse/repurpose ingredients food scraps leftover can be composted instead of going to a landfill
- the excess food can be donated to a food recovery program, providing additional meals and snacks → scraps can be composted

Both of these pathways maximize ingredients and resources while feeding the hungry and needy.

Image: http://inhabitat.com/green-home-101-talking-trash/

Slide 57

Introduction:
Along with Reducing, Reusing, Recycling & Recovery, composting is another great way to reduce food waste.
[Go through 3 reasons to compost]

Compost is the product of a biological process during which naturally occurring aerobic (oxygen-requiring) microorganisms break down organic materials such as food waste into humus, a nutrient-rich material that can be used to improve soil quality. During the composting process, the microbes use inputs of oxygen, moisture and organics to generate heat, water vapor, and carbon dioxide as they transform organics into humus.

http://www.law.harvard.edu/about/administration/facilities/energy/composting.html
http://thethinkering.com/articles/2013/08/02/composting-home

Slide 58

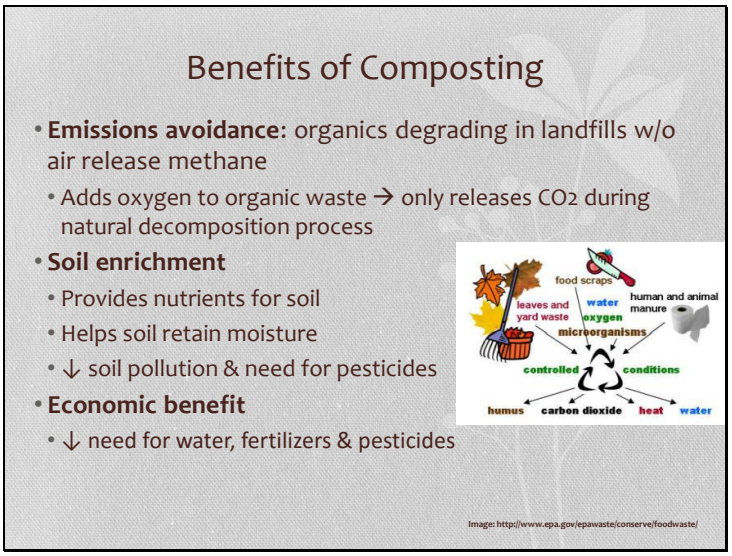
Introduction:
Here we will breakdown what can be composted to give you a clearer idea of what composting looks like.

- All kitchen waste: fruit rinds, carrot tops, non-edible produce
- Issues can come up from meat, meat/dairy products & high-fat foods → can decompose eventually, but will smell bad & attract pests
- Garden refuse: dead plants, flowers, thinned seedlings, etc.

The average household produces more than 200 pounds of kitchen waste every year. You can successfully compost all forms of kitchen waste. However, meat, meat products, dairy products, and high-fat foods like salad dressings and peanut butter, can present problems. Meat scraps and the rest will decompose eventually, but will smell bad and attract pests. Egg shells are a wonderful addition, but decompose slowly, so should be crushed. All additions to the compost pile will decompose more quickly if they are chopped up some before adding.

http://compostguide.com/compost-materials/

Slide 59



Introduction: Why Compost? There are many benefits to composting.

Emissions avoidance:

- Organics degrading in landfills without air emit methane (a greenhouse gas 21 times more potent than CO2).
- Composting adds oxygen to organic waste, so it emits only CO2 as part of the natural carbon cycle during decomposition.

Soil enrichment:

- Provides nutrients for soil
- Helps soil retain moisture
- Reduces soil pollution
- Reduces need for pesticides

Water management:

- Improves soil absorption, decreasing erosion
- Improves soil filtration, decreasing polluted storm-water runoff

Economic benefit:
Reduces need for water, fertilizers, and pesticides

Extends landfill life
Provides a **cost-effective alternative** to conventional methods of cleaning contaminated soil (www.epa.gov)

About 35 million tons of food waste reach landfills and incinerators each year in the United States. This waste could be prevented, used to feed people, or composted to create a valuable soil amendment.

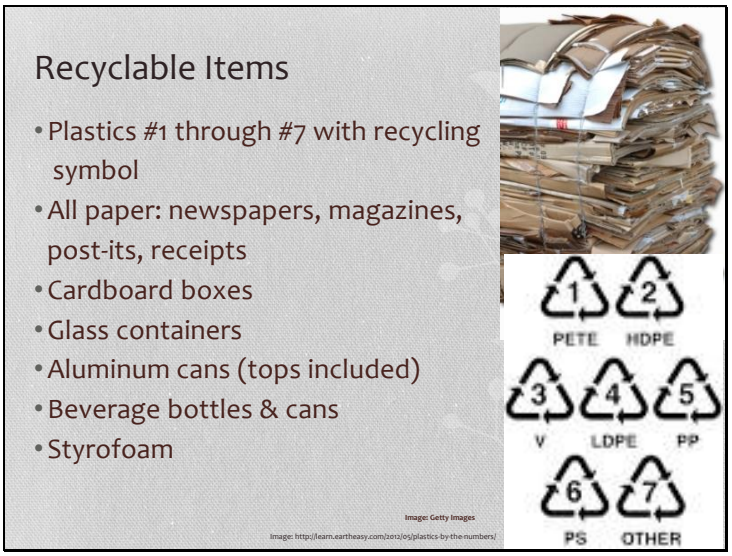
http://www.epa.gov/epawaste/conserve/foodwaste/
http://www.law.harvard.edu/about/administration/facilities/energy/composting.html
http://academics.sru.edu/MacoskeyCenter/Demonstration/composting.htm

