FOODSPAN™

Teaching the Food System from Farm to Fork

[Handouts]

Complete FoodSpan curriculum, resources, student handouts, teacher guides, and presentation slides can be found at www.foodspan.org.

Brainstorm Teacher Guide

	Prompts	Examples
Activities	▪ What activities are involved in getting these ingredients to our plates? ▪ How are the raw ingredients transformed into something we can eat? ▪ Who are the people involved at each step?	▪ Growing and harvesting crops ▪ Breeding, feeding, housing, transporting, and slaughtering animals ▪ Processing, packaging, transporting, storing, marketing, selling, preparing, eating, disposing of, and composting food
Resources	▪ What resources are used in each activity? ▪ Consider both natural and human resources.	▪ Natural resources, (e.g., land, water, soil, fossil fuels) ▪ Labor, knowledge, money, machinery, fertilizers, pesticides, animal feed
Effects on health, society, environment	▪ How could each activity affect health, society, and the environment? ▪ Consider both positive and negative impacts. ▪ For positive impacts, think about the reasons we process food (e.g., to preserve it), for example, or why we transport it long distances (e.g., to provide year-round variety).	▪ Positive impacts: feeding people, promoting health, creating jobs, strengthening communities, convenience, enjoyment, cultural expression ▪ Negative impacts: chronic disease, foodborne illness, worker injuries, hunger, greenhouse gases, air and water pollution, resource depletion, biodiversity loss, animal suffering
Influences	▪ What are some factors that influence each activity? ▪ Consider both societal and ecological factors. ▪ Think about how farmers decide what crops to grow, for example, or why we eat what we eat.	▪ Influences on the supply chain: consumer demand, government policy, technology, worldview, climate, geology, biodiversity ▪ Influences on what we eat: taste, cost, values, family, friends, culture, food availability, marketing, government policy

Food System Connection Cards (p.1 front)

Fish

Crop

Water

Pathogen

Chicken

Soil

Compost

Cow

Climate

Food System Connection Cards (p.1 back)

▪ Essential members of aquatic ecosystems ▪ Needs freshwater or saltwater (depending on the species) and food ▪ May be eaten by humans or other animals	▪ Disease-causing microorganism ▪ Some strains live in the guts of animals ▪ May be transported via air, water, soil, or food	▪ Made by decomposing manure, food waste, plant matter, or other organic materials ▪ Can be applied to soil to make it more fertile, helping plants grow
▪ Needs sun, water, fertile soil, carbon dioxide, and oxygen ▪ Produces food and oxygen ▪ Can be composted to enrich soil	▪ Needs food, land, air, water, and humane living conditions ▪ Can be raised for meat or eggs ▪ Produces manure	▪ Needs food, land, air, water, and humane living conditions ▪ Can be raised for meat or milk ▪ Produces manure and methane
▪ Needed by plants, animals, and humans ▪ Used for irrigating crops ▪ May be contaminated by animal waste, chemical fertilizers, and other pollutants	▪ Supports plant life ▪ Subject to contamination and erosion ▪ Contains ecosystems that are mostly microscopic	▪ The prevailing weather conditions in an area over a long period ▪ Affects what kind of plants and animals can survive in a region

Food System Connection Cards (p.2 front)

Food Citizen	Government	Supermarket
Corner Store	Food Service Worker	Truck Driver
Farm Worker	Chemical Fertilizer	Pesticide

Food System Connection Cards (p.2 back)

- Often provides a wider variety of healthy options, at lower prices, than smaller stores

- Enacts policies that affect farming practices, food safety, hunger relief, minimum wage laws for food chain workers, and more

- Buys and consumes food
- Takes action on food system issues by voting, organizing, and writing to government officials

- Transports food in vehicles that use fossil fuel and produce pollution
- Needs healthy food, air, water, safe working conditions, and a living wage

- Prepares and serves food in restaurants and cafeterias
- Needs healthy food, air, water, safe working conditions, and a living wage

- Typically offers a smaller variety of options, at higher prices, than supermarkets

- Kills weeds, insects, fungi, or other pests that damage crops
- Can contaminate food, soil, air, and water and cause health problems

- Helps plants grow
- Can contaminate water and cause health problems

- Plants, tends, and/or harvests food crops
- Needs healthy food, air, water, safe working conditions, and a living wage

Washington Apple Supply Chain Cards

Growing Apples grow in orchards	**Harvesting** Apples are picked by hand	**Washing, grading, waxing** A wax coating helps keep apples crisp	**Packing** Apples are sorted and packed into 40-pound cartons
Distributing Apples are transported up to thousands of miles in refrigerated trucks	**Processing** Some apples may be canned or made into applesauce, pie filling, etc.	**Packaging** Packaging depends on how the apples are processed, if at all	**Retailing** Apples are sold in a variety of stores
Preparing Apples can be eaten whole, added to salads, cooked in pies, etc.	**Consuming** Apples are eaten	**Disposing** Throughout the supply chain, some apples and parts of apples are discarded	**Composting** Discarded apples can be composted and used to help grow more apples or other crops

Broiler Chicken Supply Chain Cards

Soy growing
Soybeans are grown for animal feed

Soy harvesting
Soybeans are harvested for animal feed

Corn growing
Corn is grown for animal feed

Corn harvesting
Corn is harvested for animal feed

Fish harvesting
Fish are harvested for animal feed

Chick hatching
Baby chickens are hatched and processed

Feed processing
Soy, corn, fish, and other ingredients are combined to make poultry feed

Producing
Over 100,000 chickens are typically raised and fed in a single facility

Processing
Chickens are slaughtered, defeathered, and sanitized

Retailing
Packaged chicken products are sold in supermarkets and other stores

Preparing
Chicken products are cooked

Consuming
Chicken products are eaten

Agricultural Timeline Cards

Earliest evidence of Homo sapiens (anatomically modern humans)

Earliest evidence of agriculture

Most species of farm animals domesticated

Agriculture practiced on every major continent except Australia

Widespread adoption of industrial agriculture

Agricultural Timeline Teacher Guide

Refer to the ***History of Agriculture* primer** for references and additional details.

194,000 BCE Earliest evidence of Homo sapiens (anatomically modern humans)	▪ For the vast majority of our time on Earth, we acquired food by gathering it from the wild. ▪ Wild plant-based foods and fungi were important staples in the Paleolithic diet. ▪ While our ancestors' search for food is often depicted as an epic conflict against woolly mammoths, woolly rhinos, giant elk, and other prehistoric megafauna, early humans also took to foraging for insects and scavenging the remains of dead animals.
11,000 BCE Earliest evidence of agriculture	▪ From as early as 11,000 BCE, humans began a gradual transition away from a hunter-gatherer lifestyle toward agriculture — the cultivation of crops and animals for food. ▪ Why did people give up hunting and gathering for farming? There are many plausible reasons, all of which likely played some role at different times and across different parts of the world: ▫ **Changes in climate** may have made it too cold or too dry to rely on wild food sources. ▫ **Greater population density** may have demanded more food than could be harvested from the wild, and farming provided more food per acre, even if it did require more time and energy. ▫ **Overhunting** may have helped push woolly mammoths and other megafauna to extinction. ▫ **Changing technology**, such as domesticated seeds, would have made agriculture a more viable lifestyle.
6,000 BCE Most species of farm animals domesticated	▪ By 6000 BCE, most of the farm animals we are familiar with today had been domesticated.
5,000 BCE Agriculture practiced on every major continent except Australia	▪ The shift to agriculture is believed to have occurred independently in several parts of the world, including Northern China, Central America, and the Fertile Crescent — a region in the Middle East that gave rise to some of the earliest civilizations. ▪ Agriculture is thought to have been practiced sporadically for the past 13,000 years, and has been widely established for only 7,000 years. In the long view of human history, this is just a flash in the pan compared to the nearly 200,000 years our ancestors spent gathering, hunting, and scavenging in the wild. ▪ **If the history of modern humans were compressed into a single year, we would not have started farming until the evening of Dec. 7.**
1900s Widespread adoption of industrial agriculture (e.g., synthetic fertilizers, pesticides, monocultures)	▪ First introduced in the early 1900s, synthetic fertilizers dramatically increased crop yields, though not without consequences (covered in later lessons). ▪ They have been credited with feeding the lion's share of a global population that grew from 1.6 to 6 billion over the 20th century. ▪ After synthetic fertilizers were introduced, other aspects of industrial agriculture, such as the heavy use of pesticides, would soon follow. ▪ **If the history of agriculture were compressed into a single year, we would not have introduced industrial agriculture until the evening of Dec. 28.**

Trends in Industrialization Handout

Trend	Description	Rationale	Impact
Specialization			
Mechanization			
Rise in chemical and pharmaceutical use			
Consolidation			
Market concentration			

Ecological Impacts Handout

These are some potential ecological impacts of industrial crop production:

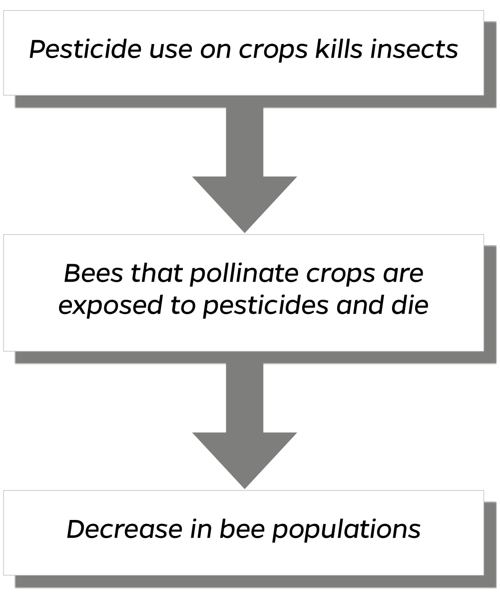
- Soil erosion (primer section: *Soil*)
- Decrease in bee populations (primer section: *Pesticide Use*)
- Emergence of pesticide-resistant weeds (primer section: *Pesticide Use*)
- Aquatic dead zones (primer section: *Nutrient Pollution*)
- Depletion of phosphorus and fossil fuels (primer section: *Fossil Resources*)
- Depletion of groundwater (primer section: *Freshwater*)

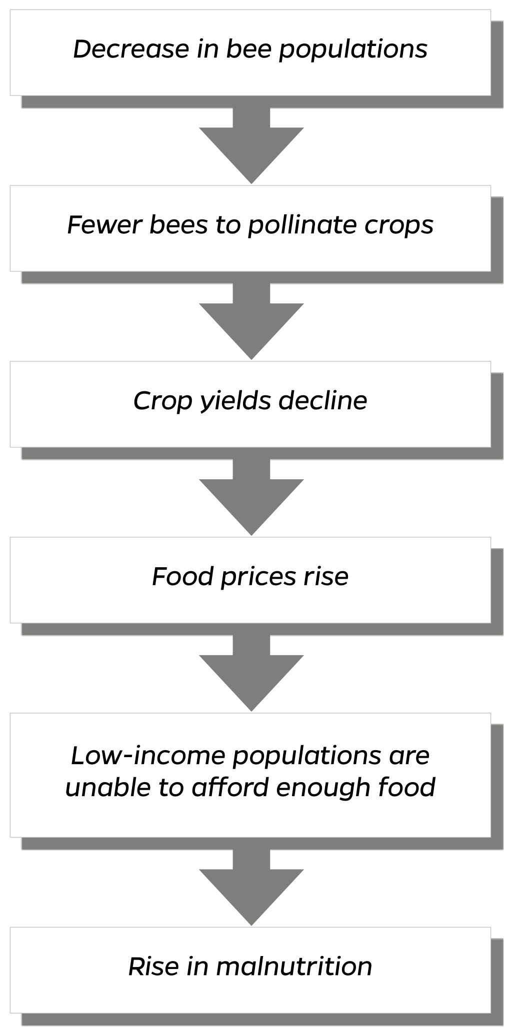
Instructions:

Your teacher will assign your group to one of the ecological impacts above. Read the corresponding section of the primer (listed above in parentheses). Then create a flow chart answering the following questions:

1. What agricultural input(s) are involved in this impact (pesticides, fertilizers, freshwater, fossil fuels)? List as many steps as you can think of between each input and the ecological impact.
2. How can this ecological impact affect human health? List as many steps as you can think of between the ecological impact and its effects on human health.

For example, here are possible answers for the group working on the event “Decrease in bee populations”:





Impacts of IFAP Handout

Use this worksheet to record key points from the cooperative learning activity.

Waste Management

1. ....
2. ....
3. ....
4. ....

Antibiotic Resistance

1. ....
2. ....
3. ....
4. ....

Community Impacts

1. ....
2. ....
3. ....
4. ....

Worker Health and Justice

1. ....
2. ....
3. ....
4. ....

