PROJECT REPORT

Designing Healthy Meals to Counter Nutrition-Related Diseases:

A Learning Activity

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Abstract

Heart disease, cancer, stroke, and diabetes—four of the top ten death-causing diseases in the United States—are nutrition related and can thus be prevented or reduced through formal and informal education aimed at changing personal diet and lifestyle. In this learning activity, students work in groups to conduct research on nutrition, nutritional ingredients, and healthy diet, as well as on nutrition-related diseases. They design healthy diets and present their own recipes for healthy meals aimed at prevention and/or healing of a specific nutrition-related disease. Through this activity, students learn about the roles that nutrition and nutrients play in their lives and the importance of following a healthy, balanced diet and lifestyle. The goal for students is not only to learn what constitutes a healthy, balanced diet and the relationships between nutrition, health, and nutrition-related diseases, but also to apply that knowledge to their lives. For educators, the goal is to involve students in a meaningful activity based on the scientific method, as well as to contribute to restoration of the nation's health and wellness.

Nutrition and Disease

Nutrition is the process by which our body takes in and makes use of food substances. Nutrients are chemical substances supplied by food, from which our body obtains the essential ingredients to perform the chemical and electrical processes required to maintain homeostasis. Carbohydrates, fats (lipids), proteins, vitamins, and water supplied by food are the six classes of nutrients that the body needs for growth, maintenance, and repair.

Failure to obtain these essential nutrients can lead to disruption in the physiological functioning of the body, which in turn can lead to illness or disease. Disease is an abnormal state of form, structure, or function due to the effects of cellular damage within the body (Nesse and Williams 1994). The abnormality not only affects the performance of vital functions, but usually also provides diagnostic symptoms. Specifically:

> Disease occurs when the cellular environment changes to such a degree that tissues are no longer able to perform their function optimally. For example … in

diabetes, the extracellular tissue of blood vessel walls undergoes changes that lead to decreased blood flow, decreased oxygen delivery, and eventually irreversible damage to tissues such as the retina, skin, heart, and kidneys. In cancer, mutations accumulating in the nucleic acids of cells result in distorted structure and function of proteins, which in turn affect the way the cells interact with or react to other cells, growth factors, hormones, and the extracellular matrix in their environment. In multiple sclerosis, destruction of the protective myelin sheath around axons in the brain results in decreased electrical conduction, which manifests neurologic signs and symptoms such as weakness, double vision, and lack of coordination. In each of these conditions, the ability of cells or tissues to perform their function optimally is compromised, with deleterious consequences to the organism (Hart and Loeffler 2012, 4).

Food is not only a source of nutrients that our body needs for energy, growth, maintenance, and tissue repair, but can also be used as therapeutic medicine (Aziz 2010). The physician and philosopher Moses Maimonides was quoted as saying, "No illness which can be treated by diet should be treated by any other means" (cited in Carleton and Wait 2001, 44). After all, food is one of the best "medicine[s] for a healthy heart, and nowhere does this statement ring more true than when it comes to conquering [the rising of] cholesterol [levels]" (Hausman and Hurley 1989, 136).

Background and Rationale

The ongoing health care debate in the United States and the Childhood Obesity Taskforce's report and recommendations have brought needed attention to the issue of health in America and the role that nutrition plays in reducing and preventing some of the leading causes of death and disease, including heart disease, cancer, stroke, and diabetes. Experts agree that proper nutrition (and consuming fewer calories) and regular exercise could help not only in preventing some types of diseases, but also in delaying age-related degeneration of physiological processes of the body (Aziz 2010; Ornish 2007; Hark and Deen 2005; NIH 2002; Carleton and Wait 2001).

Cardiovascular disease, which starts with the buildup of plaque in the arteries, has been the number one cause of adult deaths and a leading source of adult disability in the United States since 1918 (Blake 2008,151). Childhood obesity, which can lead to debilitating and costly diseases, such as type-2 diabetes, high blood pressure, and high cholesterol levels, affects 25 million young Americans and is the fastest growing health problem in the United States.

Making nutrition and exercise an important component of any regimen for promoting optimal health and the prevention of chronic disease should be one of the goals of modern society. It is true that some diseases have a genetic component or microbial root cause, but with the right diet and lifestyle, these propensities can often be overcome. Education has become one of the most important means of addressing the issues of diet, obesity, and nutrition-related diseases, and of pointing the way toward restoration of the nation's health and wellness.

