9 FOOD ENVIRONMENTS
LESSON PLAN

Overview

Estimated lesson time (not including primer and out-of-class project): 105 minutes

15 min | **Introduction**

Primer
Includes background reading, vocabulary builder and review.

Activity
Students will take a stand on the statement, "Individuals are responsible for what they eat."

Scenario discussion
Students will reflect on the effects of cost, availability and access on food choice.

Lecture-discussion
Covers food environments, essential questions and lesson overview.

30 min | **Homes, schools, restaurants, stores**

Lecture-discussion
Covers how aspects of each food environment can affect food choice and health. In pairs, students will discuss ways to improve each environment.

15 min | **Communities**

Lecture-discussion
Covers food deserts, grocery gaps, food swamps and equity concerns.

45 min | **Measuring, improving food environments**

Lecture-discussion
Covers reasons to measure food environments, tools for doing so, and examples of how the results can be used to improve food environments.

Activity
Students will use geographic data about Baltimore City to assess the accessibility of healthy food in different neighborhoods, and the possible effects on residents' health. Worksheets are provided.

Project
Students will choose from one of three research projects aimed at measuring the healthfulness of food environments in their own community.

Essential questions

Essential questions[1] point to the big ideas of a module. They can be discussed, written on the board and posed on essays and exams.

- To what degree are individuals responsible for their food choices?
- How do food environments influence food choice and health?
- Are food choices—or a lack of food choices—a social justice concern? If so, how?
- How can we know whether a food environment is healthy?
- How can unhealthy food environments be improved?

Learning objectives

Students will be able to:

- Describe how the attributes of homes, schools, restaurants, stores and communities can influence food choice and health;
- Describe how part of the food environment has changed over recent decades;
- Describe how certain populations are affected by limited access to healthy food;
- Devise a mapping or survey tool to measure the healthfulness of a food environment;
- Assess part of the food environment in their communities, and use the results to develop recommendations.

Materials

Available on the *Teaching the Food System* website:

- Vocabulary definitions
- Background reading
- Presentation slides
- Student handouts

15 min # Introduction

Primer
Includes background reading, vocabulary builder and review.

Activity
Students will take a stand on the statement, "Individuals are responsible for what they eat."

Scenario discussion
Students will reflect on the effects of cost, availability and access on food choice.

Lecture-discussion
Introduces food environments, essential questions and lesson overview.

Note: Instructions to the educator are written in italics; talking points to students are written in plain font. Talking points are not intended to be delivered verbatim—we expect educators will adapt this lesson to best suit their audiences.

Primer

- *Educators may wish to review the* background reading *as a primer for this lesson. It can also be made available to students as an optional reading assignment, or for reference purposes.*

- *Before beginning this lesson, we recommend students become familiar with the* vocabulary definitions *for this module. Refer to* vocabulary builders *for suggested activities.*

- *If time allows, the brainstorm activity in* Diet and Influences on Food Choice *places this lesson in its broader context. If students have already done the brainstorm, briefly review their results. Explain that this lesson focuses on a particular set of influences on food choice—food environments.*

Activity

- *Mark four stations around the classroom. Label the stations "strongly agree," "agree," "disagree" and "strongly disagree."*

- Respond to the following statement: "Individuals are responsible for what they eat."

- *Students will respond by standing by the stations that most reflect their opinions.*

- *Ask several volunteers to explain why they responded as they did.*

- *Write down the distribution of responses. Students will revisit this activity after the lesson.*

Scenario discussion

- *The following scenarios are based on what students ate (or plan to eat) for lunch at a school cafeteria. Since the subject of school food is close to home for many students, it serves as a "hook" to generate interest. If your institution does not have a cafeteria, the discussion can be based on a nearby restaurant, café or any other food outlet where students typically obtain meals.*

- *Ask several volunteers to share what they ate for lunch.*

- Scenario 1: Imagine the meal you described costs twenty dollars, but you could buy a hot dog and a bag of potato chips for a fraction of the price. Would you change your food choices? *Discuss. Note the effect of cost on food choice.*

- Scenario 2: The meal you described is not available. Instead, the cafeteria only sells hot dogs, potato chips and soda. What would you eat instead? What does this suggest about how our environment can influence food choice? *Discuss. Note the effect of availability on food choice.*

- Scenario 3: The cafeteria is closed for repairs. Vending machines, which only sell snacks and soda, are still open. The closest grocery store is a mile away. You don't own a car, there is no bus service to the grocery store, and there are no sidewalks along the street. What would you eat? *Discuss. Note the effect of access on food choice.*

Lecture-discussion

Title slide

- The cost and availability of food, and access to food, are important qualities of **food environments** that affect what people eat and their health.