Slide 60

Introduction:
Another way to reduce waste in landfills is by recycling. Recycling is defined as (state definition). There are many benefits to recycling. Because recycling utilizes existing materials to make more of that product, it conserves natural resources. In addition, because the used materials are being repurposed, they are diverted from the landfill and incinerator. Recycling is also an energy saving process in that it eliminates the first step to create the product itself (i.e., making plastic). Last of all, it lessens the amount of GHGs that pollute the air since plastic is made from fossil fuels.

Image: http://www.lassensloves.com/2014/04/earth-friendly-habits.html
https://downsizingthehome.wordpress.com/tag/national-recycling-month/
http://www.fagandoor.com/blog/2013/03/08/go-green-and-keep-your-garage-clean-recycling-tips-are-good-you-and-environment

Slide 61



Introduction:

- A list of recyclable items and the symbols to look for indicating recyclability is listed here.
- Plastics: important to note that plastic bread bags are often #4; salad bags often #7; all grocery bags!
- Recycling services often have on-site pick-up services that can be adjusted to the facility's needs.
- If not, local recycling facilities in the area are available for recycling drop-off. http://dpw.lacounty.gov/epd/rethinkla/recycle/

By consciously recycling these items, they are not going straight to the landfill or ocean. The recycled materials are often remade into other usable items!

Slide 62

Introduction:
Because landfills and recycling plants are often out of common sight, many are unaware of where the recycled materials go and what its used for. The Bottle 2 Pen is an example of how recycled plastic can be used in a sustainable and responsible way. The pens are made from recycled plastic bottles. 86% and 89% of the pens are from the recycled materials. It's great to see a tangible product of recycling!

Image: http://usawestreps.com/featured/bottle-2-pen/

Slide 63

Introduction:
Currently, LA County lacks a commercial-sized composting facility to accommodate large volumes of food waste; however, urban agriculture is becoming more popular. Community gardens and urban farms are great outlets that can utilize compost, avoiding landfills.

Image: www.gardening-trends.com
http://lagardencouncil.org

Slide 64

Summary Group Discussion
Module 6: Avoiding Landfills with Composting & Recycling

In groups of 2-3, take 8 minutes to discuss your thoughts on:

- What can you do to help the environment?
- What made you motivated to make those changes, if applicable?
- What is a practical way you can reduce, reuse and recycle?
- What area in your life could benefit from what we learned today?

Introduction:
Please break up into groups of 2-3 and take 8 minutes to discuss your thoughts on the module using the questions stated above. Please have at least 2 answers to share with the class.

Slide 65

Practical "Green" Tips

Image: www.gardening-trends.com

- Utilize silverware for reuse
- Conserve water whenever possible
- Reduce disposable product usage
- **Be mindful of how your actions impact the environment!**
  - Paper napkins came from trees → practice responsible usage & awareness

Being environmentally conscious is NOT more expensive, but more cost-effective!

A summary of practical waste reduction tips include… [list on slide]

Slide 66

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Slide 68

Image: http://urbanecodev.com/home/

***Distribute Post-Test survey** to evaluate participant's knowledge after training.
***Distribute Curriculum Evaluation** (evaluating presentation, materials, speaker, etc.)

APPENDIX B

PRE AND POST-TESTS

Pre-Session Questionnaire: Modules 1-2
Waste and Its Environmental Impact

Thank you for taking the time to share your experiences and opinions on the prevalence of waste and its impact on the environment. Your answers are valued and appreciated.

Please rate the following topics based on how important they are to you:

	Not Important	Neutral	Important	Very Important
Taking care of environment	1	2	3	4
Preventing pollution	1	2	3	4
Reducing waste	1	2	3	4
Having clean air	1	2	3	4

Please mark the option that best answers the question:

1. True or false: There is not enough food to feed the global population.

   (a) True (b) False

2. What is the single largest component of municipal waste in the United States?

a) paper/cardboard

b) metal

c) plastic fragments

d) food waste

3. What percentage of global food production is wasted?

a) 10-15% b) 20-35% c) 30-50% d) 40-60%

4. Please mark all of the following services available at your facility.

a) trash cans b) recycling bins c) composting bins d) all of the above e) I don't know

Post-Session Questionnaire: Modules 1-2
Waste and Its Environmental Impact

Thank you for taking the time to share your experiences and opinions on the prevalence of waste and its impact on the environment. Your answers are valued and appreciated.

