Introduction to the Food System

This lesson and information is adapted from three sources:


Dig In! Curriculum, Lesson 2: The Farm to Plate Game – [http://teamnutrition.usda.gov](http://teamnutrition.usda.gov)


Lesson Summary:

This is the first lesson in the food system unit that should be taught prior to any of the other lessons. Although we participate in the food system each day by eating, most of us do not often think about how food gets from field to table. For this lesson, students will be read the story “How Did That Get in My Lunchbox? The Story of Food,” written by Chris Butterworth. The book provides several examples to help students understand all the steps of where our food comes from: how it’s harvested, processed, packaged and transported and ends up being consumed by them. At the end of the story a food system diagram is used to reinforce and apply what the students learned from the story. Students in lower grade levels will do an activity called Nutritional Names and students in upper grade levels will be able to play a game titled Farm to Plate.

Objectives:

Students will be able to:

- Identify and describe the steps in the food system.
- Explain the activities that occur at the various steps in the food system.
- Learn how various people participate in the food system.

Time Required:

30 minutes

Background Information: (From Discovering Our Food System curriculum)

You probably know more about the food system than you can readily express. If we ask ourselves where a food might come from we will often respond, “the grocery store.” However, most of us do understand that apples grow on trees somewhere and that farms grow most of our food. It may take time and discussion to define many of the steps in the food system that we are less familiar with or have not experienced. The primary goal of the lesson is to identify the major steps of the food system and explore some of the activities that take place in each...
step. Each step is defined and discussed below to help gain a clear idea of how food-producing activities are arranged in the food system.

*What is a System?*
A system is a group of interacting, interrelated, and oftentimes interdependent elements that function together as a complex, unified whole. One core concept of a system is that a change in one element of a system has an impact, either directly or indirectly, on one or more additional elements in that system. Another core concept is that systems generally require inputs to function and produce outputs that need to be dealt with one way or another. Inputs and outputs in the food system are too numerous to list here, but every component of the food system uses inputs and results in outputs. For example, the “Growing” segment of the food system requires seeds, soil, water, sunshine, fertilizer/compost, human work, machinery and energy to run the machinery as inputs. “Growing” generates crops that serve as food for humans, and waste that may be incorporated back into the soil or disposed of in another way. Inputs and outputs vary a great deal depending on the type of food system being considered. In a true system, the components of that system are treated or considered as a whole and cannot be considered in isolation from other related components or elements of the system. Relationships and interdependencies between the components are key elements of a system. Systems vary in the degree to which they are "open" or "closed" -- that is, the degree to which system components interact with, or are (insulated) from, the larger external environment. Given the nature of food systems, which have biological, physical, and socio-economic aspects, there is a high degree of interchange both among the subsystems and with the larger environment. Dynamic adjustments in the food system to external and internal forces, including our research and education programs, are ongoing and must be given greater consideration as we conduct our work.

**Steps in the Food System:**
- **Food Production** involves many of the activities that take place on a farm, at an orchard, in bodies of water, or in greenhouses and fish-farm tanks to produce our food. Food production depends on the "input" of several resources, both natural (soil, water, climate, seeds, and human labor) and human-made (machinery, fuel, fertilizers, pesticides). A farmer owns or rents land to plant crops, or tend animals. The inputs required vary depending on what is being grown or raised and the type of agricultural system that is in place. For example, many of the pesticides and fertilizers common in most of our agriculture are not allowed in organic agriculture.

- **Harvest** can be a very labor-intensive step in the food system if we are talking about many of the fruits and vegetables that are too delicate to be harvested by machine. Other fruits and vegetables are harvested with machines. Mechanical harvesters that require fuel to run harvest most grain and cereal crops. Depending on what is harvested, different resources may be needed. Some of the inputs required for this step in the system are labor, fuel, raw materials, built equipment, and packing materials.
**Storage** refers to keeping a stock or supply of a certain crop to maintain safety and quality for some future use. Storage is required for all crops that are not marketed soon after harvest. Different crops can be stored for different lengths of time. Most fruits and vegetables are highly perishable unless processed or preserved from their fresh form. Exceptions to this include apples, root vegetables (potatoes, yams, carrots, turnips, rutabagas, parsnips), bulbs (onions, shallots, garlic), and cabbages (red and green), all of which store well for extended periods of time, if the proper temperature and humidity are maintained. Grains and cereals store well for years with no energy input. Apples are often kept in controlled atmospheres to make them available many months after they are harvested. Of course, we store food on a daily basis in our refrigerators. The inputs required for storage include energy to maintain the cool environment, gases, packaging, buildings and land.

