CELF Summer Institute '10
Subject: Environmental Science Grade: 12th
School: Medfield High School MA Teacher: Cynthia B
Unit Title: Food and Sustainability

Food and Sustainability

MA State Standards addressed by the lesson (Include minimum of two state frameworks goals for this subject and grade level that this lesson aligns to):

Technology and Engineering

IV. Unintended negative effects from uses of science and technology/engineering

1. How government, industry, and/or individuals may be responsible for negative effects (discuss examples here in Massachusetts, the United States, and abroad)

- Damage to the environment or ecosystems in this country and elsewhere (e.g., from pesticides, clear cutting, dumping of toxic wastes, overfishing, industrial reliance on soft coal for energy)
- Some sources of damage or pollution (e.g., human ignorance, overuse or abuse of natural resources)
- Unanticipated ethical dilemmas (e.g., genetic cloning, contraceptives)

V. How science and technology address negative effects from uses of science and technology/engineering

- Examples of products and systems that address negative effects (e.g., automobile emission control devices, ceramics in car glass, biodegradable plastic)
- Costs and benefits of government regulations

2. How to balance risk-taking and creative entrepreneurial or academic activity with social, personal, and ethical concerns

National Education for Sustainability Standards addressed by the lesson (Include minimum of two EFS standards that this lesson aligns to)**:**

1. **1.1 Intergenerational Responsibility**
2. **2.1 Interconnectedness**
3. **2.2 Ecological Systems**
4. **2.3 Economic Systems**
5. **Social and Cultural Systems**
6. **Personal Action**
7. **Collective Action**

Brief Summary of Unit (including curricular content and unit goals):

UNIT: FOOD
GOAL: (Need 2) - . . . strategies to connect content to students' lives/communities, and projects to engage students in real-world solutions.

In the foods unit, the text looks at food production on a global scale. It is my goal to bring the foods unit to their very own table and lunch box. In this way, students will learn where their food comes from and what we need to do on the local and global level to keep our food system sustainable. How their choices can make a difference to the local economy, social equity and the environment.

During the activities, films, essays and discussions, students will become aware of their food footprint, and how our current method of food production is unsustainable and not healthy for themselves nor the planet. It will also be discovered of how we have come to this point in the US and world food production, and why we still have mass hunger, malnutrition and famine. By the end, students will learn how their small daily choices can make a difference.

At this point in the curriculum, students' background knowledge includes the six themes of the book, (Sustainability, Sound Science, Stewardship, Ecosystem Capital, Globalization, Policy & Politics,) ecosystems (what are they, how they change over time and how they can be restored or destroyed), population issues (developed vs. developing countries) and the physical and chemical properties of soil. They have viewed the film, "World In A Balance" which has given them some background on population issues, cultural pressures, and poverty. In this unit, we will view Food. Inc. and an Agricultural Farming Film. Food, Inc. exposes students to where their food comes from. The working conditions of the employees, the monopoly of the companies, and the environmental inputs and outputs. This year, I plan to add visits from our local farmers, Volante Farm and Tangerini's being two of them, to explain their current farming challenges. I also would like to add a panel of vegetarians to help explain to students how to obtain their nutritional needs without meat products on a daily basis and how this can help the environment. There is a teacher in the district who has been vegan for over 20 years and has achieved a vegetarian classroom! I hope to have her on board as well. They will discuss with students why they made this choice, the challenges of living without animal products and meeting nutritional demands.

The reading of the text includes topics such as the transformation of traditional agriculture; the Green Revolution; animal farming and its consequences; increasing food production; GMOs; environmental concerns; developing world access; food trade and distribution; food security; hunger, malnutrition and famine; and food aid. All of which are incorporated into discussions and activities.

In the activities section of this unit, I have further explained what the activity is and what the outcomes are for students.

Activities and Assessment Projects to be included:

Activities:
Earth: Apple of Our Eye Demo

In the Apple of Our Eye, from population connections website, the whole apple represents Earth. As the teacher cuts the apple into pieces, each piece is representative of natural resources on Earth. In the end, one is left with a very small piece of peel. This tiny piece of apple peel is representative of the amount of land used to produce food. This is a nice tie in with the soil unit for we have learned that poor farming practices, erosion among other issues have led to a decline in available land for food production. How can we sustain our food needs if the available land is decreasing but the demand is increasing?

Review History Time-line from start of year

Review here is important for it will bring prior knowledge about food production in the history of mankind to the forefront before we study current methods and rate the pros and cons of both times.

Food Footprint (Homework assignment and discussion in class)

The food footprint is a nice activity that can be expanded to one week or just one day. Students record all of their food for the day along with ingredients and production location. In the end, they determine if the food they consumed has a large footprint or small. Most see that the less processed and in season the food, the smaller the footprint. Of course there are the occasional tangerines from Italy or bananas from S. America.

Tragedy of the Commons Reading (Frontline video from 1991 if time allows) (Online Homework and/or class viewing.)

Tragedy of the Commons is a great example of over consumption of a natural resource and what can happen. This lends itself perfectly to demonstrate how this does not support sustainable practices.

Panel discussions with local farmers and vegetarians

Visits from local farmers and vegetarians will assist students in making this experience real. Local Farmers can discuss their reasoning of growing organic or not produce along with methods they use to keep the land pliable for the years to come. Vegetarian panel will expose students to the different reasons people make this choice from health benefits, more environmentally friendly, and/or animal rights.

