

Nutrition, Food, and Wellness: Current Benchmarks, Trends, and Challenges in an Ever Changing Environment

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This article encourages family and consumer sciences teacher educators and their nutrition colleagues to challenge pre-service and in-service family and consumer sciences teachers to become familiar with current nutrition knowledge and to build their confidence to meet Standard 4: Nutrition, Food, and Wellness. Family and consumer sciences teacher educators are encouraged to promote better nutrition by emphasizing the importance of teaching nutrition using a variety of techniques to motivate student learning in this critical area. This article provides teacher educators and nutrition faculty with suggested methods, as well as references for current nutrition knowledge, to encourage family and consumer sciences teachers to achieve Standard 4 in both curriculum design and application in their classrooms.

When family and consumer sciences teacher educators prepare students to become family and consumer sciences pre-service or in-service teachers, they must address many content areas in their curriculum. One critical content area is nutrition, food, and wellness. The plethora of issues associated with Standard 4 (e.g., obesity, global food shortages, need for sustainable practices, ethical concerns associated with bioengineered foods), makes it imperative that family and consumer sciences teachers have current knowledge and the ability to teach their students about the impact these issues have on our society, both locally and globally. Family and consumer sciences teacher educators are positioned at the forefront of change where they can successfully provide their students, family and consumer sciences teachers, with an understanding of *why* people need to make healthier food and activity choices and *how* to make practical, healthy changes in their diets and daily routines. Remaining at the top of the learning curve, however, is difficult as new research often contradicts previous information. The aim of this article is to provide family and consumer sciences teacher educators (defined throughout this article to include their nutrition colleagues) with suggestions for how to meet Standard 4: Nutrition, Food, and Wellness. Included are specific examples of hands-on activities to reinforce the importance of family and consumer sciences teachers using stimulating teaching methods to teach nutrition, food, and wellness concepts.

Standard 4: Nutrition, Food, and Wellness

The description of the fourth item in the *National Standards for Family and Consumer Sciences Teachers* (NATEFACS, 2004) is to “Promote nutrition, food, and wellness practices that enhance individual and family well being across the lifespan and address related concerns in a global society.” The family and consumer sciences teacher educator who successfully implements Standard 4 should accomplish the following four expectation statements, developed by NATEFACS (2005, p. 2), within the curriculum:

1. Evaluate nutrition and wellness choices and practices to enhance individual and family well being across the lifespan, using reliable guidelines and sources of information;
2. Synthesize principles of food acquisition, handling, preparation, and service to meet long term nutrition needs and preferences of individuals, families, and communities;
3. Evaluate impacts of science, technology, and technological advances on wellness, nutrition, foods, and related issues (e.g., enriched foods, modified foods, food additives, emerging science of functional foods); and
4. Assess governmental, economic, geographic, and technological influences on nutrition and food practices, food availability, and related issues in a global society.

Nutrition and Wellness Choices

The first expectation related to Standard 4: Nutrition, Food, and Wellness states that family and consumer sciences teachers and ultimately their students should be able to “evaluate nutrition and wellness choices and practices to enhance individual and family well being across the lifespan, using reliable guidelines and sources of information” (NATEFACS, 2005, p. 2). Family and consumer sciences teacher educators can include a variety of assignments in their classes to help teachers identify teaching methods and design activities to meet objectives derived from this expectation. For example, the family and consumer sciences teacher educator can assign future teachers to develop a time-specific (e.g., two week) unit and set of lesson plans for a middle school classroom that focus on student-directed activities to increase learning. Such student-directed activities may include evaluating food choices for themselves and for one other person in their family. A variety of resources exist to help teachers bring the most current nutrition, food, and wellness information into the classroom and to teach consumers how to make smarter food choices from within each food group. Teacher educators should ensure their future teachers are familiar with the three resources which are described briefly in the following paragraphs: (a) Dietary Guidelines for Americans (Dietary Guidelines Advisory Committee [DGAC], 2005), (b) MyPyramid, and (c) Nutrition Facts Labels.

Dietary Guidelines for Americans

Poor diets and a sedentary lifestyle remain the major causes of morbidity and mortality in the United States (DGAC, 2005). Childhood obesity is on the rise and there is no indication that the trend is reversing (Carson, 2005). The *Dietary Guidelines for Americans* (DGAC, 2005), published jointly by the Department of Health and Human Services (HHS) and the Department of Agriculture and updated every five years since 1980, provide science-based advice to promote health and to reduce risk for major chronic diseases through diet and physical activity for people two years of age and older. The 80-page 2005 revision of the *Dietary Guidelines* can be downloaded at <http://www.healthierus.gov/dietaryguidelines/>.

In general, the *Dietary Guidelines* encourage consumers to eat a variety of nutrient-dense foods and beverages while choosing foods that limit the intake of saturated and trans fats, cholesterol, added sugars, salt, and alcohol. Specific dietary recommendations include (a) making sure at least half of the grain products eaten are whole grain, (b) eating at least two cups of fruit and two and one half cups of vegetables per day, and (c) drinking three cups of fat-free or low-fat milk or equivalent milk products per day while concomitantly (d) reducing total fat intake to between 20% to 35% of calories, (e) consuming less than 10% of calories from saturated fat, and (f) keeping trans fatty acid intake as close to zero as possible (DGAC, 2005).

The *Dietary Guidelines* also make several key recommendations related to weight management and physical activity. To reduce the risk of chronic disease in adulthood, the *Guidelines* encourage adults to engage in at least 30 minutes of moderate-intensity physical activity at least five days per week; children and adolescents are encouraged to engage in at least 60 minutes of physical activity on most, preferably all, days of the week (DGAC, 2005).

Family and consumer sciences teacher educators should become acquainted with the *Dietary Guidelines for Americans'* companion text, *A Healthier You*. This text contains easy, healthy, tested recipes; helpful websites; reproducible worksheets; helpful tips for using the Nutrition Facts label and eating out; and steps for incorporating physical activity into one's life. This resource can be ordered at <http://www.health.gov/dietaryguidelines/dga2005/healthieryou/>.

MyPyramid

The latest version of the food guide pyramid, MyPyramid, was published in April of 2005 (USDA, 2005a). A modified version adapted for children ages 6 to 11 years was released later in the same year (USDA, 2005b). The MyPyramid eating patterns are designed to integrate the *Dietary Guidelines* recommendations into a healthy way to eat for most individuals. The individualized eating patterns in *MyPyramid* are constructed across a range of calorie levels to meet the needs of most age and gender groups. Detailed information can be retrieved online at <http://www.mypyramid.gov>.

