**Name:  Debra Paul**

**Unit Title:  Food for Thought:  Raising Awareness About Food**

**Interdisciplinary Math & Science Unit**

**Time Line:  6 - 8 weeks**

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| **Stage 1 Desired Results** |
| ESTABLISHED GOALSVERMONT STANDARDS                           NATURAL RESOURCES and AGRICULTURE: Students demonstrate an understanding of natural resources and agricultural systems and why and how they are managed.INVESTIGATION & CRITICAL EVALUATION:  Students examine complex webs of causes and effects in relation to events in order to generalize about the workings of human societies and they apply their findings to problems.HEALTHY CHOICES: Students make informed, healthy choices that positively affect the health, safety and wellbeing for themselves and others.SERVICE:  Students take an active role in their community.UNDERSTANDING PLACE:  Students demonstrate understanding of the relationship between their local environment, community and the world at large; and community heritage and how each shapes their lives.SUSTAINABILITY:  Students make decisions that demonstrate understanding of natural and human communities, the ecological, economic, political, or social systems within them, and awareness of how their persona and collective actions affect the sustainability of these interrelated systems.STATISTICS:  Students use statistics and probability concepts.RESPONDING TO TEXT:  Students respond to literary texts and public documents using interpretive, critical, and evaluative processes.CONCEPTS OF CULTURE:  Students understand the concept of culture, including the cultures of indigenous people, in various times in their local community, in the United States, and in various locations worldwide.INFORMATION TECHNOLOGY: Students use computers, telecommunications, and other tools of technology to research, to gather information and ideas, and to represent information and ideas accurately and appropriately.COMMUNICATION OF DATA:  Students use graphs, charts, and other visual presentations to communicate data accurately and appropriately.WRITING DIMENSIONS:  Students draft, revise, edit and critique written products so that final drafts are appropriate in terms of the following dimensions (purpose, organization, details, voice or tone)  | ***Transfer*** |
| *Students will be able to independently use their learning to…& nbsp;*1.  Reflect on their own eating habits and self-access the extent to which they are eating healthy.2.  Respect differences between our culture and cultures from around the world.3.  Conduct research to explore the advantages and disadvantages of an issue of global significance.4.  Seek multiple perspectives on an issue. |
| ***Meaning*** |
| UNDERSTANDINGS                                     *Students will understand that…< /span>*1. The way food is raised, processed, transported, and eaten has changed dramatically over the last 50 years.2. The way food is raised, processed, transported, and eaten is having a major impact on both people and the environment in the United States and countries around the world.3.  Eating locally grown and seasonal food reduces the negative impact on the environment and on our health.4.  It is essential to preserve the diversity of food on our plant.5.  Different methods for growing food can positively or negatively impact ecosystems.6.  The spread of the western diet has had a negative impact on the health of other cultures.7.  Graphs are used to display data visually.8.  Statistical measures (mode, median, mean) are used to analyze graphs.9.  Awareness of where our food comes from will help us make positive changes to our diet.   | ESSENTIAL QUESTIONS                        1. How does the way food is raised, processed, transported, and eaten impact both people and the environment in the United States and countries around the world?2. How does eating locally grown and seasonal food benefit the health of people and the environment?3.  What can we learn about ourselves, our culture and cultures from around the world through the foods we eat?4.  In what ways do we depend on ecosystems for our food?5.  In what ways has the western diet impacted the world?6.  How can students share their research with others?7.  In what ways does awareness lead to action?  |
| ***Acquisition*** |
| *Students will know…& nbsp;*1.  There are cultural differences in diets from countries around the world.2.  The western diet is having a negative impact on everyone who eats it.3.  Foods grown locally and sustainable benefit the community in many ways.4.  Processed foods can have long-term negative effects on the human body.5.  American fast food restaurants are increasing in numbers in countries around the world.6.  Different types of graphs are used to display different types of data.7.  Statistical measures are used to analyze data. | *Students will be skilled at…& nbsp;*1. Researching a variety of sources to evaluate the advantages and disadvantages pertaining to a research topic.2.  Analyzing data using mode, median, and mean to understand research results.3.  Developing appropriate graphs to display researched data.4.  Reflecting on cultural differences and similarities from countries around the world.5.  Utilizing technology as a tool for research and presentations.6.  Developing a well-organized writing piece.7. Evaluating their personal eating habits. 8. Understanding how food is raised, processed and transported in the United States. |
| **Stage 2 – Evidence** |
| **Evaluative Criteria** | **Assessment Evidence** |
| Demonstrating knowledge of natural resources & agricultural systems       Investigating and evaluating Making healthy choices    Taking action   Understanding place   Understanding sustainability of interrelated systems  Calculating statistics Responding to text  Understanding the concept of culture  Using technological tools for research and for representing data   Communicating data Drafting, revising, editing, and applying knowledge | 1. Test on ecosystems2. Quiz on photosynthesis3.  Garden journal assignments4.  Student created poster demonstrating a food’s trip from farm to fork5.  Observation of student during planting and harvesting of the indoor and outdoor gardens6.  Student created food wheel for fruits and vegetables7.  Observation of student actively participating in field trips to farms 1. Computer research for student created chapter for *Chew On This* 1.  Journal entries & reflections2.  Student created pop out picture books on processed and whole foods3.  High fructose corn syrup worksheet4.  Student created cereal posters 1.  *What’s For Breakfast: Choosing a Healthy Cereal* poster display and presentation at two     grocery stores2.  Sharing processed foods/whole food pop out picture books with elementary students 1. Observation of student actively participating on field trips2. Student participation during guest speakers’ presentations3.  Various mapping assignments 1.  Ecosystem test2.  Student created food wheel for fruits and vegetables3.  Student created poster demonstrating a food’s trip from farm to fork 1.  Creation and analysis of two bar graphs 1.  Quiz on *Chew on This* readings2.  *Chew on This* chapter assignments3.  Journal entries and reflections1.  Student created chapter for *Chew On This*2.  Participation during guest speaker presentations 1.  Computer research on other countries2.  Google Docs ecosystem hunt research project3.  On-line template used for creating a kitchen garden4.  Excel spreadsheets for graphing 1. Creation and analysis of two bar graphs 1.  Student created chapter for *Chew on This*       |
|   | OTHER EVIDENCE: Informal conversations with studentComments regarding the unit made among students  |
| **Stage 3 – Learning Plan** |
| **Lessons, Activities, Field Trips and Guest Speakers:** **1.  Nonfiction Books** Students independently read *Chew on Thi*s:  *Everything You Don’t Want To Know About Fast Food* (middle school version of *Fast Food Nation*).  At the end of each chapter a related assignment, reflection, journal entry or quiz will be completed.  In Language Arts class students read aloud *Omnivores Dilemma* (middle school version).  At the end of each chapter a constructed response question will be completed. **2.  World Population Growth Chart** Students infer how long it takes in years until another billion people are added to the world population.  Students then complete the Human Population Growth chart with teacher assistance.

