

**Creating Environmentally Conscious Students: Integrating Garden Based- learning into the
Family/ Consumer Science 7th Grade Curriculum**



**ALLEGHENY
COLLEGE**

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April, 2015

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Caryl Waggett 4/29/2015 _____
Dr. Caryl Waggett **Date** **Kerstin Martin** **Date**

Sydney Bedford
Pledge

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Garden-based learning is a popular strategy to engage primary students in ecological processes. This educational approach enhances student learning while also teaching students to be responsible problem-solvers who are connected with their community. These skills are necessary for creating environmentally-conscious students who can address complex environmental issues. Meadville PA is a community with a high percentage of families living below the federal poverty level. Local school health screens in Meadville reveal that ~38% of children aged 5-17 are obese or overweight.

Garden-based education can address the linked challenges of obesity and poverty. Students can learn valuable skills about environmental stewardship, and also about nutrition and healthy eating. This project is part of a Community Wellness Initiative showcasing a new community garden at a recreational complex adjacent to the middle school. I designed and tested six lesson plans addressing the ecology, nutrition, and sustainability of growing foods locally and the practical benefits of doing so. Lessons integrate garden-based learning into the "Family/Consumer Science" class in the 7th grade curriculum and are linked to statewide goals and standards for science and agriculture. Lessons focused on where food comes from, what is in our food, buying local, budgeting meals, food spoilage, and harvesting.

ABOUT THE PROJECT

As environmental issues like climate change, loss of biodiversity, food security become more prevalent in our society, there will be a push for youth today to understand complex interactions between their communities, the environment and the agricultural system (Nijhuis, 2011). Youth will need to understand how their environment works and the issues we face because of our environment. One of the aspects of their environment that will be important for them to understand is agriculture and food production (Mayer-Smith, Bartosh & Peterat, 2007). Studies found that many youth today do not know where their food comes from or how their food is made (Hess, 2011). They will need to have critical thinking and problem solving skills to solve these issues. Schools have begun to implement garden-based learning to their curriculum for a couple of reasons. One it has been found to teach students about food production. Two has given students the necessary problem solving skills to approach the issues surrounding food production. (Ozer, 2007)

This project is part of a Community Wellness Initiative showcasing a new community garden at a recreational complex adjacent to the middle school. Recently, Allegheny College received a grant in partnership with the Meadville Area Recreation Center (MARC) and the Crawford Central School District (CCSD) to improve physical health and nutrition in the Meadville community. The MARC provides recreational activities such as ice skating, swimming, and hosts various events. The grant is being used to fund several new projects in order to improve the health of the community. This is especially important for Meadville because 40% of children in Meadville are obese (Pennsylvania Department of Education Health Screens, 2011) and 32% of adults in Crawford County are obese (County Health Rankings, 2015) . Obesity is proven to cause multiple preventable diseases such as coronary heart disease, high blood pressure, stroke, type 2 diabetes, abnormal blood fats, metabolic syndrome, cancer, sleep apnea, osteoarthritis, obesity hypoventilation syndrome, reproductive problems, and gallstones ("What Are the Health Risks of Overweight and Obesity?"). The grant will be used to address the health issues by providing programs that encourages physical activities and healthy eating. One of those projects include creating a community garden and connecting with the nearby schools (Meadville Middle School) so they can use the garden as a resource. Garden-based education can address the linked challenges of obesity and poverty in the Meadville Area.

The goal of this project is to create lesson plans that integrate garden based learning into the existing course curriculums for the 7th grade Family and Consumer Science class. The 7th grade was chosen for two reasons. First the 7th grade teachers were interested in using a garden as a teaching tool. Second Professor Caryl Waggett's Environmental Health class conducted a survey with the 7th graders that provided insight about the students' food environment and physical activity. Results from this survey can be used to build on the current knowledge the students have on gardening and nutrition. I will also use the results to get a better idea of where the 7th are at and whether I need to provide more or less background about nutrition and gardening.

I designed and tested six lesson plans addressing the ecology, nutrition, and sustainability of growing foods locally and the practical benefits of doing so. Lessons integrate garden-based learning into the "Family/Consumer Science" class in the 7th grade curriculum and are linked to statewide goals and standards for science and agriculture. Lessons focused on: where food comes from; what is in our food; buying local; budgeting meals; food spoilage; and harvesting. The lesson plans can be used by teachers at CCSD or elsewhere in Northwestern PA and similar regions who are interested in integrating garden-based learning into their curriculum. The lesson plans are especially relevant to teachers in the Meadville PA area looking to utilize the MARC's community garden as a resource.

THE PROCESS

This section explains the process of developing the lesson plans and all of the factors that were included in the lesson plans. In developing the lesson plans; I have conducted research pertaining to the history of garden-based learning, understand the academic skills and needs of seventh grade students; attended a training facilitated by Grow Pittsburgh about garden-based learning, attended the North American Association for Environmental Education conference, used the 7th Grade Wellness Survey conducted with Professor Caryl Waggett through ES 415 and Meadville Area Middle School course; met with the Family and Consumer Science teacher at the Meadville Area Middle School; and met with Kerstin Martin (Co-Primary Investigator, Community Wellness Initiative) and Guy Mc UMBER . I used all of this information to create lesson plans that not only enhances student learning through gardening, but also helped me to create lessons that would fit into the structure of the Family/ Consumer Science class at the Meadville Area Middle School.

BACKGROUND ON GARDEN-BASED LEARNING

What is garden-based learning?

Garden-based learning is a combination of experiential education, ecological literacy and environmental awareness (Subramaniam 2002). Experiential education is teaching learners to build knowledge, skill and value from direct experiences. Ecological literacy being able to understand the natural systems that make life on earth viable. Environmental awareness is the ability to understand how humans interconnect with nature and how one's actions can impact the environment. The purpose of garden-based learning is to teach students through personal discovery about the ecological principles that govern life as a way to develop students' sense of connection with their environment.

Garden-based learning can be implemented into curriculums in a number of ways, depending on what the end goal (in terms of student learning and developing skills) that one wants to achieve. One approach is focusing on the experiential aspect of gardening and building students' relationships with nature and their peers (Subramaniam 2002). It may include working hands on in the garden with peers and experiencing first hand how food is produced. Another approach is focusing on building students' environmental literacy which may include lessons that teach about soil chemistry, insects, germination, the needs of plants and energy (Edible Schoolyard Pittsburgh). Another approach is a focus on environmental awareness. Students may think big picture about issues surrounding where their food comes from and the agricultural system. There are a range of lessons and strategies to implement garden-based learning into a school curriculum.

Benefits of garden-based learning

Using school gardens as an education tool in schools is becoming more popular. California has implemented a "garden in every school" initiative. Whereas all 8,000 of the public educational institutions in California have either implemented a garden, have plans to implement a garden or are in the process of implementing a garden in the school (Skelly & Bradley, 2007). Northern states such as New York and Vermont have slowly begun to implement garden-based learning curriculums in the classrooms. In New York State, student gardens have been implemented in more than 200 schools, 100 teachers and 11,000 student gardens that have been implemented (Blair, 2009). There is a push for implementation garden-based learning because gardens in schools have been shown to enhance the learning of students (DeMarco, 1999; Skelly and Bradley, 2000). Studies found that the hands-on aspects of gardening promotes learning about scientific and other concepts consistent with state mandated learning objectives/ standards and improve achievement through strengthening school bonding (Ozer, 2007). With the growing concern for environmental issues like global warming, unsustainable food production and food security (Mayer-Smith, Bartosh & Peterat, 2007), garden based teaching has been proven to help students better understand these issues (Sheffield, 1992). Studies found that garden based learning helps students understand plant life cycles, food production and promotes healthy eating (Ramey, 2012). Garden-based learning also teaches students about recycling and composting (Ozer, 2007). There are many benefits to using gardens as education tools and there are many ways to integrate gardens to the curriculum.

garden-based learning may add an additional stress factor for teachers. (Desmond & Grieshop 2004; Ozer 2007; Blair 2009) Teachers may not have time to do the research necessary to create a garden-based curriculum.

Achieving Department of Education Standards

A major concern for educators is meeting state Department of Education standards. The objective of both teachers and principals is to make sure students are performing at or above state requirements. Some concerns of teachers include: not being able to help every child reach his/her potential and the focus on testing (Crean 2013). When garden-based learning programs are introduced, schools are concerned with whether the program will support teachers in meeting state standards. Much of the garden-based curriculum directly aligns with Department of Education science, writing and math standards (Williams & Dixon 2013). Studies found that students who participate in garden-based learning programs have higher scores on science achievement tests (Klemmer, Waliczek & Zajicek 2005; Gaylie 2009; Rye 2012). Garden-based curriculum helps students better perform on math, writing, reading and social study standardized test (Desmond & Grieshop 2004).

Funding

The other major issue with implementing garden-based learning is funding. There are cost associated with starting up a garden. Some cost include soil, garden tools, seeds, land and any other affiliated garden needs. An additional cost is maintaining the garden over a sustained period of time. Schools may receive funding from the state or the school districts, but usually that is not enough to fund the garden and the school has to rely on donations. However, solely relying on donations may not be enough to continually fund a garden.

Implications to the lesson plans

My project aims to address all of the challenges that would prevent schools from implementing garden-based learning. I address the “teacher knowledge and experience” and “achieving Department of Education Standards” challenges by, researching the content necessary to develop the lesson plans and fitting them into the Department of Education state standards. In each of the lessons I include the standards the lesson aims to achieve. I have also included lessons that can be used during the off season that still align with the philosophy of garden-based learning. I chose to incorporate those types of lessons to address the issue around “climatic variations”. Lastly, to address funding, time commitment, the garden that the school would use is a community garden created by the Community Wellness Initiative. The teachers would not have to worry about buying materials for the garden or managing the garden.

Techniques for implementing a garden

Schemata

Schemata are complex mental organizers of interconnected information individuals hold about a topic (Moll, 1990). The process of learning happens when individuals deconstruct and reconstruct their schemata. As individuals learn new information, their perceptions are compared to existing schemata. Schemata are an important concept for educators to understand because part of the process of learning involves changing a person’s schema in some way (Bereiter, 1994). Educators must know the individual’s existing perceptions in order effectively transform the individual's schema. A study

have the garden be owned by the schools and managed by the students, teacher and parents. However, the garden that will be used for this project is a community garden that will be managed by Kerstin Martin and her workers/ volunteers. Learning about the different styles of implementation helped me to think creatively about how the middle school could utilize the community garden. Although the students would not be physically tending to the garden, they will visit the garden and do activities like harvesting and possibly planting some crops. Lastly, the section on “nutrition” helped me to think about how I could incorporate some aspect of nutrition in each of the lessons. I incorporated lessons that teaches students how to read nutrition facts, the role energy plays in our food system and the benefits of eating unprocessed foods.