Both teacher educators and teachers are encouraged to become familiar with *MyPyramid Tracker*, an on-line computer program that provides an assessment of an individual's dietary intake and physical activity (USDA, 2005a). Teacher educators could require future teachers to complete the dietary analysis and analyze their diet by writing a paragraph that connects "what I should eat" with "what I do eat." Teacher educators may want to share with their future teachers an excellent source of PowerPoint presentations, handouts, posters, and activities covering a wide range of food, nutrition, and wellness topics available at <http://lancaster.unl.edu/food/resources.shtml>. These materials cover fun topics such as "Let's Play 'FOOD' Ball," "Spending Your Calorie Salary," "Meet the Grain Group," and "Cold Pizza for Breakfast: MyPyramid Food Safety Tips for Teens & Tweens Who Cook" (Henneman, 2006).

Nutrition Facts Labels

The Food and Drug Administration's (FDA) Nutrition Facts label makes it easier for consumers to make quick, informed food choices that contribute to a healthy diet (FDA, 2004). Teaching students how to use the Nutrition Facts panel, however, is challenging. Teacher educators are encouraged to inform future teachers about "Spot the Block!" (FDA, 2007). This new program, a joint effort between the FDA and several network television stations, was designed to urge middle-school students to look for the Nutrition Facts Label on food packages and to read and think about the Nutrition Facts before making food choices. "Spot the Block!" can be accessed at <http://www.cfsan.fda.gov/~dms/spotov.html>. A wealth of information about the Nutrition Facts panel, including lesson plans and fun, interactive quizzes, are found at <http://www.cfsan.fda.gov/label.html>.

Family and consumer sciences teachers could also be encouraged to adapt the kit *The New Food Label: There's Something In It For Everybody* (International Food Information Council, 1994) to teach their students how to use the food label. The complete program, including a 48-page teacher's guide with lesson plans, learner outcomes, learning strategies,

handouts, charts, worksheets, suggested activities, and a quiz with an answer key, can be downloaded at <http://ific.org/publications/other/tnfl.cfm>. While the fundamental premise and the student activities in this program are fine, teacher educators are cautioned that, in addition to the revision of the Food Guide Pyramid (USDA, 2005a), a major change has occurred on the Nutrition Facts panel. Effective January 1, 2006, the amount and percent of *trans* fat must be listed on the Nutrition Facts label (FDA, 2006). Current scientific evidence indicates the consumption of *trans* fat, along with saturated fat and dietary cholesterol, raises low-density lipoprotein (LDL) or "bad" cholesterol levels, which increases the risk of coronary heart disease, the leading cause of death in the United States (FDA, 2003a). Teacher educators are encouraged to ensure that future teachers understand what *trans* fat is and why it is important to limit it to as little as possible in the diet, so they can explain it in a meaningful way to their students. In addition, the importance of updating any nutrition label lessons created prior to January 2006 should be stressed. An updated, high-resolution Nutrition Facts food label panel can be downloaded at <http://www.cfsan.fda.gov/~dms/label-dl.html>.

Additional Nutrition Resources and Ideas

While family and consumer sciences teacher educators will encourage future teachers to ensure all students have a basic knowledge of nutrition, food, and wellness, the teacher's exact choices for classroom activities will be influenced by the needs and goals of the students in the class and resources available. For example, the teacher of a class of juniors and seniors will want to include activities such as those in the *Guide to Good Food: Teacher's Resource Guide*, for "Nutrition During Pregnancy and Lactation" and "Nutrition in Infancy and Early Childhood" (Bence, 2006, pp. 97-98). In addition, the "Diets in the Life Cycle" activity and the "Making a Weight Management Plan" in the *Guide to Good Food, Student Activity Guide* (Bence & Lazok, 2006, pp. 24, 30) require students to apply knowledge they found in the USDA MyPyramid, the Dietary Guidelines for Americans, and the food label analysis.

Bence (2006) included suggestions for activities related to physical activities, cultural influences on food choices, the food supply, food choices and practices, and legislation and regulations. For example, the teacher educator can model the concept of bringing "textbook" concepts to life by inviting guest speakers to talk about issues related to family and consumer sciences. A local nutritionist with the Women, Infants, and Children (WIC) program could be invited to talk about the incidence of childhood obesity, bottle-mouth syndrome, or iron-deficiency anemia in the city or county, giving future teachers an excellent opportunity to understand the connection between classroom knowledge and reality. Similarly, a local Cooperative Extension agent could talk to the future teachers about the Expanded Food and Nutrition Education Program (EFNEP), tying in concepts related to poverty, hunger, economics, and using the Dietary Guidelines, MyPyramid, and Nutrition Facts labels, in order to help families prepare healthy, affordable, nutritious meals.

Food Acquisition, Handling, Preparation, and Service

The second expectation of Standard 4: Nutrition, Food, and Wellness states that family and consumer sciences teachers, and ultimately their students, should be able to "synthesize principles of food acquisition, handling, preparation, and service to meet long-term nutrition needs and preferences of individuals, families, and communities" (NATEFACS, 2005, p. 2). Suggestions to help family and consumer sciences teacher educators explore relevant research

related to the following three specific content areas with their future teachers will be presented: (a) eating patterns, (b) threats to safety of the food supply, and (c) hunger and food security.

Eating Patterns

Family meals, although considered important for building relationships and communication skills between adolescents and parents (Fulkerson, Neumark-Sztainer, & Story, 2006), have been challenged by changes in our society, including increased after-school activities, changes in family structure, increased convenience food availability (Kimm et al., 2001) and more eating outside the home (USDA, 2005a). Family meals can provide an opportunity for a pleasant, cooperative time where entertaining conversation and healthy food choices accompany the opportunity to develop strong parent-child relationships and family connectedness. Teacher educators could encourage future teachers to use family and child development classes to reinforce the importance of families being together and having time to talk on a regular basis, emphasizing the important role of family meals to both family dynamics and family nutrition and wellness. Teacher educators are encouraged to demonstrate how the teachers can use a “role play” to model entertaining dinner table conversation, since not all youth have experienced this at home.

As children grow older, they spend less time with the family and eat more meals away from the home. Teens cite reasons such as a desire for autonomy, conflicting schedules, a dislike of the food served, and dissatisfaction with family relations, while parents cite conflicting schedules and being busy (Child Trends Data Bank, 2006). In 2003, less than half (42%) of adolescents ages 12 to 17 ate a meal as a family six to seven days a week, 27% ate a meal as a family four to five days a week, and approximately one third (31%) ate meals as a family from zero to three days a week (Child Trends Data Bank). Adolescents whose parents have less than a high school degree are more likely than those with parents who have a high school degree or more to eat meals six to seven days a week with their family (61% versus 46% and 39%, respectively, in 2003) (Child Trends Data Bank).