Animal Welfare

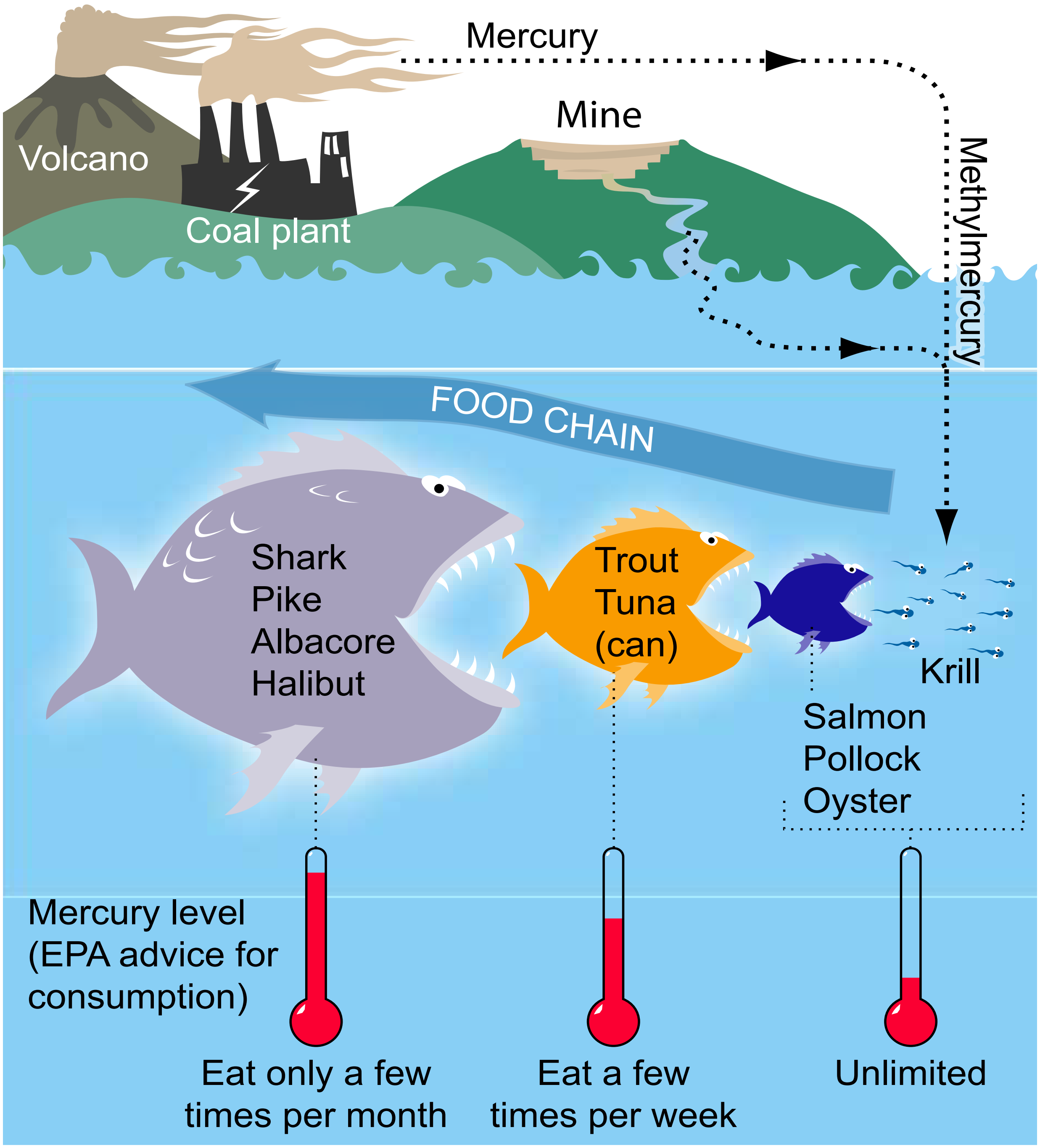
1. ....
2. ....
3. ....
4. ....

Seafood Production Handout

Seafood Production Method	Ecological Impacts	Potential Advantages

Seafood Safety Handout

These guidelines are designed to protect children and pregnant women.



What can we learn from this image?

Gallery Walk Handout

Instructions: Read the quotes and statistics posted for each food chain worker. Consider the risks and challenges of each job and list them in the second column below. When you are finished, think of one more food chain worker not mentioned in the activity and list any risks and challenges for that job as well. Be prepared to share your answers.

Job	Risks and Challenges
Crop worker	
Truck driver	
Meat processing worker	
Fast food worker	

Gallery Walk Sign 1

CROP WORKER

"She and the other three dozen Mexican immigrants in the field were bent at an almost 90-degree angle, using two hands to pack strawberries into plastic containers that they pushed along on ungainly one-wheeled carts."[1]

Photo Credit: Alex Proimos, 2012. Creative Commons CC BY 2.0.

Gallery Walk Sign 2

TRUCK DRIVER

"I get paid 40 cents a mile. I have days I turn in over 600 miles and days I turn in less than 200. ... A really good day on the job for me is lots of miles ... and being able to get to the truck stop early to find a spot and have a nice clean hot shower followed by a good meal. What makes it a really, really good day is if I am going to make it home that night after perhaps 12 to 19 days on the road."

– Commercial truck driver[2]

Photo Credit: Alex Proimos, 2012. Creative Commons CC BY 2.0.

Gallery Walk Sign 3

MEAT PROCESSING WORKER

"The line is so fast there is no time to sharpen the knife. The knife gets dull and you have to cut harder. That's when it really starts to hurt, and that's when you cut yourself."

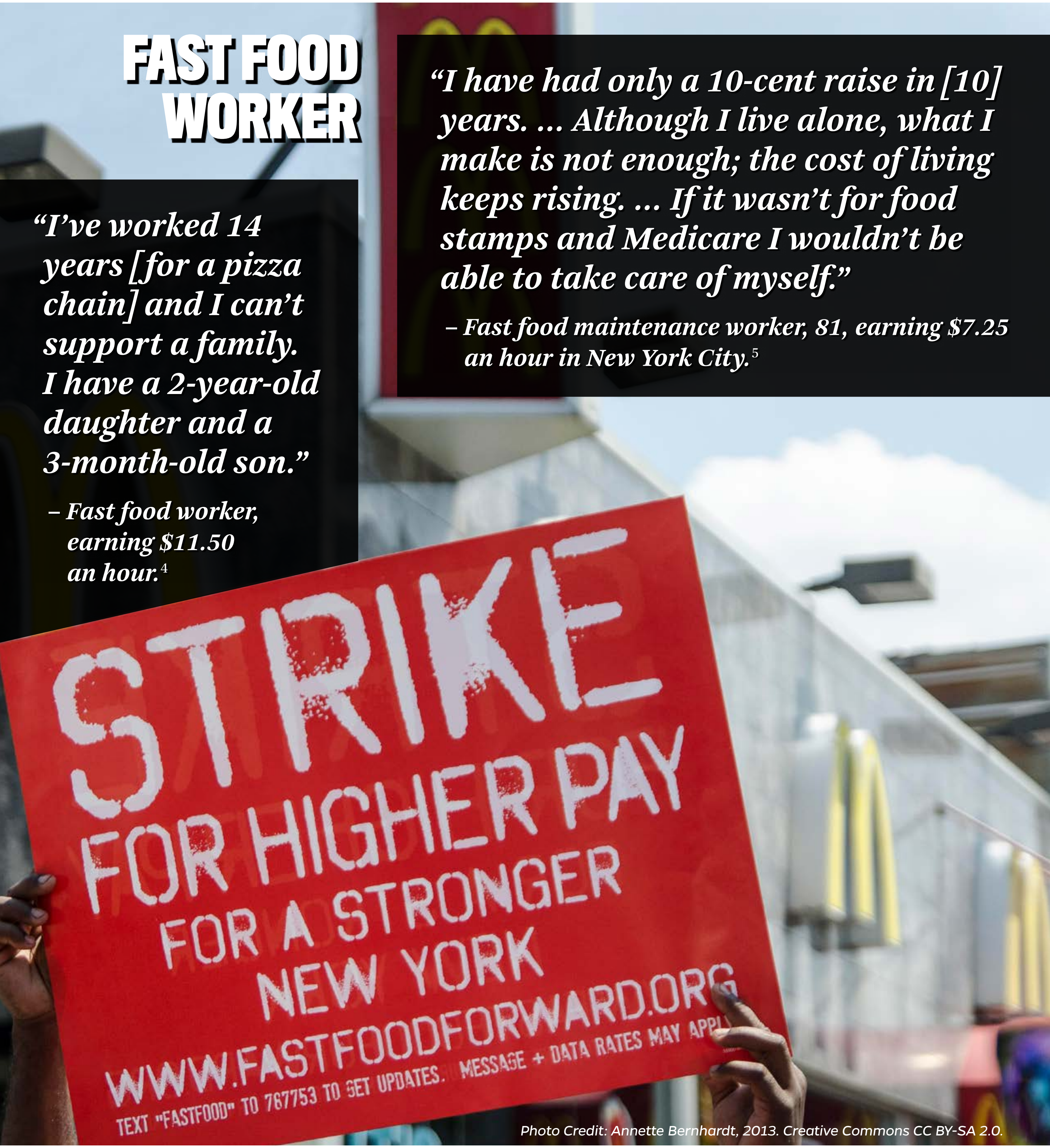
– Pork packing plant line worker[3]

"They love you if you're healthy … If you get hurt, watch out. They will look for a way to get rid of you before they report it. They will find a reason to fire you, or put you on a worse job like in the cold room, or change your shift so you quit. So a lot of people don't report their injuries. They just work with the pain."

– Beef packing plant worker[3]

Photo Credit: Joe Valbuena, USDA.

Gallery Walk Sign 4



FAST FOOD WORKER

"I've worked 14 years [for a pizza chain] and I can't support a family. I have a 2-year-old daughter and a 3-month-old son."

– Fast food worker, earning $11.50 an hour. [4]

"I have had only a 10-cent raise in [10] years. … Although I live alone, what I make is not enough; the cost of living keeps rising. … If it wasn't for food stamps and Medicare I wouldn't be able to take care of myself."

– Fast food maintenance worker, 81, earning $7.25 an hour in New York City. [5]

Photo Credit: Annette Bernhardt, 2013. Creative Commons CC BY-SA 2.0.

Food Justice in Action Handout

Instructions: Read your group's assigned case study and prepare a brief presentation that will:

- Describe the risks and challenges faced by these workers
- Describe the intervention to promote fair wages and/or safer working conditions
- Assess whether you think the intervention is an effective approach
- Propose an additional intervention

Crop workers

According to the National Agricultural Workers Survey, the average income of a crop worker in 2009 was less than $12,500 for individuals and less than $17,500 for a family of four. That same year, the federal poverty line was $10,830 for an individual or $22,050 for a family of four.[6] For crop workers who harvest fruits or vegetables, pay is often based on how much they pick, which is called a "piece rate." The incentive to pick more can discourage workers from taking breaks to rest, eat, or drink water and from taking days off for health or personal reasons. In 1996, a federal minimum wage was established to ensure farm workers are paid a certain amount regardless of how much they pick. However, loopholes remain, and farms and companies can bypass this law if the farms are small enough or if the workers are hired as contractors instead of as employees.[7]

In addition to the problems with piece rates, U.S. farm workers face particularly high risks of toxic exposure to pesticides, particularly when pesticides drift (are blown by wind) away from where they are sprayed.[8] Workers in crop production also suffer 80 percent more injuries compared to the national average for private industries.[9] Only one in 10 seasonal farm workers claims the ability to read or speak English fluently, potentially increasing their risks of pesticide exposure and injury (e.g., if they are unable to read warning labels). As nearly half of U.S. crop workers are immigrants who are not authorized to work in the U.S., these workers may not seek healthcare or better working conditions due to fear of employer retaliation or deportation.

The Coalition of Immokalee Workers (CIW) is campaigning for an increase in minimum farm worker wages and has developed a Fair Food Code of Conduct. By signing on to the code, companies that grow and buy produce are supporting better working conditions. Participating growers must, for example, take measures to protect workers from excessive heat, pesticides, and other hazards, and workers who feel in danger for their health or safety must be allowed to stop working (without pay) without fear of retaliation. As of 2015, 14 major buyers had signed Fair Food Agreements with the CIW, including Compass Group (the world's largest food service provider), Chipotle, McDonald's, Trader Joe's, Walmart, and Whole Foods.[10]

Truck drivers

The trucking industry is heavily regulated, and rules about how many hours truckers can be on the road per week have resulted in companies hiring more drivers to ship the same amount of cargo, often at lower wages. Some companies encourage drivers to quietly violate federal rules on the amount of hours they drive each week. Violating these rules earns drivers and shipping companies more money, but as one driver states in a 2014 *Business Insider* article, "When you're non-compliant as a driver you run the risk of fatigue and the risk of hurting other people [...] And as a driver it's my license on the line." According to the article, the driver "said he was asked by multiple trucking companies to falsify his logs, but he refused to."[11] Making matters harder for drivers, bills have been proposed that would remove limits on how many hours they can work and how large their trailers can be. Organizations such as the Teamsters (a union that represents truck drivers) and the Advocates for Highway and Auto Safety have pressured lawmakers to oppose such bills, which they say can endanger both truckers and other drivers on the road.