BACKGROUND ON ADOLESCENTS (AGES 12-14)

When creating lesson plans for a specific age group it is important to understand their cognitive, social-emotional and identity development. It is important to understand these aspects of their development in order to help them further develop as adolescents and clear up any misconceptions about nutrition/ healthy eating. Cognitively, early adolescents ages 12-14 begin to engage in a deeper moral way of thinking (American Academy of Child and Adolescent's Facts for Families, 2008) and have a stronger sense of self/ social awareness (Oregon Health Authority, 2011). Socio-emotionally, at this age they have a desire for independence (American Academy of Child and Adolescent's Facts for Families, 2008). They become more preoccupied and critical of their body image, as well as begin to mature and develop physically and set standards for what a "normal" appearance is compared to their peers. (Oregon Health Authority, 2011) During this stage they begin to develop eating disorders in order to maintain that "normal" appearance. About 50% of teenage girls engage in unhealthy weight control behaviors and about 30% of teenage boys engage in this behavior. Unhealthy weight control behaviors include skipping meals, fasting, and smoking cigarettes, vomiting and taking laxatives. (Ekern 2012)

A study done by Stevenson et al. (2007), engaged adolescent in focus groups to better understand their views of food/ eating, and the barriers they face to eating healthy. The study found that adolescents perceive dieting as eliminating unhealthy (junk food) from their diet and eating more healthier foods (fruits and vegetables) (Maxwell, Bagnall, & Bilton, 2001; Stevenson et al., 2007). The study also found that food aesthetics play a major role in food choice. The taste, texture, appearance and smell were all major factors. Another major finding was that taste also plays a major role in food choice. Many of the participants mentioned that they pick foods based on their taste which tended to be junk foods. They disliked green vegetables because they perceived them as unpleasant and bland. They were less likely to eat them. (Stevenson et al., 2007)

Implications to the lesson plans

As I considered which topics to teach and how to execute each of the lessons, I thought about where the students were developmentally. I thought about what they were most concerned about and how I can highlight that or clear up any misconceptions. Learning about the different stages of development of adolescents and where the student fell on the spectrum helped me to create my lessons more effectively. One of the pieces of information that I tried to build off was that students ages 12-14 begin to engage in a deeper moral way of thinking. That piece of knowledge is important because I know they are able to think critically about the food system and the issues that affect both their community and other community. Some of the questions in the activity ask the students to reflect on their own experiences which allow them to develop their own morals and values about the food decisions they make each day.

The Stevenson et al. (2007) study shed some insights on the factors that influence student's food choice. This insight helped me shape the lessons about reading food labels and the dishes I chose to make as a class. I tried to provide more information about foods beyond "this is unhealthy because this is junk food and its sweet." I want students to be able to pull information from the nutrition labels and explain why the food item is unhealthy based on the ingredients and not just taste. Lastly, I wanted to highlight that there are ways to make vegetables taste better by making them into a quick snack.

STUDY AREA

Meadville Demographics

Meadville is located in Northwestern Pennsylvania. It is a small city with a population of about 13,265 (as of 2013). The median household income between 2009 and 2013 was roughly \$31,397. (U.S. Census Bureau) There are many farms in Meadville and a few community gardens. There is a community push for improving the health of the community. One of the reasons the community has banded together around health and wellness is because of the high rates of obesity in the community. The Department of Education Health Screens (2011) revealed that 40% of children are obese in the community and 30% of adults are obese in the community. Allegheny College in partnership with the Meadville Area Recreation Center (MARC) recently received a grant to improve physical health and nutrition in Meadville. The grant will be used to fund several new projects in order to improve the health of the community.

Study Population

My lesson plans were created for the 7th & 8th Grade Family and Consumer Science class. The reason I chose this class was because the teacher was interested in learning more about garden-based learning. The second reason I chose this class was because the course is flexible when it comes to trying something new; the students do not have to take any standardized testing in this course, thus leaving room for flexibility. The third reason I chose this class was because a lot of the curriculum around garden-based learning fit with the objectives of the course and the course content. In the course, students learn about how to prepare dishes and the importance of food preservation. Garden-based learning curriculum teaches students how to prepare meals while also pushing them to think about where their food is coming from and how to make informed decisions about buying food. It also teaches students by allowing them to experience and work hands on. The curriculum for garden-based learning does not take away from the content but enhances the curriculum. Although much of the curriculum for garden-based learning can fit into science curriculum (biology, earth science and chemistry), I chose the Family and Consumer Science course because of the flexibility of the course and because it is the first time the school is implementing a program like this.

DISCUSSION

hold all the knowledge, there is an outside resource that can train new teachers or teach the lessons during transition. It would allow for students to receive uniform instruction and content.

Another solution offered by Graham & Zidenberg-Cherr (2005) is to provide professional development in garden-based learning to teachers. Providing professional development for teachers would better prepare them to implement garden-based content into their curriculums. It would also boost the confidence of teachers who are new to this subject matter. They would also feel more comfortable and enthusiastic about teaching the material. There have been opportunities for the educators at the Meadville Area Middle School to attend professional development around how to implement garden-based learning into the curriculum. A few teachers, Kerstin Martin, Guy McUmber, the principal, vice principal and myself attended a workshop hosted by Grow Pittsburgh. The workshop offered resources on where to buy discounted materials for gardens, lesson plan materials and space to talk with other educators about best practices around this work. Although the workshop provided helpful resources, the teachers felt as though they would not be able to implement it into their curriculum but wanted to instead provide the experience through some sort of after school program. Instead of adding an additional stress to the teachers, I've decided to create the lesson plans and have people specialized in both teaching the lessons and training others to teach the lessons.

Time Commitment

Managing a garden and developing curriculum takes time and commitment. Teachers expressed that having a lack of time to develop curriculum and manage a garden as an issue (Graham 2004). Developing the lessons for teacher removes that additional stress and creates opportunity for teachers to focus on the content covered in the lessons.

Garden management is not an issue specific to the Meadville Area Middle School. The garden the school will utilize is a community garden that was created out of the Community Wellness Initiative. The garden is located at the MARC, which is within walking distance from the middle school. The garden will be managed by Kerstin Martin and possibly other workers from MARC, Allegheny College or students from CCSD. They will be responsible for tending to the crops. Having a set up where teachers do not have to worry about tending to the garden reduces the time they have to commit to the garden. It does not make the garden seem like a burden.

Achieving Department of Education State Standards

All of the lessons are aligned with the Pennsylvania's Department of Education Academic Standards for Family and Consumer Science (Department of Education Academic Standards). There were five standards that directly aligned with the lessons. The standards include: 11.1.9 F, 11.3.6 A, 11.3.7 F, 11.3.9 A and 11.3.9 G.

Standard 11.1.9 F: "Evaluate different strategies to obtain consumer goods and services". Lessons one, two and four directly align with this standard. The lessons highlight the environmental impacts of food production and ways to individual choice can alleviate some of the problems.

Standard 11.3.7 F: "Hypothesize the effectiveness of the use of meal management principles (e.g., time management, budgetary considerations, sensory appeal, balanced nutrition, safety, sanitation)". Lessons two, three, four, five and six directly align with this standard. These lessons teach students

Assessment

The other crucial factor to consider when implementing garden-based learning to a curriculum is assessment. Assessment is crucial this project for two reasons. The first is, it allows the educators at the Meadville Area Middle School to measure their students learning and ensure they are meeting course goals. Seeing that this project is in collaboration with the Community Wellness Initiative, the assessment piece provides information about how successful the program is. It is important to diversify assessment techniques to accommodate all student learning styles. In my lessons the students are able to demonstrate their learning through their written work, orally (through their discussions) and by administering a pre and post survey. The assessments for each of the lessons were created using the Bloom's Taxonomy model.

The Bloom's Taxonomy model aims to teach students for understanding rather than knowledge. It is believed that if students are taught for understanding then students would be brought to a higher level of learning. There are levels six levels to Bloom's Taxonomy: knowledge, comprehension, application, analysis, synthesis and evaluation. The first level knowledge, requires students to recall facts related to the topic taught. The next level comprehension, requires students to reword and explain something they learned in a meaningful manner. Followed by comprehension is application. Application requires students to think holistically about the concepts and to be able to apply the concepts to novel situations. (Lord & Baviskar 2007) Once students are able to apply concepts they learned they then move to the analysis level. In the analysis level students should be able to break ideas into component parts and uncover the unique characteristics of what they have been taught. Students then move to the synthesis level where they are able to pattern knowledge in new original ways and use their creativity. Finally, at the evaluation level students are expected to make judgements about what they learned based on either external or internal criteria. Each of the lessons aims to get students to achieve the higher levels of Bloom's Taxonomy. One technique I used to get students to the higher levels of Bloom's Taxonomy was using group/class discussions to get students think about the concepts they learned while also forming their own opinions about the concepts. Another technique I used was developing writing prompts to get students to reflect on their experiences. The writing components asks students to first recall concepts from the lesson, apply them to their daily lives and then form an opinion based on their knowledge of the concepts and their personal experiences. (Lord & Baviskar 2007)

Written

In lessons 1, 3, 5 there are written assessments. The students were asked to answer a series of questions that challenges them to apply the concepts they learned. The questions also asked students to form an opinion about some aspect of the food system and to support their opinion based on the material covered in class. For example in "Lesson 3: What is in our food (Part 2)", the reflection question at the end of the lesson asks "Consider the price, energy to make and ingredients in both the homemade granola bars and store bought granola bars. Would you rather buy or make your granola bars? Why or why not?". The first part of the question asks students to think about what they learned. They have to think back to "Lesson 1: Where does our food come from?", where they learned about how food is produced and the impacts our food system has on the surrounding environments. The second part of the question requires students to apply the concepts from "Lesson 2: What is in our food? (Part 1)". In Lesson 2 the students learn exactly what ingredients like soy lecithin, fructose and glycerin are. They also compare some of the ingredients in processed granola bars to the ingredients in the homemade granola bars that may serve a similar purpose. For both parts of the question

because students learn about nutrition. Nutrition is directly connected to the food system and the environment. However content around germination and soil chemistry does not fit in with the Family and Consumer Science class, but it would fit in better in a Biology class or Earth Science class. Dividing up the different content into different subjects will allow more students to engage in garden-based learning. As of now, only the students in the Family Consumer Science class are being exposed to garden-based learning.

THE LESSONS

There are eight lesson plans addressing the ecology, nutrition, and sustainability of growing foods locally and the practical benefits of doing so. Lessons focus on where food comes from, what is in our food, buying local, budgeting meals, food spoilage, and harvesting.