Learning Activity

In this activity, students work in groups to research nutritional ingredients and to design and present their own special recipes to combat one or more of the top nutrition-related diseases. They learn about the role that nutrition plays in their lives and the importance of a healthy, balanced diet and lifestyle. The goal is to learn what biologically constitutes a healthy, balanced meal and to develop a better understanding of the relationships between nutrition, health, and nutrition-related disease. Students also learn about various foods and ingredients: which of these make them healthy, the nutrients they contain, and what specific health problems and diet-related diseases a healthy, balanced meal can combat and why. They also learn about the process by which the body takes in and makes use of food substances.

The objective of the activity is to help students from high school through college (with a background in at least high school biology or chemistry) to understand the nutritional, health, and wellness values of what they eat and how diet can help prevent nutrition-related diseases. In addition, the activity is designed to help them

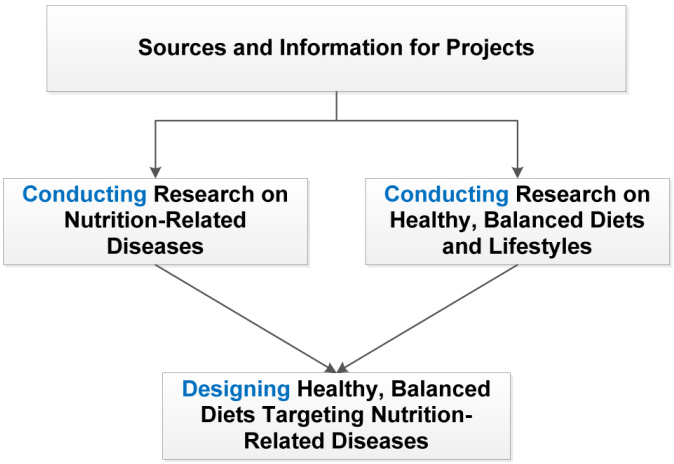
- Understand the nature of nutrition-related diseases and the mechanisms of how these diseases affect the metabolic and other biological activities of the human body
- Understand how the ingredients in food can facilitate the reduction or prevention of nutrition-related diseases

- Apply this understanding toward the choices they make in their daily eating habits and lifestyles.

Throughout the learning activity, instructors reinforce student understanding of the concepts of nutrition, nutrients, biologically balanced healthy meals and diet, and the role that cholesterol, sugar, saturated fat, salt, lack of physical exercise, etc., play in the development of nutrition-related diseases. Instructors also emphasize the importance of lifestyle in shaping and maintaining a healthy body. They emphasize the fact that since the human brain's prime directive is "to eat and defend against the loss of fat," which emerged early in biological evolution, metabolic processes alone might not be enough to successfully influence our state of health, including the maintenance of a healthy body and lifestyle (Hurley 2012 a & b; Freedman 2011).

Pedagogical Approach

The conceptual basis of the learning activity may be summarized in the following chart:



The learning activity itself is organized and carried out in five phases, as shown in Table 1. Phases One and Two are designed to help students successfully complete Phases Three and Four. Phase Five is related to students' learning outcomes and understanding. At the end of each phase, the students engage in discussion questions that help them move forward in the activity.

TABLE 1. Five Phases of Learning Activity

Activity Phases	PART	
PHASE I: Introducing the Learning Activity	1	Informing students what they have to do in order to successfully complete the activity
	2	Discussing the criteria that will be used to assess the designed meals and to evaluate student work
PHASE II: Studying and Evaluating Examples of Existing Healthy, balanced Meals	1	Evaluating two already prepared healthy, balanced meals using given criteria
	2	Discussion of the meals' identified nutritional values for the intended goals
PHASE III: Conduc ing Research	1	Gathering data and information on diet and nutrition- related diseases
PHASE IV: Designing and Presenting Healthy, balanced Meals	1	Designing a healthy, balanced meal targeting one of the nutrition-related diseases
	2	Presenting the healthy meals in the class and to the **F**ood **P**olicy and **R**egulation **C**ommittee (FPRC)
PHASE V: Evaluating What Students Have Done and Learned	1	The FPRC evaluates students' healthy meals and decides whether or not to endorse the proposed meals for specific nutrition-related diseases
	2	The instructor uses the final decisions of the FPRC and a set of specific questions to reinforce understanding of the intended learning outcomes

In the first phase the students are introduced to what they have to do to successfully complete the activity. Students are also provided with a set of criteria designed to help complete their assignments, assess their designed meals, and understand how their work will be evaluated. Then they are asked to participate in a guided discussion using a set of related

questions to help them advance their understanding of various nutrition-related concepts.