- While the relationships between food environments and diet are not yet fully understood,[2] studies have shown that residents of communities without access to affordable, healthy food options generally have poorer diets and are at a higher risk for certain diet-related diseases.[3–8]

- Some people view the burden of unhealthy food environments as a social justice concern, particularly since low-income communities and communities of color are often those that are most affected.[9–11]

Overview

- In our tour of food environments, we'll begin with homes—where Americans consume the majority of their daily **calories**—before moving on to schools, restaurants, supermarkets, convenience stores, farmers' markets and food banks.

- We'll then examine communities. Factors such as income, transportation and the types of stores in a community can affect what people eat.

- Finally, we'll use tools such as maps and surveys to study food environments in actual communities.
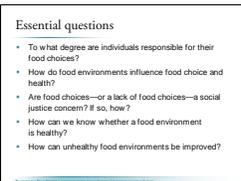
Essential questions

- These questions reflect the "big ideas" covered in this lesson.

- *Allow students time to read and reflect upon the essential questions.*

- *Briefly solicit students' initial responses to the questions.*

- *If you intend to use essential questions on exams or essay questions, notify students at this time.*

## *30 min* Homes, schools, restaurants, stores

Lecture-discussion
Covers how aspects of each food environment can affect food choice and health. In pairs, students will discuss ways to improve each environment.

- *You may provide each student with a copy of the handout,* Homes, schools, restaurants, stores and communities. *Students can fill these out when prompted.*

### Overview: Homes, schools, restaurants, stores
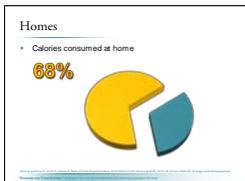
Homes

- Americans, on average, consume an estimated 68 percent of their total calories from foods prepared at home.[12]
- For many people, particularly youth, their food choices are strongly affected by the foods available in their home environment.[13,14] Studies have found that children tend to:
  - Eat more fruits and vegetables in homes where more fruits and vegetables are available;[14–16]
  - Eat more produce if it is made more easily available, such as by peeling and slicing carrots and storing them in the refrigerator;[15]
  - Drink more soft drinks in homes where soft drinks are available;[17]
  - Follow the examples set by their family members.[14,17–19] This is an example of a social influence on food choice (*refer to* Diet and Influences on Food Choice).

Healthier homes

- *Ask students to turn to a partner and discuss the following. They may write their responses on their handouts.*
  - Describe one thing you learned about home food environments;
  - Describe how part of your home food environment affects what you eat;
  - Describe one change you could make to your home food environment that might improve your diet;
  - Anticipate challenges that might need to be overcome before this change could be implemented.
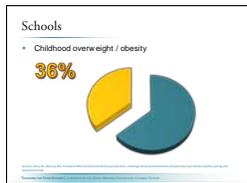
Schools

- Over a third (36 percent) of U.S. youth are **overweight** or **obese**[20]—more than at any other time in history.[21]

- Recent research indicates that the main sources of energy for 2- to 18-year olds included cakes, cookies, donuts, pies, soda, and other **nutrient-poor** foods.[22]

- Is school food part of the problem, or part of the solution? Why? *Discuss.*

- Schools play a key role in affecting the diets and health of children and adolescents. Outside of their homes, most children spend the majority of their time in schools,[23] where students who eat school meals for breakfast and lunch may consume over half of their daily calories.[24]

Federal meal programs

- Most public and private schools offer meals through the **National School Lunch Program**(NSLP), the School Breakfast Program, or both.[25]

- These meals are expected to meet dietary guidelines set by the **U.S. Department of Agriculture**, though over two thirds of public schools serve meals that exceed recommendations for total and saturated fat.[23]

- What is the effect of federal meal programs on children's diets? Do you think students who eat federal meals eat healthier diets? *Discuss.*

- Surveys suggest that students who eat meals offered through the NSLP consume:
  - Higher amounts of fat and sodium;
  - Lower amounts of **added sugars**;
  - Higher amounts of several key **dietary nutrients** (including calcium and B vitamins);[24]
  - Three times as much milk and half as much soda, which may explain the differences in fat and sugar intake.[24]

- Free and reduced-price meals offered through federal programs also serve as an important safeguard against hunger, particularly for the 59 percent of children eating school meals who come from low-income families (refer to *Hunger and Food Security*).[26]

Controversy

- Historically, the nutritional value of federal school meal programs has been the subject of controversy.