Family and Consumer Science

- **Lesson 1: Introduction: Where does our food come from?**
 - *Objective:* Students will be able to discuss the hidden cost of producing meat and produce.
 - Class Activity
 - Watch “True Cost” and discuss the true cost of buying produce and meat
 - Independent Activity (14 mins)
 - Think about the true cost of your favorite meal
- **Lesson 2: What is in our food? (Part 1)**
 - *Objective:* Students will be able to identify and read the nutrition labels of food.
 - Class Activity
 - Students will compare the ingredients in store bought granola bars and homemade granola bars.
 - Independent Activity
 - Deconstructing food ingredients
- **Lesson 3: What is in our food? (Part 2)**
 - *Objective:* Students will be able to make homemade no bake granola bars.
 - Class Activity
 - Make no baked granola bars
 - Independent Activity
 - Students will reflect on whether they would buy granola bars or make them homemade. They will need to keep in mind the price, environmental impact and nutrition value.
- **Lesson 4: Buying Local: Food Miles**
 - *Objective:* Students will be able to discuss the benefits of buying local.
 - Class Activity:
 - Students will map out the distance food travels. The lesson concludes with an energizing activity where students expend their own energy to demonstrate how far each meal has traveled from farm to plate.
- **Lesson 5: Budgeting you Food (Part 1)**
 - *Objective:* Students will be able to create a budget.
 - Class Activity
 - Students will engage in an interactive activity where they will create their own budget to buy and make healthy chips.
- **Lesson 6: Budgeting your Food (Part 2)**
 - *Objective:* Students will be able to make homemade chips.
 - Class Activity
 - Students will make their chips and discuss how they created their budget.
- **Lesson 7: Food Spoilage**
 - *Objective:* Students will understand the importance of food storage.
 - Class Activity: Students will learn about the history of food storage.
- **Lesson 8: Harvesting**
 - *Objective:* Students will be able to harvest tomatoes, onions, cilantro, garlic and bell pepper
 - *Class Activity:* Students will harvest tomatoes, peppers, onions, garlic can cilantro and use the vegetables to make salsa.

Lesson 1: Where does our food come from?

Objective: Students will be able to discuss the hidden cost of producing meat and produce.

Standards: PA FCS Standard 11.1.9 F

Skills: Evaluate different strategies to obtain consumer goods and services

Grade Level: 7-8th grade

Time: 40 minutes

Materials:

- "The True Cost of Food" video found on the vimeo website. It was created by the Sierra Club National. The video can be found at the following link: <https://vimeo.com/37835035>. Make sure to request permission from your I.T. administrator to get access through your internet browser.
- A computer or laptop to play the video
- Food Experience Bingo game (one for each student)
- "Where does our food come from?" handout (one for each student)
- "Growing Livestock: Feed and Water Needs" diagram

Opening (5-8 minutes): Students will play the Food Experience Bingo game. The rules of the game are as follows:

- Students will be given a Bingo Board. There are three different versions of the board to allow for some competition.
- Students need to get Bingo by having three spaces signed diagonally, horizontally or vertically. In order to get someone to sign one of their squares they must share a story or experience that relates to the word. After sharing their story they sign the person's board. The goal is to get people to share their stories/ experiences with each other. Every student should be signing other people's boards and not their own.
 - Example: I chosen the word gardening on someone else's board. The first time I gardened was my freshman year in college. I volunteered at a community garden and help plant and harvest a variety of vegetables. It was also the first time I ate a vegetable directly off of the plant.

They will then regroup and talk about what they heard answering the following questions.

- Does anyone want to share an experience from their board?
- Did any of the topics stand out to you? Why or why not?
- Did anyone you talked to have a similar experience to you?

Mini Lesson (20 minutes): Before getting started break the class up into groups of 4 or 5. Then show parts of the video "True Cost of Food". This video explains the different aspects of food production. It list the different cost (environmental, economic and health issues) of both produce and meat production in the United States.

Part 1: Show 3:02-7:38. This section of the video talks about the true cost of buying meat (specifically beef). After students watch the snippets have them discuss in groups the following questions. Each question is listed and the possible answers are bulleted. The answers come directly from the video.

- What are some of the hidden cost of producing meat in the United States?

Farm

Cooking

Farmer's Market

Fast Food

Free Space

Gardening

Grocery Store

**Fresh Fruits &
Vegetables**

Favorite Food

Farmer's Market

Grocery Store

Fast Food

Favorite Food

Free Space

Gardening

Cooking

**Fresh Fruits &
Vegetables**

Farm

Name: _____ Date: _____

Where does our food come from?

You will watch parts of the video "Trust Cost". The video explains the different aspects of food production. It list the different cost (environmental, economic and health) of both meat and produce production in the United States. It also explains how money allocated to both big farms and small farms effect the quality of food and the environmental impacts in has on society.

Group Activity:

In groups you will discuss the following questions and record your answers.

1. What are some of the hidden cost of producing meat in the United States?

2. What are some of the hidden cost of producing produce in the Unites States?

3. How do farm subsidy allocation impact big farms and small farms?

Lesson 2: What is in our food? (Part 1)

Objective (1 min): Students will be able to identify and understand how to read the ingredients in the foods they eat.

Standards:

Skills:

PA FCS Standard 11.3.9 G	PA FCS Standard 11.3.7 F	PA FCS Standard 11.3.9 F
Describe the physical, biological, and chemical changes that take place in food preparation	Hypothesize the effectiveness of the use of meal management principles (e.g., time management, budgetary considerations, sensory appeal, balanced nutrition, safety, sanitation)	Evaluate different strategies to obtain consumer goods and services

Grade Level: 7-8th grade

Time: 40 minutes

Materials:

- Quaker Chewy Granola Bars (or any other granola bar brand) boxes or wrappers with visible ingredient list. Bring in chocolate chip, peanut butter, oatmeal raisin and craisin.
- Chart paper and Markers
- Board to write notes
- Ingredients for No Bake Granola Bars

Opening (4 mins): Students will be assigned their cooking groups. Assign groups by asking the question "who likes peanut butter granola bars, oatmeal raisin granola bars, chocolate chip granola bars or craisin granola bars?". Then split them into groups by who ever liked the same type of granola bar. Each group member will then be assigned cooking roles for when they make their own granola bars as a group. Pick roles (measure ingredients, stir ingredients and press mixture) by picking from a hat.

Mini Lesson (20 mins): Students will learn how identify the various ingredients in granola bars. They will be looking under the "Ingredient" label on the granola bars. (Bring in boxes of store bought granola bars or the wrappers. If you can bring in the actual boxes the nutrition facts can be found at this website: <http://www.quakeroats.com/products/oat-snacks/chewy-granola/chocolate-chip.aspx> I used Quaker Chewy Bars, but you are free to use any brand.) We will be comparing the ingredients in store bought granola bars and homemade granola bars. We will use the ingredients of the chocolate chip flavored granola bars. We will also learn how to read the labels.

Give each group a granola bar box or wrapper with the flavor they chose (peanut butter, oatmeal raisin, chocolate chip and craisins). Tell students to look at the ingredient list. On the board have the following terms written with their definition (this can be written on chart paper or directly,

Note:

- You do not have to refrigerate mixture. Refrigerating the mixture just makes it hard and gives it the texture of the granola bars you buy at stores.

Assessment: Assessment will take place in part 2 of the lesson.

Example chart for the class activity:

Quaker Chocolate Chip Chewy Bar (store bought granola bar)	Homemade No Bake Granola Bar
Granola	Rolled Oats
Whole Grain Rolled Wheat	Natural Crunchy Peanut Butter
Soybean Oil	Ground Flaxseed
Dried Coconut	Dried Cranberries
Whole Wheat Flour	Chocolate Chips
Sodium Bicarbonate	Sliced Almonds
Soy Lecithin	
Semi-sweet Chocolate Chips	
Corn Syrup	
Brown Rice Crisp	
Glycerin	
Molasses	
Sugar	

Lesson 3: What is in our food (Part 2)

Objective: Students will be able to make homemade no bake granola bars.

Standards: PA FCS Standard 11.3.7 F

Skills: Hypothesize the effectiveness of the use of meal management principles (e.g., time management, budgetary considerations, sensory appeal, balanced nutrition, safety, sanitation)

Grade Level: 7-8th grade

Time: 40 minutes

Materials:

- Ingredients for granola bars and recipe
- Large Post It paper for group activity
- Reflection handout

Opening: Students will get into their jobs and set up their stations

Mini Lesson: Review the recipe and answer any questions

Independent Activity: After students finish making their granola bars, they will reflect on the following question: "Would you rather buy granola bars or make them homemade. Why or why not. Consider the price, energy to make them, and nutrition facts." Be sure to write down your reflections.

Part 1: In groups create some sort of visible (flow chart, diagram etc...) to depict whether you would buy or make granola bars. In their visibles students need to be sure to consider the price, energy to make them and nutrition facts. Students should be actively discussing their answers and working together to come to a consensus.

Part 2: If there is time left, have students record their reflections on the handout.

Assessment: Learning will be assessed based on how well students answer the independent activity question.

Note: You do not have to refrigerate mixture. Refrigerating the mixture just makes it hard and gives it the texture of the granola bars you buy at stores.

Reflection: Consider the price, energy to make and ingredients in both the homemade granola bars and store bought granola bars. Would you rather buy or make your granola bars? Why or why not?

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Lesson 4: Buying Local: Food Miles

Objective: Students will be able to discuss the benefits of buying local

Standards:

Skills:

PA FCS Standard 11.1.9 F	PA FCS Standard 11.3.7 F
Evaluate different strategies to obtain consumer goods and services	Hypothesize the effectiveness of the use of meal management principles (e.g., time management, budgetary considerations, sensory appeal, balanced nutrition, safety, sanitation)

Materials:

- Food Mile Clue Cards
- Food Miles Dinner Menu
- Chart Paper to record class food miles calculations

Opening: Taste test between locally produced foods and foods produced further away.

- Chocolate Milk
- Bread

Mini Lesson: Students will consider the sources of our food, and the distance food travels to reach our plates. Working in groups, students will trace the steps that a meal, either sourced locally or non-locally, took to reach the plate. Students will compile data and calculate the miles each meal traveled. The lesson concludes with an energizing activity where students expend their own energy to demonstrate how far each meal has traveled from farm to plate.

Group Activity: Part 1: Split students into 6 groups. Each group will get an envelope containing: dinner menu, food clue cards, and ingredient transportation worksheet. Explain to students that the goal of this activity is find out the total miles that each different meal traveled. Demonstrate how to fill out the chart. (Draw the chart on the board and label "Total Miles Traveled", with empty spaces)

Meal	Local	Non Local
Roast Chicken	360	20,206
Spaghetti	290	24,062
Hamburger	365	28,506

As each group finishes, ask them to report their total miles traveled for their meal on the chart. If some groups finish early, ask them to report back the on number of states and countries their meal traveled to. Ask for student reactions: What do they notice? How do they feel about it? Are they surprised? What new questions do they have?