Eating with parents is also an important factor for the nutrition and eating habits of adolescents, with research showing that family meals and parental presence at meals is associated with higher intake of fruits, vegetables, and dairy products (Videon & Manning, 2003). In addition, family mealtimes may influence whether an adolescent develops disordered eating. One study found adolescents who reported frequent and structured family meals and a more positive atmosphere at family meals were less likely to have disordered eating habits, with the association being stronger for girls (Neumark-Sztainer, Wall, Story, & Fulkerson, 2004).

Families who learn to cook healthful and quick meals have been shown to increase their opportunities for greater nutritional intake (Fulkerson et al., 2006). In contrast, families who watch television during mealtimes have been found to have a lower consumption of fruits and vegetables and a higher consumption of calorie-dense foods such as pizzas, snack foods, and sodas (Coon, Goldberg, Rogers, & Tucker, 2001). The association between frequency of eating dinner with family and measures of diet quality was studied in a national convenience sample of 16,202 children who were 9 to 14 years of age. Subjects were children of the participants in the Nurses Health Study II. Results indicated an increased frequency of family dinners was associated with substantially higher intakes of fiber, calcium, folate, iron, vitamins B6, B12, C, and E, a lower glycemic load, and lower intakes of saturated and trans fat as a percentage of energy (Gillman et al., 2000). The frequency of eating family dinner also has been found to be inversely associated with the prevalence of overweight among 14,431 children aged 9 to 14

years. Children who ate family dinner “on most days” and “every day” were significantly less likely to be overweight than children who ate family dinner “never” or “some days” (Taveras et al., 2005).

Larson, Story, Eisenberg, and Neumark-Sztainer (2006) assessed adolescent involvement in preparing and shopping for food to determine if the level of involvement was related to diet quality. Results indicated the majority of adolescents reported helping prepare dinner (68.6%) and nearly half reported shopping for groceries (49.8%) at least once during the past week. Frequency of preparing food was related to lower intakes of fat ($p < 0.01$) and higher intakes of fruits and vegetables, fiber, folate, and vitamin A among all adolescents, lower intakes of carbonated beverages among female adolescents ($p < 0.01$), and lower intakes of fried foods among male adolescents ($p < 0.01$). The researchers concluded adolescents should be encouraged to help with meal preparation and/or enroll in basic food preparation classes or programs that teach skills for cooking and making healthful purchasing decisions. Unfortunately in many of today's households, the number of sit-down family meals and the time spent in the kitchen preparing food as a family is dwindling, and so are the food preparation skills of today's youth. If families do not model appropriate food preparation techniques to their children (e.g., how to prepare foods, what to prepare, when to prepare each meal component so everything is ready at one time), then family and consumer sciences teachers must ensure we teach fundamental food preparation skills to our students. To achieve this objective, teacher educators should encourage their future teachers to consider developing lessons that require students to prepare simple foods or meals at home that are verified by a parent or guardian signature. Lastly, teacher educators should make certain all future teachers know these key research findings and can cite them when needed to support the need for their foods program.

Threats to the Safety of the Food Supply

The events of September 11, 2001, heightened the nation's awareness and placed a renewed focus on ensuring the protection of the nation's critical infrastructures, including our food and water supply. The Food and Drug Administration (FDA) has delineated a plan to ensure the safety and security of the food supply (FDA, 2003b).

The U.S. food supply is increasingly characterized by centralized production and wide distribution of products, making a deliberate contamination possible (Sobel, Khan, & Swerdlow, 2002). A terrorist attack on the food supply could present itself in a manner similar to an unintentional food borne disease outbreak occurring over a wide geographical area. Depending on the biological agent and type of food contaminated, the attack could slowly become evident with only a few cases initially or as an explosive epidemic suddenly producing many illnesses (Sobel et al., 2002). One of the most likely scenarios that poses the greatest threat to the food supply is the release of botulinum toxin in cold drinks such as milk (Danzig, 2003), resulting in the potential poisoning and death of several hundred thousand individuals (Wein & Liu, 2005). Family and consumer sciences teacher educators should make sure their future teachers are aware of the potential catastrophic events that could occur if local, state, and federal officials do not work in concert to protect our food supply.

In order to emphasize the potential for contamination during handling, storage, preparation, serving, and consumption, teacher educators may invite the county “serve-safe” food handler’s certifying agent to speak to the future teachers about the local efforts that have been taken to comply with the federal law that requires restaurants to have at least one employee who meets the requirements necessary to assure they serve safe food. By using this approach, the

teachers will become aware of who the “serve-safe” certifying agent is in their county and what the “serve-safe” program is doing to protect the food supply.

To provide further emphasis on food safety, teacher educators may require their future teachers to search the web for additional information about food borne illnesses. The teacher educator might provide a list of actual food borne illness outbreaks. During the research process, the teachers could identify when and how the contamination occurred (e.g., during initial handling, storage, preparation, serving, or at consumption) and identify how the contamination could have been avoided. The “Say No to Dangers in the Kitchen” transparency and the “Poison Treatment” activity in the *Guide to Good Food, Teacher’s Resource Guide* (Bence, 2006, pp. 128-129) would reinforce the importance of safe food selection and handling practices throughout the cycle from selection to consumption. The teacher educator could invite a state or county food inspector, typically housed in the local or state health department, to discuss the processes involved in restaurant inspections and how a food borne outbreak is investigated.

Hunger and Food Security

The presentation of principles related to food acquisition, handling, and preparation must rightfully contain issues related to food insecurity and hunger, both within the United States and throughout the world. Food security is a term used to describe “assured access at all times to enough food for an active, healthy life, with no need for recourse to emergency food sources or other extraordinary coping behaviors to meet basic food needs” (Food Research and Action Center [FRAC], 2007, n.p.). Food insecurity, in contrast, refers to the “lack of access to enough food to fully meet basic needs at all times due to lack of financial resources” (FRAC, n.p.) or a “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain availability of acceptable foods in socially acceptable ways” (Anderson, 1990, p. 1598).