In the second phase students are given a homework assignment which asks them to use the given criteria to analyze and evaluate two examples of balanced healthy meals. Then they engage in discussions about the meals' identified nutritional values for the intended goals. From the homework and the guided discussion, students learn that the choices of food ingredients and the combination of nutrients are very important when designing a healthy, balanced meal and in preventing some of the nutrition-related diseases.

One important discovery made by scientists investigating the disease-fighting powers of foods is that nutrients are absorbed better from food than from pills. It also turns out that foods work synergistically—that is, their health benefits are greater when they are eaten together. For instance, tomatoes, chilies, and garlic—the classic salsa ingredients—deliver more potent health protective powers when they are eaten in combination than when they are eaten alone. This finding reinforces the fact that supplements can never [yet] replicate the benefits of a varied diet (Carleton and Wait 2001, 42-43).

Furthermore, the synergy of multiple nutrients, especially micronutrients, is a very important factor in how food contributes to prevention, reduction, and/or treatment of nutrition-related diseases.

Not only do all nutrients in food work together to make something greater than the whole, the organ systems in your body do the same. We now know that disease isn't usually something that strikes out of the blue and hits an isolated organ. For example, did you know that obesity is a risk factor for age-related macular degeneration (AMD)? Who would guess that being overweight would affect your vision? (Pratt and Matthews 2004, 24)

In the third phase, students engage in research, acquire ideas, and learn biological and nutritional facts and concepts. In the fourth phase the students apply what they have learned in designing their own healthy, balanced meals for specific nutrition-related diseases. Then students present their specialized recipes and (if possible) sample meals in the classroom, along with written papers and presentations of their work.

In the fifth phase, the Food Policy and Regulation Committee (FPRC) (consisting of the instructor, two students, and, if possible, the chef or another staff member from the school cafeteria) evaluates the students' proposed healthy meals for effects on nutrition-related diseases using the specific criteria provided in Phase One. The FPRC then decides whether or not to endorse the proposed meals. The instructor uses the final recommendations of the FPRC as well as another set of specific questions to guide student discussions reinforcing understanding of the intended learning outcomes.

In summary, by researching nutrition-related diseases, the nutritional values of various food ingredients, and designing specialized meals targeting specific nutrition-related disease, students learn to:

1. Organize their nutritional needs on a day-to-day or weekly basis
2. Make healthy and desirable food choices
3. Learn and reinforce their understanding of the role of food and nutrition in fighting nutrition-related diseases and achieving a healthy lifestyle
4. Understand the roles that the human brain and stomach play in tackling hunger and obesity

Procedures (Instructor)

Before the Presentations

1. Form a Food Policy and Regulation Committee (FPRC).
2. Hand out the Criteria for the Assessment of the Learning Activity sheet shown in Table 2.
3. Divide the students into groups of 2 or 3 and instruct each group to
   a. Research one of the nutrition-related diseases, then research nutritional ingredients and design their own recipe for a healthy, balanced meal for a given mealtime and targeting their selected nutrition-related disease
   b. Prepare a written and oral presentation that includes the research, the nutritional components of the designed meal, the recipe for their meal, and why and how the designed meal is beneficial in reducing and/or preventing their chosen nutrition-related disease(s)
   c. Present their recipes and (if possible) sample designed meals and assignments to the class
4. At the next class meeting, ask each student to write answers to at least some of the following questions, and then lead the class in a whole-group discussion. Give the students 20-30 minutes to complete the assignment.

a. What constitutes a "Healthy, balanced Meal" (HBM) and what is the general character and purpose of a given mealtime (breakfast, lunch, and dinner)?