I am bread

***I was baked at Creative Crust Bakery in Meadville PA.**

*** I was transported 1.2 miles to the Meadville Area Middle School by car to the Meadville Area Middle School.**

I am a chicken

*** I was raised at Fruitful Farm in Cochran, PA.**

*** First, I transported 11.5 miles to the Market House Farmers' Market in Meadville, PA by car for distribution.**

***Last, I traveled 1.6 miles from the Farmers' Market to your plate after you purchased me for dinner.**

Local Chicken

Local Chicken

I am ice cream

*** I am made from cows' milk. The milk came from cows raised at Little Bit of Heaven farm.**

*** First, the milk from cows was used to make me on site.**

*** Next, I was transported 17.8 miles by car your freezer.**

Local Chicken

I am lettuce

***I was grown in at the MARC community garden.**

***I was picked and traveled 0.1 mile from the garden to the Meadville Area Middle School to end up on your plate.**

Local Chicken

I am a tomato

***I was grown in at the MARC community garden.**

***I was picked and traveled 0.1 mile from the garden to the Meadville Area Middle School to end up on your plate.**

Local Chicken

I am a cucumber

*** I was grown at Fruitful Farm in Cochran, PA.**

*** First, I was picked and transported 11.5 miles to the Market House Farmers' Market in Meadville, PA by car for distribution**

***Last, I traveled 1.6 miles from the Farmers' Market to your plate after you purchased me for dinner.**

Local Chicken

I am corn

*I was grown in at the MARC community garden.

*I was picked and traveled 0.1 mile from the garden to the Meadville Area Middle School to end up on your plate.

Local Chicken

I am ice cream

*I am made from cows' milk. The cows were raised at an unknown farm in Watertown, WI.

*First, the milk transported 47 miles to Milwaukee, WI by truck for pasteurization.

*Next, the milk was transported 1,052 miles to Breyer's Ice Cream Processing Plant in Framingham, MA by truck, where it was made into ice cream, labeled, and packaged.

*Then, I was transported 23 miles to the Breyers Ice Cream Distribution Warehouse in Boston, MA by truck for distribution.

*After that, I was transported 579 miles to your local Tops grocery store via truck in Meadville .

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-Local Chicken

I am bread

*I am made from wheat grown at unknown farms in Three Forks, Montana and Harper, Kansas.

* First the wheat was transported 951 miles from Three Forks, Montana to Inland, Nebraska by rail car where it was milled into flour.

* Then, it was transported 1712 miles to LePage Bakery in Auburn, Maine by truck where it was baked into bread.

*After that, I was transported 708 miles by truck your local Tops grocery store via truck in Meadville.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Chicken

I am a tomato

* I was grown at an unknown farm in San Joaquin, California.

*First, I was transported 20 miles to Sun Ripe Farms in Exeter, California by truck for washing and packaging.

* Next, I was transported 227 miles to West Coast Produce in Oakland, California by truck for distribution.

*Then, I was transported 2,571 miles to Tops grocery store in Meadville .

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Chick

I am lettuce

*I was grown at a farm owned by Foxy Produce Inc. in Castroville, California where I was picked and packaged.

*First, I was transported 9 miles to Salinas, California by truck where I was put in cold storage.

*Next, I was transported 2,664 miles to Tops grocery store in Meadville via truck.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Chick

I am chicken

*I was raised at an unknown farm in Albertville, Alabama wher was processed and packaged.

* First, I was transported 593 miles to the Tyson Chicken Company in Springdale, Arkansas by truck for distribution.

*Next, I was transported 996 miles to Tops grocery store in Meadville PA, via truck

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Chick

I am cucumber

* I was grown at an unknown farm in Hermosillo, Mexico.

*First, I was transported 175 miles to Nogales, Arizona by truck for packaging and distribution.

*Next, I was transported 551 miles to Coast Foods Los Angeles, California by truck for distribution.

* Then I was transported 2,461 miles to Tops grocery store in Meadville PA, via truck

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Chicken

I am corn

* I was grown at a farm owned by Foxy Produce Inc. in San Joaquin, California where I was picked and packaged.

* First, I was transported 124 miles to Salinas, California by truck for cold storage.

* Next, I was transported 2,664 miles to Tops grocery store in Meadville via truck.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Chick

I am bread

*I was baked at Creative Crust Bakery in Meadville PA.

* I was transported 1.2 miles to the Meadville Area Middle School by car to the Meadville Area Middle School.

Local Hamburger

I am a strawberry

*I was grown at Strawberry Lane Produce in Conneaut Lake, PA

*First, I was picked and transported 10.7 miles to the Market House Farmers' Market.

* Last I traveled 1.6 miles from the Farmers' Market to your plate after you purchased me for dinner.

Local Hamburger

I am lettuce

*I was grown in your neighbor's garden.

*I was picked and traveled 1 mile from your neighbor's garden to your plate.

Local Hamburger

I am French fries

*I was grown in your backyard garden.

* I was picked and traveled 3 miles from the vine to your plate the Meadville Area Middle School.

Local Hamburger

I am cheese

* I am made from cows' milk. The milk came from cows raised at Conneautee Creamery in Cambridge Springs, PA. First, the milk was made into cheese and packaged at Conneautee Creamery.

* First, I was transported 12.8 miles to the Market House in Meadville, PA by car.

* Last I traveled 1.6 miles from the Market House to your plate after I was purchased for your dinner.

Local Hamburger

I am a hamburger

*I am from a cow raised at Skelton Farms in Cambridge Springs Rd. Edinboro, PA. I was then taken to a small local family butcher to be processed.

* I was then picked up at the butcher and transported 19.5 miles to your plate.

Local Hamburger

I am honey

*I was made in hives at Vorisek's Backyard Bee where I was harvested, bottled, and labeled.

* First, I was transported 17.1 miles from Vorisek's to the Meadville Market House.

* Last I traveled 1.6 miles from the Market House to your plate after I was purchased.

Local Hamburger

I am an onion

*I was grown in at the MARC community garden.

*I was picked and traveled 0.1 mile from the garden to the Meadville Area Middle School to end up on your plate.

Local Hamburger

I am cheese

*I am made from cows' milk. The cows were raised at an unknown farm in Lancaster, California.

*First, the milk was transported 89 miles to California Dairies Inc. in Artesia, California by truck for pasteurization and processing into dry milk.

*Next, the dry milk was transported 1,152 miles to Kraft Cheese in Bremerton, Washington by air cargo where it was processed into cheese, labeled, and packaged.

*Then, I was transported 2,572 miles to Giant Eagle in Meadville, PA via truck.

*After that, I was transported 3.2 miles to your plate.

Non-local Hamburger

I am a hamburger

*I am from a cow raised at unknown farm in Nacogdoches, Texas.

*First, I was transported 42 miles to Texas Meat Packer in Henderson, Texas by truck for processing, packaging, and inspection.

*Next, I was transported 134 miles to the Dallas Airport by truck for distribution.

*Then, I was transported 871 miles to Kroger's Inc. in Cincinnati, Ohio by air cargo for re-packaging and labeling.

*After that, I was transported 336 miles by truck to the Giant Eagle in Meadville, PA.

* Last, I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner.

Non-local Hamburger

I am honey

* I was made in bee hives at an unknown farm somewhere near San Luis Obispo, California.

*First, I was transported 226 miles to the Sue Bee Honey Factory in Anaheim, California by truck where I was bottled and labeled for distribution.

Next, I was transported 32,464 miles to Giant Eagle in Meadville, PA.

*Last I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner

Non-local Hamburger

I am a strawberry

*I was grown at Las Adoberas Farm in Jocotepec, Mexico.

*First I was transported 39 miles to the airport in Guadalajara, Mexico by truck for distribution to the United States.

* Next, I was transported 1,310 miles by air cargo to Los Angeles, California for distribution in the United States.

*Then, I was transported 3,012 miles to the airport in Boston, MA for by air cargo for distribution.

*After that, I was transported 577 miles to Giant Eagle in Meadville by truck.

*Last, I traveled 3.2 miles from the Giant Eagle to your plate after you purchased me for dinner.

Non-local Hamburger

I am lettuce

*I was grown at a farm owned by Foxy Produce Inc. in Castroville, California where I was picked and packaged

*First, I was transported 9 miles to Salinas, California by truck where I was put in cold storage.

*Next, I was transported 2,662 miles to Giant Eagle by truck

*Last I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner.

Non-local Hamburger

I am French fries

* I am made from potatoes. I was grown at Amstad Produce in Hermiston, Oregon.

*First, I was transported 202 miles to Amstad Produce location in Sherwood, Oregon by truck for packaging and distribution.

*Next, I was transported 2,581 miles to Giant Eagle in Meadville, PA.

* Last, I traveled 3.2 miles from the Giant Eagle to your plate after you purchased me for dinner

Non-local Hamburger

I am an onion

*I was grown at a farm owned by Adams Produce Inc. in Hatch, New Mexico.

* First I was transported 1,121 miles to West Coast Produce in Oakland, California by truck for distribution.

*Next, I was transported 2,569 miles to Giant Eagle by truck.

* Last I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner

Non-local Hamburger

I am bread

*I am made from wheat grown at unknown farms in Three Forks, Montana and Harper, Kansas.

* First the wheat was transported 951 miles from Three Forks, Montana to Inland, Nebraska by rail car where it was milled into flour.

* Then, it was transported 1712 miles to LePage Bakery in Auburn, Maine by truck where it was baked into bread.

*After that, I was transported 708 miles by truck to your local Toj grocery store via truck in Meadville.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Hamburger

I am milk

*I am from cows raised at 86 Acre Farm in Saegertown, PA the cows were milked, and the milk was pasteurized, bottled, labeled.

* I was then picked up at the farm and taken to the Meadville Area Middle School to serve as your drink. I traveled 7.5 miles.

Local Spaghetti

I am a tomato

*I was grown in your backyard garden.

* I was picked and traveled 2 miles from the vine to your plate the Meadville Area Middle School.

Local Spaghe

I am ice cream

* I am made from cows' milk. The milk came from cows raised at Little Bit of Heaven farm.

* First, the milk from cows was used to make me on site.

* Next, I was transported 17.8 miles by car your freezer.

Local Spaghetti

I am bread

*I was baked at Creative Crust Bakery in Meadville PA.

* I was transported 1.2 miles to the Meadville Area Middle School by car to the Meadville Area Middle School.

Local Spaghe

I am garlic

*I was grown in at the MARC community garden.

*I was picked and traveled 0.1 mile from the garden to the Meadville Area Middle School to end up on your plate.

Local Spaghetti

I am spaghetti noodles

* I am made from wheat grown purchased at the Market House I traveled 1.7 miles from the Market House to your house.

*I was made homemade in your home, then traveled 0.2 miles to the Meadville Area Middle School .

Local Spaghe

I am Broccoli

*I was grown the Ackerman Farm.