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| **Population** | **Number of years until another billion is added to the population** | **Year** |
| 1st billion | 2 – 5 million years | About 1800 |
| 2nd billion | 130 years | 1930 |
| 3rd billion | 30 years | 1960 |
| 4th billion | 15 years | 1975 |
| 5th billion | 11 years | 1986 |
| 6th billion | 14 years | 2000 |
| 7th billion | 11 years | 2011 |
| 8th billion | ? | ? |

 **a.**  Students research the population for the top ten populous countries in the world and create a bar graph depicting this data.  They answer the question: what percent does each country make up out of the total world population of 7 billion? Then they locate each country on their world map. **b.**  In small groups, students discuss the affects of rapid population growth on the food supply in these countries.  The groups come together to share their ideas.  Students brain storm how food is grown and processed.  The concepts of the industrial food chain and processed foods are introduced.  For homework students investigate the changes in the U.S. diet over the last 50 years by interviewing a grandparent or elderly community member and they research population growth for the U.S. over the last 50 years.  Findings are recorded and shared with the class. **Extension:**  Students research the population for the top ten most populous cities in the world and locate them on their world map. **3.  Carrying Capacity of the Earth:  Earth/Apple Simulation**  - How much land is available on earth for growing food? (*For Earth’s Sake:  Lessons in Population and the Environment*) Let an apple represent the earth.  Cut the apple into fourths and remove three of the pieces leaving only one-fourth of the apple.  The three pieces that you removed represent the ocean. Cut the remaining fourth in half.  Remove one of the pieces.  This piece represents the land area that is inhospitable to people:  polar areas, deserts, swamps, and very high or rocky mountains.  Cut the remaining 1/8 into four pieces.  Remove 3 of the pieces.  The three pieces you removed represent areas too rocky, too wet, too cold, too steep, or with too poor soil to actually produce food.  They also contain the cities, suburban sprawl, highways, shopping centers, schools, parks, factories, parking lots, and other places where people live but do not necessarily grow food. Peel the 1/32 of the apple slice that is left.  This tiny bit of peel represents the surface, the very thin skin of the earth’s crust upon which mankind depends.  It is less than five feet deep.  a.  This demonstration should lead students to understand that there is a fixed amount of food-producing land on earth.  Students write a journal entry reflecting on the population chart and apple demonstration depicting the carrying capacity of the earth.  They include a conjecture on how and why the majority of our food has become industrialized in the United States.  Entries will be shared with the class. b.  Students locate and highlight major mountain ranges, deserts, artic zones, urban areas, and other major landforms on their world map. They record in their journals conjectures about where food can most likely be grown based on the location of viable ecosystems. **4.  What the World Eats** The vocabulary words, processed food and whole food are discussed.  Using the book, *What the World Eats*, students compare and contrast what a family from the United States eats in a week with a family from another country.  Students keep a journal of what they eat for a week and make a final comparison with the United States family (from the book) and the family from another country.  In their analysis they categorize food items as processed or whole foods.  Next students determine the percentage of processed food and whole foods that they have eaten in a week and the amount that the family from another country has eaten.  Students complete the worksheet called “Major Food Producers” to gain a better understanding of what is being produced in different parts of the world and how it influences diets in that region. **Differentiation for advanced students:**  Students will research the number of McDonalds in the ten most populated countries. Information will be shared with the class. **5.  Overweight Adults Worldwide** Students research a definition for overweight and obesity.  They research eight countries including the United States to determine the percent of overweight adults.  Using the data they construct a bar graph and determine mode, median and mean. Lastly they use the information they gathered previously from their classmates on how diets have changed over the last 50 years to make conjectures on why more and more people are becoming overweight.   **Differentiation for high achieving students:**Construct coordinate graphs comparing the above data to the number of fast food restaurants in each country to determine if there is a possible correlation.  