b. What is cholesterol? Is it necessary? When and how does cholesterol become a health problem for the human body?

c. What is sugar? Is it necessary? When and how can sugar become a health problem for the human body?

d. What is an allergy? What is an allergic reaction? What are the symptoms of allergies? What are the most common allergic reactions? What are the main foods that are responsible for 90 percent of all food allergies in the United States? How does "Oral Immune Therapy" work in treating some of the food allergies?

e. What is fiber? What is the difference between soluble and insoluble fiber? What is the best way to increase fiber intake?

f. What are phytochemicals? What role do they play in achieving a healthy body and lifestyle?

g. What is hunger? What is starvation? On average, how long can a person stay alive without food?

h. What is fortified food? Why do many believe that it is one of the most effective ways to provide nutrients to some populations that couldn't otherwise obtain them?

i. What are the nutrients most often added to foods?

j. What is the leading cause of stroke? What are the stroke risk factors?

k. What are the differences between macronutrients and micronutrients? Provide examples.

l. What is the difference between a "good carb" and a "bad carb"? What are rich sources of good carbs and rich sources of bad carbs?

m. What are trans fats? What are the major sources of trans fats in our diets?

n. What are free radicals? What role do nutrients play in the generation of free radicals? How do free radicals affect the human body and health?

5. Once students have answered the questions, discuss them in the classroom and help them select the best answers. Then challenge them to refine their definitions.

6. At the next class meeting, give students the two proposed Healthy, Balanced Meals shown in Table 3 as a homework assignment to study and critically analyze. These examples will help them design their own healthy, balanced meals for a given mealtime targeting one or more of the top nutrition-related diseases. In this assignment, students are asked to:

   a. Critically analyze the two examples of Healthy, balanced Meals

   b. Identify any missing nutrients or substances that are needed to achieve their intended goals

   c. Provide a justifiable explanation for agreeing or disagreeing that these two meals are nutritionally balanced

   d. Using the criteria provided in Tables 2 and 3, provide a rating for each of the two proposed balanced meals

7. Finally, give the students 2-3 weeks to research, design, prepare, and present their specialized meals and their presentations (both oral and written). In addition, set aside time in each class period for the groups to meet and work on their projects. Instruct the groups to:

   a. Research and prepare a well-supported and evidence-based paper and oral presentation about their specialized meals

   b. Be prepared to engage in a debate with their classmates and the members of the FPRC on the nutritional value of their specialized meal and why it is suitable for the selected mealtime and the targeted nutrition-related disease

   c. Have a well-researched handout ready to be distributed to the class before the presentation, as well as an illustrated poster or photos, etc., that help convey the group's message and support the argument for its designed meal

   d. Prepare a final written statement for the judges (after the presentation) that can be read to support the usefulness of their specialized meals and their health value to the targeted disease(s)

As mentioned above, the students are provided with a set of criteria that must be used to guide and to assess their designed meal and their oral and written presentations. As shown in Table 2, this set of criteria contains 11 key factors. The criteria are used by both the students and the Food Policy and Regulation Committee. Students use them to prepare their learning assignment and the FPRC uses them to assess student work.

TABLE 2. Criteria for the Assessment of Student Projects

1. Does the meal address one of the four identified nutrition-related diseases?

2. Does the meal

a. Include more than one ingredient?

b. Include vegetables, fruits, grain, etc.?

c. Help prevent or reduce the incidence or severity of the targeted disease?

3. Is the meal easy to make from available and affordable ingredients?

4. Does the meal contain any of the main eight foods which are responsible for 90 percent of all food allergies in the United States? If yes, does the group

a. Acknowledge that there are allergens?

b. Provide a warning and/or state who should avoid them?

c. Provide alternative ingredients?

d. Provide advice if an allergic person accidentally eats the meal?

5. Does the source of ingredients meet the American Health Association's food criteria for saturated fat and cholesterol for healthy people over age 20?

6. Does the meal contain ingredients that should be taken in moderation? If so, does the group bring this to our attention and explain the need for moderation?

7. Does the group identify the type of dish and for which specific mealtime it was designed?

8. Does the group

a. Disclose all the ingredients in the meal?

b. Identify the nutritional value of each ingredient?

c. Provide a complete recipe for its designed meal?