* First, I was transported 3.1 miles to the Farmer's Market on Market Street via car.

*Last, I traveled 1.6 miles from the Farmer's Market to your plate.

Local Spaghetti

I am garlic

*I was grown at an unknown farm in Jinxiang, Shandong, China.

*First, I was transported 334 miles to Qingdao, China by truck for distribution.

* Next, I was transported 6,275 miles to West Coast Produce in Oakland, California by cargo ship where I was inspected for distribution in the United States.

*Then, I was transported 2,569 miles Giant Eagle in Meadville, PA by truck.

*Last I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner.

Non-local spaghetti

I am bread

*I am made from wheat grown at unknown farms in Three Forks, Montana and Harper, Kansas.

* First the wheat was transported 951 miles from Three Forks, Montana to Inland, Nebraska by rail car where it was milled into flour.

* Then, it was transported 1712 miles to LePage Bakery in Auburn, Maine by truck where it was baked into bread.

*After that, I was transported 708 miles by truck your local Tops grocery store via truck in Meadville.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Spaghetti

I am spaghetti noodles

*I am made from wheat grown at two different farms in Farmington, Iowa and Harper, Kansas.

*First, some of the wheat was transported 175 miles from Farmington, Iowa to Ames, Iowa by rail car where it where it was milled, processed into spaghetti noodles, labeled, and package

*Next, more wheat was transported 476 miles from Harper, Kansas to Ames, Iowa. by rail car where it where it was milled, processed into spaghetti noodles, labeled, and packaged.

*Then, I was sent 800 miles to Giant Eagle by truck

* Last, I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner.

Non-local spaghetti

I am a tomato

* I was grown at an unknown farm in San Joaquin, California.

*First, I was transported 20 miles to Sun Ripe Farms in Exeter, California by truck for washing and packaging.

* Next, I was transported 227 miles to West Coast Produce in Oakland, California by truck for distribution around the world.

*Then, I was transported 2,569 miles Giant Eagle in Meadville, PA by truck.

*Last I traveled 3.2 miles from Giant Eagle to your plate after y purchased me for dinner.

Non-local spaghetti

I am ice cream

*I am made from cows' milk. The cows were raised at an unknown farm in Watertown, WI.

*First, the milk transported 47 miles to Milwaukee, WI by truck for pasteurization.

*Next, the milk was transported 1,052 miles to Breyer's Ice Cream Processing Plant in Framingham, MA by truck, where it was made into ice cream, labeled, and packaged.

*Then, I was transported 23 miles to the Breyers Ice Cream Distribution Warehouse in Boston, MA by truck for distributor

*After that, I was transported 579 miles to your local Tops grocery store via truck in Meadville.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local Spaghetti

I am milk

*I am from a cow raised at a farm owned by Inter-American Products in Horse Cave, Kentucky.

*First, I was transported 130 miles to Murfreesboro, Tennessee by truck for pasteurization, bottling, labeling, and distribution.

*Next, I was transported 34 miles to Nashville, Tennessee by truck for distribution across the country.

*Then, I was transported 608 miles to Giant Eagle in Meadville, PA via truck.

*Last I traveled 3.2 miles from Giant Eagle to your plate after you purchased me for dinner.

Non-local Spaghetti

I am broccoli

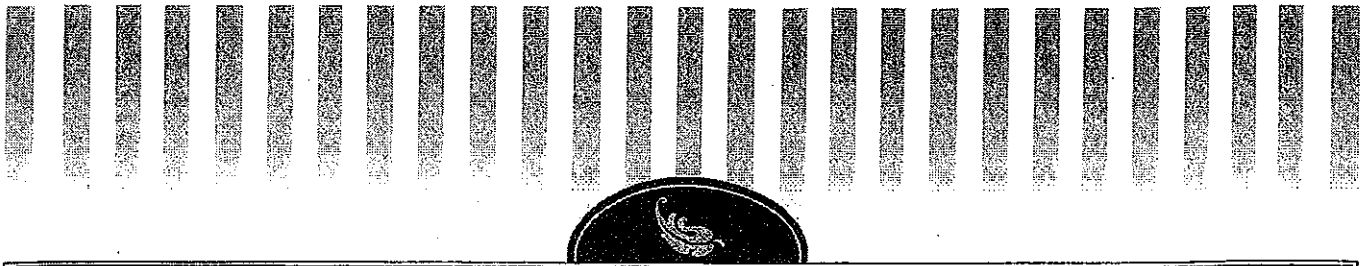
*I was grown at a farm owned by Foxy Produce Inc. in Castroville, California.

* First, I was transported 9 miles to Salinas, California by truck where I was put in cold storage.

* Next, I was transported 2,664 miles to Tops grocery store in Meadville via truck.

*Then I was transported 1.6 miles by car to Meadville Area Middle School.

Non-local spaghetti

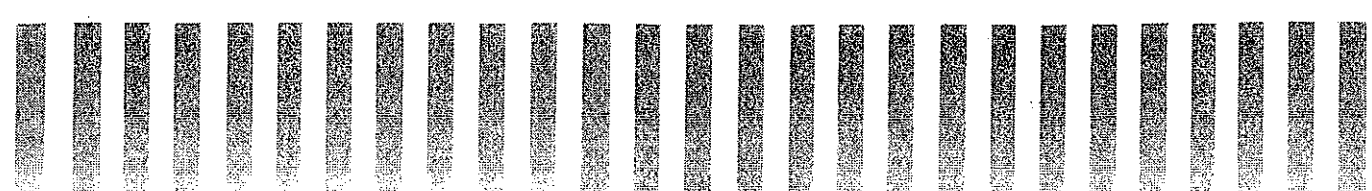


Roast Chicken Dinner—Local Menu

Today you will be dining on a sumptuous dinner of
locally raised roast chicken,
local artisan bread,
fresh salad made of locally grown lettuce, tomatoes, and cucumbers,
a delicious ear of corn on the cob,
followed by a dish of locally produced ice cream.

Ingredient	Miles traveled to your plate
Chicken	
Wheat (Bread)	
Lettuce	
Tomato	
Cucumber	
Corn on the Cob	
Ice Cream	
Total miles your meal traveled	

Bon appétit!



Hamburger Dinner—Local Menu

Today you will be dining on a delectable dinner of

A locally raised beef hamburger

on a bun of native Vermont wheat,

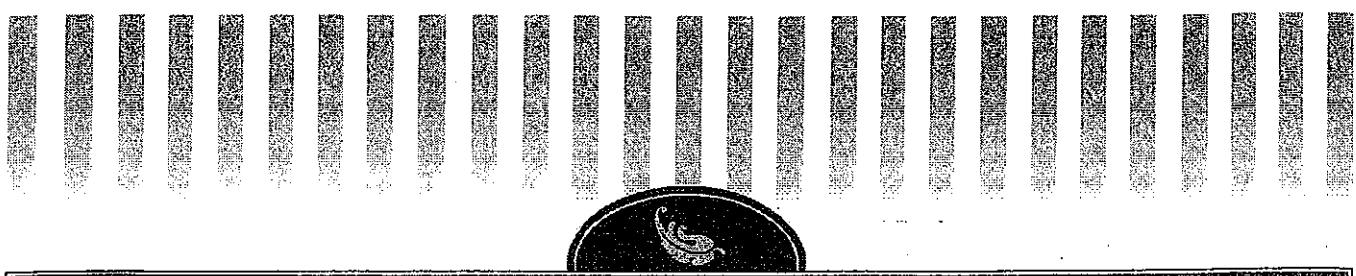
topped with locally grown lettuce, onion, and cheese,

served with a side of hand-cut fries made from local potatoes,

followed by a dish of local strawberries with a glaze of honey.

Ingredient	Miles traveled to your plate
Hamburger (beef)	
Wheat (Bun)	
Lettuce	
Onion	
Cheese	
French Fries (potatoes)	
Strawberries	
Honey	
Total miles your meal traveled	

Bon appétit!



Spaghetti Dinner—Local Menu

Today you will be dining on a scrumptious dinner of
homemade spaghetti noodles
with a garden-fresh sauce of tomatoes, garlic, and broccoli
served with a glass of frothy local milk, and
followed by a dish of locally produced ice cream.

Ingredient	Miles traveled to your plate
Spaghetti Noodles (wheat)	
Tomato	
Garlic	
Broccoli	
Bread (wheat)	
Milk	
Ice Cream	
Total miles your meal traveled	

Bon appétit!

Lesson 5: Budgeting your Food (Part 1)

Objective: Students will be able to create a budget

Standards: PA FCS Standard 11.3.7 F

Skills: Hypothesize the effectiveness of the use of meal management principles (e.g., time management, budgetary considerations, sensory appeal, balanced nutrition, safety, sanitation)

Grade Level: 7-8th grade

Time: 40 minutes

Materials:

- Chart paper, board or PowerPoint to present the information about budgeting
- Nutrition Facts for kale, turnips, sweet potatoes and beets
- The different modes of transportation written on the board
- The different grocery stores and the distance they are from the middle school

Opening: Ask students whether they have been grocery shopping with their guardian? Did their guardian have a specific list of food items, did they have a set amount of money they were willing to spend?

Mini Lesson: Ask students "What is budgeting?" (Answer: to allow or provide a particular amount of money to a budget.) Have a discussion about the importance of making a budget and how to create a budget. Ask students to also think about how often people may go shopping (weekly, biweekly, monthly, etc...) Budgets are different for everyone.

- What is a budget?
 - A budget is an estimate of income and expenditure for a set period of time.
 - Allocating a set amount of money for specific things.
 - The purpose of a budget is to help you save money or not spend money you do not have.
- How do you create a budget? What to consider when making a budget
 - When creating a budget it is important to know the amount of money you have to spend.
 - Then think about the items you plan to buy and any other expenses (such as gas to drive there)
 - Write out the list and assign each an estimate of a price. Make sure when you add all of your expenses it does not exceed the amount of money you have.
- Tips
 - Compare prices of items to other grocery stores
 - Buy foods that be used in multiple meals
 - Buy in bulk
 - Think seasonably

Group Activity: Part 1: Students will be told they have \$20. There will be several ingredients in the front of the room, and different modes of transportation. Their job is to create a budget for making chips for the entire class. They have to think about which vegetable they will turn into chips, the ingredients they will need and nutrition facts. They will then have to explain why they chose the items they bought.

Crispy Kale "Chips"

Ingredients

- 1 head kale,
- 2 tablespoons olive oil
- Sea salt, for sprinkling (you can use regular salt)

Directions

1. Preheat the oven to 275 degrees F.
2. Rinse the kale thoroughly and let dry..
3. Remove the ribs from the kale and cut into 1 1/2-inch pieces.
4. Place cut up kale on a baking sheet and toss with the olive oil and salt.
5. Bake for about 10 minutes and then flip leaves. Bake for another 10 minutes until crisp. (Your kale should bake for 20 minutes in total)

Note: If you do not have access to an oven you can bake the kale in a toaster oven. You will bake it for 2 ½ minutes then rotate the tray and cook for another 2 ½ minutes. You can also make the chips in the microwave. Cook for 3 minutes or until crisp. If your chips are not crisp after 3 minutes cook in the microwave in 30 second increments until they are crisp.