- *Ask students if they can recall any controversies around school food.*

- For example, in 1981, a government official proposed that ketchup and relish—sweetened condiments—be considered vegetables in meeting nutritional requirements.[27,28]

- This proposed change would have reduced government spending on school meals (ketchup is a cheaper alternative to fresh vegetables), but it was met with fierce criticism and never implemented.[27,28]

- This incident illustrates the ongoing tension between limited funding for school meal programs and the desire to maintain or improve healthy options.

Competitive foods

Competitive foods

- The ketchup controversy was not the first time the nutritional value of school food would be compromised for budgetary reasons.

- When the NSLP was first introduced in 1946, restrictions were put in place to keep private food manufacturers out of schools. Founders of the program were concerned that "Corporations [would] sell anything to the child as long as he has the money to pay for it."

- But by the 1970s and 80s, school meal programs became increasingly desperate for funding, and private companies could provide meals cheaply and efficiently.[28] Restrictions were eventually lifted, paving the way for fast-food chains, soft-drink manufacturers and other corporate vendors to sell their products in schools.

- Foods sold outside of federal meal programs are called **competitive foods.**

- As of 2005, nine out of ten public schools in the United States allowed competitive foods to be sold, typically through vending machines, snack bars and cafeterias.[29]

- *Ask students if they can identify any competitive foods sold at their school.*

- While they provide a substantial source of revenue for schools,[26] competitive foods raise some **public health** concerns:

  o Unlike federal meals, they are rarely required to meet nutritional requirements[13], and are often high in calories, fat and sugar.[20,29,30]

  o The most common competitive foods are sweetened beverages, salty snacks and high-fat baked goods.[26]

- Industry representatives have admitted that selling these products in schools is only marginally profitable. What do they have to gain? *Discuss.*

  o …They benefit from the opportunity to recruit lifelong **brand loyal** customers at a young age.[28]

- *Refer to Food Marketing and Labeling for more on marketing to youth.*

Healthier schools

- *Ask students to turn to a partner and discuss the following. They may write their responses on their handouts.*
  - o Describe one thing you learned about school food environments;
  - o Describe how part of your school environment affects what you eat;
  - o Describe one change that could be made to your school environment that might improve your diet;
  - o Anticipate challenges that might need to be overcome before this change could be implemented.
- Many parents, teachers, public health advocates and other groups are fighting for healthier options in schools. They are calling for:
  - o More fruits and vegetables in school meals;
  - o Hands-on cooking and gardening classes;
  - o Stricter regulations on competitive foods;
  - o Improved nutrition education;
  - o Farm-to-school programs that introduce fresh, local produce into cafeterias.[13]
- Some of these changes have been shown to increase students':
  - o Knowledge of nutrition;
  - o Consumption of fruits and vegetables.[31]
- Efforts to improve school meals face challenges, including:
  - o Tight budgets;
  - o Limited kitchen staff and facilities;
  - o The fact that students may object (at least initially) to healthier meal offerings when they have the option of familiar alternatives like pizza and fries.[27]
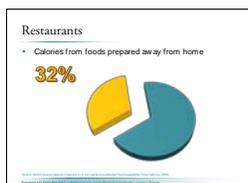
Restaurants

- Americans eat 32 percent of their total calories from restaurants, including fast-food and takeout establishments.[12]
- In 2006, American households spent nearly half of their food budgets on meals and snacks prepared away from home (at restaurants, hotels, schools and other places), up from 30 percent in 1965.[32]
- Why is this cause for concern? *Discuss.*
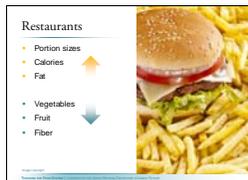
Restaurants (continued)

- Contrary to what some consumers may expect, full-service restaurants do not necessarily offer more healthful options than fast-food restaurants.[33,34]

- Restaurants also tend to offer large portion sizes,[13] which has been shown to encourage consumers to eat more.[35]

- In some cases, portion sizes of sodas, french fries, hamburgers, and chocolate bars are between two and five times larger than when these foods were originally introduced.[36]

- Compared to individuals who eat more meals prepared at home, individuals who frequently eat at restaurants tend to consume:
  - More calories;
  - More fat;
  - Fewer vegetables;
  - Less fruit;
  - Less fiber.[34]

- Research suggests that without nutrition information on menus, consumers are likely to underestimate the amounts of calories, saturated fat and sodium in restaurant items (refer to *Food Marketing and Labeling*).[37]

- Eating out more frequently has been associated with weight gain and obesity,[13] possibly due to the influences on food choice that have been described here.