Meat processing workers

Although slaughterhouses and meat-processing facilities are highly mechanized, certain steps of the process must be done by hand. Some workers kill and bleed the animals while others make a series of cuts to separate fat, muscle, and bone. Plant workers may be required to use sharp tools and heavy machinery, at high speeds, under crowded conditions, for long hours, and on slippery floors—sometimes without adequate training.[3] As a result, workers in the meat-processing industry face a very high rate of injury—over 40 percent higher than the average for the private-sector American workforce.[12] To keep costs down and the volume of production high, the conveyor belts that transport animals and carcasses through facilities move at very high speeds—up to 140 birds per minute at poultry processing plants, for example.[13] Workers frequently experience chronic pain in their hands, wrists, arms, shoulders, and back from performing quick, repetitive motions. Workers who use sharp equipment, like knives, are also at risk of serious injuries due to dull and fast-moving blades.[14] Slaughterhouse workers who incur cuts, burns, or scrapes may be at greater risk of infections, particularly from antibiotic-resistant strains of bacteria.[15]

Many workers are pressured to not report their injuries. Corporations often reward facility supervisors with bonuses if they report low numbers of workers' compensation claims. One worker in Nebraska explained, "Once the company got fined for safety violations and the manager told us: 'Be careful or we'll have to pay more fines'—not be careful because you might get hurt."[3] Organizations like the Food Empowerment Project advocate for stricter regulation of slaughterhouse line speeds, limits on the amount of overtime workers can be required to do, and increased reporting of worker injuries.

Fast food workers

Fast food employees are among the lowest-paid workers in the U.S.,[16] while as of 2012, the CEOs of that industry earned over 1,200 times as much as the average worker.[17] That's more than four times the amount of CEO-to-worker inequality in the U.S. economy as a whole.[18]

In November 2012, fast food workers around the U.S. began a wave of one-day strikes to demand a $15 an hour minimum wage and the right to form a union. While their struggle was partly aimed at their employers, they also needed to combat a public perception that fast food employees are mostly teenagers who are just picking up a little pocket money. The reality is that only about 30 percent of the fast food workforce is made up of teenagers. Among adult fast food workers, a large proportion are parents (30 percent), and a much higher proportion (70 percent) have completed high school, if not more.[19]

To try to win public support for the fast food strikes, the Service Employees International Union (SEIU)—which organized the fast food strikes along with Fast Food Forward—hired a public relations firm, BerlinRosen, to help attract media coverage of the workers and their movement.[20] Numerous media outlets have covered the campaign. Despite this success, some people have criticized this PR-focused strategy—and the top-down nature of the organizing effort—as detracting from efforts to organize workers into a union. One worker lamented: "I don't like the fact that these people, the workers, are being used like pawns. ... tell them what to say, what makes the best story for the media." SEIU organizers expressed concern that this kind of criticism of the campaign would only provide a public relations boost to political factions who already oppose it.[21]

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Sources of Greenhouse Gases Handout

Part 1

Match the greenhouse gases (GHGs) with their sources within the food system. One source can produce more than one GHG. The first source is completed for you.

Greenhouse Gases: Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O)

Food System Source	Greenhouse Gas(es)
Decomposition of food waste in landfills	Methane, nitrous oxide
Use of nitrogen-based fertilizer on crops	
Transporting food products	
Bacterial decomposition in rice paddies	
Livestock manure	
Clearing forests for farmland	
Cattle belching	
Running agricultural machinery	

Part 2

List different sources of GHG emissions from the food system, rank them in order of importance, and propose interventions that could reduce emissions from each source. An example is provided.

Source of GHG Emissions	Rank	Intervention to Reduce GHG Emissions
Transporting Products		Transport products by rail or ship, instead of by truck or plane

Climate Change Impacts Teacher Guide

Photo credit: Bob Nichols, 2013. USDA. Creative Commons CC BY 2.0

Loss of topsoil

- Extreme heat: Heat dries out soil, making it more vulnerable to wind erosion.
- Extreme weather events: Hurricanes and flooding can damage crops and wash away soil.
- Changing rainfall patterns: Periods without rainfall can dry out soil, making it more vulnerable to wind erosion. Heavy rainfall can wash soil away.
- Rising sea level: Rising tides along coastal waterways can wash soil away.

Fungus invasion in corn crop

- Changing rainfall patterns: Long periods of heavy rain create ideal circumstances for fungal diseases to flourish and damage crops.

Saltwater contamination of freshwater supply

- Rising sea level: A higher ocean tidal range can introduce saltwater into groundwater supplies.

Increased cost to fight weeds

- Extreme heat: Temperatures rise and hardier weeds can outcompete more sensitive crops.

Increase in a crop's water needs

- Extreme heat: Heat dries out soil.
- Changing rainfall patterns: Periods with low rainfall can dry out soil.

Higher food prices

Explain to students that reduced crop yields often lead to higher food prices.

- Extreme heat: Damage from heat-tolerant weed species can lead to crop losses.
- Extreme weather events: Droughts, hurricanes, and flooding can erode soil and damage crops.
- Changing rainfall patterns: Dry periods and heavy rains can erode soil and damage crops.
- Rising sea level: Rising tides can erode soil and higher salinity can damage crops.

Depletion of freshwater sources for irrigation

- Extreme heat: Higher temperatures increase the evaporation rate. Freshwater in rivers, lakes, and groundwater may become depleted if it evaporates faster than it is replenished.
- Changing rainfall patterns: Periods with low rainfall can cause freshwater sources to dry up.

Food System Greenhouse Gas Emissions Handout

Greenhouse gas emissions by food type

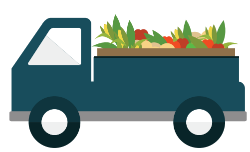
Red meat (beef, pork, and lamb) and dairy production together account for nearly half of the greenhouse gas emissions associated with producing, processing, distributing, and selling food in the U.S.[1, 2]

Food type	Share
Red meat (beef, pork & lamb)	30%
Beverages, sweets, oil & other	21%
Dairy	18%
Cereals & Carbs	11%
Fruits & Vegs	11%
Chicken, fish & eggs	10%

Greenhouse gas emissions by supply chain stage

GHG emissions associated with United States food supply chains are predominantly from food production (83 percent) with much smaller contributions from transporting food and food ingredients (11 percent) and food retail (5 percent). Transporting food from stores to homes, home refrigeration, cooking, and emissions from food waste were not included in these estimates, but are also significant contributors of emissions.

Production: 83%



Transport: 11%

Retail: 6%

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Duck-Rice-Fish Case Study Handout

Ducking the Use of Pesticides, Fertilizers in Rice Paddies

Takao Furuno, a Japanese farmer, developed a system for growing rice that mimics natural systems. He puts ducks in his paddies (flooded parcels of land used to grow rice) to eat weeds and insects. The ducks' waste puts nutrients into the water that the crops can use. This means the farmers who have mimicked Furuno's system can save money because they do not need the pesticides or fertilizers typically used to grow rice. They also earn extra money by selling duck meat and duck eggs. Furuno's system also uses fish in the paddies, which become another source of income. Industrial rice farmers had discontinued this practice because the insecticides they used in their growing system would kill their fish. The Furuno system yields 20 percent more rice than conventional systems, which grow rice exclusively.[1]

Efficiency: ....

....

....

Self-sufficiency: ....

....

....

Diversity: ....

....

....

Resilience: ....

....

....

Agroecology Case Studies Handout

1. It is all about the trees and the bees in Canada

Bees are vital to agriculture and natural biodiversity. Seventy-six percent of the world's most widely used food crops require pollination to be productive. A new Canadian initiative is looking to put bees to work to help conserve a fragile area. Trees are needed to protect watersheds—delicate areas of land that form the drainage systems for streams and rivers in which many plant and animal species thrive. Trees and shrubs help filter pollutants from stormwater runoff and anchor the soil with their roots, which reduces erosion. With a government grant, a British Columbia farm family will use their small woodland plot to blend apiculture (keeping bees for honey and pollination) with integrated agroforestry (agriculture that incorporates the cultivation and conservation of trees). In this system, the bees will pollinate the shrubs, while the trees and shrubs will provide natural windbreak protection for the bees.[2]

2. "Do nothing but microorganisms" farming in Thailand

According to a report by Horizon Solutions, in Thailand more than 20,000 farmers have adopted an integrated farming system known as "do nothing farming." They cultivate crops with minimal interference with nature, namely without plowing, weeding, pruning, or using chemical pesticides or synthetic fertilizers. They do, however, use effective microorganisms (EMs) that were developed by Dr. Teruo Higa from the agricultural department at the University of Ryukyu, Japan. EMs are a blend of microorganisms that readily exist in nature and have not been modified in any way, merely added to the fields. By enriching the soil and stimulating plant growth, EMs increase crop yields while allowing the farmer to maintain a balanced ecosystem.[2]

3. Grass farming in the United States

Joel Salatin calls himself a grass farmer. His Polyface Farms in Swoope, Va., was made famous by appearances in Michael Pollan's book *An Omnivore's Dilemma* and the documentary films *Food, Inc.* and *Fresh.* The hilly homestead is set on 100 acres of grass, surrounded by 400 acres of woodland. It is a polyculture—an agricultural system that tries to imitate the diversity of a natural ecosystem by using multiple crop and animal species in the same space. It includes chickens, cows, turkeys, rabbits, and pigs.

Salatin carefully orchestrates all the elements in an intricate symbiosis — every being follows its natural instincts to contribute an ecosystem service (benefit) that maintains the overall health of the pasture. For example, his large herd of cows feeds on a different quarter-acre of grass every day and contributes manure. Three days later, 300 laying hens—Polyface Farms' "sanitation crew" — are let loose to eat the fly larvae that have grown in the cow manure. The larvae are an important source of protein for the chickens, who fertilize the paddock with their nitrogen-rich excrement. Each year, the farm's closed-loop natural system produces 40,000 pounds of beef, 30,000 pounds of pork, 10,000 broilers, 1,200 turkeys, 1,000 rabbits, and 35,000 dozen eggs on just 100 acres. And, as Pollan writes, "at the end of the year, there is more biodiversity not less, more fertility not less, and more soil not less."[2]

4. What's good for the goose is good for the farm

Mother Goose Farms is a five-acre coffee orchard in Hawaii. Hawaii's mild climate is well suited to coffee trees. Because the land is sloping, tilling it would quickly erode the soil. Growing perennial trees avoids this problem. The trees also provide habitat for wildlife. The farm is certified organic, so instead of using herbicides, the farmers raise geese that waddle through the orchard eating weeds and fertilizing soil with their droppings. The farmers process their own coffee and sell it directly to local customers, bypassing intermediaries and allowing them to capture more of the revenue. However, what is sustainable in Hawaii might not be sustainable in Iowa. The sustainability of a farm is rooted in its own unique ecosystem, culture, and economy.[3]

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2. Adapted, with permission, from: Fenton I. *Five Holistic Alternative Farming Methods: Agroecology at its Best.* Worldwatch Institute. 2012. http://inesad.edu.bo/developmentroast/2012/08/inesad-news-ducks-in-rice-paddies-bees-in-bushes-and-chicken-sanitation-crews/?upm_export=print
3. Johns Hopkins Center for a Livable Future. Food System Primer. https://www.foodsystemprimer.org/food-production/ecological-and-urban-agriculture/

Gallery Walk Handout

As you review your classmates' posters, record how each case study embodies the agroecological qualities of efficiency, self-sufficiency, diversity, and resilience. Do the same for your poster, too.

Case Study #1:

Efficiency:

Self-sufficiency:

Diversity:

Resilience:

Case Study #2:

Efficiency:

Self-sufficiency:

Diversity:

Resilience:

Case Study #3:

Efficiency: ....

....

Self-sufficiency: ....

....

Diversity: ....

....

Resilience: ....

....

Case Study #4:

Efficiency: ....

....

Self-sufficiency: ....

....

Diversity: ....

....

Resilience: ....

....

Food Map of the U.S. Handout

Instructions:

- Choose a favorite meal and make a list of up to five main ingredients. For example, a burrito might include cheese, tomatoes, beans, cilantro and rice.
- For each ingredient, plot on the map your best guess (or research it on the Internet) of where each ingredient was produced. If any ingredients come from outside the U.S., write the name of the country of origin and its corresponding ingredient in the right-hand column below.

Ingredients from the U.S.

1. ....

2. ....

3. ....

4. ....

5. ....

Ingredients from outside the U.S.

1. ....

2. ....

3. ....

4. ....

5. ....

Food Contamination

Food safety involves protecting people from pathogens and chemicals in our food supply and—if that fails—preventing contaminated food from making people sick. Food supplies are susceptible to many different types of contaminants, for example:

Pathogens: disease-causing organisms such as bacteria, viruses, and parasites.