Baked Veggie Chips

Ingredients

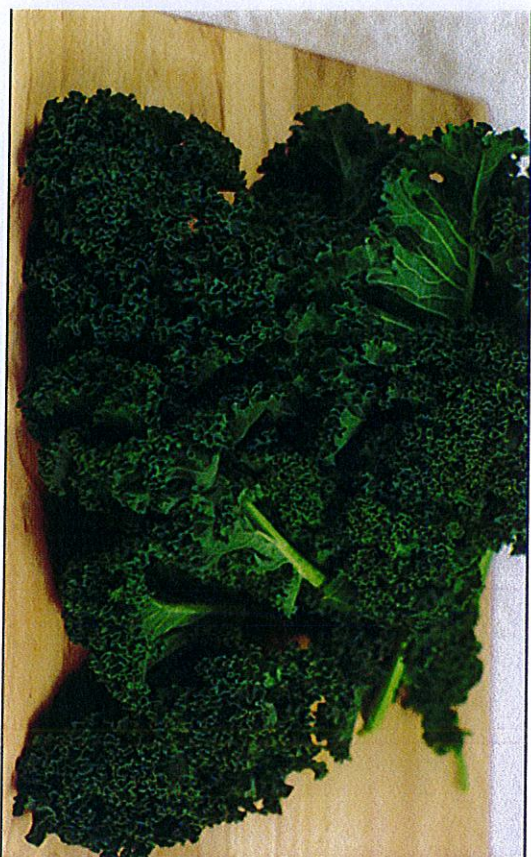
- 2 large turnips
- 2 sweet potatoes
- 2 purple or golden beets
- Fine sea salt
- Olive oil cooking spray

Directions

1. Preheat the oven to 375
2. Rinse and cut the ends of the turnips and toss. Peel the remainder if the parsnip and cut in halves lengthwise.
3. Rinse and peel the sweet potatoes and cut in halves crosswise.(Rinse again after cutting in halves)
4. Rinse and peel the beets and cut in halves.
5. Take a hand held slicer and slice the vegetables so they are thin like potato chips. (If you do not have a hand held slicer cut the vegetables very thin)
6. Place the vegetable slices on paper towels in a single layer; sprinkle with sea salt. Let stand for 15 minutes, then blot dry.
7. Spray the baking sheet with olive oil cooking spray and place vegetables on the baking sheet.
8. Bake until crisp for about 20 minutes.
9. Sprinkle with salt and let the chips cool for 5 minutes.

Note: If you do not have access to an oven you can make the chips in the microwave. Place the sliced vegetables on a microwave plate and cook on high for 2-3 minutes. Turn the slices over and microwave for additional 2-4 minutes until they start to crisp and brown around the edges.

KALIB



Grocery Store	Regular Price	Organic Price
Tops		
Giant Eagle		
Walmart		

Nutrition Facts

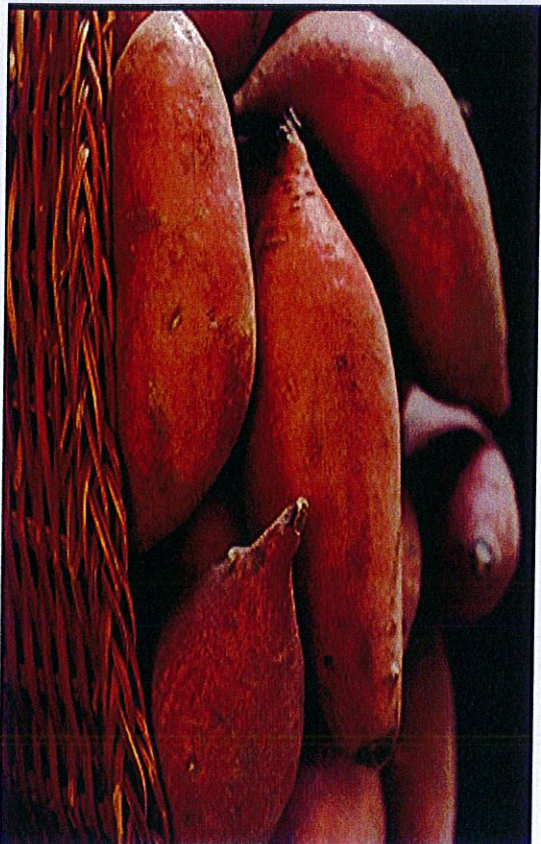
Serving Size 136 g

Amount Per Serving		Calories from Fat 2
Calories 58		% Daily Value*
Total Fat 0g		0%
Saturated Fat 0g		0%
Trans Fat		
Cholesterol 0mg		0%
Sodium 106mg		4%
Total Carbohydrate 13g		4%
Dietary Fiber 4g		15%
Sugars 9g		
Protein 2g		
Vitamin A	1% • Vitamin C	11%
Calcium	2% • Iron	6%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

Sweet Potato



Grocery Store	Regular Price	Organic Price
Tops		
Giant Eagle		
Walmart		

Nutrition Facts

Serving Size 136 g

Amount Per Serving

Calories 58 Calories from Fat 2

% Daily Value*

Total Fat 0g 0%

Saturated Fat 0g 0%

Trans Fat

Cholesterol 0mg 0%

Sodium 106mg 4%

Total Carbohydrate 13g 4%

Dietary Fiber 4g 15%

Sugars 9g

Protein 2g

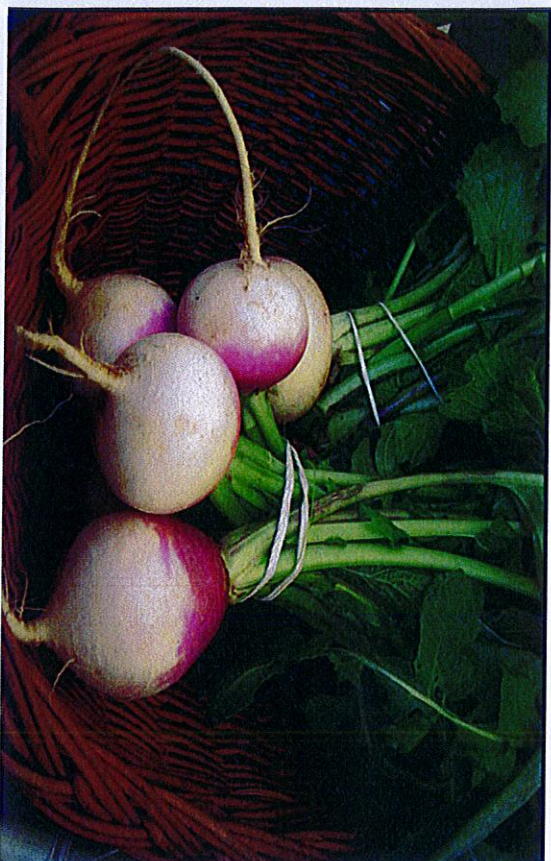
Vitamin A 1% • Vitamin C 11%

Calcium 2% • Iron 6%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

TURBUNT



Grocery Store	Regular Price	Organic Price
Tops		
Giant Eagle		
Walmart		

Nutrition Facts

Serving Size 136 g

Amount Per Serving

Calories 58 Calories from Fat 2

% Daily Value*

Total Fat 0g 0%

Saturated Fat 0g 0%

Trans Fat

Cholesterol 0mg 0%

Sodium 106mg 4%

Total Carbohydrate 13g 4%

Dietary Fiber 4g 15%

Sugars 9g

Protein 2g

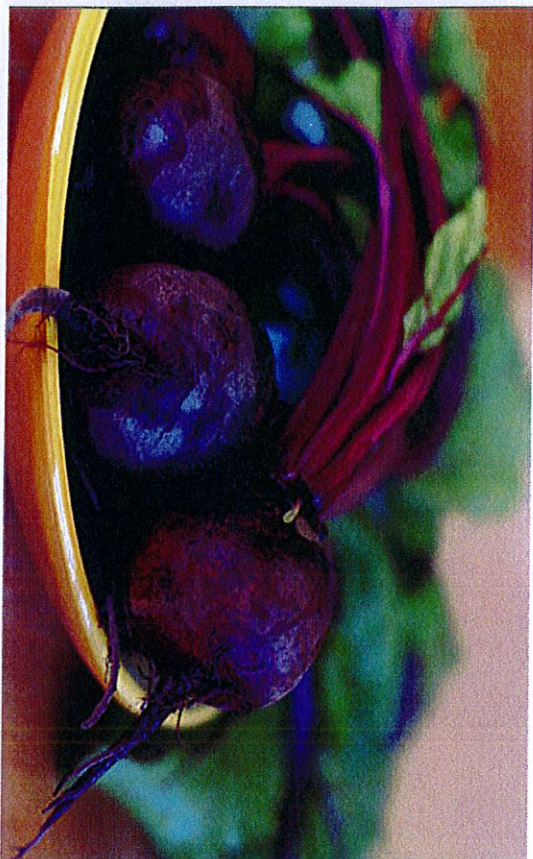
Vitamin A 1% • Vitamin C 11%

Calcium 2% • Iron 6%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

Beet



Grocery Store	Regular Price	Organic Price
Tops		
Giant Eagle		
Walmart		

Nutrition Facts

Serving Size 136 g

Amount Per Serving

Calories 58 Calories from Fat 2

% Daily Value*

Total Fat 0g 0%

Saturated Fat 0g 0%

Trans Fat

Cholesterol 0mg 0%

Sodium 106mg 4%

Total Carbohydrate 13g 4%

Dietary Fiber 4g 15%

Sugars 9g

Protein 2g

Vitamin A 1% • Vitamin C 11%

Calcium 2% • Iron 6%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

NutritionData.com

Name: _____

Date: _____

Budgeting Our Foods (Part 1)

The task will be to make chips for the entire class. Each group will be given \$35 to make either kale or veggie (sweet potato, turnip, beet) chips. You will be responsible for creating a budget that considers both the price to purchase your food items and the cost of transportation. When picking your chips consider the nutritional value, environmental impacts and time it takes to prepare the chips. This worksheet will help you and group members plan your budget.

1. Circle One

Kale Chips or Veggie Chips (sweet potato, turnip and beet)

Car or CATA Bus

2. Fill out the table

3. What are the environmental impacts of the chips you chose? Consider the transportation you chose and how each of your ingredients were produced.