Hunger is defined as “the uneasy or painful sensation caused by lack of food” (FRAC, 2007, n.p.). The U.S. Department of Agriculture (USDA) reported that in 2006, based on a national U.S. Census Bureau survey of households representative of the U.S. population, 10.9% of the 12.6 million U.S. households were “food insecure.” Of these, 4.6 million were classified as “hungry” or “very low food secure” (Nord, Andrews, & Carlson, 2007). Groups particularly vulnerable to food insecurity and hunger include immigrants and their children (Van Hook & Balistreri, 2006), older adults (Frongillo & Horan, 2004; Hall & Brown, 2005), WIC recipients (Andig, Osborn, & Gorman, 2006), and households receiving food from emergency food providers, such as food pantries and soup kitchens (Kim, Ohis, & Cohen, 2001).

Results from the Panel Study of Income Dynamics (PSID) were examined to determine the prevalence of and persistence in food security between 1997 and 1999 among families with children under age 13 years (Hoffert, 2005). Key findings included: (a) food stamps play a positive role in preventing food insecurity, (b) immigrants were more likely to become food insecure than non-immigrants, (c) food insecurity is persistent, (d) families with young children are more at risk than families with older children, (e) families with younger heads are more vulnerable than families with older heads, (f) families with less educated heads (less than 12 years of school) were highly likely to become food insecure and to remain food insecure, (g) large families (with three or more children) were more likely to become food insecure than smaller families, and (h) low-income families (below 185% of poverty) were likely to be and remain food insecure.

On a global basis, the Food and Agriculture Organization has reported more than 840 million people (one out of every 13 people) do not have enough to eat (Food Insecurity and

Vulnerability Information and Mapping Systems [FIVIMS], 2006) and over half of deaths world wide are associated with malnutrition (Pelletier, Frongillo, Schroeder, & Habicht, 1995). Within families, the youngest are most vulnerable to malnourishment (World Bank, 1997). A position paper of the American Dietetic Association (ADA) summarized the need for balancing people, food, and the environment within a global perspective (ADA, 2003).

Family and consumer sciences teacher educators can help future teachers be ready to address hunger with their students. Requiring a service learning experience at a local food pantry or soup kitchen is one simple way to open students' eyes to what has become too many people's reality. Participation in a "hunger banquet" lets students learn about hunger from the points of view of those who experience it every day. Oxfam (2006) has a 10-minute computer simulation of a hunger banquet (<http://www.hungerbanquet.org/>) and the Evangelical Lutheran Church of America (ELCA) web site (<http://www.elca.org/hunger/resources/youth.html>) provides instructions for hunger simulation meals as well as a hunger Jeopardy game, a hunger quiz, and hunger dramas for youth (ELCA, 2006).

Impact of Technology on Nutrition and Food Practices

The third expectation of Standard 4: Nutrition, Food, and Wellness states that family and consumer sciences teachers, and ultimately their students, should be able to evaluate impacts of science, technology, and technological advances on wellness, nutrition, foods, and related issues (e.g., enriched foods, modified foods, food additives, and functional foods) (NATEFACS, 2005, p. 2). Science and technological advances have a great potential to enhance our food supply and improve health and overall quality of life, but only if both the benefits and costs of these advances are understood. Dramatic changes have impacted our food supply and our understanding of the complex relationship between food and health. Family and consumer sciences teacher educators should emphasize the impact of scientific and technological advances on nutrition, food, and wellness when preparing teachers who will be teaching advanced nutrition and/or foods courses in secondary or technical schools. This section will discuss three specific content areas: (a) biotechnology, (b) functional foods, and (c) fortified foods.

Biotechnology

The term "biotechnology" is a general umbrella term meaning any process that uses living things or organisms to accomplish a desired outcome (Penn State University, 2002). Crops produced through biotechnology are significant components of the U.S. harvest. Biotech crops are estimated to account for 38% of corn, 80% of soybeans, and 70% of cotton grown in the United States (International Food Information Council [IFIC], 2004). Benefits of biotechnology include greater disease resistance, reduced pesticide use, more nutritious composition of foods, herbicide tolerance, more rapid growth of crops, and improvements in taste and quality (IFIC). Benefits that can be expected in the near future include (a) reducing levels of natural toxins, such as allergens, in plants; (b) providing simpler and faster methods to locate pathogens, toxins, and contaminants to reduce risk of food borne illness; and (c) extending a product's freshness (IFIC).

The world's population, currently about six billion, is projected to grow to about nine billion by 2050. Biotechnological advances will be crucial to help avoid hunger and starvation worldwide in this century, as crops will be better able to withstand environmental factors (IFIC, 2004). Scientists are currently focusing on engineering food products that could increase crop production and maximize the healthy components in a variety of foods. Products estimated to be in the market in a few years include (a) enhanced protein quality in corn and soybeans; (b)

modification of acid production in potatoes and peas grown to remain sweeter and produce higher crop yields; (c) smaller, seedless melons for use as single servings; (d) bananas and pineapples with delayed ripening qualities; (e) peanuts with improved protein balance; (f) fungus-resistant bananas; (g) tomatoes with a higher antioxidant (lycopene) content; (h) fruits and vegetables containing higher levels of vitamins such as C and E to potentially protect against the risk of chronic diseases such as cancer and heart disease; (i) garlic cloves that produce more allicin to help lower cholesterol levels (IFIC); and (j) oils engineered to change the fatty acid composition so it does not have to be hydrogenated, resulting in the reduction of trans fatty acids in food products (Penn State University, 2002).

The World Health Organization noted that biotechnology is not without risk as some of these products have not been in the food supply previously (World Health Organization [WHO], 2006). However, WHO also pointed out that foods in international markets have passed safety assessments and are not likely to carry significant risk. Various regulatory groups have jurisdiction for monitoring development and testing of plant and animal products produced through biotechnology. Some of these groups include the Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and the Environmental Protection Agency (EPA). The International Life Science Institute (ILSI) provides a database which shows comparisons of risk characteristics of conventionally bred crops and those bred/grown utilizing biotechnology. Some scientists believe the current safety review process used by the FDA is inadequate and are pushing for stricter guidelines and more detailed safety testing of genetically modified foods (Gurian-Sherman, 2003). This ethically-charged discussion will continue to be a topic all family and consumer sciences teacher educators and teachers should follow.

Functional Foods

Consumers have long sought the “perfect food” or the “magic bullet” which offers a promise of health and/or special benefits. One definition of functional foods is “foods that provide health benefits beyond basic nutrition” (International Life Sciences Institute [ILSI], 1999). Unmodified whole foods such as fruits and vegetables, as well as modified foods which have been fortified with nutrients or enhanced with phytochemicals or botanicals, fit this definition. Biotechnology, spurred by consumer demand, will continue to drive the development of new functional foods. Examples of functional foods that have strong evidence of providing the “promised” effect of reducing both total and low density lipoprotein (LDL) cholesterol include fortified margarines containing plant sterols and stanol esters, psyllium which contains a type of soluble fiber, soy protein foods, and whole wheat products containing glucans. Other examples of functional foods with at least moderate or weak evidence of various health benefits include green tea, black tea, spinach, tomatoes, cruciferous vegetables (e.g. cabbage, cauliflower, broccoli), fermented dairy products, tree nuts, and grape juice or red wine. The impact of functional foods and their bioactive component have been summarized in a recent position paper of the American Dietetic Association (ADA, 2004).