9. Does the group emphasize the relevance of the meal's nutritional value and health benefits for the prevention of one or more of the four nutrition-related diseases?

10. Does the group identify the approximate dollar value of the meal and the time it takes to prepare?

11. Does the group generate a "Card-Fact-Sheet" of ingredients in their specialized meal?

The students are provided with the following examples to help them start their assignment and as a subject for a homework assignment.

TABLE 3. Examples of Proposed Healthy, balanced Meals

Example One: A Balanced Healthy Oatmeal Breakfast

Ingredients: 1 cup 100% whole oatmeal, ¼ cup dried cranberries, 10-15 chopped almonds (unsalted), ¼ cup raisins, and a handful of chopped walnuts (to taste).

Directions: Measure 2 cups of water into a pot. Add the chopped almonds and heat to a boil. When the water boils, take the pot off the burner and add the raisins, cranberries, walnuts, and 1 cup of oatmeal to the mix. Cook on low heat for 3-4 minutes and then remove from heat and let cool. Add a bit of brown sugar to your meal, if desired. (Note: raisins are loaded with sugar and dried cranberries are already sugar sweetened, so sugar is optional. For more protein in this morning meal, a few roasted chickpeas can be added. This meal can be eaten with or without fat-free milk or fat-free soy milk).

Example Two: A Nutritionally Balanced Healthy Lunch

This meal consists of fresh lettuce, fresh spinach, cooked skinless chicken or turkey breast, almonds, cranberries, cooked beans (black beans, green peas, or chickpeas), fresh tomatoes, fresh cucumber, and one slice of whole-wheat bread.

Directions: Clean and cut up ¼ pound of fresh lettuce and ¼ pound of fresh spinach and mix them in a bowl. Add 8 oz (227 g) of already-cooked skinless chicken or turkey breast strips into the bowl. Then add ¼ cup each of almonds, cranberries, and cooked beans or peas (black beans, green peas, or chickpeas) to the bowl. Cut up and add one fresh tomato and one-half fresh cucumber. If desired, add your favorite reduced-fat or fat-free dressing to the mix. Eat with one slice of whole-wheat bread. If desired, salmon or tuna can be substituted for the chicken or turkey breast.

In addition, as part of designing a balanced healthy meal, students must also complete Table 4 using the ingredients they selected for their design. The students should be advised to be creative with their designed meals and menus by mixing and matching different categories of foods (fruits, vegetables, grains, fish and white meat, and so on) to suit their preferences, objectives, and targeted nutrition-related diseases.

TABLE 4. Criteria for the Assessment of Student Projects

INGREDIENTS	HEALTH BENEFITS OF FOOD	NUTRIENT BENEFITS	POSSIBLE ADVERSE EFFECTS

During the Presentation:

1. The groups take turns presenting their specialized meals to the class. The members of the FPRC question each group. In addition, the students in the class can ask up to three questions after a group finishes presenting its designed meal. The members of each group take note of the questions that are asked.
2. When all the groups finish presenting their specialized meals, the FPRC can ask more questions of any of the groups. The FPRC must also consider the student questions and answers in their final evaluation.
3. The members of the FPRC wait until the next class meeting before sharing their final decisions with the groups. During this time, if there is a room available in the school, the posters, illustrations, photos, etc, can be made available for all the students to view.

After the Presentation (For the FPRC)

1. In making their final decisions, the members of the FPRC take into consideration the following:
   a. The academic quality and integrity of the written paper, the oral presentation, the poster illustration, and/or any additional aids used by the students to help convey their message
   b. The delivery of the presentations, the articulation of their arguments, the demonstration of the interrelationship between the ingredients in the meals and their roles in reducing, treating, and/or preventing nutrition-related diseases, as well as the individuals' personal involvement and engagement during the presentations
   c. The type and quality of questions being asked during the process; in addition, the quality of the answers the group provided to questions directed at them (The teachers should also record the types of questions being asked by the groups, the relevancy of the questions to the subject matter and to the point being presented and discussed, and the number of questions being discussed from one group to the other.)
2. Each group is given 2-3 minutes to address the FPRC one more time before the members of the committee read the final decision and recommendations. In these final remarks, the groups must have a written statement that can be read to support the usefulness of their specialized meals for their health value and their relevancy to both their designated mealtime and the targeted nutrition-related disease.
3. Using a scale of 1 to 5 (as seen in Table 5), the Committee makes its recommendations based on the nutritional value of the designed meal, as well as on the meal's effectiveness in reducing or preventing the targeted nutrition-related disease.