Please rate the following topics based on how important they are to you:

	Not Important	Neutral	Important	Very Important
Taking care of environment	1	2	3	4
Preventing pollution	1	2	3	4
Reducing waste	1	2	3	4
Having clean air	1	2	3	4

Please mark the option that best answers the question:

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a) 10-15% b) 20-35% c) 30-50% d) 40-60%

4. Please mark all of the following services available at your facility.

a) trash cans b) recycling bins c) composting bins d) all of the above e) I don't know

Pre-Session Questionnaire: Modules 3-6
Sustainably Managing Waste

Thank you for taking the time to share your experiences and opinions on solutions for sustainably managing waste. Your answers are valued and appreciated.

Please rate the following topics based on how important they are to you:

	Not Important	Neutral	Important	Very Important
Finding alternative solutions for food waste	1	2	3	4
Feeding the hungry & needy	1	2	3	4
Proper waste management	1	2	3	4
Reducing extra spending costs	1	2	3	4

Please mark the option that best answers the question:

1. How can kitchens reduce food production waste?

a) measure out all ingredients used

b) precise recipe scaling

c) accurate forecasting

d) all of the above

2. True or False: Donations of edible, ready prepared food by foodservice operations are protected under Federal law, where gross negligence is the only form of liability.

(a) True (b) False

3. Which of the following is the most sustainable method to discard food waste?

a) landfill b) compost facility c) recycling bin d) I don't know

4. Please rate how you feel about the following statement:

In my opinion, my facility excessively demands unnecessary:

Paper products Yes or No

Water usage Yes or No

Food resources Yes or No

Post-Session Questionnaire: Modules 3-6
Sustainably Managing Waste

Thank you for taking the time to share your experiences and opinions on solutions for sustainably managing waste. Your answers are valued and appreciated.

Please rate the following topics based on how important they are to you:

	Not Important	Neutral	Important	Very Important
Finding alternative solutions for food waste	1	2	3	4
Feeding the hungry & needy	1	2	3	4
Proper waste management	1	2	3	4
Reducing extra spending costs	1	2	3	4

Please mark the option that best answers the question:

1. How can kitchens reduce food production waste?

a) measure out all ingredients used

b) precise recipe scaling

c) accurate forecasting

d) all of the above

2. True or False: Donations of edible, ready prepared food by foodservice operations are protected under Federal law, where gross negligence is the only form of liability.

(a) True (b) False

3. Which of the following is the most sustainable method to discard food waste?

a) landfill b) compost facility c) recycling bin d) I don't know

4. Please rate how you feel about the following statement:

In my opinion, my facility excessively demands unnecessary:

Paper products Yes or No

Water usage Yes or No

Food resources Yes or No

APPENDIX C

PRE AND POST-TEST ANSWER KEYS

ANSWER KEY
Pre/Post-Session Questionnaire: Modules 1-2
Waste and Its Environmental Impact

The correct answers are highlighted in yellow below:

Please mark the option that best answers the question:

1. True or false: There is not enough food to feed the global population.

(a) True (b) False

2. What is the single largest component of municipal waste in the United States?

a) paper/cardboard

b) metal

c) plastic fragments

d) food waste

3. What percentage of global food production is wasted?

a) 10-15% b) 20-35% c) 30-50% d) 40-60%

ANSWER KEY
Pre/Post-Session Questionnaire: Modules 3-6
Sustainably Managing Waste

The correct answers are highlighted in yellow below:

Please mark the option that best answers the question:

1. How can kitchens reduce food production waste?
   a) measure out all ingredients used
   b) precise recipe scaling
   c) accurate forecasting
   d) all of the above

2. True or False: Donations of edible, ready prepared food by foodservice operations are protected under Federal law, where gross negligence is the only form of liability.
   (a) True (b) False

3. Which of the following is the most sustainable method to discard food waste?
   a) landfill b) compost facility c) recycling bin d) I don't know

APPENDIX D

POST-SESSION EVALUATION TOOLS

Post-Training Evaluation Form
Sustainable Waste Management Curriculum

Thank you for taking the time to give your feedback on your experience with this session. Your feedback is valued and appreciated.

Please rate how much you agree or disagree with each of the following statements about the training by circling a number below:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The overall objectives of the session were clear.	1	2	3	4	5
The overall objectives of the session were met.	1	2	3	4	5
I have a better understanding of how my facility can sustainably manage waste.	1	2	3	4	5
I found the information from the session useful.	1	2	3	4	5
The materials provided helped me understand the class content.	1	2	3	4	5
The instructor presented in a way that helped me learn.	1	2	3	4	5

Please circle your overall rating of the session.

Poor Fair Good Very Good

Please provide any additional suggestions or thoughts in the space below.

APPENDIX E

LOS ANGELES COUNTY

URBAN FARM RESOURCES

Los Angeles County Composting Resources

- Foodscape Long Beach
  - http://foodscapelb.blogspot.com/
- Long Beach Community Garden
  - http://lbcg.org/home_0.shtml
- Santa Monica Main Street Community Garden
  - http://www.smgov.net/Departments/CCS/content.aspx?id=33150
- Wattles Farm, Hollywood
  - http://www.wattlesfarm.com/
- Wild Oats Community Garden
  - http://longbeachorganic.org/gardens/wildoatsgarden.html

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