

# The Quicker the Better? Food Processing

## Social Studies & Health Core—Grade 6



### Materials

#### Activity 1

- ◆ Grocery bag with processed food products (see *Grocery Bag Examples*)
- ◆ Food labels for each pair of students

#### Activity 2

- ◆ Food labels for each pair of students (can use the same labels as above)
- ◆ Calculators and scratch paper for each student

#### Optional:

- ◆ *Levels of Processing*, blackline master copy of the background information for overhead projector (available in full lesson, <http://extension.usu.edu/aitc/lessons>)
- ◆ *From Farm to Table*, student worksheet for each student (available in full lesson, <http://extension.usu.edu/aitc/lessons>)

#### Activity 3

- ◆ A copy of *An Inconvenient Truth* worksheet for each student

**Time:** Activity 1: 30 minutes  
Activity 2: 2 hours  
Activity 3: 20 minutes

**Grade Level:** 6

### Grade 6 Health, Standard 3

Students will understand and respect self and others related to human development and relationships.

#### Objective 1

Adopt behaviors that contribute to a healthy body image; e.g., exercise, balanced diet.

### Health, Standard 6

Students will understand how a healthy diet and exercise can increase the likelihood of physical and mental wellness.

#### Objective 1

Evaluate food intake and levels of activity. Modify personal eating and activity plans to promote health.

#### Objective 2

Compare a variety of food preparation techniques. Explain the impact of food preparation on nutritional content. Judge food preparation methods to determine impact on nutritional content.

#### Objective 3

Explain nutritional labeling and identify nutritional content. Compare similar products and determine nutritional values of each.

### Background

Most foods that we consume require some processing. Many of us take food for granted and seldom think about how our food processing system affects our health and our environment.

The amount of processing varies from food to food. “Processed” means that the food has been changed in some way, either physically or chemically. Foods can be highly processed—greatly changed from the original ingredients that were grown or raised. Foods can be moderately processed—changed somewhat since the “raw” or main ingredients left the farm. Or foods can be minimally processed—meaning very little has changed since the ingredient left the farm.

**Highly Processed:** Many highly processed foods are mixed foods, often with many ingredients that are mostly or fully prepared in the factory. This means they do not need lots of preparation at home. These foods often contain ingredients that add vitamins and minerals, high fructose corn syrup, and partially hydrogenated oils. The products also contain ingredients—polysorbate 65 (*an emulsifier often used instead of milk and/or cream*) and sodium erythorbate (*a food additive in processed meats which helps to retain color and improve flavor*). Most of the time the original ingredients are not even recognizable in the final product. A “convenience food” is usually a highly processed food, meaning preparation has been done at the factory and little or no preparation needs to be done before eating.

**Moderately Processed:** In this category, food has been changed a medium amount from the form in which it was grown or raised. If products have several ingredients, most of them are still recognizable and some preparation must still be done before eating. A good example would be a pancake mix which includes all the necessary ingredients. You just add water to make the batter. Since the mixing and cooking must be done at home, they are moderately processed. However, an ingredient list may show that the products contain ingredients not found in the home kitchen, including defatted soy flour, soy lecithin (*an emulsifier which keeps cocoa and cocoa butter from separating*), corn syrup solids, mono- and diglycerides, polysorbate 60 (*an emulsifier which keeps water and oils mixed*), and artificial colors. Other examples include a jar of spaghetti sauce and a can of soup.

Utah Agriculture in the Classroom



Does your fruit drink really contain any fruit?

**Minimally Processed:** In this category, food has been changed a small amount after it was grown or raised on the farm. There are very few ingredients that would be foreign to a home kitchen. Examples include applesauce, peanut butter, pre-washed and torn lettuce, and dry milk powder. A packaged pancake mix that just includes the dry ingredients, but requires the consumer to add milk, eggs, and oil at home is also a good example of a minimally processed food.