Both the groups and the FPRC use the following criteria for this learning activity.

TABLE 5. Recommendations of the Food Policy and Regulation Committee

LEVEL OF RECOMMENDATION	RECOMMENDATION FOR TARGETED NUTRITION RELATED DISEASE	EXPLANATION AND/OR CLARIFICATION	SUPPORTING EVIDENCE
Level Five	Highly Recommended		
Level Four	Recommended		
Level Three	Recommended with reservations		
Level Two	Lack of sufficient data on the nutritional value of the meal to allow a recommendation		
Level One	Not recommended		

Discussion Questions

Asking questions can provide information and promote critical thinking that can spark interest in the research done in Phase 1, as well as giving students a fresh perspective when needed. The following list of questions can be used at the beginning of each class or at any time during the activity, and can be asked orally or prepared as handouts. Instructors can select any of these questions for use in the activity based on their discipline's educational objectives and goals. Some of the questions may also be given out for pre-class research by students.

1. Explain the differences among "safety food," "quality food," and "comfort food."
2. According to microbiologist and MD Roberts Desowitz, "The immune system is the body's doctor, our own personal physician that cures and protects us from a panoply of diseases" (Carleton and Wait 2001, 25). Write a letter to a friend to explain this quote.
3. Which of the four nutrition-related diseases (heart disease, cancer, stroke, and diabetes) has a stronger relationship with the condition of the immune system than the others? Which disease has a weaker relationship than the others? Explain.
4. Differentiate chemically, biologically, and nutritionally between carbohydrates, proteins, and fats/lipids.
5. What is the secret behind the power of oats in bringing cholesterol levels down?
6. Why is spinach not recommended for someone with a tendency toward loose stools or urinary incontinence?
7. Why have we been advised not to eat large quantities of bolted lettuce (lettuce that has gone to seed)?
8. Why should we not worry too much about the total amount of protein we ingest, but rather focus on the healthy sources of the protein and how to increase them in our diet?
9. It has been said that consuming vegetable protein causes less bone loss than animal protein. Why is that?
10. Explain why many scientists believe that breakfast is the most important meal of the day.
11. How should we best eat our food—raw, semi-cooked, or cooked? Explain.
12. In his book Perfect 10 Diet, Dr. Michael Aziz (2010) argued that "a healthy diet balances all the macronutrients in a very specific way." He recommended the balance of 40% carbohydrates, 20% protein, and 40% fat. Do you agree? Explain.

13. Explain how poor nutrition impacts both the physical and mental development of young people.
14. What will happen when your body secretes too much insulin?
15. It has been proposed that everyone should be a "food label sleuth," paying attention to the percentage of calories from fat and the number of grams of fiber. Why is this an important strategy for maintaining a healthy, balanced diet?
16. What are the three main types of carbohydrates and how do they differ?
17. What might happen to the gallbladder of someone whose cholesterol levels are very high?
18. What would you suggest to someone with diabetes to satisfy his or her sweet tooth and why?
19. Explain the significance of the following quote from a health and diet perspective:

The outermost leaves of spinach and cabbage, for example, have the highest levels of vitamin C, and broccoli florets have more C than the stalks. One hundred grams of fresh apples with the skin contain about 142 milligrams of flavonoids, but the same amount of apples without the skin has only 97 milligrams of flavonoids.... Of course, the skin is where the pesticides and potentially harmful bacteria reside, so a careful washing is mandatory. (Pratt and Matthews 2004, 168-169)

Conclusions

Benjamin Franklin (1706-90) recommended almost 280 years ago: "To lengthen thy life, lessen thy meals" (NIH 2002, 34). Until the twentieth century, complex carbohydrates, starch, and glycogen provided the majority of the metabolic fuel for most people in the world, but this was not the case in the United States during the past century. American diet changed significantly in that time by replacing carbohydrates with fats and protein as energy sources and by replacing complex carbohydrates with sugar (Armstrong 2012, 616).