Name: _____

Date: _____

In your groups you will make either "Crispy Kale Chips" or "Baked Veggie Chips" (CHOOSE ONE). You will work together as a team to follow the recipe carefully. Keep in mind your budget, why your team picked the type of chip they did and the process it took to make the chips.

Member Assignment

Rinse and Dry the Kale	Chop the Kale	Place on baking sheet and toss	Bake and check chip crispiness

Crispy Kale "Chips"

Ingredients

- 1 head kale,
- 2 tablespoons olive oil
- Sea salt, for sprinkling (you can use regular salt)

Directions

1. Preheat the oven to 275 degrees F.
2. Rinse the kale thoroughly and let dry..
3. Remove the ribs from the kale and cut into 1 1/2-inch pieces.
4. Place cut up kale on a baking sheet and toss with the olive oil and salt.
5. Bake for about 10 minutes and then flip leaves. Bake for another 10 minutes until crisp. (Your kale should bake for 20 minutes in total)

Note: If you do not have access to an oven you can bake the kale in a toaster oven. You will bake it for 2 ½ minutes then rotate the tray and cook for another 2 ½ minutes. You can also make the chips in the microwave. Cook for 3 minutes or until crisp. If your chips are not crisp after 3 minutes cook in the microwave in 30 second increments until they are crisp.

Name: _____

Date: _____

Member Assignment

Rinse, peel, chop and slice turnip	Rinse, peel, chop and slice sweet potato	Rinse, peel, chop and slice beets	Toss in sea salt and bake	Check chip crispiness

Baked Veggie Chips

Ingredients

- 2 large turnips
- 2 sweet potatoes
- 2 purple or golden beets
- Fine sea salt
- Olive oil cooking spray

Directions

1. Preheat the oven to 375
2. Rinse and cut the ends of the turnip and toss. Peel the remainder of the parsnip and cut in halves lengthwise.
3. Rinse and peel the sweet potatoes and cut in halves crosswise. (Rinse again after cutting in halves)
4. Rinse and peel the beets and cut in halves.
5. Take a hand held slicer and slice the vegetables so they are thin like potato chips. (If you do not have a hand held slicer cut the vegetables very thin)
6. Place the vegetable slices on paper towels in a single layer; sprinkle with sea salt. Let stand for 15 minutes, then blot dry.
7. Spray the baking sheet with olive oil cooking spray and place vegetables on the baking sheet.
8. Bake until crisp for about 20 minutes.
9. Sprinkle with salt and let the chips cool for 5 minutes.

Note: If you do not have access to an oven you can make the chips in the microwave. Place the sliced vegetables on a microwave plate and cook on high for 2-3 minutes. Turn the slices over and microwave for additional 2-4 minutes until they start to crisp and brown around the edges.

Lesson 7: Food Spoilage

Objective: Students will understand the importance of food storage.

Standard: PA FCS 11.3.9 A

Skills: Explain how scientific and technological developments enhance our food supply (e.g., food preservation techniques, packaging, nutrient fortification)

Grade Level: 7-8th grade

Time: 40 minutes

Materials:

- Board to hang the different types of food storage
- "Types of Food Storage Information Sheets"
- List of hints for groups
- Ingredients for making pickles

Opening: What are some ways we store foods today?

Mini Lesson: History of food storage. Students will be broken into 8 groups and given hints to a type of food storage. The different types of storage should be posted on the board or in the front of the room. Once students figure out their type of food storage they should go to the board/ front of the room to pick up the facts. Afterwards they will pull out 2-4 facts about their type of food storage. The different types of food storage are: drying, freezing, fermentation, pickling, curing, jam and jelly, canning and chemical preservatives.

DRYING

In ancient times the sun and wind would have naturally dried foods. Evidence shows that Middle East and oriental cultures actively dried foods as early as 12,000 BC in the hot sun. Vegetables and fruits were also dried from the earliest times. The Romans were particularly fond of any dried fruit they could make. In the Middle Ages purposely built "still houses" were created to dry fruits, vegetables and herbs in areas that did not have enough strong sunlight for drying. A fire was used to create the heat needed to dry foods and in some cases smoking them as well.

Possible Responses:

- Middle East and oriental cultures dried fruits and vegetables using the sun as early as 12,000 B.C.

Hint:

- ★ Uses very cold temperature to preserve food.
 - ★ Led to the creation of the ice box.
-

FERMENTATION

Fermentation was not invented, but rather discovered. Opportunistic microorganisms fermented the starch-derived sugars into alcohols. It was invented around 7000 BC to make beer, wine and bread. So too can be said about fruits fermented into wine, cabbage into Kim chi or sauerkraut, and so on. In 1854, the French chemist Louis Pasteur determined that fermentation is caused by yeast. Fermentation was a valuable food preservation method. It not only could preserve foods, but it also created more nutritious foods and was used to create more palatable foods from less than desirable ingredients. Microorganisms responsible for fermentations can produce vitamins as they ferment. This produces a more nutritious end product from the ingredients.

Possible Answers:

- Invented around 7000 BC to make beer, wine and bread.
- In 1854, the French chemist Louis Pasteur determined that fermentation is caused by yeast.
- Microorganisms responsible for fermentations can produce vitamins as they ferment.
- Foods like kim chi and sauerkraut are made through the process of fermentation

Hint:

- ★ Caused by yeast.
 - ★ Things like sauerkraut and kimchi are made using this technique.
-

CURING

The earliest curing was actually dehydration. Early cultures used salt to help desiccate foods. Salting was common and even culinary by choosing raw salts from different sources (rock salt, sea salt, spiced salt, etc.). In the 1800's it was discovered that certain sources of salt gave meat a red color instead of the usual unappetizing grey. Consumers overwhelmingly preferred the red colored meat. In this mixture of salts were nitrites (saltpeter). As the microbiology of *Clostridium botulinum* was elucidated in the 1920's it was realized that nitrites inhibited this organism.

Possible Answers:

- The earliest form of curing was dehydration. Early cultures used salt to help remove the moisture from meats.
- In the 1800's it was discovered that certain sources of salt gave meat a red color instead of the usual unappetizing grey.

Hint:

★ Uses salt to preserve meat.

CANNING

Canning is the process in which foods are placed in jars or cans and heated to a temperature that destroys microorganisms and inactivates enzymes. This heating and later cooling forms a vacuum seal. The vacuum seal prevents other microorganisms from re-contaminating the food within the jar or can. Canning is the newest of the food preservations methods being pioneered in the 1790s when a French confectioner, Nicolas Appert, discovered that the application of heat to food in sealed glass bottles preserved the food from deterioration. He theorized "if it works for wine, why not foods?". It was thought that the exclusion of air was responsible for the preservations. It was not until 1864 when Louis Pasteur discovered the relationship between microorganisms and food spoilage/illness did it become clearer. Just prior to Pasteur's discovery Raymond Chevalier-Appert patented the pressure retort (canner) in 1851 to can at temperatures higher than 212°F. However, not until the 1920's was the significance of this method known in relation to *Clostridium botulinum*.

Possible Answers:

- It was pioneered in the 1790s when a French confectioner, Nicolas Appert, discovered that the application of heat to food in sealed glass bottles preserved the food from deterioration.
- Canning is the process in which foods are placed in jars or cans and heated to a temperature that destroys microorganisms and inactivates enzymes.

Hint:

- ★ An old technique still used today to store vegetables
- ★ Require jars or cans to complete the process

Class Activity:

Part 1: Have students discuss as a class how some of these techniques are used today. Some examples include canned vegetables or drying meat to make jerky. Challenge students to think critically about foods where it may not be as obvious, such as pasta. Pasta noodles are made then dried and chemical preservatives are added to help it have a longer shelf life.

Part 2: Make pickles as a class. Taste them in the next class period.

Quick and Easy Pickles**Ingredients**

- 3 1/2 ounces sea salt (about 1/3 cup plus 1 tablespoon)
- 1/2 cup apple cider vinegar
- 8 cups bottled water
- 1 1/2 pounds kirby cucumbers, thoroughly washed and dried
- Few sprigs fresh dill, washed and dried

Directions

Pickling vegetables refers to the simple process of submerging them in a salt and water solution (brine) or an acidic ingredient like vinegar. In very simple terms, the good bacteria that exists naturally on vegetables consumes the starches/sugars in the vegetable and secretes acids (namely lactic acid) that prevent spoilage. More importantly, the process adds flavor to vegetables, gives them brightness and acidity and, in some cases, increases their vitamin content!

Mix the sea salt, apple cider vinegar, and water and bring to a boil. Simmer for 5 minutes. Remove the brine from the heat and allow it to cool slightly. Arrange the cucumbers upright in a container large enough to hold the brine. Place the dill sprigs in amongst the cucumbers in the jars. The cucumbers should be fitted tightly and should come within 1/2-inch of the top of the container. Fill the container with the brine to the top and tap on a flat surface to remove any possible air bubbles.

- ★ Used in many processed foods.
 - ★ The use of chemicals to preserve food.
-

DRYING

In ancient times the sun and wind would have naturally dried foods. Evidence shows that Middle East and oriental cultures actively dried foods as early as 12,000 B.C. in the hot sun. Vegetables and fruits were also dried from the earliest times. The Romans were particularly fond of any dried fruit they could make. In the Middle Ages purposely built "still houses" were created to dry fruits, vegetables and herbs in areas that did not have enough strong sunlight for drying. A fire was used to create the heat needed to dry foods and in some cases smoking them as well.

FREEZING

Freezing was an obvious preservation method to the appropriate climates. Any geographic area that had freezing temperatures for even part of a year made use of the temperature to preserve foods. Less than freezing temperatures were used to prolong storage times. Cellars, caves and cool streams were put to good use for that purpose. In America estates had ice houses built to store ice and food on ice. Soon the "icehouse" became an "icebox". In the 1800's mechanical refrigeration was invented and was quickly put to use. Also in the late 1800's Clarence Birdseye discovered that quick freezing at very low temperatures made for better tasting meats and vegetables. After some time he perfected his "quick freeze" process and revolutionized this method of food preservation.

FERMENTATION

Fermentation was not invented, but rather discovered. Opportunistic microorganisms fermented the starch-derived sugars into alcohols. It was invented around 7000 BC to make beer, wine and bread. So too can be said about fruits fermented into wine, cabbage into Kimchi or sauerkraut, and so on. In 1854, the French chemist Louis Pasteur determined that fermentation is caused by yeast. Fermentation was a valuable food preservation method. It not only could preserve foods, but it also created more nutritious foods and was used to create more palatable foods from less than desirable ingredients. Microorganisms responsible for fermentations can produce vitamins as they ferment. This produces a more nutritious end product from the ingredients.