### Activity 1: From Farm to Table

1. Define processing and discuss the following questions with your students. The discussion will assist your students in determining the level of processing of a food product.
  - *How far removed from the original source are the ingredients in the food?* (For example, how many steps away from fresh milk is dry milk?)
  - *How many ingredients are on the ingredient list?* The more processed a food is, the more ingredients it probably contains.
  - *How many ingredients do you recognize?*
  - *How many ingredients can you pronounce?* The more ingredients you do not recognize or cannot pronounce, the more processed it probably is.
2. Bring in a large grocery bag that contains 3-5 different food products that have all been derived from the same raw or primary product. (For example: *canned tomatoes, salsa, and ketchup*). The *Grocery Bag Examples* list, seen at right, may help give you some other ideas.
3. Read the ingredients list from each item out loud.
4. As a class, students should write down the name of the main ingredient and identify whether they think the product is highly, moderately, or minimally processed. Students may find it helpful to have a copy of the background information with them during the identification process.
5. Students should also list on their paper how the processed food was packaged (*refrigerated, frozen, dry in a box, liquid container, or can*).
6. Finally, ask them to indicate whether or not they have ever eaten or tasted the processed food product. *Teacher Tip:* A student worksheet *From Farm to Table* for tracking the processing information and a blackline master copy of the background information *Levels of Processing* are available in the full lesson the AITC website (visit: <http://extension.usu.edu/aitc/lessons>).
7. Discuss with your students other types of processing. Some examples of processing may include: crushed, ground, pressed, flaked, chopped, peeled, pitted, dehydrated, canned, frozen, pickled, smoked, salted, bottled, or bagged.
8. Ask the students to define the word “convenience.” Many highly processed foods are referred to as “convenience foods.” Why would a consumer choose to eat a convenience food? (*to save time, spend time with family, don't know how to cook, students may answer that they aren't allowed to cook on the stove without a parent present*)
9. Give each pair of students a food label. Have them examine the ingredients list. Explain that the primary or main ingredient is the first ingredient listed and that the food ingredients are listed in order of highest amount of that product to the least amount of that product.
10. Have the students find the primary ingredient in their food product.

### Activity 2: Nutritional Value

1. Using their food labels from Activity 1, have each student identify one ingredient with which they are unfamiliar (*i.e., sodium bicarbonate, citric acid, monosodium glutamate, sorbitol.*)

## Grocery Bag Examples

### Oatmeal:

- Regular rolled oats
- Instant oatmeal
- Oatmeal cookies

### Wheat:

- Whole wheat flour
- Dried pasta or macaroni noodles
- Instant pancake mix
- Frozen waffles
- White and/or whole wheat bread
- Wheat flakes cereal

### Tomatoes:

- Canned tomatoes
- Tomato sauce
- Bottled spaghetti sauce
- Tomato-based soup
- Salsa
- Ketchup



### Corn:

- Frozen corn
- Canned corn
- Corn tortillas
- Corn flour
- Corn syrup (or any item with high fructose corn syrup)
- Corn (or vegetable) oil
- Corn flakes cereal

### Apples:

- Fresh apples
- Applesauce
- Apple juice
- Apple desserts (e.g., frozen apple pastries or pies)
- Dehydrated apples (used in cereals and snack foods)
- Assorted fruit juices that contain apple juice

### Chicken:

- Chicken broth/stock
- Frozen/fresh chicken
- Chicken nuggets or tenders
- Frozen chicken-based dinners
- Chicken-based soups
- Canned chicken
- Chicken-based hot dogs or deli meats