The food we eat is vital in determining both our current and potential health (Hark and Deen 2005). Traditionally, meals exist to nourish our bodies. In our modern, fast-paced world, the focus of food and meal preparation has changed from nutrition to convenience and speed. Unfortunately, consciously or unconsciously, many of us often eat the wrong kinds of food. Our diet, often too rich in saturated fats, sugar, and alcohol, has been linked in part to at least 5 of the 10 leading causes of death in the United States: heart disease, cancer, stroke, diabetes, and kidney disease (Hill and Kolb 2007, 459).

This learning activity aims to provide a hands-on method for students to understand the role that nutrients play in their lives. The goal is to teach them what biologically constitutes a healthy meal and to be more aware of the relationship between nutrition and nutrition-related diseases and how nutrition can be used to maintain one's health and well-being. Students learn how to combine ingredients to create a healthy meal, the possible dangers of additives, and the common allergy-inducing foods. By designing and preparing their own meals, students acquire practical lifelong skills that can contribute to achieving a healthy lifestyle.

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Dr. Matthew Bruder is an Associate Professor for DeVry University at the Addison Illinois campus. He is the current co-chair of DeVry's National Anatomy and Physiology Curriculum Committee. He also serves on DeVry's National Nutrition Curriculum Committee. He is a Subject Matter Expert in the areas of Anatomy and Physiology. He has worked as an Associate Professor since 2011. Prior to this he served as an assistant professor. He began his DeVry career as an adjunct professor and instructor in 2008. He has taught at many other colleges and universities all over the greater Chicagoland area.

Bruder holds a Doctor of Medicine degree from St. Matthew's University. He has completed masters' level work in Health Systems Administration at Central Michigan University and St. Joseph's College of Maine. He holds a bachelor's degree in Biological Sciences from Michigan Technological University.

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Appendix

Extra Credit Assignment

1. Design simple standardized techniques for designing and making healthy, balanced meals for nutrition-related diseases.
2. What are the benefits of getting a good night's sleep of about 7- 9 hours? What are the best ways to help someone sleep more deeply and soundly to achieve a healthy lifestyle?
3. What can be included and what excluded from each proposed healthy, balanced meal for a given nutrition-related disease? Explain.
4. "Today, far too many American children grow up in environments where sedentary lifestyles and an excess of nutrient-poor, calories-dense foods are the norm. If the current trend continues, our children may have shorter life expectancies than we do" (Newsweek, June 26 and July 5, 2010, 22). What solutions would you suggest for dealing with this problem in both the short term and the long term?
5. If the consumers of your healthy, balanced meal also love to drink caffeinated beverages (tea, coffee, chocolate, etc.), which caffeinated beverage do you suggest will BEST complement your meal and the specific nutrition-related disease it addresses? Explain.
6. Many scientists and activists have been talking about the need for a law to protect children's diet and health. Propose a detailed "Child Nutrition Bill" which can be submitted to the U.S. Congress for consideration.
7. Design rules for eating out that help those who would like to have a healthy, balanced diet and maintain healthy eating habits.
8. Conduct research and write a short paper on
   a. The role that drinking plenty of water plays in weight reduction and a healthy body
   b. The relationship between aging and diet
   c. The positive and negative sides of alcohol consumption
   d. Food and genetic diseases
   e. Nutrition and longevity (caloric restriction and longevity)
9. We all know that food does not come from packages and cans in the grocery store; it comes originally from farms and people's gardens. Yet, small farms and farmers are disappearing at an alarming rate in many areas of the United States and are being replaced with large agribusinesses. From your perspective, how might this trend affect the type and quality of food large industrial farms produce for public consumption?
10. Which of these four nutrition-related diseases—heart disease, cancer, stroke, and diabetes—has the strongest relationship and which has the weakest relationship with the condition of the immune system? Explain.
11. Cancer, which is one of the nutrition-related diseases, is a disease characterized by the presence of one or more malignant tumors, a mass of neoplastic cells that have the capability of spreading throughout the body. What often causes a normal cell to become a cancer cell? In what ways are cancer cells abnormal cells?
12. Cancers are classified according to the tissues in which they arise. Conduct research to learn more about cancer. Then discuss and differentiate between the common types of cancers.