**Distribution** is the process of dividing up, spreading out, and delivering food to various places. Farm products can be taken from their original sources and delivered to supermarkets, other food stores, or farmers’ markets for sale as a whole fresh product - like many fruits and vegetables. Alternatively, farm products can be transported to a site where they will be transformed in some way, combined with other ingredients, made into food products, packaged and then distributed through a number of marketing channels. Most of what we find in grocery stores today has been transported great distances and has undergone some degree of processing. We currently transport food by truck, train, boat, and plane. A few foods (tomatoes and bananas primarily) that will be transported a significant distance are usually harvested before full ripeness so that they will withstand the bumps along the way.

**Transformation or Processing** changes made to a food’s structure, composition, character, or condition, is another way to make food available at times or places that it might otherwise not be. Much of the food we eat on a regular basis is transformed in some way before we eat it. Think of the bread on your sandwich, the juice you had with breakfast, tomato sauce and the pasta is covers, or the cheese you had on a cracker (and the cracker itself). During processing, food is changed in some way to enhance flavor, make it last longer than the processed raw foods it came from, or create new products altogether. There are many different ways to process a food. Turning fresh strawberries into jam, making juice from fresh apples, pre-cutting and cooking potatoes for frozen French fries are all ways to process food. It may include drying, cooking, freezing and canning, or adding preservatives to lengthen shelf life. Processing may enhance the nutritional content of a food, and in many cases may decrease nutritional content. Depending on the type of food and processing technique, a variety of inputs are necessary for this step in the food system. Some of them are labor, machinery, water, fuel for cooking and freezing, sugar, and preservatives.

**Packaging** is a way to protect food from spoilage on its way to our grocery stores. Almost everything we purchase at the grocery store is packaged in some way. Strawberries are put into plastic quart containers, bread is packaged in plastic or paper bags, pasta is kept in cardboard boxes, etc. Packaging is also a way to divide up the goods in a standard way so that people can purchase a known quantity quickly. It can provide a place for advertisement of the goods.
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contained within. Some of the inputs necessary to make packaging are paper, plastic, cardboard, aluminum, glass, ink, and machinery.

Marketing, Sales and Purchasing is the process of determining and catering to the consumer’s wants or needs, (or it may give the illusion of need in an effort to get people to buy a product). A significant portion of the money we spend on each food item goes to marketing teams who determine what people want from the food they eat. Marketers determine how to make food appealing to consumers. The inputs for this step in the system are people’s labor and time, in addition to advertising and packaging.

Disposing and Composting
Composting is a method of recycling as old as time. The Earth composts as a matter of course. Compost releases its nutrients slowly, over several months or years. Composting is also a way to reduce the amount of trash going to the landfill. It is amazing to think of the amount of food waste that goes into trash bags; it is free fertilizer when used properly. Soil retains fertilizers better when enriched with compost. Less fertilizer runs off to pollute waterways. Students will be taught how to compost food scraps and garden waste, producing a product they can use to enhance garden and potting soil. Compost balances both acid and alkaline soils, bringing pH levels into the optimum range for nutrient availability. Compost is also a natural top dressing for lawns.

Materials:
- Diagram of a food system
- Book: How Did That Get In My Lunchbox? The Story of Food written by Chris Butterworth
- Paper, markers or crayons, and alphabet food list to do nutritional name activity
- Example of Nutritional Name sheet for students to see
- Farm to Plate game instructions and cards
- Real or fake food examples

Procedures:

1. Introduce yourself and tell the students you are here to talk about food.
   a. Ask students:
      i. What did you eat for breakfast or lunch today?
      ii. Where do we get our food from?
      iii. How does food get into the grocery stores?
   b. Explain to the students that we are going to learn how food gets to our refrigerator at home by reading a story.
2. Read the story “How Did that Get In My Lunchbox?” The story of food.
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a. Point to the pictures as you read along and use the fake/real food models. Let students ask questions as you go along – there is a lot of information in the book.