Fortified Foods

The American Dietetic Association (ADA) published a position paper on the use of fortified foods and/or supplements (ADA, 2005), one category was functional foods. The ADA promoted the consumption of a widely and wisely chosen variety of foods to promote optimal health and reduce the risk of chronic disease. The association acknowledged additional nutrients found in fortified foods and/or supplements can help some people meet their nutritional needs

utilizing standards such as the Dietary Reference Intakes. The ADA position paper provided coverage of several topics including (a) nutrient density, (b) rationale for consuming a variety of foods and beverages, (c) regulatory framework for supplementation and fortification, (d) nutrient bioavailability, (e) technical feasibility of fortification including sensory properties, (f) biotechnology, and (g) when supplementation is appropriate. Teacher educators are encouraged to become familiar with this document.

Teacher educators working with future teachers who have a major interest in nutrition and foods, or whose position may involve only the teaching of foods, can encourage the development of curriculum for an advanced course that may meet a science credit requirement for graduation. Such a course would have expectations that the secondary students not only learn advanced preparation techniques, but also learn about the application of biotechnology to foods, functional foods, and fortified foods.

External Influences on Nutrition and Food Practices

The fourth expectation of Standard 4: Nutrition, Food, and Wellness states that family and consumer sciences teachers, and ultimately their students, should be able to assess governmental, economic, geographic, and technological influences on nutrition and food practices, food availability, and related issues in a global society (NATEFACS, 2005, p. 2). This review will focus on three key areas: (a) integration of curriculum with school wellness policies, (b) economic and/or geographic influences on nutrition and food practices, and (c) sustainability of global resources.

Integration of Curriculum with School Wellness Policies

Family and consumer sciences educators have a tremendous opportunity to reinforce the relationship between nutrition, food, and wellness with the mandated school wellness policies. Section 204 of S.2507, the Child Nutrition and WIC Reauthorization Act of 2004, required all school districts with a federally-funded school meal program to develop and implement wellness policies that address nutrition and physical activity by the start of the 2006-2007 school year (Child Nutrition and WIC Reauthorization Act of 2004). Each school's wellness policy can be a wonderful tool for teachers to integrate nutrition, food, and wellness into their curriculum in a very practical and real way. To that end, teacher educators should ensure their future teachers are aware of the mandated school wellness policy. Every family and consumer sciences teacher should be encouraged to become a leader in efforts related to their school's wellness policy, working diligently to connect their curriculum with specific items included in their school's policy.

Learning is easier to achieve when principles of good nutrition and health can be reinforced with specific, concrete examples, and the school wellness policies include many examples. When trying to operationalize the concept "we need to eat more whole grains," teachers could have their students identify specific ways that goal is being met in their school (e.g., the cafeteria is serving whole grain tortillas, whole grain bread, and whole grain rolls; the vending machines include servings of whole grain cereals and cereal bars). The reinforcement of course concepts through concrete examples in the school wellness policy should ultimately enhance the adoption of a healthier lifestyle for a larger percentage of the population, beginning at an earlier age.

Economic and/or Geographic Influences on Nutrition and Food Practices

Many economic and geographic factors influence the foods, and thus the nutrients, individuals consume. Teacher educators should help their future teachers understand the synergistic relationships between economic resources, food availability, and family food choices and their impact on nutrient intake. For example, while affordable fresh fruits and vegetables might be readily available in most suburban grocery stores, small inner-city convenience stores often have an extremely limited availability of fresh foods at a significantly higher price than those found at a larger supermarket. Canned fruits and vegetables, while available at convenience stores, are bulky and heavy. Consequently, individuals who live in the inner city and lack reliable transportation often have a difficult time meeting their MyPyramid recommendation for fruits and vegetables – not from lack of knowledge about their importance, but because fresh fruits and vegetables are not available or affordable and bulky canned foods are hard to carry on a bus.

Another important factor influencing food selection, quality, and nutrient intake is the knowledge and skills of the food preparer. Teacher educators will want to emphasize the importance of including information about the selection, storage, preparation, and service of food as an important part of nutrition, food, and wellness. Teacher educators also should be encouraged to help future teachers better understand the multidimensional nature of food decisions. An exploration of food economics, time management, and assessing the nutrient quality of diets based on the use of the Food Guide Pyramid and the Nutrition Facts label become useful activities in the family and consumer sciences teacher's classroom. Practical assignments that compare time, cost, and nutrient value of "convenience foods" compared to "home made foods" should be encouraged. Teacher educators could incorporate an activity where the future teachers analyze the cost, taste, texture, and time to make instant oatmeal compared to "quick" oatmeal. Above all, teachers should emphasize the importance of having their students give careful attention to preserving major nutrients while preparing palatable, high-quality products with an appropriate appearance, texture, and flavor. By using clear examples, practical assignments, and fun demonstrations using foods from a variety of cultures, teachers will be able to reach their students and help them more clearly see the relationships between food science, geography, culture, food choices, and one's quality of life.

Sustainability of Global Resources

Sustainability of the earth's resources is a civic responsibility. Teaching students about actions that can be taken by individuals and families to foster sustainability is an appropriate activity for the family and consumer sciences teacher. Technological advances, food choices, and food handling all have an impact on the utilization of global resources, including energy, water, air, and management of solid waste. Issues abound related to resource consumption and generation of waste among developed countries in contrast to the scarcity of food and limited resources among developing nations (Rosegrant & Sombilla, 1997). Global population growth will have a major impact on environmental, economic, and social concerns related to the food system (Brown, Gardner, & Halwell, 1999). Biotechnology can help address the issue of food production and decrease the need for toxic pesticides.

Conservation of energy reduces the stress on the energy generation and distribution system while concomitantly saving money for individuals and families (Vann, Ahmadi, & Friesen, 2004). In addition, conservation of energy reduces the release of toxic air pollutants into the environment and the depletion of non-renewable resources, thus improving the quality of life

in the communities where individuals live and work in the present, and enhancing the availability of resources in the future. Family and consumer sciences teachers should be prepared to be key players in resource development and sustainability issues (Atiles & Cude, 2002). Teacher educators can help future teachers learn how to select the most energy efficient systems and, to the limits imposed by the system, how to operate the systems using the most energy-efficient behaviors possible. As Anderson (2003) so clearly stated, “Today’s choices affect individual, family, and community well-being as well as our children’s future” (p. iii). By teaching students to select energy-efficient systems and to adopt energy-conserving behaviors, teachers will have taken yet another step toward ensuring our future.