Healthier restaurants

- *Ask students to turn to a partner and discuss the following. They may write their responses on their handouts.*
  - Describe one thing you learned about school food environments;
  - Describe how the environment in one of your favorite restaurants affects what you eat;
  - Describe one change that could be made to the restaurant environment that might improve diets;
  - Anticipate challenges that might need to be overcome before this change could be implemented.

Food stores

- Retail food stores include supermarkets, small-scale grocers, and convenience stores.

- Two of the most important considerations in how these places affect consumers' health are the cost and availability of healthy food options (such as fruits, vegetables and low-fat or low-sugar options), compared to less healthy alternatives.[9]

Supermarkets

- Supermarkets are generally thought to offer the greatest variety of healthy options at the lowest costs.[13,38]

- **Economies of scale**—the increase in efficiency gained from operating at a larger scale (buying in bulk, for example)—allow supermarkets to save on costs.[38] Those savings may be passed on to consumers in the form of cheaper products.[38]

- The larger cold storage capacity of supermarkets also allows them to stock more perishable goods, such as meats and fresh produce.

- Possibly for these reasons, studies have found that residents of neighborhoods with supermarkets tend to eat healthier diets (more fruits and vegetables, for example), and have lower rates of obesity and hypertension.[7,9,13,39]

Smaller stores

- In contrast, neighborhoods with a higher concentration of smaller stores such as small-scale grocers, corner stores and convenience stores have been associated with higher rates of overweight and obesity.[7,39]

- While some small-scale grocers sell healthy food at reasonable prices, studies suggest that small-scale grocers, corner stores and convenience stores generally carry fewer items, of lower quality and at higher prices, than supermarkets.[7,38,40]

- In some corner stores where the owners are concerned about security, foods are displayed behind bulletproof glass and sold through a revolving window.[5] Consumers buying from "behind-glass" stores have limited ability to inspect the quality of products or view nutrition labels or expiration dates.[5] A study of behind-glass stores in Baltimore found them to have the most limited selection of healthy foods.[5]

Store layout

- The physical layout of the inside of stores can also influence customers' food choices.

- For example, stores typically stock perishable sections around the perimeter with the understanding that customers looking for staple items like milk and cheese will be directed to walk through the entire store, encouraging them to select products they may not have planned to purchase.[41]

- Several authors recommend shopping primarily along the periphery of stores, where fruits, vegetables and other minimally processed foods are generally found.[42–44]

Healthier food stores

- *Ask students to turn to a partner and discuss the following. They may write their responses on their handouts.*
    - o Describe one thing you learned about food store environments;
    - o Describe how the environment in one of the stores in your community affects what you eat;
    - o Describe one change that could be made to the store environment that might improve diets;
    - o Anticipate one challenge that might need to be overcome before this change could be implemented.

Food store alternatives

- Although a recent survey suggests most U.S. consumers buy the majority of food from grocers and supermarkets,[45] there are many alternative sources of food. *Ask students to list examples.*

Food store alternatives (continued)

- Some of these alternatives have grown in popularity; the numbers of farmers' markets and **community supported agriculture** (CSA) programs in the U.S. have risen dramatically over the past 10 years.[46] Through these arrangements, farmers typically sell fruits, vegetables, eggs, meat and other fresh fare directly to consumers.[46]

- Some farmers' markets now allow consumers to make purchases using Supplemental Nutrition Assistance Program (SNAP, formerly the Food Stamp Program) benefits, and provide coupons to low-income seniors and participants of the **Women, Infants and Children** (WIC) **program**.[46]

- Many citizens also produce their own food in backyard and community gardens.

- Other alternative food sources include those that provide **emergency food** assistance, such as food pantries and soup kitchens (refer to *Hunger and Food Security*).

15 min # Communities

Lecture-discussion
Covers food deserts, grocery gaps, food swamps and equity concerns.

Overview: Communities

- When we examine food environments at the community level, how can we know whether the environment is healthy? What factors should we consider? *Discuss.*
  - How many food outlets are there in the community?
  - What type of outlets are they (supermarkets, corner stores, farmers markets, etc.)?
  - Where are the outlets located, and how easily can residents travel to them?