Food can be contaminated by pathogens at multiple points along the supply chain, including during production, processing, transport, storage, preparation and handling.

- Grasses are the natural diet of cattle. Feeding them grain, which is a standard practice in industrial operations, changes their gut environment in ways that increase populations of certain pathogens.[1]
- Poultry processing plants can legally operate at very high speeds—up to 140 birds moving down the line per minute—allowing as little as 0.43 seconds to identify and remove contaminated carcasses before they enter the food supply.[2]
- Industrial meat, dairy, and egg operations generate manure in such large quantities that it becomes difficult to safely manage. Pathogens in manure can contaminate food supplies, for example, if manure contaminates groundwater and that water is used to irrigate food crops.[3]
- Pathogens and biological toxins in food generally cause illness within hours or days of exposure. Symptoms may include cramps, nausea, and vomiting.

Chemicals: most originate from human activities, such as pesticide use in agriculture and heavy metals from coal-fired power plants.

- Industries such as mining, coal burning, and plastics manufacturing release chemicals into our environment. Many are known to be harmful, while the health effects of thousands of others are not yet understood. Because these chemicals are present in air, water, and soil, they can make their way into our food supply.
- Some potentially harmful chemicals, such as caramel color in soft drinks, are present in food or beverages because manufacturers add them directly to the product.[4]
- Agricultural pesticides give farmers some control over crop pests, such as weeds and certain insects, at least in the short term. Residues of these chemicals can remain on the fruits and vegetables we eat. Some pesticides persist in the environment and can accumulate in animals, contaminating meat and seafood.[5]
- In the U.S., growth hormones are given to cattle. It is unclear what effect these hormones may have on people who consume beef and dairy products, though some studies suggest a possible link to increased cancer risk.[6]
- Most chemical contaminants in food are associated with illnesses that develop gradually and persist over time, such as cancer, usually as a result of longer-term, repeated exposures.

References

1. Callaway TR, Elder RO, Keen JE, Anderson RC, Nisbet DJ. Forage feeding to reduce preharvest Escherichia coli populations in cattle, a review. *J Dairy Sci*. 2003;86(3):852-860.
2. Zuraw L. Reactions Vary to USDA's Poultry Inspection Rule. *Food Saf News*. 2014.
3. Graham JP, Nachman KE. Managing waste from confined animal feeding operations in the United States: the need for sanitary reform. *Water Heal*. 2010;December:646-670.
4. Smith TJS, Wolfson JA, Jiao D, et al. Caramel Color in Soft Drinks and Exposure to 4-Methylimidazole: A Quantitative Risk Assessment. *PLoS One*. 2015;10(2).
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Outbreak Investigation: Description of the Outbreak

Scenario

On Wednesday, June 5, a local community organization held a fundraising crab feast for cancer research. Roughly 50 people attended. The menu included fresh steamed crabs, macaroni salad, egg salad, and sandwiches.

On Thursday, June 6, a woman who had attended the crab feast woke up feeling ill. She scheduled an appointment with her doctor. She described her symptoms as nausea, fever, chills, and body aches. On Friday, June 7, the physician noted that during the morning of her shift, she had seen several people with similar symptoms. She began asking questions about their previous activities and found they had all attended the crab feast. The doctor called the local health department to report what she suspected was a **foodborne illness outbreak.**

Start of the Investigation

The health department immediately began an investigation. A district health officer contacted patients and confirmed the doctor's report of their illnesses as well as their attendance at the crab feast. The investigator suspected the crab feast might have been the source of the illnesses.

The health department also prepared a questionnaire, which was distributed a week after the crab feast to as many people as possible who had attended the event. The questionnaire asked for the following information:

- Whether the person became ill
- What symptoms are occurring, if any
- When the symptoms began
- What foods the person ate

Out of the 50 people who attended the event, 20 responded to the questionnaire. The results are given in ***Outbreak Investigation: Questionnaire Data***. Each row represents a different person.

Parts of this activity have been adapted from: Principles of Epidemiology: Problem 1: An Outbreak of Sore Throats Following a Charity Luncheon. Johns Hopkins Bloomberg School of Public Health; 2010. Farber R.E., Korff F.A. *Foodborne Epidemic of Group A Beta Hemolytic Streptococcus*. Public Health Reports, 1958; 73(3), 203-9.

Outbreak Investigation: Questionnaire Data

Response #	Date sick	Crabs	Macaroni	Egg salad	Sandwiches
1	6th	Ate	Did not eat	Ate	Ate
2	7th	Ate	Did not eat	Ate	Ate
3	Not sick	Ate	Ate	Ate	Did not eat
4	8th	Did not eat	Ate	Ate	Ate
5	7th	Ate	Ate	Ate	Ate
6	Not sick	Did not eat	Did not eat	Did not eat	Ate
7	8th	Did not eat	Ate	Ate	Ate
8	Not sick	Ate	Ate	Ate	Ate
9	10th	Ate	Did not eat	Ate	Ate
10	8th	Did not eat	Did not eat	Ate	Did not eat
11	8th	Ate	Ate	Ate	Ate
12	7th	Did not eat	Did not eat	Ate	Ate
13	8th	Ate	Did not eat	Ate	Did not eat
14	7th	Ate	Ate	Ate	Ate
15	Not sick	Ate	Ate	Ate	Did not eat
16	7th	Did not eat	Did not eat	Did not eat	Did not eat
17	Not sick	Did not eat	Did not eat	Did not eat	Ate
18	8th	Did not eat	Ate	Ate	Ate
19	8th	Did not eat	Did not eat	Ate	Ate
20	9th	Did not eat	Did not eat	Ate	Ate

Outbreak Investigation: Attack Rate

The attack rate is the percentage of the people who became sick. Knowing about the attack rate can provide clues about which food was responsible for the outbreak.

Instructions: What percentage of the questionnaire's respondents got sick? Using the Questionnaire Data, count how many people became sick. To determine the attack rate, divide the number of sick people by the number of people who responded to the questionnaire. Write your results in the table below.

Number of respondents who got sick	Number of people who responded to questionnaire	Attack rate

Outbreak Investigation: Attack Rate by Food

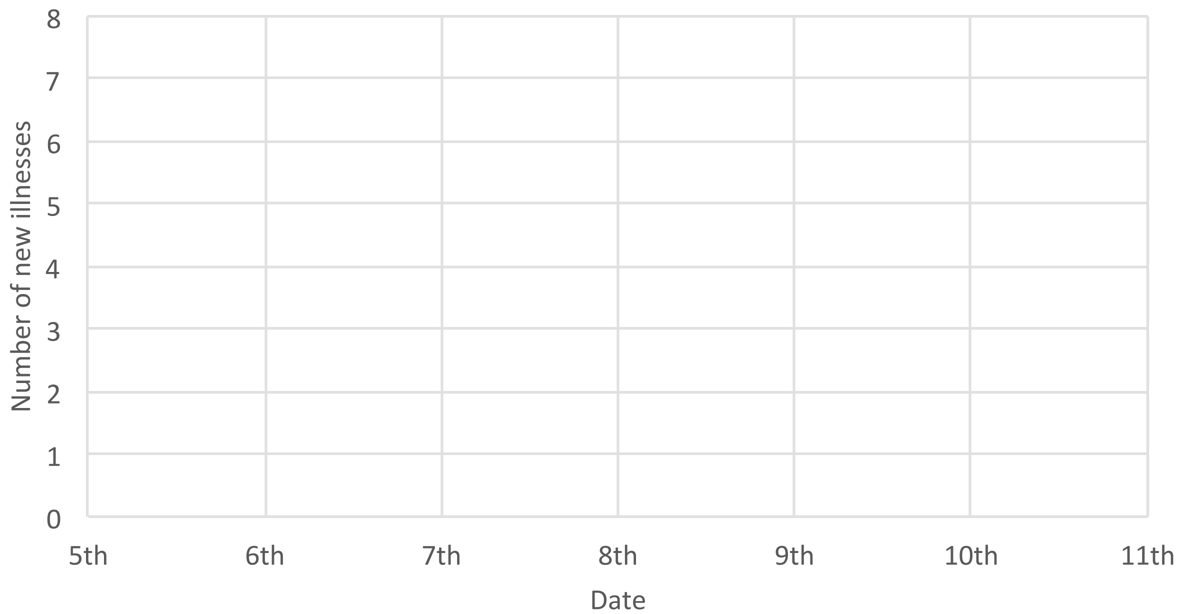
Instructions: Which food at the feast had the highest attack rate? For each food that was served, determine how many of the people who ate that food became sick. Divide this by the number of people who ate that food. The result is the attack rate for that particular food.

Food	Number of people who ate this food and got sick	Number of people who ate this food	Attack rate
Crabs	*7*	*10*	*0.70 (70%)*
Macaroni			
Egg salad			
Sandwiches			

Outbreak Investigation: Epidemic Curve

The incubation period is the time between exposure to a **pathogen** and the onset of symptoms. Knowing about the incubation period can provide clues about which pathogen was responsible for the outbreak.

Instructions: Determine when each person first reported his or her sickness. Graph your results below to determine when the majority of people became ill.



On what date did the most people become sick?..

What is the mode (value that occurs most often) incubation period? In other words, how many days passed between the event and the date when the most people became sick?..

Outbreak Investigation: Pathogen and Contaminated Food

Instructions: Answer the questions below about the pathogen and food that probably caused the outbreak. Consider the results of your investigation so far: the symptoms of people who became ill, the attack rate and the incubation period. Compare these against the descriptions of each pathogen below.

Which pathogen do you suspect caused the illnesses? ....

....

Which food do you suspect was contaminated by the pathogen? ....

....

Some of the people who said they ate this food did not get sick. What are some possible explanations?

....

....

....

....

One person (#16) did not eat any of the foods on the menu. What are some possible explanations for his or her illness?

....

....

....

....

Norovirus

Incubation period: 1-2 days

Signs and symptoms: nausea, vomiting, diarrhea

Commonly associated foods: poorly cooked shellfish, ready-to-eat foods like salads and sandwiches handled by infected persons, contaminated water

Campylobacter

Incubation period: 2-5 days

Signs and symptoms: fever, vomiting, diarrhea, abdominal cramps

Commonly associated foods: raw and undercooked poultry, unpasteurized milk, contaminated water

Salmonella

Incubation period: 1-3 days

Signs and symptoms: fever, vomiting, diarrhea

Commonly associated foods: eggs, poultry, meat, and cheese; unpasteurized milk and juice; certain raw fruits and vegetables like sprouts and melons

E. coli

Incubation period: 1-8 days

Signs and symptoms: vomiting, diarrhea, abdominal cramps

Commonly associated foods: undercooked ground beef, unpasteurized milk and juice, contaminated water

Adapted from foodsafety.gov

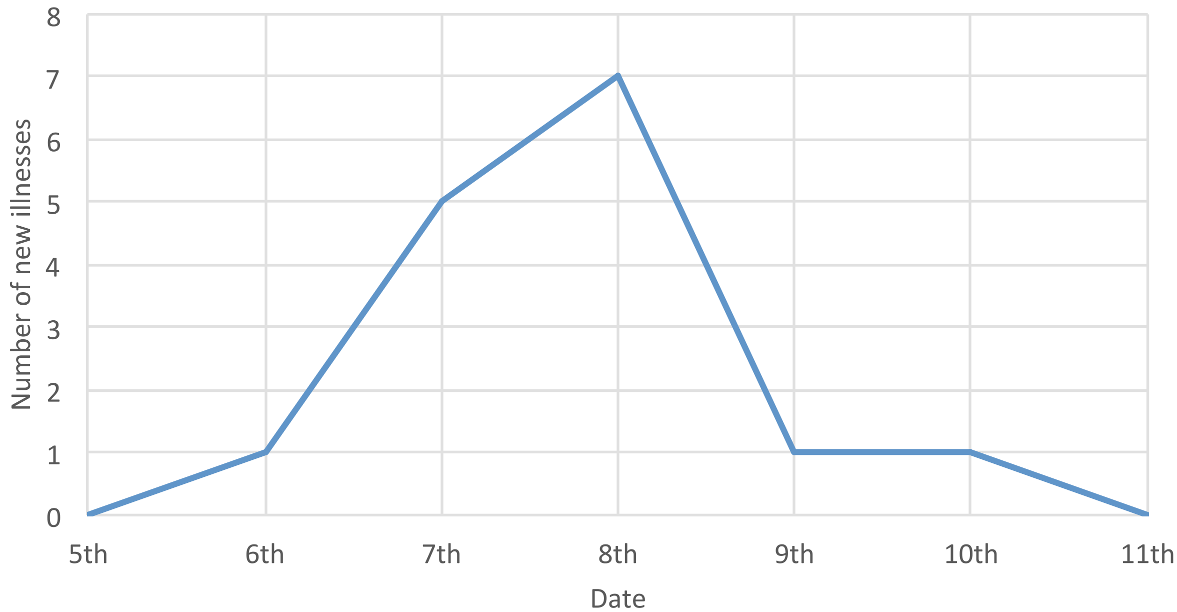
Answer Key: Attack Rate

Number of people who got sick	Number of people who responded to questionnaire	Attack rate
17	*20*	*0.85*

Answer Key: Attack Rate by Food

Food	Number of people who ate this food and got sick	Number of people who ate this food	Attack rate
Crabs	*7*	*10*	*0.70 (70%)*
Macaroni	*6*	*9*	*0.67 (67%)*
Egg salad	*14*	*17*	*0.82 (82%)*
Sandwiches	*12*	*15*	*0.80 (80%)*

Answer Key: Epidemic Curve



On what date did the most people become sick? *June 8th*

Mean, median, and mode incubation period: *3 days*

Answer Key: Pathogen and Contaminated Food

Which pathogen do you suspect caused the illness? *Salmonella*

Which food do you suspect was contaminated by the pathogen? *Egg salad*

Some of the people who said they ate this food did not get sick. What are some possible explanations?