Summary

Promoting nutrition, food, and wellness practices that enhance individual and family well being across the lifespan and in a global society is complex and challenging. To achieve this standard will require a tremendous breadth of knowledge and current information. Family and consumer sciences teacher educators must enable future teachers to assume an integral role in this process. In addition to the suggestions for teacher educators throughout this article, the teacher educators should provide future teachers opportunities to become familiar with the use of texts and supplemental books that are rich with suggestions for such things as curriculum development through content sequencing, assessment techniques (with test creation software), and bulletin board ideas that can be used to enhance the teaching of this standard. Additional suggested resources for teacher educators to review with future teachers are identified in the Appendix.

References

- American Dietetic Association (ADA). (2003). Position of the American Dietetic Association: Addressing world hunger, malnutrition and food insecurity. *Journal of the American Dietetic Association, 103*, 1046-1057.
- American Dietetic Association (ADA). (2004). Position of the American Dietetic Association: Functional foods. *Journal of the American Dietetic Association, 104*, 814-826.
- American Dietetic Association (ADA). (2005). Position of the American Dietetic Association: Fortification and nutritional supplements. *Journal of the American Dietetic Association, 105*, 1300-1311.
- Anderson, C. L. (2003). Sustainability-Coexisting in times of enormous change. *Journal of Family and Consumer Sciences, 95*(2), iii.
- Anderson, S. (1990). Core indicators of nutritional state for difficult to sample populations. *Journal of Nutrition, 102*, 1559-1660.
- Andig, J., Osborn, L., & Gorman, M. A. (2006). Study finds food insecurity in households receiving WIC benefits. *Journal of Family and Consumer Sciences, 98*(2), 33-38.
- Atiles, J. H., & Cude, B. J. (2002). Expanding on the meaning of resource development for family and consumer sciences in the 21st century. *Journal of Family and Consumer Sciences, 94*(2), 9-10.

- Bence, D. L. (2006). *Guide to good food: Teacher's resource guide*. Tinley Park, IL: Goodheart-Willcox.
- Bence, D. L., & Lazok, C. A. (2006). *Guide to good food: Student activity guide*. Tinley Park, IL: Goodheart-Willcox.
- Brown, L. R., Gardner, G., & Halwell, B. (1999). Sixteen impacts of population growth. *The Futurist*, 33, 36-41.
- Carson, D. E. (2005). Food and fitness fun in Houston. *Journal of Family and Consumer Sciences*, 97(4), 45-46.
- Child Nutrition and WIC Reauthorization Act of 2004, Public Law (PL) 108-265. (2004, June 30). Retrieved July 12 2006, from http://www.fns.usda.gov/cnd/Governance/Legislation/PL_108-265.pdf
- Child Trends Data Bank. (2006). *Family meals: Child trends' original analyses of data from the 2003 national survey of children's health*. Retrieved July 11, 2006, from <http://www.childtrendsdatabank.org/indicators/96FamilyMeals.cfm>
- Coon, K. A., Goldberg, J., Rogers, B. L., & Tucker, K. L. (2001, January). Relationship between use of television during meals and children's food consumption patterns. *Pediatrics*, 107(1), e7. Retrieved July 12, 2006, from <http://pediatrics.aappublications.org/cgi/content/abstract/107/1/e7>
- Danzig, R. (2003). *Catastrophic bioterrorism – What is to be done?* Washington, DC: National Defense University, Center for Technology and National Security Policy.
- Dietary Guidelines Advisory Committee (DGAC). (2005). *The Dietary Guidelines for Americans: 2005*. Retrieved July 4, 2006, from <http://www.healthierus.gov/dietaryguidelines/>
- Evangelical Lutheran Church of America (ELCA). (2006). *World hunger: Youth resources*. Retrieved July 12, 2005, from <http://www.elca.org/hunger/resources/youth.html>
- Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS). (2006). *What is meant by food insecurity and vulnerability?* Retrieved July 8, 2006, from <http://www.fivims.net/static.jsp?lang=en&page=overview>
- Food and Drug Administration (FDA). (2003a). *Revealing trans fats*. Retrieved July 6, 2006, from <http://www.cfsan.fda.gov/~dms/fdatrans.html>
- Food and Drug Administration (FDA). (2003b). *Progress report to Secretary Tommy G. Thompson: Ensuring the safety and security of the nation's food supply*. Retrieved July 6, 2006, from <http://www.cfsan.fda.gov/~dms/fssrep.html>
- Food and Drug Administration (FDA). (2004). *How to understand and use the nutrition facts label*. Retrieved July 12, 2006, from <http://www.cfsan.fda.gov/~dms/foodlab.html>
- Food and Drug Administration (FDA). (2006). *Food labeling and nutrition*. Retrieved July 12, 2006, from <http://www.cfsan.fda.gov/label.html>
- Food and Drug Administration (FDA). (2007). *Spot the block! Using the nutrition facts label to make healthy food choices—A program for tweens*. Retrieved January 28, 2008, from <http://www.cfsan.fda.gov/~dms/spotov.html>