3. When you have completed the book ask students if there are any questions about the story.

4. Now show children the food system diagram/poster. Talk about each step, the words and what they mean.
   a. Now see if the children can remember parts of the story and apply where each part would fit on the wheel. For example start with the bread.
      i. Growing and Harvesting: Wheat – is grown by the farmer. Then harvested by the farmer using a combine.
      ii. Transporting: the wheat is transported to a flour mill.
      iii. Processing: The miller grounds the wheat grains into flour.
      iv. Transporting again: The flour is transported to a bakery.
      v. Packaging: the baker used the flour to make bread, packages the bread and sends it to the store.
      vi. Retailing: The bread is now on the store shelf ready for you to purchase.
      vii. Eating: you can now make your sandwich from the bread you purchased at the store.
      viii. Talk about left over food and how it can be composted. You can repeat this with each part of the story until you feel the children understand the food system wheel. If needed, look back at the story to help the children.

5. The following is a thorough example and explanation of how an apple gets from farm to table titled “Getting to the Core”. Share with the students if necessary.
   a. **Harvest** - Apples are harvested by hand. In the United States, apples are picked by migrant or resident farm laborers from Mexico and Latin America. Ladders are used in the case of freestanding trees in order to reach all of the apples. The pickers will fill bags that are attached to their ladders and lower them into boxes being towed with a tractor.
   b. **Washing, grading and waxing** – Apples are washed, graded, and waxed.
   c. **Storing** – Apples are sorted by size and then packed into 40-pound cartons.
   d. **Transporting** – If not sold locally, a buyer arranges for shipment and a trucking company is contracted for shipment (4-5 days from Washington State to the east coast, for example). Temperature-controlled trucks travel 2,800 miles from Spokane, Washington to Maryland.
   e. **Processing** – Not all apples are sold as fresh fruit. Apples can be canned, made into pie filling or applesauce, or added to many different products. How many food products can you think of that contain apples?
f. **Packaging** – The packaging of apples is different, depending on how the fruit is sold: fresh and whole, or as part of a food product.

g. **Marketing/Retailing** – Apples can be marketed a number of waste and through different sales channels.

h. **Cooking** – Apples of course can be eaten without any cooking – right from the tree. But, they also can be baked whole or in pies and other pastries, made into sauce, or made into a fruit salad – such as Waldorf salad.

i. **Consuming** - YUM!

j. **Disposing, composting or recycling** – Apple cores can be composted.

6. Activity for lower grade levels – Nutritional Names – make an example to show them.

   a. Put your name across the top of the paper in big lettering.

      i. Example: H E I D I

   b. Explain to the students that they must think of a food that begins with each letter of their name and draw a picture of that food below each letter.

      i. For Example H – Ham, E- Eggs, I – Ice cream, D – Dill pickle, I – Ice cubes.

   c. Then students can draw a picture of that food underneath each letter of their name and label it.

   d. This activity requires students to think about different food items as well as label, spell, draw and follow directions. Attached to this lesson is an alphabet food list in supporting materials – to help students with the difficult letters. If time allots, you could have students share their drawings.

7. Activity for upper grade levels (3rd grade and higher) - Farm to Plate game

   a. See attached directions and game cards in supporting material section.

**Assessment:**

Use the food system diagram to see if the children can apply what they learned from the story. Ask questions about the food examples in the book or what students had for breakfast/lunch.

**Supporting Materials:**


Dig In!- Farm to Plate Lesson Plan - [http://www.fns.usda.gov/sites/default/files/diginTG_lesson2.pdf](http://www.fns.usda.gov/sites/default/files/diginTG_lesson2.pdf)

Dig in! – Farm to Plate Handout/Game Cards - [http://www.fns.usda.gov/sites/default/files/digin_l2h1.pdf](http://www.fns.usda.gov/sites/default/files/digin_l2h1.pdf)
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References/Resources:

Discovering Our Food System Curriculum – http://www.discoverfoodsys.cornell.edu/

Teaching the Food System Curriculum, Ingredients of the Food System -
http://www.jhsph.edu/research/centers-and-institutes/teaching-the-food-system/curriculum/

Technology link for kids- www.rif.org.kids