- *People who responded to the survey may not accurately remember which foods they ate.*
- *Some people might have greater immunity to the illness because they had been exposed to it before, because they have stronger immune systems, or because they are genetically less susceptible.*
- *The people who got sick may have eaten more egg salad than those who did not. This is sometimes called "dose-response" because exposure to a larger dose of pathogens generally increases the risk and severity of illness.*
- *Because people often don't seek treatment and report their symptoms, it can be difficult to trace the source of a foodborne illness outbreak. The people who do report illness may represent only the tip of the iceberg.*

One person (#16) did not eat any of the foods on the menu. What are some possible explanations for his or her illness?

- *Person #16 may have forgotten what he or she ate.*
- *Person #16 may have been exposed to the pathogen through contact with another infected person. Proper hand washing could have prevented this type of person-to-person transmission.*
- *Person #16 may have gotten sick from a completely unrelated event, from a different pathogen. Many pathogens cause nausea, diarrhea, and vomiting.*
- *Person #16 may have suffered illness from cross-contamination from an item that did contain the pathogen. For example, someone brought leftovers home, spilled them on the counter and then, person #16 prepared food on that counter.*

Food Processing Cards

Preservation allows businesses to transport foods over greater distances.	**Preservation allows stores to stock foods for longer periods of time.**	**Freezing and canning allow people to enjoy foods out of season, and they preserve some nutrients.**
Pasteurization destroys pathogens (disease-causing organisms) that may contaminate food.	**Large processing plants often handle large volumes of products from many different sources, which can lead to cross-contamination.**	**Processing can enhance the texture, flavor, and appearance of food.**
Processed foods can be high in refined sugars and unhealthy fats.	**Fortification allows processed foods to have higher levels of certain nutrients.**	**Food packaging accounts for roughly two-thirds (by volume) of total U.S. packaging waste.**
Some processed food packaging contains BPA, a chemical that has been linked to cardiovascular disease, certain cancers, and changes to immune system function.	**Many processed foods are designed to be eaten virtually anywhere, at any time, with little or no preparation.**	**In addition to producing a variety of flavors and textures, fermentation can promote gut health, preserve foods, improve nutritional quality, and reduce cooking times.**

Food Processing Handout

You will explore the pros and cons of processing food. Read each statement and choose whether it reflects a pro, con, or both. Analyze each statement from the following perspectives:

- Manufacturing company
- Food chain worker
- Retailer (e.g., grocer)
- Citizens

Record your responses below, along with your reasons for each choice. The first statement has been completed as an example.

1. Preservation allows businesses to transport foods over greater distances.

Pro: Gives citizens access to a greater variety of foods; gives manufacturers a wider range of products to sell.

Con: Long-distance transport can use more fuel, particularly when food is transported by air, which creates more pollution, a threat to citizens' health.

2. Preservation allows stores to stock foods for longer periods of time.

3. Freezing or canning allows people to enjoy foods for a greater part of the year with more nutrients intact.

4. **Pasteurization destroys pathogens (disease-causing organisms) that may contaminate food.**

5. **Large processing plants often handle large volumes of products from many different sources, which can lead to cross-contamination.**

6. **Processing can enhance the texture, flavor, and appearance of food.**

7. **Processed foods can be high in refined sugars and unhealthy fats.**

8. **Fortification allows processed foods to have higher levels of certain nutrients.**

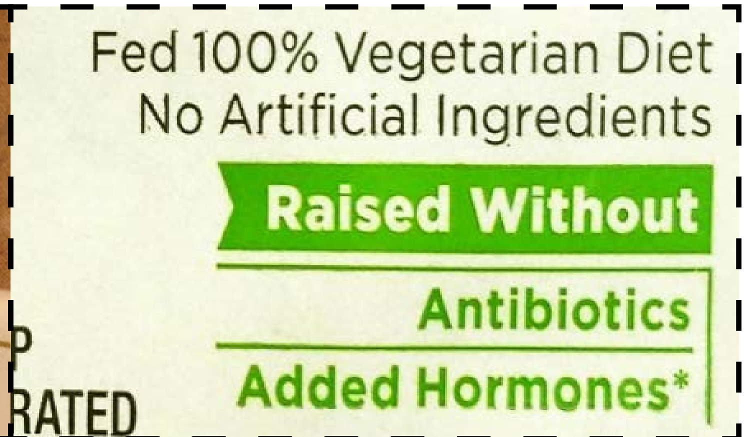
9. **Food packaging accounts for roughly two-thirds (by volume) of total U.S. packaging waste.**

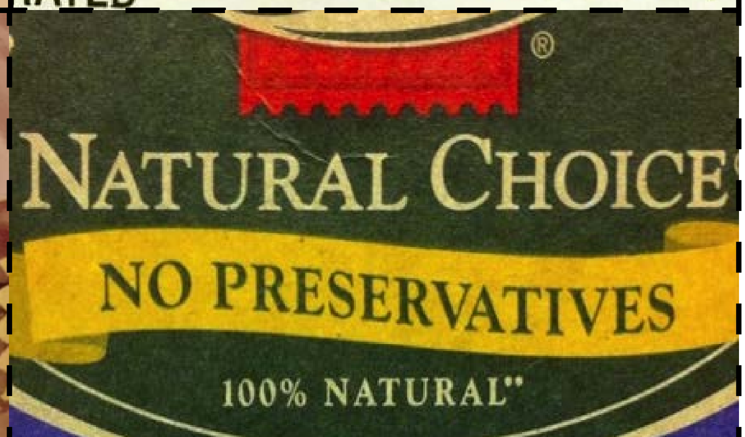
10. Some processed food packaging contains BPA, a chemical that has been linked to cardiovascular disease, certain cancers, and changes to immune system function.

11. Many processed foods are designed to be eaten anywhere, at any time, with little or no preparation.

12. In addition to producing a variety of flavors and textures, fermentation can promote gut health, preserve foods, improve nutritional quality, and reduce cooking times.

Sample Food Labels





Nutrition Facts
Serving Size 1/6 Sheet (41g /1.5oz)
Servings Per Container 12

Amount Per Serving	
Calories 160 Calories from Fat 90	
	% Daily Value*
Total Fat 10g	15%
Saturated Fat 5g	25%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 140mg	6%
Total Carbohydrate 16g	5%
Dietary Fiber 1g	4%
Sugars 1g	
Protein 3g	

MADE FR
WHEAT FL
IRON, THI
B1], RIBC
ACID), WA
SOYBEAN,
CONTAINS
FRUCTOSE
DIGLYCERI
BARLEY FL
EXTRACTS
910148001

Photo credit (fish fillets): Quim Gil, 2010. Flickr. Creative Commons CC BY-SA 2.0.

Photo credit (other labels): CarrotNewYork.

Slides Teacher Guide

For each of the sample food labels, ask: *What do you think this label tells us? Do you look for this label (or specific information provided on the label) when you buy or eat food? How does this information affect your food choices?*

Nutrition Facts

- Federal law requires certain foods to bear this label. While it is up to the food companies to accurately list **nutrient** content and ingredients, the government performs random tests to verify that companies are following the rules and regulations.

Ingredients

- This list is always found near the nutrition label.
- Items in the ingredients list must be listed in descending order by weight. For example, the first ingredient listed on a box of corn flakes is milled corn.

USDA Organic

- This label means the food was mostly produced without **pesticides** or synthetic fertilizers.
- The **U.S. Department of Agriculture (USDA)** sets rules for the methods and materials allowable under the label. For example, these rules generally prohibit the use of pesticides and synthetic fertilizers on certified organic farmland. To use the organic label, food manufacturers must use a certain percentage of organic ingredients. USDA-accredited organizations verify whether farms and other businesses follow the rules.[1]

Natural

- As of 2015, according to **U.S. Food and Drug Administration (FDA**) standards, the term "natural" means that no artificial colors, flavors, or other synthetic ingredients have been added.[2] These FDA standards are not enforced. The USDA, however, does regulate the use of the natural label on meat and poultry products.[3]

Third-party labels

- Some food label claims may be misleading. Labels such as "free range," for example, may imply that hens are raised outdoors, whereas the reality may be that they have only limited access to a small outdoor area.
- Looking for claims that have been certified by a third-party organization is a step in the right direction for consumers. Some of these certifiers have websites or contact information. The label pictured here shows the "Certified Humane" logo, as well as the certifiers website.

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1. USDA Agricultural Marketing Service. *Organic Regulations*. Available at: https://www.ams.usda.gov/rules-regulations/organic
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Brand Recognition Teacher Guide

a. Coca-Cola

b. Taco Bell

c. McDonald's

d. Pizza Hut

e. Burger King

f. Subway

g. Starbucks

h. Dunkin' Donuts

i. Gatorade

j. Little Debbie

k. Sprite

l. KFC

Trivia Game Teacher Guide

Brand Recognition

<u>10 points:</u> What is the most profitable soda brand in the world?

Answer: Coca-Cola is by far the most profitable soda brand in the world, making more money than Pepsi, Dr. Pepper, Sprite, and Fanta combined.[1] (Note: Sprite and Fanta are both brands of the Coca-Cola Company.)

Discuss: *Why do you think Coca-Cola is so successful?*

Possible answers: Coca-Cola has a massive year-round marketing campaign that includes special holiday ads, novel marketing techniques such as adding people's names to bottles, and a wide variety of products that feature the company logo and mascots (such as the polar bears).

<u>20 points:</u> Name two food products that feature a cartoon character in their ads or on their packaging.

Possible answer: Many cereals such as Frosted Flakes (Tony the Tiger), Cap'n Crunch (Cap'n), and Rice Krispies (Snap, Crackle, and Pop), use cartoon characters.

Discuss: *Why do companies use cartoon characters in their marketing?*

Answer: Children respond more favorably to foods that use popular cartoon characters. In one study, twice as many children preferred the taste of foods that had cartoon characters on the package, compared to those who preferred the same foods from a plain package.[2]

<u>30 points:</u> Name two cartoon mascots that appear in ads for vegetables, fruits, or nuts.

Possible answers: The Jolly Green Giant, the Sun-Maid Raisins girl, the California Raisins, the Vlasic Stork (pickles), and Mr. Peanut.

Discuss: *Generally, companies spend less money marketing fruits, vegetables, and other less-processed foods, and are less likely to use marketing tools like mascots. Why is this?*

Possible answers: Processed foods typically have a higher profit margin than raw produce. Processing is said to add value to products because consumers are willing to pay more for a food with added convenience, longer **shelf life**, or enhanced flavors or appearances, for example. Many fruits and vegetables, by contrast, are limited to being frozen, canned, peeled, sliced, pre-washed, or sold raw—meaning they have less potential for adding value.

Influence of Ads

<u>10 points:</u> In a 2006 study, people were shown different brands while their brains were hooked up to an MRI.[3] Seeing the most well-known brands activated parts of the brain associated with which of the following? A) Reward, B) Positive emotions, C) Self-identity, D) All of the above.

Answer: D.

<u>20 points:</u> In 2010, the Television Bureau of Canada launched an advertising campaign featuring broccoli, "the Miracle Food." Following the campaign, broccoli sales A) increased, B) decreased, C) stayed the same.

Answer: A. broccoli sales increased by 8 percent, while consumers' perceptions of broccoli as a tasty and healthy food rose substantially.[4] This campaign demonstrated that advertising can be used to promote healthy foods.

<u>30 points:</u> At what age do children become able to understand that the purpose of commercials is to persuade them to buy products? A) Age 4, B) Age 6, C) Age 8, D) Age 10.

Answer: C. Research has shown that children younger than 8 are developmentally unable to understand that the purpose of commercials is to persuade people to buy products and frequently accept advertising claims as true statements.[5]

Discuss: *How, if at all, should governments restrict advertising to children?*

Advertising Tactics

<u>10 points:</u> Successful marketing often involves developing unique products. For every successful new product, there are countless failures. Which of the following real products was <u>not</u> a market failure? A) Life Savers soda, B) Greek yogurt, C) Pepsi A.M. (the breakfast cola), D) Colgate brand frozen entrées.