PICKLING

Pickling is preserving foods in vinegar (or other acid) and was invented in 2400 BC. Pickling may have originated when food was placed in wine or beer to preserve it, since both have a low pH. Perhaps the wine or beer went sour and the taste of the food in it was appealing. Containers had to be made of stoneware or glass, since the vinegar would dissolve the metal from pots. Never ones to waste anything our ancestors found uses for everything. The left over pickling brine found many uses. The Romans made a concentrated fish pickle sauce called "garum". It was powerful stuff packing a lot of fish taste in a few drops. There was a spectacular increase in food preservation in the sixteenth century owing to the arrival in Europe of new foods. Ketchup was an oriental fish brine that traveled the spice route to Europe and eventually to America where someone finally added sugar to it. Spices were added to these pickling sauces to make clever recipes. Soon chutneys, relishes, piccalillis, mustards, and ketchups were commonplace. Worcester sauce was an accident from a forgotten barrel of special relish.

CURING

The earliest curing was actually dehydration. Early cultures used salt to help desiccate foods. Salting was common and even culinary by choosing raw salts from different sources (rock salt, sea salt, spiced salt, etc.). In the 1800's it was discovered that certain sources of salt gave meat a red color instead of the usual unappetizing grey. Consumers overwhelmingly preferred the red colored meat. In this mixture of salts were nitrites (saltpeter). As the microbiology of *Clostridium botulinum* was elucidated in the 1920's it was realized that nitrites inhibited this organism.

JELLY & JAM

It is unknown when making jelly and jam were invented, however it is predicted that it began centuries ago in Middle Eastern countries. Preservation with the use of honey or sugar was well known to the earliest cultures. Fruits kept in honey were commonplace. In ancient Greece quince was mixed with honey, dried somewhat and packed tightly into jars. The Romans improved on the method by cooking the quince and honey producing a solid texture.

CANNING

Canning is the process in which foods are placed in jars or cans and heated to a temperature that destroys microorganisms and inactivates enzymes. This heating and later cooling forms a vacuum seal. The vacuum seal prevents other microorganisms from re-contaminating the food within the jar or can. Canning is the newest of the food preservations methods being pioneered in the 1790s when a French confectioner, Nicolas Appert, discovered that the application of heat to food in sealed glass bottles preserved the food from deterioration. He theorized "if it works for wine, why not foods?". It was thought that the exclusion of air was responsible for the preservations. It was not until 1864 when Louis Pasteur discovered the relationship between microorganisms and food spoilage/illness did it become clearer. Just prior to Pasteur's discovery Raymond Chevalier-Appert patented the pressure retort (canner) in 1851 to can at temperatures higher than 212°F. However, not until the 1920's was the significance of this method known in relation to *Clostridium botulinum*.

CHEMICAL PRESERVATIVE

Chemicals are added to foods to prevent spoilage, keep foods together, help maintain freshness or appearance and consistency. Along with emulsifying and stabilizing agents, preservatives also help to maintain freshness of appearance and consistency. Preservatives used to maintain moisture and softness in baked goods are known as antistaling agents (e.g. glyceryl monostearate). These substances are thought to act by preventing water loss from starches.

Lesson 8: Harvesting

Objective: Students will be able to harvest tomatoes, onions, cilantro, garlic and bell peppers.

Skills: Students will learn the proper way to harvest tomatoes, bell peppers, onions, garlic and cilantro

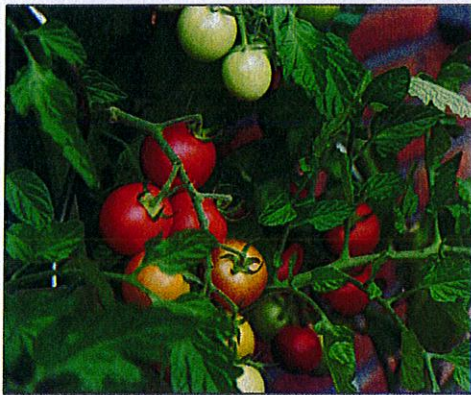
Materials:

- "How to Harvest" signs for each of the stations

Opening: Students will walk down to the MARC to harvest vegetables.

Mini Lesson: Students will tour the community garden at the MARC. Kerstin or student helpers will demonstrate how to harvest the the following vegetables: tomatoes, onions, cilantro, garlic and bell peppers. Students will then break up into 5 groups and harvest the following vegetables (tomatoes, onions, cilantro, garlic and bell pepper). Each station will have a sign posted of "how to harvest" each of the vegetables.

Tomatoes



How to Harvest:

- Look for tomatoes that are deeply colored and have no cracks or disease spots.
- Gently pick one off the vine, being careful not to crush it. Remove the calyx (the green cap) and place the tomato into a pint box

Onions



How to Harvest:

- Loosen the soil to encourage drying, and after a few days turn them up and let them cure on dry ground. ...
- When tops are brown, pull the onions.

Class Activity:

Part 1: Students will harvest the vegetable with their groups.

Part 2: After students harvest the vegetables, have them gather and prepare to make salsa. Students will remain in their groups and will be given a recipe. They should assign roles () and begin to make salsa. They will have the chance to taste their salsa at the end of the class.

Closing: Students will head back to the classroom

Assessment: Students will be assessed on how well they harvest the vegetables and make salsa.

Tomatoes

How to Harvest:

- Look for tomatoes that are deeply colored and have no cracks or disease spots.
- Gently pick one off the vine, being careful not to crush it. Remove the calyx (the green cap) and place the tomato into a pint box



Onions

How to Harvest:

- Loosen the soil to encourage drying, and after a few days turn them up and let them cure on dry ground. ...
- When tops are brown, pull the onions.



Cilantro



How to Harvest:

- Harvest when it is low.

Garlic

How to Harvest:

- Look for yellow tops and carefully lift the bulbs with a spade or garden fork.



Bell Peppers



How to Harvest:

- Use a sharp knife or scissors to cut peppers clean off the plant for the least damage.

References

- American Academy of Child and Adolescent's Facts for Family for Families. (2008). *Stages of adolescent development*. Retrieved from <http://thebccp.org/wp-content/uploads/2014/12/Stages-of-Adolescent-Development.pdf>
- Bell & Dymont (2008) Grounds for health: the intersection of green school grounds and health-promoting schools, *Environmental Education Research*, 14:1, 77-90, DOI: 10.1080/13504620701843426
- Bereiter, C. (1994). Constructivism, socioculturalism, and Popper's world 3. *Educational Researcher*, 23(7), 21-23. doi: 10.2307/1176935
- Blair, D (2009) The Child in the Garden: An Evaluative Review of the Benefits of School Gardening, *The Journal of Environmental Education*, 40:2, 15-38, DOI: 10.3200/JOEE.40.2.15-38
- Claranoelle , J. (n.d.). *No bake granola bars*. Retrieved from <http://allrecipes.com/recipe/no-bake-granola-bars-2/>
- Crawford Area Transportation Authority, Public Transit for Crawford County. (n.d.). *Bus fares, schedules and maps*. Retrieved from <http://www.catabus.org/bus-fares-schedules-and-maps/>
- Crean, M. (2013, July 22). *Being a teacher: Concerns, needs and what's lacking*. Retrieved from <http://topnotchteaching.com/site-updates/being-a-teacher-concerns-needs-whats-lacking/>
- D'Arabian, M. (Writer) (2011). Soup and sandwich savings: Crispy kale chips [Television series episode]. In *Ten Dollar Dinners*. Food Network. Retrieved from <http://www.foodnetwork.com/recipes/melissa-darabian/crispy-kale-chips-recipe.html?oc=linkback>
- DeMarco, L. (1999). *The factors affecting elementary school teachers' integration of school gardening into the curriculum*. Doctoral dissertation, Virginia Tech. University, Blacksburg
- Desmond, D., & Grieshop, J. (2004). *Revisiting garden-based learning in basic education*. Rome, Italy: Food and Agriculture Organization of the United Nations and International Institute for Educational Planning. Retrieved from <http://www.fao.org/3/a-aj462e.pdf>
- Department of Education Health Screens PA. (2011)
- Edible Schoolyard Pittsburgh - Garden Lesson Plans. (2012, October 5). Retrieved March 4, 2015, from <http://edibleschoolyardpgh.org/teach/lesson-plans/>
- Ekern, J. (2012, April 20). *Eating disorder statistics & research*. Retrieved from <http://www.eatingdisorderhope.com/information/statistics-studies>

- Nijhuis, M. (2011, May 26). Green failure: what's wrong with environmental education?. *Yale Environment 360*. Retrieved from http://e360.yale.edu/feature/green_failure_whats_wrong_with_environmental_education/2407/
- Nummer, B. (2002, May). *Historical origins of food preservation*. Retrieved from http://nchfp.uga.edu/publications/nchfp/factsheets/food_pres_hist.html
- "Nutrition facts." *Self Nutrition Data*. Self Nutrition Data. Web. <<http://nutritiondata.self.com/>>.
- Motor Trend. (n.d.). *Lowest gas prices for Meadville*. Retrieved from http://www.motortrend.com/gas_prices/33/pennsylvania/crawford/meadville/
- McAleese, J., & Rankin, L. (2007). Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. *Journal of the American Dietetic Association*, 107(4), 662-665. Retrieved from http://ac.els-cdn.com/S0002822307000144/1-s2.0-S0002822307000144-main.pdf?tid=9429f602-dae7-11e4-9323-00000aach35d&acdnat=1428165068_ab54eb340825e9ec87e298a73fd510b9.
- Ozer, E. (2007). The effects of school gardens on students and schools: conceptualization and considerations for maximizing healthy development. *Health Education & Behavior*, 34, 846-861. doi: 10.1177/1090198106289002
- Pennsylvania Department of Education, (2002). *Academic standards for family and consumer sciences* (22 Pa. Code, Chapter 4, Appendix D)
- Ramey, L. (2012). *Engaging urban students in a schoolyard beautification and gardening project*. Wright State University.
- Ramsey, C. E., & Rickson, R. E. (1976). Environmental knowledge and attitudes. *Journal of Environmental Education*, 8(1), 10-18
- Ramsey, L. (2008). Fed from above. *Foodservice Director*, 21(1), 30-31. Retrieved from <http://search.proquest.com/docview/236476903?accountid=8268>
- Ratcliffe, M., Merrigan, K., Rogers, B., & Goldberg, J. (2011). The effects of school garden experiences on middle school-aged student's knowledge, attitudes, and behaviors associated with behavior. *Health Promotion Practices*, 12(1), 36-43. doi: DOI: 10.1177/1524839909349182
- Roman, H. (2010). Rooftop garden design challenge. *Technology and Engineering Teacher*, 16-18.
- Robertwood Foundation. (2015). *County health rankings: Crawford county*. Retrieved from <http://www.countyhealthrankings.org/app/pennsylvania/2015/rankings/crawford/county/outcomes/overall/snapshot>
- Rye, J.A. (2012). Elementary school garden programs enhance science education for all learners. *Teaching Exceptional Children*, 44(6), 58-65.