- Food Research and Action Center (FRAC). (2007). *Hunger and food insecurity in the United States*. Retrieved January 28, 2008, from http://www.frac.org/html/hunger_in_the_us/hunger_index.html
- Frongillo, E. A., & Horan, C. M. (2004). Hunger and aging. *Generations, Fall*, 28-33.
- Fulkerson, J. A., Neumark-Sztainer, D., & Story, M. (2006). Adolescent and parent views of family meals. *Journal of the American Dietetic Association, 106*, 526-532.
- Gillman, M. W., Rifas-Shiman, S. L., Frazier, A. L., Rockett, H. R., Camargo, C. A., Jr., Field, A. E., et al. (2000, March). Family dinner and diet quality among older children and adolescents. *Archives of Family Medicine, 9*(3), 235-240.
- Gurian-Sherman, D. (2003). *Holes in the biotech safety net: FDA policy does not assure the safety of genetically engineered foods*. Washington, DC: Center for Science in the Public Interest. Retrieved July 13, 2006, from http://www.cspinet.org/new/pdf/fda_report__final.pdf
- Hall, B., & Brown, J. L. (2005). Food security among older adults in the United States. *Topics in Clinical Nutrition, 20*, 329-338.
- Henneman, A. (2006). *Education materials: University of Nebraska-Lincoln Extension in Lancaster County*. Retrieved July 6, 2006, from <http://lancaster.unl.edu/food/resources.shtml>
- Hoffert, S. K. (2005). *Persistence and change in the food security of families with children, 1997-1999* (EFAN04001). Retrieved July 12, 2006, from <http://www.ers.usda.gov/Publications/EFAN04001/>
- International Food Information Council (IFIC). (2004). *Food biotechnology*. Retrieved July 7, 2006, from <http://www.ific.org/food/biotechnology/index.cfm>
- International Food Information Council (IFIC). (1994). *The new food label: A food label education program for high school students*. Retrieved January 28, 2008, from <http://ific.org/publications/other/tnfl.cfm>
- Jackson, L. (2003). *Careers in focus: Family and consumer sciences: Teachers resource guide*. Tinley Park, IL: Goodheart-Willcox.
- International Life Sciences Institute (ILSI). (1999). Safety assessment and potential health benefits of food components based on selected scientific criteria. ILSI North America Technical Committee on Food Components for Health Promotion. *Critical Reviews in Food Science and Nutrition, 39*, 203-216.
- Kim, M., Ohis, J., & Cohen, R. (2001). *Hunger in America, 2001. National report prepared for America's second harvest*. Princeton, NJ: Mathematica Policy Research.
- Kimm, S. Y., Barton, B. A., Obarzanek, E., McMahon, R. P., Sabry, Z. I., Waclawiw, M. A., et al. (2001). Racial divergence in adiposity during adolescence: The NHLBI growth and health study. *Pediatrics, 107*(3), e34. Retrieved March 13, 2008, from <http://pediatrics.aappublications.org/cgi/content/full/107/3/e34>
- Largen, V. L., & Bence, D. L. (2008). *Guide to good food*. Tinley Park, IL: Goodheart-Willcox.

- Larson, N. O., Story, M., Eisenberg, M. E., & Neumark-Sztainer, D. (2006). Food preparation and purchasing roles among adolescents: Associations with sociodemographic characteristics and diet quality. *Journal of the American Dietetic Association, 10*, 211-218.
- National Association of Teacher Educators for Family and Consumer Sciences (NATEFACS). (2004, December.) *National standards for teachers of family and consumer sciences*. Retrieved March 13, 2008, from <http://www.natefacs.org/National%20Standards%20for%20Teachers%20of%20Family%20and%20Consumer%20Sciences.pdf>
- National Association of Teacher Educators for Family and Consumer Sciences (NATEFACS). (2005, October). *Expectation statements – Work group reports*. Working paper developed at the 2005 Family and Consumer Sciences Teacher Education Conference, Implementing National Standards for Teachers of Family and Consumer Sciences, Indianapolis, IN.
- Neumark-Sztainer, D., Wall, M., Story, M., & Fulkerson, J. A. (2004). Are family meal patterns associated with disordered eating behaviors among adolescents? *Journal of Adolescent Health, 35*(5), 350-359.
- Nord, M., Andrews, M., & Carlson, S. (2007, November). *Household food security in the United States, 2006* (Economic Research Report No. ERR-49). Retrieved January 28, 2008, from <http://www.ers.usda.gov/publications/err49/>
- Oxfam. (2006). *Hunger banquet simulation*. Retrieved July 12, 2006, from <http://www.hungerbanquet.org/>
- Pelletier, D. L., Frongillo, E. A., Schroeder, D., & Habicht, J. P. (1995). The effects of child nutrition on child mortality in developing countries. *Bulletin of the World Health Organization, 73*, 443-448.
- Penn State University. (2002). *Genetically engineered foods and you: Stakeholders' role in public policy*. Retrieved July 11, 2006, from <http://pubs.cas.psu.edu/freepubs/pdfs/uk103.pdf>
- Rosegrant, M. W., & Sombilla, M. A. (1997). Critical issues suggested by trends in food, population and the environment for the year 2020. *American Journal of Agricultural Economics, 79*, 1467-1471.
- Sobel, J., Khan, A. S., & Swerdlow, D. L. (2002, March 9). Threat of a biological terrorist attack on the US food supply: The CDC perspective. *Lancet, 359*, 874-880.
- Taveras, E. M., Rifas-Shiman, S. L., Berkey, C. S., Rockett, H. R., Field, A. E., Frazier, A. L., et al. (2005, May). Family dinner and adolescent overweight. *Obesity Research, 13*(5), 900-906.
- United States Department of Agriculture (USDA). (2005a). *MyPyramid: Steps to a healthier you*. Retrieved July 12, 2006, from <http://www.mypyramid.gov/>
- United States Department of Agriculture (USDA). (2005b). *MyPyramid for kids*. Retrieved July 12, 2006, from <http://www.mypyramid.gov/kids/index.html>

- Van Hook, J., & Balistreri, K. S. (2006). Ineligible parents, eligible children: Food stamps receipt, allotments, and food insecurity among children of immigrants. *Social Science Research*, 35, 228-251.
- Vann, J., Ahmadi, R., & Friesen, C. A. (2004). Energy conservation tips for individuals and families. *The Forum for Family and Consumer Issues*, 9(2), ISSN 1540 5273. Retrieved July 12, 2006, from http://www.ces.ncsu.edu/depts/fcs/pub/9_2/encon.html
- Videon, T. M., & Manning, C. K. (2003). Influences on adolescent eating patterns: The importance of family meals. *Journal of Adolescent Health*, 32, 365-373.
- Wein, L. M., & Liu, Y. (2005, July 12). Analyzing a bioterror attack on the food supply: The case of botulinum toxin in milk. *Proceedings of the National Academy of Sciences, USA*, 102(28), 9984-9989.
- World Bank. (1997). *World development indicators*. Washington, DC: Author.
- World Health Organization (WHO). (2006). *Modern food biotechnology, human health and development: An evidence-based study*. Retrieved July 11, 2006, from <http://www.who.int/foodsafety/publications/biotech>

Appendix

Selected Classroom Teaching Activities to Reinforce Concepts Associated with Standard 4: Nutrition, Food, and Wellness

New food, nutrition, and wellness texts such as Largen and Bence's (2008) *Guide to Good Food*, with teacher and student supplements, correlate standards for nutrition and wellness with the content of the text. Family and consumer sciences educators will also find Largen and Bence's (2008) text and supplemental books rich with suggestions for such things as content sequencing, assessment techniques (with test creation software), and bulletin board ideas, to mention a few, that can be used to enhance the teaching of this standard. Other publishers have similar resources available. Student activities related to food, nutrition, and wellness careers are included in the *Guide to Good Food, Student Activity Guide*, "Career Activities," (Bence & Lazok, 2006, p. 37-42) and in Jackson's (2003) *Teacher's Resource Guide to Careers in Focus: Family and Consumer Sciences*. A variety of additional teaching ideas and resources to aid the family and consumer sciences teacher educator can be found in this Appendix.