These can be constructed by hand or by using Hans Rosling’s tool. 4 minute video of Hans Rosling tracing 200 countries over 200 years: [http://www.youtube.com/watch?v=jbkSRLYSojo](https://mail.sbschools.net/owa/redir.aspx?C=ugxHjXWuxE6W2Z8ISK-PB_neUfGDjc8IKqvX4BfTFSGICigsw6RscXwCq5S-NWKkuK158lIKkls.&URL=http%3a%2f%2fwww.youtube.com%2fwatch%3fv%3djbkSRLYSojo)  The link to the web site for the tool that Hans Rosling used to create some of his graphs: [http://www.gapminder.org/](https://mail.sbschools.net/owa/redir.aspx?C=ugxHjXWuxE6W2Z8ISK-PB_neUfGDjc8IKqvX4BfTFSGICigsw6RscXwCq5S-NWKkuK158lIKkls.&URL=http%3a%2f%2fwww.gapminder.org%2f) **6.  Ecosystem Hunt** Students explore a garden and a forested area to find evidence of ecosystem components and interactions. They apply vocabulary such as carnivore, herbivore, omnivore, decomposer, producer, consumer and nutrient while conducting an ecosystem hunt.  In the classroom they share their findings from the hunt for the garden and forest ecosystem.  Students discuss how the two ecosystems are alike and different and how the ecosystem components and interactions are involved in the growing of food.  They address possible ways that human activity can impact both ecosystems. Students repeat the activity using Google Docs with a partner.  They choose a different ecosystem in the United States and one from another country to conduct an ecosystem hunt.  Students compare and contrast their two ecosystems to determine if they are suitable for growing food.  They discuss how human activity can affect both ecosystems. Lastly they locate their ecosystems on their world map. **7.  Indoor and Outdoor Gardens and Garden Journals** Students grow basil, chive and micro greens indoor under grow lights.  They also have an outdoor garden with kale, lettuce and radishes.  After the growing season, garlic will be planted outdoors.  A salad will be prepared from the outdoor harvest along with the micro greens. Asian cold spring rolls will be made with the basil and other vegetables to demonstrate one difference in American food and Asian food. Garden journals are used for a variety of purposes.  Some of the activities in the garden journals include creating your own mini photosynthesis booklets, completing related worksheets, designing a kitchen garden on-line by using the template found at www.gardeners.com and recording data from the indoor and outdoor gardens.    **8.  Food Wheels** Students create food wheels depicting the time of year each local vegetable and fruit are available.  As a class they define food shed and food desert.  Using a Vermont map, students create a food shed including many of the local farms located within a 150 miles radius.    **9.  From Farm to Fork** Students work with partners to research a label from a can, jar or box to determine how far the food item traveled and where it was manufactured before arriving on their fork.  To demonstrate their understanding students create posters showing the steps and distance involved in food processing from farm to fork.  When presenting their posters, students will draw the farm to fork route on a huge United States displayed on the Smart Board. **10.  Taking Action by Educating Others** a. What’s for Breakfast:  Choosing a Healthy Cereal.  Students make cereal posters showing where the cereal originated from and depicting the amount of sugar in a serving size by converting grams to teaspoons.  A visual representation of the serving size with the related amount of sugar in that serving will be included on the poster.  Posters will be displayed at two local grocery stores with students present to answer questions shoppers may have. b. Processed Foods/Whole Food Pop Out Picture Books:  Students create two-sided mini pop out books.  One side contains pictures of processed foods that students cut out of a magazine or draw and the other side contains pictures of whole foods.  Students share their books with kids in the district’s elementary schools and explain to the younger children the difference between the two and the journey involved. **11.  Applying Knowledge** Students choose a country where the western diet has been introduced and American fast food restaurants are popping up to research.  They write a mini chapter to add to *Chew on This*.  The chapter will include information and statistics on the spread of the western diet and its impact on the country’s eating habits and obesity rate.  Pictures and at least one graph will be included. **12.  Field Trips:** •&νβσπ;Bread and Butter Farm to learn about vegetable, dairy production and bread making•&νβσπ;Half Acre at South Village to harvest squash and plant garlic•&νβσπ;School cafeteria to learn more about school lunches and federal guidelines•&νβσπ;Healthy Living Grocery Store to take a tour and display student posters•&νβσπ;Hannaford Grocery Store to take a tour and display student posters **13.  Guest speakers:** Guest speakers from Germany, Uganda, Viet Nam, China, and Haiti talk about cultural differences, food, and education in their respective countries.  Using the world map from the apple demonstration activity, students will locate and highlight the countries discussed in the presentations.    |