Answer: B.

<u>20 points:</u> Placing candy and other tempting products at the cash register is designed to encourage spur-of-the-moment purchases. This tactic is called: A) Impulse marketing, B) Drip marketing, C) Niche marketing, D) Ambush marketing.

Answer: A. Food manufacturers frequently pay "slotting fees" to place their products on the most visible areas of supermarket shelves, where consumers are more likely to notice them. Placing products in prominent locations can increase their sales by as much as fivefold.[6]

<u>30 points:</u> What is the main reason companies sell sodas and other products in schools?

Answer: To build brand loyalty. Company representatives have admitted that selling their products in schools is only marginally profitable, but they benefit from recruiting lifelong customers at a young age. This approach is based on the theory that the younger the age at which brand awareness is established, the stronger the brand loyalty will be as a child grows and the more money they will spend on those products.[7]

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Soda Ban Case Study Handout

Instructions: Use this case study about the soda ban in California schools to develop your argument for or against the ban. Each member of your group should present at least one fact, statement, or point from the case study to defend your group's position.

In 2005, the state of California began requiring elementary and middle schools to stop offering soda as a cafeteria option and to prohibit sodas in school vending machines.[8] A year later, the ban was expanded to include high schools. The ban was designed to encourage students to make healthier choices during school hours.[9]

The governor at the time, Arnold Schwarzenegger, was a firm supporter of the bill, as were the majority of California's lawmakers. Gov. Schwarzenegger didn't just want to ban sodas; he also wanted to promote healthier choices. To that end, he signed another bill that provided funding for more fruits and vegetables in school food programs.

As a 2006 California Endowment report states, "The problem [of obesity] was particularly disturbing in children, one-third of whom are overweight and one-seventh of whom are obese. The causes of what some considered to be an obesity epidemic were not hard to discover: people were eating more food, much of it unhealthy, and getting less physical activity."[8]

Soda in particular was a major issue, since a child's risk for obesity increases by almost 60 percent with every additional daily serving of soda.[10] Banning sodas in schools was one way legislators saw to help stem the tide of unhealthy habits.

However, banning only soda, and not other sugar-sweetened beverages such as juice and energy drinks, may not actually improve student health. According to one recent study: "States that only ban soda, while allowing other beverages with added caloric sweeteners, appear to be no more successful at reducing adolescents' [sugar-sweetened beverage] access and purchasing within school than states that take no action at all."[11]

Because of these findings, some argue that we should allow sodas so cash-strapped schools can use the sales revenue to fund sports, arts, science, health, and other programs. One California school brought in as much as $58,000 a year on a Pepsi contract before the bans began.[12]

So the question remains, should schools ban sodas?

8. Isaacs S, Swartz A. *Banning Junk Food and Soda Sales in The State's Public Schools*. The California Endowment. 2006.

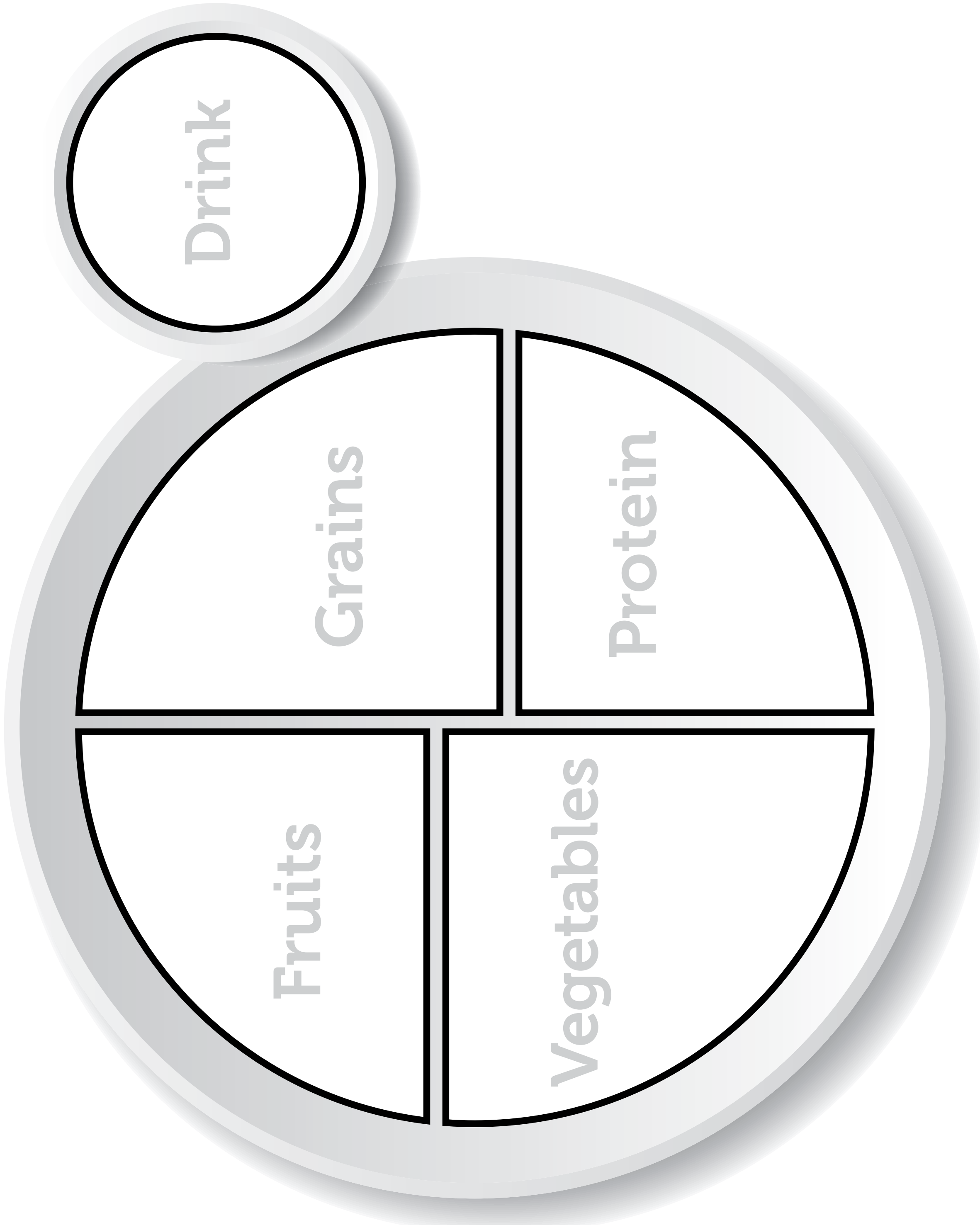
9. Fudge T. *California Bans Soda in Schools*. KPBS Public Media, 1 July 2009.

10. Johnson R, Appel L, Brands M, et al. Dietary Sugars Intake and Cardiovascular Health: A Scientific Statement From the American Heart Association. *Circulation*. 2009;120(11):1011-1020.

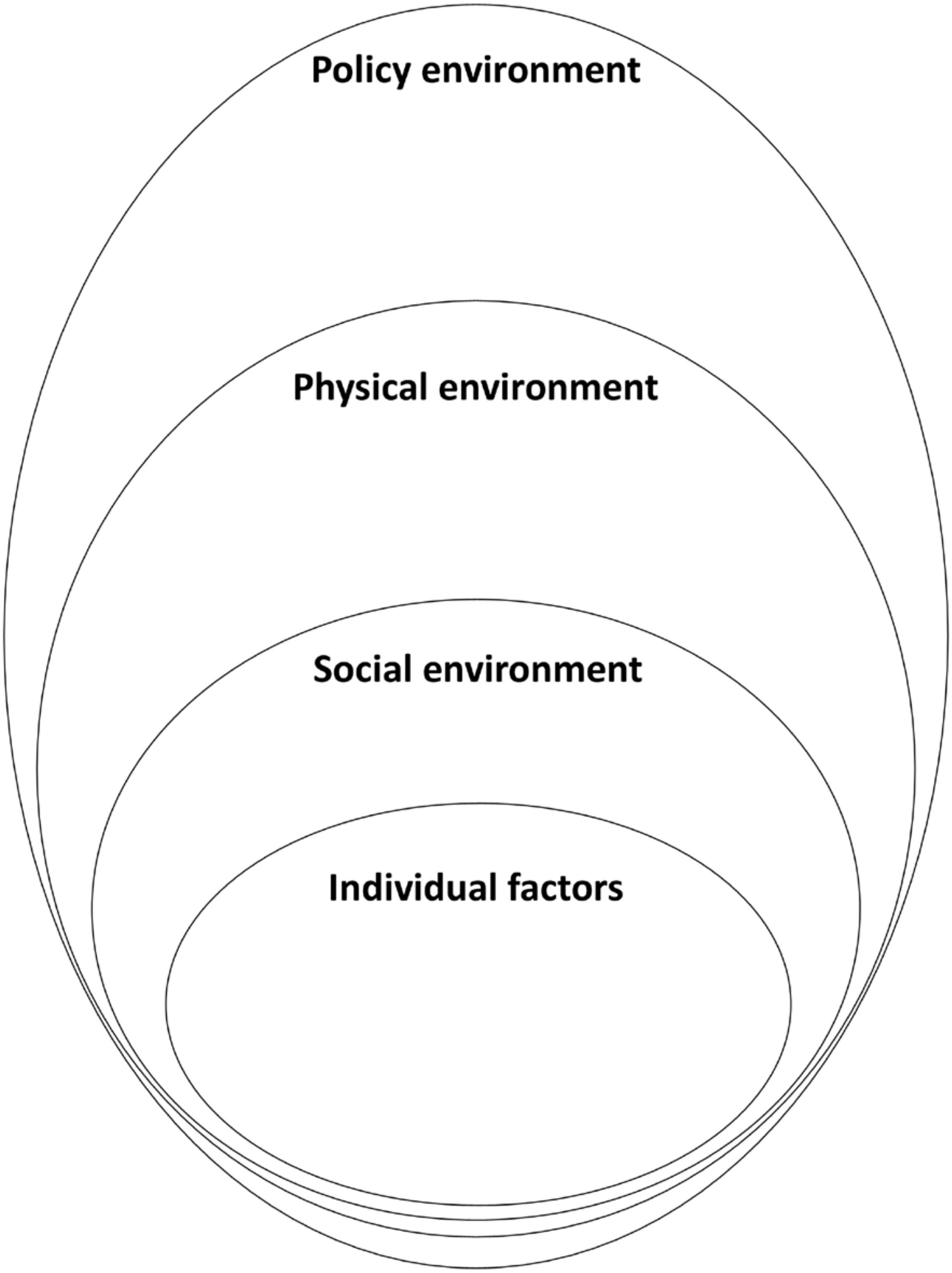
11. Taber DR, Chriqui JF, Powell LM, Chaloupka FJ. Banning all sugar-sweetened beverages in middle schools: reduction of in-school access and purchasing but not overall consumption. *Arch Pediatr Adolesc Med*. 2012;166(3):256-262.