- All of these factors—the number, type, location and accessibly of places to acquire food—are frequently associated with the health of community members.[9]

- For example, compared to people living in communities where more healthy foods are accessible, people who live in areas with limited access to healthy food tend to:
  - Eat less healthy diets;
  - Suffer more from obesity and type 2 **diabetes**.[3–5]

Food deserts

- **Food deserts** are areas with limited access to affordable and nutritious food, particularly among low income communities.[2]
- We define food deserts using four criteria:
  - Distance from a supermarket;
  - Household income;
  - Vehicle ownership;
  - Availability of healthy food in stores.[47]
- For example, in an urban setting, an area qualifies as a food desert if:
  - It is outside of walking distance from the nearest supermarket;
  - The median household income is at or below 185 percent of the **federal poverty level**;
  - 40 percent of households do not own a vehicle;
  - The availability of healthy food in stores is considered low (based on the results on in-store surveys).[47]
- In rural settings, where walking to a supermarket is less feasible, areas over ten miles from a supermarket are sometimes considered to be food deserts.
- It is also important to consider whether residents have access to affordable public transport, shuttle services or other means of transportation.[2] For residents who live closer to supermarkets, features such as sidewalks, controlled intersections and safe neighborhoods can make walking a more viable option.[2]
- Do you agree with these criteria for food deserts? If not, how would you change them? *Discuss.*
- How might it be helpful, or unhelpful, to think of communities in terms of whether they qualify as food deserts? *Discuss.*

Food swamps

- Some researchers suggest that the overabundance of unhealthy food in a community—rather than the absence of healthy food—is more of a problem with regards to obesity.[2,48]
- For this reason, they have proposed the term food swamp as a "more useful" alternative to food desert.[48]
- Food swamps refer to places where the abundance of nutrient-poor snack foods such as cookies, chips and sodas overwhelms the presence of fruits, vegetables and other healthy options.[48]

Grocery gaps

- What has caused certain communities to become food deserts? *Discuss.*

- In some urban areas, food deserts are often areas that were once well-served by supermarkets or large-scale grocers, but now suffer from what have been called "grocery gaps."[49] The disappearance of supermarkets from low-income neighborhoods is a result of several changes that took place over the past 80 years.[38]

- After World War II, middle class families migrated to newly built suburbs.[38] Supermarkets soon followed, relocating away from core neighborhoods to suburbs, where they could attract more affluent consumers.[38]

- Supermarkets also benefitted from cheaper land that allowed them to grow larger in size (for more on industry consolidation, refer to *History of Food*).[38,50] Many of the poorest urban areas in America lost supermarkets.[38]

- Although work is being done to encourage supermarkets to return to low-income areas, store owners have expressed concerns about crime and a lack of buying power among lower income residents.[38] Zoning laws, the scarcity of large lots and limited parking are other potential barriers for supermarkets in urban areas.[38]

- We've placed a lot of emphasis on supermarkets as a key part of addressing food deserts, but are they necessarily the solution? *Discuss.*
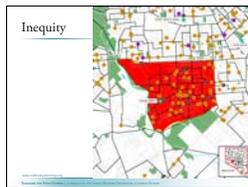
Inequity

- In many cases, the burden of unhealthy food environments weighs more heavily on low-income communities and communities of color.

- Residents of these communities are often surrounded by a higher concentration of fast food restaurants[9,10] and fewer supermarkets[10] than predominantly white or high-income communities.

- Low-income communities and communities of color have also been found to have fewer healthy options, such as high-quality fruits and vegetables.[9,10]

- Adolescents may be particularly affected by disparities in food environments; research suggests that fast food restaurants and convenience stores tend to cluster around schools that serve a higher percentage of low-income students and students of color.[10,11]

- *Orange circles on the map indicate corner stores or small grocers.*

Healthier communities

- *Ask students to turn to a partner and discuss the following. They may write their responses on their handouts.*
  - Describe one thing you learned about community food environments;
  - Describe how the environment in your community affects what you eat;
  - Describe one change that could be made to your community food environment that might improve diets;
  - Anticipate challenges that might need to be overcome before this change could be implemented.

45 min Measuring, improving food environments

Lecture-discussion
Covers reasons to measure food environments, tools for doing so, and examples of how the results can be used to improve food environments.

Activity
Students will use geographic data about Baltimore City to assess the accessibility of healthy food in different neighborhoods, and the possible effects on residents' health. Worksheets are provided.

Project
Students will choose from one of three research projects aimed at measuring the healthfulness of food environments in their own community.