Jamie Oliver Food Revolution Series (Homework and discussion forums)

http://www.jamieoliver.com/campaigns/jamies-food-revolution

http://abc.go.com/search?search=Food+Revolution

In this series, Jamie Oliver focuses on the obesity and diabetes epidemic we are having in the US. He exposes one of the reasons for this is how processed food is readily available and often cheaper then fresh food. His goal is to change the school lunch programs and finds it very challenging due to government laws and people's habits. This was eye opening for students.

The Pleasures of Eating by Wendall Berry (Homework and class discussion)

An interesting essay on the pleasures of food and why so much we do is centered around food. Q & A Homework assignment.

Hopp Essays (Barbara Kingsolver book, Animals, Vegetables, Miracle) and questions (Homework and class discussion along with Wiki space collaboration)

http://animalvegetablemiracle.com/

In this book, Kingsolver talks about her family's journey in moving to West Virginia and living off the land to sustain themselves. They could only eat what they could grow. Incorporated into the book are her husband's essays (an Environmental Professor) which delve a bit deeper into some of the global food issues that are mentioned in the book. This activity works well as a jigsaw. (Her college daughter also wrote essays for this book but mostly pertain to her recipes and experience of this adventure with her family.) Online sharing method with Wiki space.

Food Inc., video and questions (Socratic Method) (In class viewing and class discussions)

http://www.foodincmovie.com/spread-the-word.php

In this source, the background, questions and worksheets are great but the whole process takes many class periods. You need to pick and choose your questions.

http://www.newyorkscienceteacher.com/sci/pages/movies/index.php

This is a great website to search for questions which go with a movie. Just type in Food, Inc. into the search tab and you will have a choice of three which have been divided by grade level. These options are much shorter than the first option.

Final response to film Q&A (Online submission)

Online Game – Students help solve food shortages in Africa. (Homework and class discussion)
http://www.nutrientsforlife.org/teachers/curriculum/gametime/

Food at your College

In this activity, students are asked to research the food at the college they have chosen to attend. Are vegetarian options available? Is the college making strides in environmentally sound practices including in their cafeterias? Is there any mention of where the food comes from? How it is prepared? Any efforts at all in making more sustainable choices?

Additional Activities to be used from Creative Change

The Story of Two Jams
Feeding Yourself for a Year
The Biography of Three Potatoes
The Life Story of a Potato Chip
Cafeteria Audit
Price verses Cost

Resources

http://www.nutrientsforlife.org/teachers/curriculum/
http://www.enviroliteracy.org/category.php/6.html
http://www.sustainabletable.org/spread/kits/

Projects

Vegetarian Cook Book WIKI
http://blumenvironmental2010.wikispaces.com/MEATLESS+MONDAY%27S+COOKBOOK

This project is an alternative assessment to a test. Students are asked to research a vegetarian recipe and cook it for their family. This is a stretch for some students for many have never cooked before and many never purposefully ate a vegetarian meal. This year, the rules will become more strict. The meal must be able to feed their family for under ten dollars. The food that must be purchased cannot be from more than 500 miles away. Students then plan the evening of cooking and are required to take a photo of themselves with the prepared dish as evidence. Then, they submit the recipe and their photo to the wiki space where other high school families can access it. There is a reflection sheet to follow this assignment where students discuss their experience in this assignment.

Stage 1 – Identify desired results

Enduring understandings (what understandings are desired?):

Students will understand that: The environment is not its own entity but rather an interconnected world of sciences in which humans interact with and our actions have large effects on this environment. Any and all systems must work in a sustainable way in order to survive.

Essential questions (what essential questions will be considered?):

What are the major patterns of food production?

Can we differentiate among hunger, malnutrition and famine?

Does genetically modified food have an impact on food production?

How does food production effect climate change?

Outcomes (what key knowledge and skills will students acquire as a result of this lesson/unit?)

The key knowledge will be the awareness of where our food comes from and how it is produced. That natural or organic is not always better and what does GMO stand for. How does our increase in animal consumption and common farming practices effect the environment and our health. Why do we have enough food for everyone and yet so many people are malnourished or hungry. Last, the challenge of cooking a meatless meal for under ten dollars.

Stage 2 – Determine acceptable evidence

Performance tasks (what evidence will show that students understand?):

Students are challenged to find and cook a vegetarian meal for their family using the rules of ten dollars or less, in season food, and was produced less than 500 miles away. A reflection paper and discussion forums are included in this project as well. Students will take a picture of themselves with the finished product and post this along with their recipe to the Wiki Website.

Other evidence (quizzes, tests, prompts, observations, dialogues, work samples):

Test, guided reading worksheets, warm-ups, discussions from essays and films.

Stage 3 – Learning plan

Learning activities (what will students do and what will you, the teacher do, to prepare the students to achieve the desired outcomes?

I will need to be well organized for this unit. Planning ahead for online forums and homework assignments will be essential. Feedback and assistance will be important to students in relating new knowledge to sustainability concepts.

Students will need little assistance for the online part of this unit for they will have had much practice. However, they will need to draw from prior knowledge and current research to help them understand the desired outcome of sustainability and our food system.