12. Kuznia R. *Soda Bans Cost South Bay Schools Thousands of Dollars*. The Daily Breeze, 11 Aug. 2012.

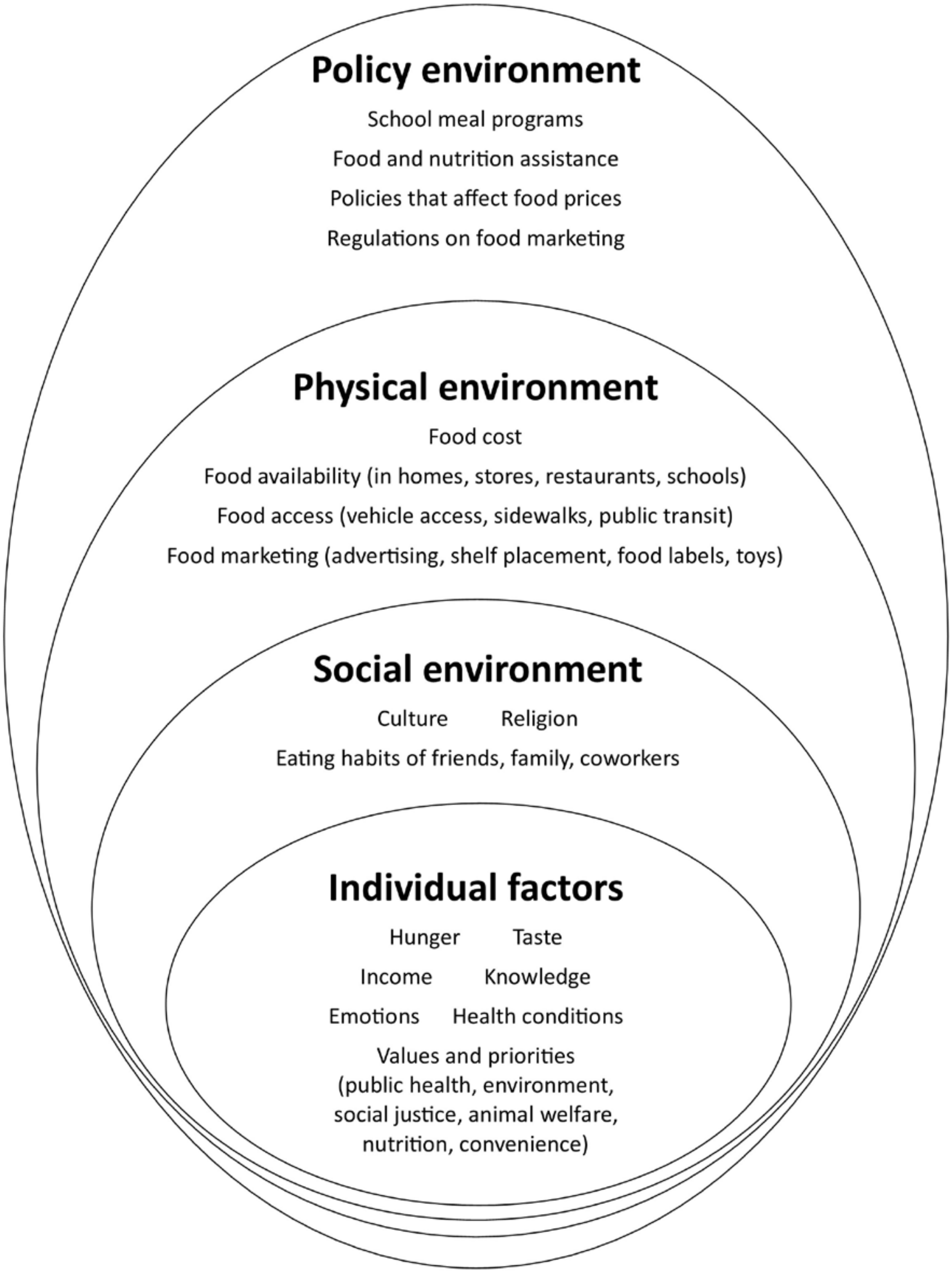
Blank Healthy Plate Handout



Influences on Food Choice Handout



Influences on Food Choice Teacher Guide



Food Environments Handout

John's Food Environment

John lives near a small town in a rural farming community. His parents produce and sell vegetables on their family farm, and they raise chickens to sell eggs. They sell their produce at several farmers' markets in nearby towns. John's parents do not have a large income, and they produce as much of their own food as possible. When their food supplies run out, they must drive 30 miles to a general store that has limited options.

What would John eat for dinner?
Draw or describe what might be on John's dinner plate:

Why does John eat what he eats?
Give examples of how John's social and physical environment might affect his food choices:

Social environment	Physical environment

Lydia’s Food Environment

Lydia and her family, immigrants from Central America, live in a large city. Her parents are rarely home from work in time for dinner, so Lydia often eats alone in front of the television. Her father uses the family car to get to work, so Lydia stays within walking distance to get meals. Though her parents encourage her to eat fruits and vegetables, there is no grocery store near her family’s apartment. There are a couple of corner stores, which sell microwavable snacks. Her friends often meet up to eat at the only nearby restaurant.

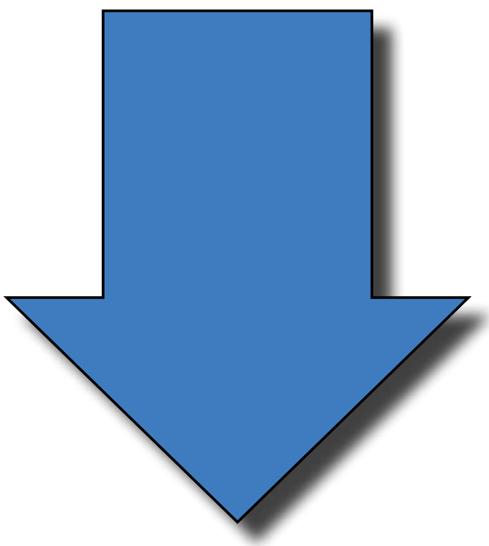
What would Lydia eat for dinner?
Draw or describe what might be on Lydia’s dinner plate:

Why does Lydia eat what she eats?
Give examples of how Lydia’s social and physical environment might affect her food choices:

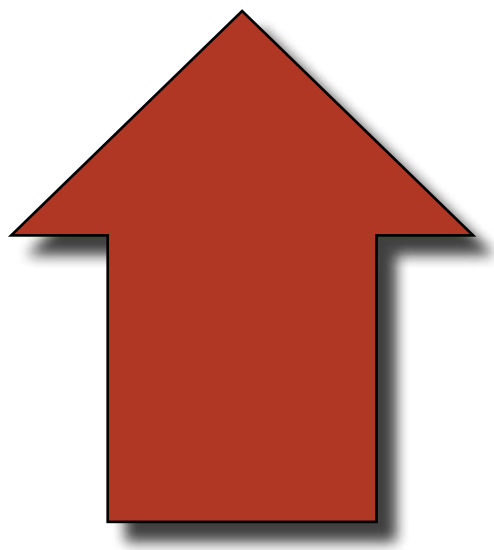
Social environment	Physical environment

Dietary Change Signs

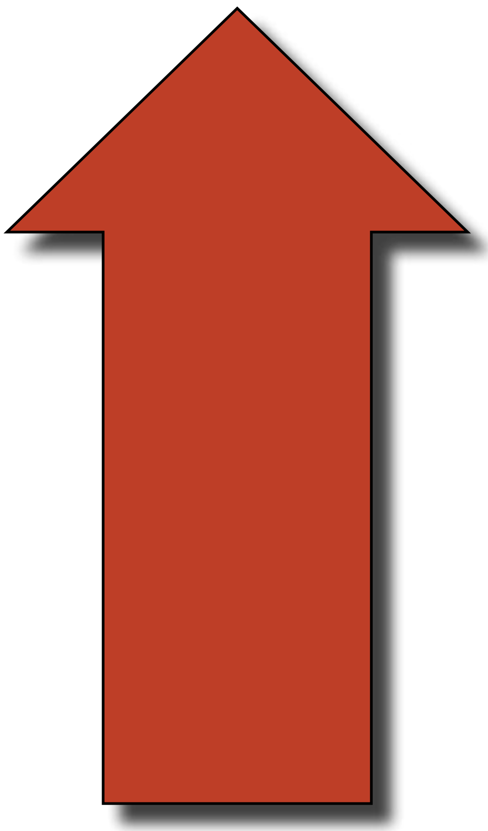
DECREASED



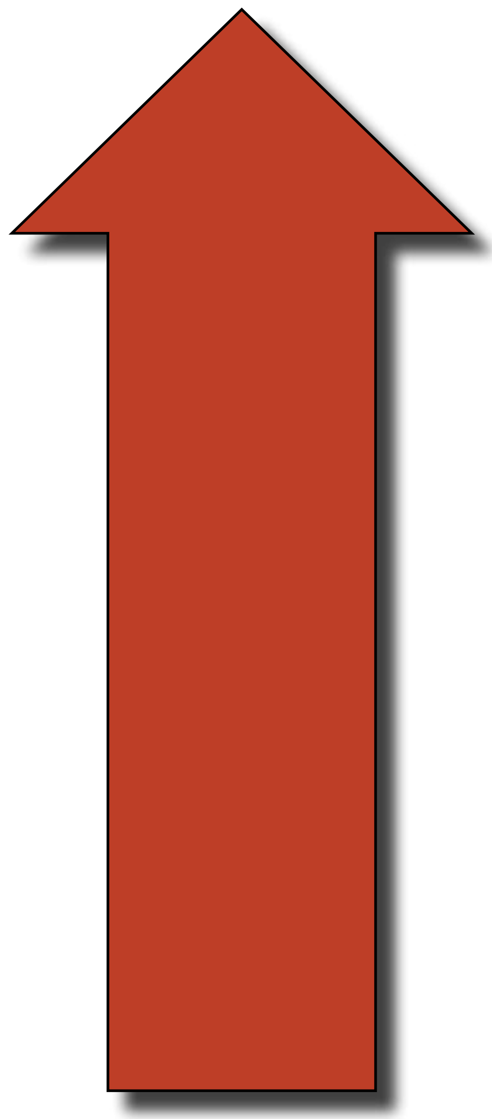
INCREASED BY UP TO 50%



DOUBLED



MORE THAN DOUBLED



Community Food Availability Maps

1. **What is the name of this community?**

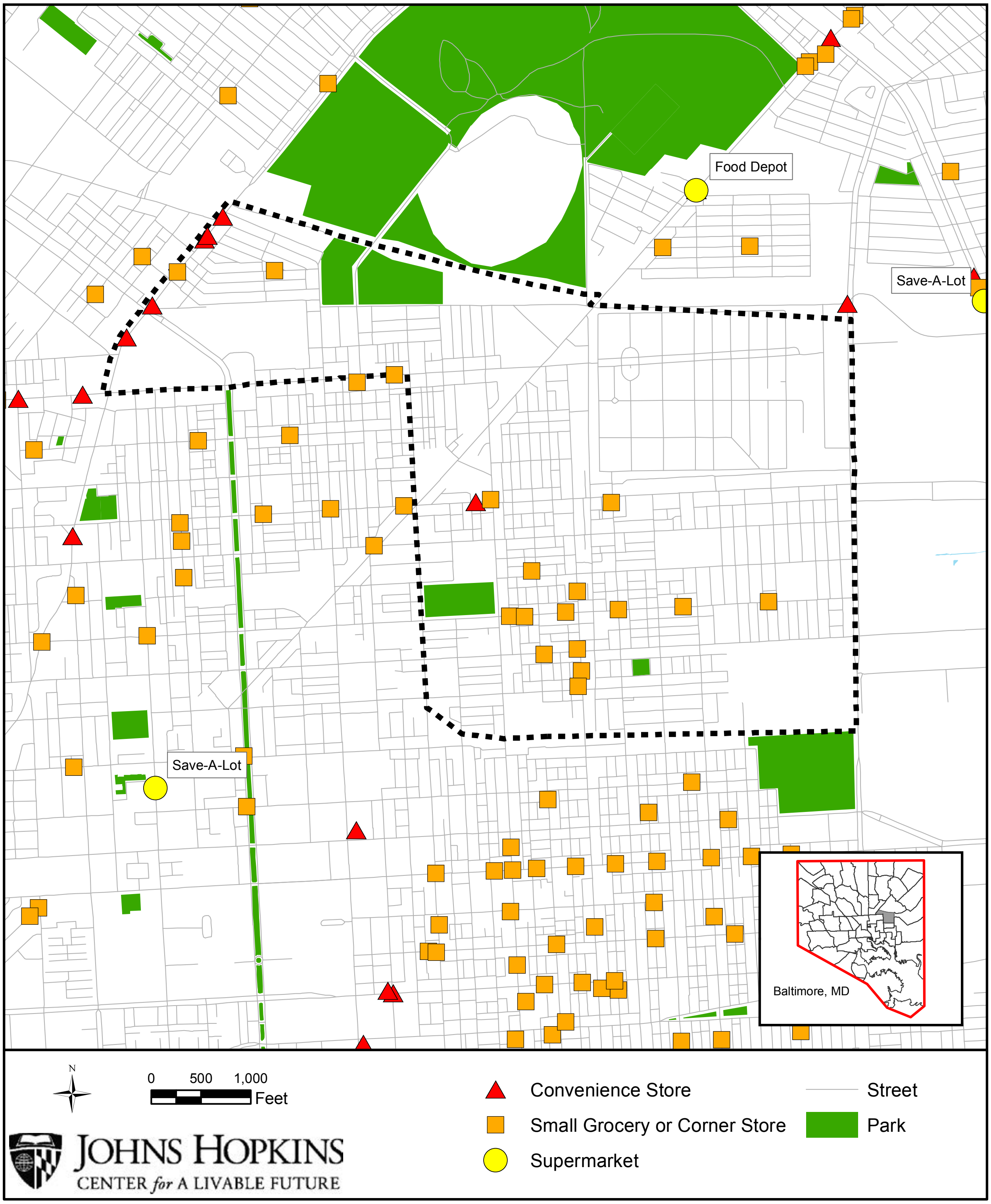
2. **From what type of store(s) do you think most residents in this community get the majority of their food? How might this differ among residents who have access to a vehicle versus those who don't?**

3. **Does this type of store(s) generally offer a variety of healthy options, such as fruits, vegetables, whole grains, and beans, at affordable prices?**

4. **Based on the information given, how would you describe how difficult it is for residents of this community to get enough healthy food? Would you consider this community a food desert? Why or why not?**

5. **What additional information might help you better measure how difficult it is for residents of this community to get enough healthy food?**