Overview: Measuring, improving

- What are some reasons to measure the healthful of food environments? *Discuss.*
  - o To better understand and describe the effects of food environments on our health;
  - o To identify socioeconomic or racial disparities in access to healthy foods;
  - o To guide interventions aimed at improving food environments;
  - o To evaluate the success of these interventions.[51]
- One of the most important steps in improving unhealthy food environments is to measure the problem. As the popular saying goes, "What is not measured, is not managed."
- What tools might be helpful in measuring the healthfulness of food environments? *Discuss.*
- Tools such as maps, surveys, checklists and interviews can better our understanding of food environments.
- Some researchers use geographic information to measure the type and distribution of food sources in a community; this might involve counting the number of grocers in a neighborhood, or measuring the distance from a residential area to the nearest supermarket.[52]
- Checklists can be used to describe the cost and variety of foods stocked in stores and schools, while sales receipts indicate which products are being sold to consumers.[52]
- Surveys can also be used to measure residents' perceptions of their food environments.[52]
- Data on the availability and accessibility of foods can then be compared against other measures, such as health outcomes or family income levels.[53]

Healthier food environments

- Evidence gathered from measuring food environments can guide efforts to improve them.[51]

- Neighborhood planners and other policymakers might encourage more fresh food availability by offering grocery stores tax incentives, by setting up new farmers' markets, or by changing zoning laws to encourage community gardens.

- Administrators might limit the availability of vending machines in schools.

- Public health researchers and citizens could ask local store owners to stock healthier foods, and encourage their friends and neighbors to purchase those foods.

- Officials might increase bus service to grocery stores; or in some food deserts, helping to open a new supermarket might be a more effective alternative to improving transportation.[2]

- Some cities have organized **food policy councils**, which bring together these and other stakeholders in the food system to promote changes that improve their cities' food environments.[54]

Conclusion

- There is a growing body of knowledge linking the cost and availability of healthy food to diet-related disease.

- What we eat, the research suggests, may be heavily influenced by where we live, work and study.

- Still, there is much to be learned about the effects of food environments on diet and health.[2] Efforts to better understand these effects, and to foster healthier food environments, can be furthered by the many tools at our disposal.

Activity

- In this activity, you will use geographic data about Baltimore City to measure the availability of healthy food in different neighborhoods, and the possible effects on residents' health.

- *Students will work in small groups.*

- *Provide each group with the following handouts:*

    o *Measuring food environments;*

    o *Baltimore City: Mortality rates from diet-related diseases;*

    o *One of three Community maps. Distribute these evenly so each map is given to roughly the same number of groups.*

- *Refer to Measuring food environments for detailed instructions.*

- *Invite volunteers to present their results. Images of each map are included in the slides.*

Project

- *In groups, students will pursue one of the following research projects in their community. These may take several days. Have each group present their findings.*

Option 1:

- Design a survey or checklist for measuring the cost and availability of food in restaurants, stores or schools.

- Implement the checklist in one or more of these three settings.

- Based on your findings, identify opportunities for improving the food environment.

- *Students may wish to explore the Nutrition Environment Measures Survey (www.med.upenn.edu/nems/) for ideas.*

Option 2:

- Design and implement a mapping tool for measuring the healthfulness of a community food environment.

- Implement the tool in a nearby community.

- Based on your findings, identify opportunities for improving the food environment.

- *Students may wish to explore the Maryland Food System Mapping Resource (www.jhsph.edu/clf/programs/food_mapping/) for ideas.*

Option 3:

- Design and implement a survey to local residents about how their food environments have changed over recent decades.

- Survey questions should allow for open-ended responses.

- *Students might consider visiting a local retirement home.*

- *Students with an interest in digital media might consider making a documentary.*

References

1. Wiggins G, McTighe J. *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development; 1998.

2. Ver Ploeg M, Breneman V, Farrigan T, et al. *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences: Report to Congress.* USDA Economic Research Service; 2009.

3. Moore LV, Diez Roux AV, Nettleton JA, Jacobs DR. Associations of the local food environment with diet quality—a comparison of assessments based on surveys and geographic information systems. *American Journal of Epidemiology*. 2008;167(8):917-924.

4. Goldstein H, Harvey S, Banthia R, et al. *Designed for Disease: The Link Between Local Food Environments and Obesity and Diabetes*. California Center for Public Health Advocacy, PolicyLink, and the UCLA Center for Health Policy Research; 2008.

5. Franco M, Diez Roux AV, Glass TA, Caballero B, Brancati FL. Neighborhood characteristics and availability of healthy foods in Baltimore. *American Journal of Preventive Medicine*. 2008;35(6):561-567.