2. Have the students research these words using the Internet to discover the additives' purpose in food processing.
3. Ask the students to identify whether or not their ingredient contributes to the nutritional value of the food product. Explain to the students that raw products generally have a greater nutritional value than processed food products because through processing, some nutrients are removed. Processors often have to add vitamins and minerals back into the processed product so that it has some nutritional value. An example of an exception will include wheat, where we get more nutrients from flour than we do from raw wheat seeds.
4. Have the students identify the salt and sugar content from their food label. Ask them to convert the milligrams/grams to teaspoons using the following conversion formula. The sugar will be listed in grams; to convert grams to teaspoons, divide the number of grams by four (i.e., *you have 22 grams of sugar, divide that number by 4, which equals 5.5. This is the number of teaspoons of sugar in the food product*). The salt will be listed in milligrams; to convert milligrams to teaspoons multiply the number of milligrams by .00012 (i.e., *you have 980 mg of sodium, multiply by .00012, which equals .12 of a teaspoon. Students may need to think about how a fraction can convert to a percentage to relate that this is approximately 1/8th of a teaspoon*).
5. Relate to the students that it is recommended that we not eat more than 45 grams of sugar (12 teaspoons) and no more than 2400 milligrams (about 1 teaspoon) of salt daily. What role do they think convenience foods play in an unhealthy diet? How does too much salt in our diet affect our bodies? (*leads to high blood pressure*) Why should students look at the grams of sugar in a food product in relation to a healthy diet? (*A key factor is what other nutrients come along with the sugar. Does the food offer other vitamins and minerals along with the sugar, or is it a soda which is nothing but calories and water? Students need to relate the calories to more nutritious choices.*)

### Extension Activity: Taste Testing and Serving Size

1. Bring in two cans of peas, one lower-sodium and one regular canned version. Examine and discuss the salt content of each. Have the students taste the vegetables and discuss why the salt would be necessary for processing. The students will notice that the low-sodium canned peas will have little flavor. (*This is due to the heat during the canning process, which preserves the product and some of the nutritional value, but the flavor is compromised. Salt is added to enhance the flavor and retard spoilage.*)
2. Ask the students to find the serving size on their food label. Have them write the total number of servings from the entire product on a piece of paper. Ask them to calculate the amount of salt and sugar in the entire product (*multiply the number of servings by the amount of grams/milligrams from the serving size*). Have them convert this number from the entire product into teaspoons. Ask the students if they generally eat more or less than the actual serving size. Do they feel that the serving sizes really reflect what people eat?
3. Have the students use teaspoons to measure out the actual sugar and salt content of processed foods.

### Activity 3: Worksheet Review

1. Give each student a copy of the worksheet, *An Inconvenient Truth*.
2. Have them complete the worksheet according to the directions.

## Additional Activities and Resources

### How much sodium does my body need:

To replace salt lost in urine, feces, and sweat, the body needs about 500 mg of sodium a day (less than 1/4 teaspoon of salt). It is recommended for adults to consume no more than 2,400 mg of sodium, for 9- to 13-year-olds, the recommendation is 2,200 mg/day.

### Where do we get sodium?

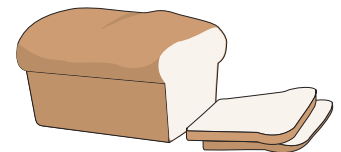
Salt is our number one dietary source of sodium. The average American eats 6,000 mg of sodium (2 1/2 teaspoons of salt) a day. Seventy-five percent is from eating processed foods like luncheon meats, bacon, sausage, canned soups and vegetables.

**How much sugar is in a 12-ounce can of orange soda?**  
12 teaspoons! A full day's serving.

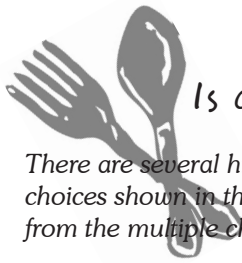
### Check this out!

#### Food Timeline: Milestones in Food Processing

A blackline master copy is available in the full lesson on the Utah AITC website <http://extension.usu.edu/aic/lessons>



Background information and *Milestones in Food Processing* used with permission from the *Farm to Table and Beyond* curriculum. Permission granted by Pamela Koch, author and Project Director of the Linking Food and the Environment Project (LiFE).



# An Inconvenient Truth

Is convenience the only factor in making a food match?

There are several highly processed food choices listed below. Match the correct convenience food from the "Food List" with the choices shown in the "Ingredients List." Write your answer on the numbered lines. Then circle the primary (or main ingredient) from the multiple choice options for each food item.