Community Food Availability Map: Clifton Park

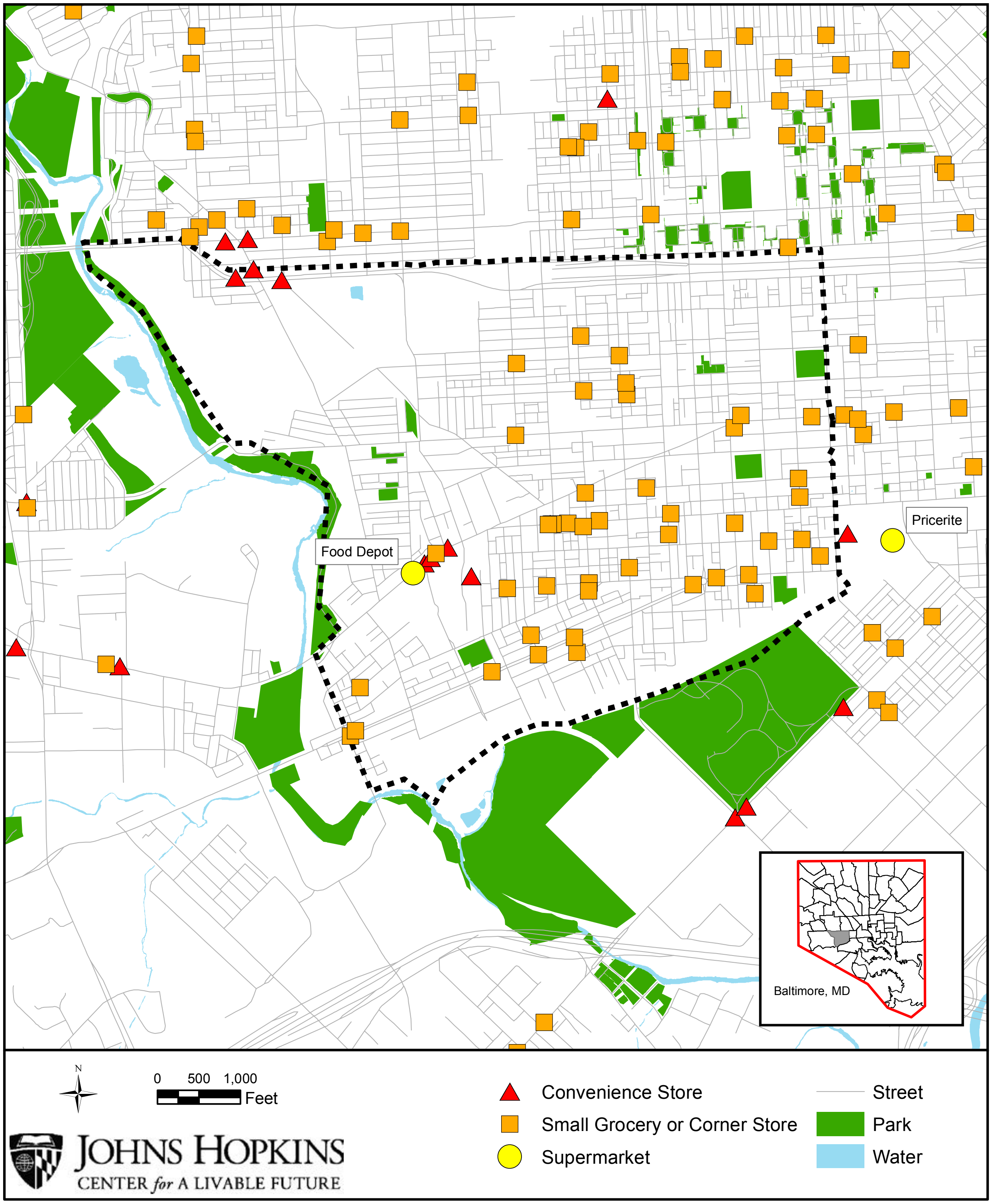


- Median household income: $25,737
- Percent of households with no vehicles available: 44.2%

Maryland Food System Map. Johns Hopkins Center for a Livable Future. http://mdfoodsystemmap.org/

Baltimore Neighborhood Indicators Alliance. Jacob France Institute. http://bniajfi.org/

Community Food Availability Map: Southwest Baltimore

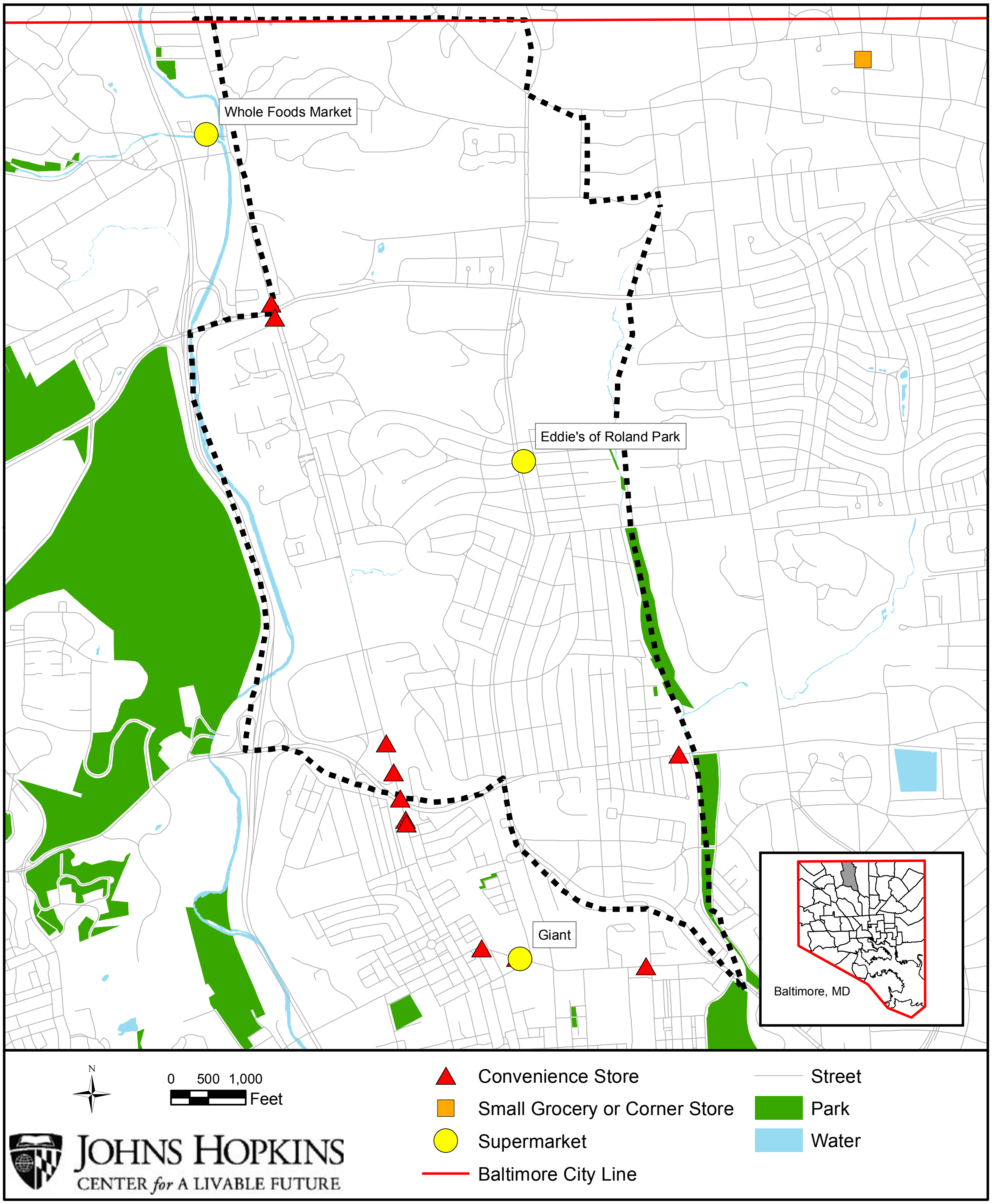


- Median household income: $24,946
- Percent of households with no vehicles available: 52.8%

Maryland Food System Map. Johns Hopkins Center for a Livable Future. http://mdfoodsystemmap.org/

Baltimore Neighborhood Indicators Alliance. Jacob France Institute. http://bniajfi.org/

Community Food Availability Map: Roland Park



- Median household income: $104,481
- Percent of households with no vehicles available: 4.4%

Maryland Food System Map. Johns Hopkins Center for a Livable Future. http://mdfoodsystemmap.org/

Baltimore Neighborhood Indicators Alliance. Jacob France Institute. http://bniajfi.org/

Measuring Household Food Security

The USDA produced this household food security survey to use with youth ages 12 and older.

The following questions are about the food situation in your home during the last month.

1. Did you worry that food at home would run out before your family got money to buy more?

.... A LOT .... SOMETIMES .... NEVER

2. Did the food that your family bought run out, and you didn't have money to get more?

.... A LOT .... SOMETIMES .... NEVER

3. Did your meals only include a few kinds of cheap foods because your family was running out of money to buy food?

.... A LOT .... SOMETIMES .... NEVER

4. How often were you not able to eat a balanced meal because your family didn't have enough money?

.... A LOT .... SOMETIMES .... NEVER

5. Did you have to eat less because your family didn't have enough money to buy food?

.... A LOT .... SOMETIMES .... NEVER

6. Has the size of your meals been cut because your family didn't have enough money for food?

.... A LOT .... SOMETIMES .... NEVER

7. Did you have to skip a meal because your family didn't have enough money for food?

.... A LOT .... SOMETIMES .... NEVER

8. Were you hungry but didn't eat because your family didn't have enough food?

.... A LOT .... SOMETIMES .... NEVER

9. Did you not eat for a whole day because your family didn't have enough money for food?

.... A LOT .... SOMETIMES .... NEVER

United States Department of Agriculture, Economic Research Service. *Self-Administered Food Security Survey Module for Youth Ages 12 and Older*. 2015. http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/survey-tools.aspx#youth.

Food Policy Goals Handout

The policies of local, state, and federal governments determine, to a considerable degree, how we farm and what we eat. Ideally, these policies would help to ensure that all people have access to safe, affordable, healthy food; protect our air, water, and land; support the farmers and workers who put food on our tables; and uphold rigorous standards for the welfare of animals used for food.

Supporting Farmers

Historically, the government has given economic support to farmers to:

- Insure farmers against crop loss (for example, from pests or unpredictable weather).
- Incentivize farmers to conserve soil and wetlands.
- Provide a stable price for crops, even if the market price falls.
- Set minimum prices for crops.
- Support agricultural research and development of new technologies.

Feeding the Hungry

Federal food and nutrition assistance programs like SNAP (food stamps) and Women, Infants and Children (WIC) help low-income families put food on their tables. These programs also:

- Boost the economy by allowing participants to spend more on food.
- Support local economies when SNAP benefits are accepted at farmers' markets.
- Alleviate hunger, at least in the short term, and can support/aid the most vulnerable populations.
- In addition, the U.S. government purchases surplus grain from farmers and distributes it to other countries in need. In countries that receive food aid, however, farmers may see their own prices drop with influxes of donated grain.

Keeping the Food Supply Safe

The U.S. Food and Drug Administration (FDA) and Department of Agriculture (USDA) work to reduce the risks of foodborne contamination. These agencies:

- Inspect processing facilities for signs of contamination.
- Require producers, processors, restaurants, and other businesses to follow food safety protocols.
- Respond to foodborne illness outbreaks.
- Regulate drugs and chemicals used in food animal production, including antibiotics.

Protecting the Environment

Agriculture affects air, water, land and climate. Policies can help conserve resources, reduce pollution, and promote more ecologically sound farming practices. In addition to regulating agricultural pollutants, environmental protection efforts offer incentives for farmers to:

- Reduce soil erosion and runoff
- Conserve freshwater
- Shift to renewable energy sources
- Preserve wetlands
- Protect wildlife habitats
- Minimize agricultural pollutants

Food Policy Council Roles Handout

- **School food service director:** oversees purchasing for school cafeterias, plans menus, etc.
- **Public health advocate:** provides guidance on nutrition, food security and other public health issues in the food system.
- **Hospital administrator:** manages food purchasing for hospitals, often involved in community health initiatives.
- **Anti-hunger advocate:** focuses on food access for disadvantaged populations.
- **City planner:** works on policies that affect where food can be sold and/or grown.
- **Supermarket manager:** manages food purchasing and relationships with distributors, customers and sometimes farmers.
- **Restaurant owner:** manages food purchasing and relationships with distributors, customers and sometimes farmers.
- **Community member:** represents the interests of communities, such as food access and local food production.
- **Farmer:** produces and sells food in the city or region served by the food policy council.
- **Labor representative:** represents the interests of food system workers, such as fair wages and safe working conditions.
- **Representative from an environmental nonprofit:** provides guidance on how the food system impacts air, water, soil, climate, biodiversity, and other parts of the environment.