6. Morland K, Wing S, Diez Roux A. The contextual effect of the local food environment on residents` diets: the atherosclerosis risk in communities study. *American Journal of Public Health*. 2002;92(11):1761-1767.

7. Morland K, Diez Roux AV, Wing S. Supermarkets, other food stores, and obesity: the atherosclerosis risk in communities study. *American Journal of Preventive Medicine*. 2006;30(4):333-339.

8. Morland KB, Evenson KR. Obesity prevalence and the local food environment. *Health & Place*. 2009;15(2):491-495.

9. Glanz K, Sallis JF, Saelens BE, Frank LD. Healthy nutrition environments: concepts and measures. *Am J Health Promot*. 2005;19(5):330-333.

10. Larson NI, Story M, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the U.S. *American journal of preventive medicine*. 2009;36(1):74-81.

11. Sturm R. Disparities in the food environment surrounding US middle and high schools. *Public health*. 2008;122(7):681-690.

12. Guthrie JF, Lin B-H, Frazao E. Role of Food Prepared Away from Home in the American Diet, 1977-78 versus 1994-96: Changes and Consequences. *Journal of Nutrition Education and Behavior*. 2002;34(3):140-150.

13. Story M, Kaphingst KM, Robinson-O´Brien R, Glanz K. Creating healthy food and eating environments: policy and environmental approaches. *Annual Review of Public Health*. 2008;29:253-272.

14. van der Horst K, Oenema A, Ferreira I, et al. A systematic review of environmental correlates of obesity-related dietary behaviors in youth. *Health education research*. 2007;22(2):203-226.

15. Cullen KW, Baranowski T, Owens E, et al. Availability, Accessibility, and Preferences for Fruit, 100% Fruit Juice, and Vegetables Influence Children's Dietary Behavior. *Health Education & Behavior*. 2003;30(5):615-626.

16. Neumark-Sztainer D, Wall M, Perry C, Story M. Correlates of fruit and vegetable intake among adolescents: Findings from Project EAT. *Preventive medicine*. 2003;37(3):198-208.

17. Grimm GC, Harnack L, Story M. Factors associated with soft drink consumption in school-aged children. *Journal of the American Dietetic Association*. 2004;104(8):1244-1249.

18. Hanson NI, Neumark-Sztainer D, Eisenberg ME, Story M, Wall M. Associations between parental report of the home food environment and adolescent intakes of fruits, vegetables and dairy foods. *Public Health Nutrition*. 2005;8:77-85.

19. Fisher JO, Mitchell DC, Smiciklas-Wright H, Birch LL. Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes. *Journal of the American Dietetic Association*. 2002;102(1):58-64.

20. Nollen NL, Befort C, Davis AM, et al. Competitive foods in schools: availability and purchasing in predominately rural small and large high schools. *Journal of the American Dietetic Association*. 2009;109(5):857-64.

21. Story M, Nanney MS, Schwartz MB. Schools and Obesity Prevention: Creating School Environments and Policies to Promote Healthy Eating and Physical Activity. *The Milbank Quarterly*. 2009;87(1):71-100.

22. Reedy J, Krebs-Smith S. Dietary Sources of Energy, Solid Fats and Added Sugars among Children and Adolescents in the United States. 2010;110(110):1477-1784.

23. Story M, Nanney MS, Schwartz MB. Schools and obesity prevention: creating school environments and policies to promote healthy eating and physical activity. *The Milbank Quarterly*. 2009;87(1):71-100.

24. Gleason P, Suitor C. *Food for Thought: Children's Diets in the 1990s*. Princeton, NJ; 2001.

25. Fox MK, Hamilton W, Lin B-H. *Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 3, Literature Review*. Washington DC; 2004.

26. Story M, Kaphingst KM, French S. The role of schools in obesity prevention. *The Future of Children*. 2006;16(1, Childhood Obesity):pp. 109-142.

27. Poppendieck J. *Free for All: Fixing School Food in America*. Berkeley, CA: University of California Press; 2010.

28. Levine S. *School lunch politics: the surprising history of America's favorite welfare program*. Princeton, NJ: Princeton University Press; 2008.

29. Office USGA. *School meal programs: competitive foods are widely available and generate substantial revenues for schools*. Washington, DC: U.S. Government Accounting Office; 2005.

30. Harnack L, Snyder P, Story M, et al. Availability of A La Carte Food Items in Junior and Senior High Schools: A Needs Assessment. *Journal of the American Dietetic Association*. 2000;100(6):701-703.