## Ingredients List:

**Choice A (microwave-ready, just add water):** Enriched wheat flour product, thiamin mononitrate, riboflavin, cheese sauce mix (whey, corn syrup, palm oil, milkfat, milk protein concentrate, salt, maltodextrin, high acid gum, lactic acid, calcium phosphate, modified food starch, monosodium glutamate, citric acid, milk, yellow 5, artificial flavor, yellow 6, dried onions, natural flavor); modified food starch, salt, maltodextrin, potassium chloride, acetylated monoglycerides, medium chain triglycerides, color.

**Choice B (add water):** Sugar, citric acid, calcium phosphate, salt, ascorbic acid (vitamin C), yellow 5, natural flavor, blue 1, artificial flavor, BHA (preserves freshness).

**Choice C (ready-to-eat):** Enriched unbleached flour, water, unbleached whole wheat flour, high fructose corn syrup, yeast, partially hydrogenated soybean oil and/or soybean oil, wheat gluten, salt, dough conditioners, mono- and diglycerides, ethoxylated mono- and diglycerides, sodium stearoyl lactylate, calcium peroxide, ascorbic acid, azodicarbonamide, yeast nutrients, calcium propionate (maintain freshness), corn starch, enzymes, peanuts, dextrose, sugar, partially and fully hydrogenated vegetable oils (soybean and/or cottonseed and/or rapeseed), salt, molasses, palm and/or soybean oil, strawberries, high fructose corn syrup, corn syrup, sugar, pectin, citric acid, potassium sorbate (preservative).

**Choice D (microwave-ready, heat and eat):** Chicken stock, wheat flour, egg white, egg niacin, ferrous sulfate, thiamine mononitrate, riboflavin, folic acid, carrots, water, cooked chicken meat, modified food starch, celery, salt, chicken fat, monosodium glutamate, high fructose corn syrup, emulsifier blend, onion powder, flavoring, dextrose, maltodextrin, chicken flavor, disodium inosinate, disodium guanylate, dehydrated parsley, autolyzed yeast extract, cultured whey, beta carotene for color, dehydrated garlic, dehydrated chives, soy protein isolate, sodium phosphates, whole egg solids, chicken flavor, vegetable oil, soy lecithin, mono- and diglycerides, mixed tocopherols (to protect flavor), ascorbic acid for flavor, spice extract.

**Choice E (heat and eat):** Tomato puree, water, wheat flour, niacin, ferrous sulfate, thiamine mononitrate, riboflavin, folic acid, high fructose corn syrup, salt, enzyme modified cheddar cheese, natural flavoring, potassium chloride, vegetable oil (corn, cottonseed, canola and/or soybean), enzyme modified butter, oleoresin paprika, spice extract, citric acid, nonfat dry milk.

## Food List:



### Frozen Peanut Butter and Jam Sandwich

Circle the primary ingredient:

sugar wheat soybean oil salt

1. \_\_\_\_\_



### Flavored Drink Mix

Circle the primary ingredient:

strawberries water citric acid sugar

2. \_\_\_\_\_



### Canned Spaghetti

Circle the primary ingredient:

tomatoes wheat cheese butter

3. \_\_\_\_\_

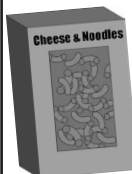


### Condensed Chicken Noodle Soup

Circle the primary ingredient:

eggs sugar chicken stock chicken meat

4. \_\_\_\_\_



### Cheese & Noodles

Circle the primary ingredient:

wheat milk cheese vegetable oil

5. \_\_\_\_\_

# Levels of Food Processing

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Name \_\_\_\_\_

**From Farm to Table: Determining the Level of Food Processing**

<b>Food Product</b>	<b>Level of Processing (High, Moderate, Minimal)</b>	<b>Packaging (Box, Bottle, Bag, or Can)</b>	<b>Storage Temperature</b>	<b>Eaten or Tasted (Yes or No)</b>