Dietary Guidelines for Americans

1. Have students prepare a handout for their classmates about tips for eating out with the Dietary Guidelines. Use the tip sheet "Eating Out with the Guidelines" found at <http://www.health.gov/dietaryguidelines/dga2005/toolkit/eatout.htm>

MyPyramid

1. Translate Food into Exercise. If you have a chocolate chip cookie lab or a candy lab, have the students calculate how many minutes of exercise they will have to complete to burn the calories from the foodstuff they have made using the <http://www.mypyramid.gov> web site.

2. “Vote for Your Favorite Nutritious Meal” campaign. Students work in small groups to follow the food guide pyramid to develop a nutritious meal. The class holds an election. Students tally and graph the results. The winning menu is prepared by the class with the winning team members as guests.
3. Have students record their food and physical activity for three days. Enter the data in the MyPyramid Tracker at <http://www.mypyramidtracker.gov/>. Compare the results to recommendations of the Dietary Guidelines for Americans.

Nutrition Facts Labels

1. Read the labels as you shop and pay attention to serving size and servings per container. Compare the total calories in similar products and choose those items with the highest nutrient density.
2. Collect nutrition facts from local fast food restaurants. Which foods are lower in saturated fat, trans fat, and cholesterol? Is there a fast food restaurant you would recommend?
3. Compare the sugar and fiber content of various breakfast cereals and breakfast bars. Which cereals have the highest amount of fiber? The highest amount of sugar? Measure the sugar in your favorite breakfast cereal (5 grams of sugar = 1 tsp. sugar). Rank order the cereals in order by grams of fiber and by grams of sugar per serving.

Hunger and Food Security

1. Assign Oxfam America’s “Hunger Banquet” at <http://www.hungerbanquet.org/>. During this 10 minute on-line exercise, students role play various characters who represent individuals at various socioeconomic levels throughout the world. The purpose of the exercise is to help students understand the root causes of hunger (e.g., distribution of food, education, resources and power).
2. Take the hunger quiz http://www.hungerbanquet.org/page.php?id=hunger_quiz
3. Volunteer at a food pantry or soup kitchen.
4. Conduct a food drive for a food bank.
5. Plan menus for one day using the Thrifty Food Plan allotment (dollar value updated monthly at <http://www.usda.gov/cnpp/using3.html>). Resources can be found at http://riley.nal.usda.gov/nal_display/index.php?info_center=15&tax_level=3&tax_subject=275&topic_id=1336&level3_id=5221. Enlist students’ families to follow a food budget for two weeks which reflects the current food stamp allocation.

Food Safety and Threats to Food Supply

1. Visit the web site for Kids, Teens, and Teachers <http://www.foodsafety.gov>. Have your students take the Food Safety Quiz.
2. Explore the web site “Countering Bioterrorism and Other Threats to the Food Supply” at <http://www.foodsafety.gov/~fsg/bioterr.html>. Have your students prepare a handout or brochure for a specified target audience describing tips for emergency preparedness.
3. Play "Lose a Million (Bacteria)," a fun, interactive game based on the popular TV game show, "Who wants to be a Millionaire." The game begins with a million bacteria. The object of the game is to lose bacteria. Access the game at <http://www.cfsan.fda.gov/~cjm/million.html>
4. Have your students explore various careers in the food safety field. The search can begin at <http://www.cfsan.fda.gov/~dms/careers.html>

Importance of Family Meals

1. Have students develop a week's menu that meet the minimum MyPyramid recommendations for each food group. Create a shopping list that corresponds to the menus. Encourage students to shop with a parent and assist in the meal preparation.
2. Visit Purdue University's Promoting Family Meals Web site. Share the annotated bibliography "Selected References: Family Meals" with the students: http://www.cfs.purdue.edu/cff/promotingfamilymeals/Meal_Time_References.pdf. Have students create a research-based brochure or handout to be shared with a local school, worksite, or church that encourages families to make time for each other.

Biotechnology and Functional Foods

1. Visit the Institute of Food Safety and Technology's web site at <http://www.ifst.org/site/cms/contentChapterView.asp?chapter=1>. Have students select a current issue and write a short report based on the IFST position paper.
2. Identify foods consumed that likely have had some form of biotechnology applied to the ingredients.
3. Have students review Nutrition Labeling and Education Act (NLEA) regarding health claims; examine products with health claims and compare to NLEA requirements.
4. Review the Dietary Supplement Health and Education Act, relative to functional foods and labeling.
5. Review advertising regulations in regard to health claims.
6. Visit a grocery store and examine the fruit flavored water with additional nutrients; note the product's cost compared to water; note nutrients added – where can these nutrients be obtained through other foods? How much of the flavored water can be consumed before the nutrient intake level becomes potentially toxic? Note labeling – for whom has the product been developed? Have students think of other products they could make that would have similar nutrition value or greater nutrition value.
7. Learn more about the viewpoints of the food manufacturers regarding genetic engineering by visiting the following websites:
 - National Food Processors Association: <http://www.nfpa-food.org/science/biotech.html>
 - Food Marketing Institute: <http://www.fmi.org>
 - International Food Information Council (IFIC): <http://ificinfo.health.org>
 - Grocery Manufacturers of America: <http://www.gmabrands.com>

Fortified Foods

1. Have students write about why the fortification of grain products with folic acid is a public health concern and how it could impact each local pregnancy.
2. Prepare a presentation on how and why the bioengineering and genetic modification of food products to optimize the food's nutrient profile (e. g., reduce fat, increase protein, extend shelf life) are important contributions of science and agriculture to our food supply and its nutritious quality.

School Wellness Policies

1. Include a guest speaker from the local School Wellness Committee who will discuss the goals and activities planned by the Committee and discuss how your class can get involved in the goals of this committee.

Sustainability of Global Resources

1. Visit a landfill; initiate a recycling program in school, community organization.
2. Conduct a waste audit in home, school, community building.
3. Prepare a report on environmental issues in developing countries related to food production (such as massive tree removal for farm fields).
4. Visit websites provided in American Dietetic Association position paper on conservation of natural resources.

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