31. Rauzon S, Wang M, Studer N, Crawford P. *An Evaluation of the School Lunch Initiative*. Chez Panisse Foundation; 2010.

32. Martinez S, Kaufman P. Twenty Years of Competition Reshape the U.S. Food Marketing System. *Amber Waves*. 2008.

33. Stewart H, Blisard N, Jolliffe D. *Let's Eat Out: Americans Weigh Taste, Convenience, and Nutrition*. Economic Research Service, USDA; 2006.

34. Saelens BE, Glanz K, Sallis JF, Frank LD. Nutrition environment measures study in restaurants (NEMS-R): development and evaluation. *American Journal of Preventive Medicine*. 2007;32(4):273-281.

35. Wansink B. Environmental Factors that Increase the Food Intake and Consumption Volume of Unknowing Consumers. *Annu. Rev. Nutr.* 2004;24:455-479.

36. Young LR, Nestle M. The Contribution of Expanding Portion Sizes to the US Obesity Epidemic. *American Journal of Public Health*. 2002;92(2).

37. Burton S, Creyer EH, Kees J, Huggins K. Attacking the obesity epidemic: the potential health benefits of providing nutrition information in restaurants. *American journal of public health*. 2006;96(9):1669-75.

38. Short A, Guthman J, Raskin S. Food deserts, oases, or mirages? Small markets and community food security in the San Francisco Bay area. *Journal of Planning Education and Research*. 2007;26(3):352-364.

39. Powell LM, Slater S, Mirtcheva D, Bao Y, Chaloupka FJ. Food store availability and neighborhood characteristics in the United States. *Preventive Medicine*. 2007;44(3):189-195.

40. Andreyeva T, Blumenthal DM, Schwartz MB, Long MW, Brownell KD. Availability and prices of foods across stores and neighborhoods: the case of New Haven, Connecticut. *Health affairs (Project Hope)*. 2008;27(5):1381-8.

41. Jay Coggins, Ben Senauer. Grocery retailing. In: David C. Mowery, ed. *U.S. Industry in 2000: Studies in Competitive Performance*. Washington, DC: National Academies Press; 1999.

42. Pollan M. *In defense of food: an eater's manifesto*. New York, NY: Penguin Press; 2008.

43. Moore T, Jenkins M, Svetkey L. *The DASH diet for hypertension: lower your blood pressure in 14 days ...* New York, NY: Simon & Schuster; 2003.

44. Fishback AL. *The Daily Fix: Your Guide to Healthy Habits for Good Nutrition*. Rodale; 2008:240.

45. National Grocers Association. *2010 Consumer Survey Report*. National Grocers Association and Consumer Insight, Inc. 2010.

46. Martinez S, Hand M, Da Pra M, et al. *Local Food Systems: Concepts, Impacts, and Issues*. USDA Economic Research Service; 2010.

47. Johns Hopkins Center for a Livable Future. The Maryland Food System Mapping Resource. 2012:Documentation. Available at: http://www.jhsph.edu/clf/programs/food_mapping/documentation/. Accessed February 2012.

48. Rose D, Bodor JN, Swalm CM, et al. Deserts in New Orleans? Illustrations of Urban Food Access and Implications for Policy. In: *Understanding the Economic Concepts and Characteristics of Food Access.*; 2009.

49. Coterrill RW, Franklin AW. The Urban Grocery Store Gap. *Food Marketing Policy Issue paper*. 1995;(8).

50. Gottlieb R, Joshi A. *Food Justice*. Cambridge, MA: MIT Press; 2010.

51. Glanz K. Measuring Food Environments: A Historical Perspective. *Measurement of the Food and Physical Activity Environments - Enhancing Research Relevant to Policy on Diet, Physical Activity, and Weight.* 2009;36(4, Supplement 1):S93-S98.

52. McKinnon RA, Reedy J, Morrissette MA, Lytle LA, Yaroch AL. Measures of the Food Environment: A Compilation of the Literature, 1990-2007. *American journal of preventive medicine*. 2009;6(4):S124-S133-S124-S133.

53. Gallagher M. *Examining the Impact of Food Deserts on Public Health in Detroit*. Chicago, IL: Mari Gallagher Research & Consulting Group; 2007.

54. Clancy K, Hammer J, Lippoldt D. Food Policy Councils: Past, Present, Future. In: Hinrich CC, Lyson TA, eds. *Remaking the North American Food System: Strategies for Sustainability*. University of Nebraska Press; 2008.