

Risks vs. Benefits in Food Production

Grade Level: 4-6

Approximate Length of Activity: 30-40 Minutes

Objectives

Teacher

1. Integrate food production into the subject area of safety.
2. Present information about food additives and make students aware of rules involved in food processing.

Students

1. Explain why additives in food production and processing pose both risks and benefits.
2. Become aware that local, state and national governments have rules on producing and processing food to make sure it is wholesome to eat.

Michigan Content Standards: (Health) 4: 1.5; 1.8; 5.1; 5: 1.1; 1.5; 6: 1.2; 5.1

Introduction

The United States has the most abundant supply of food in the world. Local, state and national governments have regulations to make sure food is safe. The U.S. Department of Agriculture (USDA) inspects fresh, canned and frozen as well as foods prepared other ways. If a contaminated sample is found, the USDA can pull the shipment out of the marketplace. The Environmental Protection Agency (EPA) determines which pesticides may be used on what foods and the maximum residue levels. The Federal Food and Drug Administration (FDA) monitors the food supply for compliance. They monitor package claims including ingredients, nutrition and net weight. Local and state governments can impose their own laws to regulate food supplies.

Though sometimes food ingredients are not easy to pronounce, they are in our food for a reason. Additives help make our food safer, more economical and appealing. Without additives like calcium propionate and potassium sorbate, breads would mold within just a day or two. BHA helps preserve products like granola bars. Sodium nitrate gives bacon its distinctive flavor. Natural and artificial flavors and colors make many of our foods taste better and look more appealing.

Salt and sugar are the two most common food additives. Salt brings out the flavor of ingredients and also serves as a preservative. Early sailors and pioneers salted meat on their journeys. Sugar comes in many different forms including sucrose, dextrose, honey and corn syrup. These ingredients are also added for flavor and preservation. With today's health concerns about too much salt possibly causing high blood pressure and too much sugar causing obesity, many products can now be purchased in low-salt or low-sugar versions.

Some food additives pose risks. Several sugar substitutes, when consumed in large quantities, have been linked to cancer in laboratory animals. Not using additives also poses risks. Each consumer must determine if the benefits outweigh the risks based on scientific data.

The use of pesticides enables us to grow more food for less money. According to a study from Texas A&M University, "The average American household (2.5 people) would spend \$228 more per year for food if pesticides were eliminated. If inorganic nitrogen fertilizers were also banned, the cost of food would rise \$428 per year. For a middle income family, this would amount to a 12% increase in their weekly food bill." Eliminating agriculture chemicals would also mean people would eat less healthy fruits and vegetables because the cost for them would increase or they might not be available for purchase.

The EPA determines the greatest amount of residue that can be consumed safely and sets a limit 100-1,000 times less than this amount. In 1998, the FDA found that 99 percent of food produced in the U.S. and 97 percent of imported foods tested met these standards for pesticide residues.

The average American life expectancy has increased by nine years in the 40 years that pesticides have been used. Farmers do not use any pesticides unless they are essential to grow a healthy product. They must complete training programs and be tested and certified to apply pesticides. As with agricultural chemicals, the directions on household and lawn and garden pesticide labels aren't just suggestions, they are the law. Research scientists are looking for additional ways farmers can reduce pesticide usage. Farmers use integrated pest management practices and scout fields for pests before applying chemicals. An average pesticide is researched and tested for safety for nine years at a cost of \$35 million before it can be marketed. Included in this group are pesticides such as dog flea collars, garden sprays, and home termite, roach and ant killers.

Vocabulary

- **Additive** – A substance added in small amounts to something else to improve, strengthen, or otherwise alter it.
- **Benefit** – Anything that promotes or enhances well-being.
- **Fungi** – Any group of plants that lack flowers, leaves or chlorophyll and get their nourishment from dead or living organic matter. This includes mushrooms, molds and yeasts.
- **Nematode** – Any class of slender, unsegmented, cylindrical worms.
- **Pesticide** – Any chemical used to kill pests (harmful insects, weeds, rodents, fungi, and nematode).
- **Risk** – The possibility of suffering harm or loss.
- **Weed** – A useless or troublesome plant, either growing wild or in cultivated ground to the exclusion or injury of the desired crop.
- **IPM** – Pest management that uses techniques to maintain pest levels that are below economically accepted levels of damage or loss.

Materials Needed

- "Pest Popping" worksheet
- "Risks vs. Benefits" worksheet
- Dictionaries

Activity Outline

1. Before the lesson, discuss with the students information from the introduction so they are aware of the rules about food processing.
 - a. Discuss with the students how some words are created from combinations of other words. Explain how, by using parts of words, you can define them. An example is the word “pesticides.” The root “cide” means “to kill.” When combined with the word “pest” it means “to kill pests.”
 - b. Have students use the “Pest Popping” worksheet to determine which pesticide controls which pest.
2. Ask students to give meanings of the words “risk” and “benefit.” Explain that every action we take has both risks and benefits. Have students give examples of different actions and list the different risks and benefits of each.
3. Have the students complete the “Risks vs. Benefits” worksheet.
4. Have students make posters of how to keep processed food (canned, fresh, frozen and packaged) safe in the home.

Discussion Questions

1. How would our food supply be affected if farmers did not use pesticides? Discuss how this relates to food production.
2. Discuss the overall risks and benefits of agricultural chemical use. Discuss how this relates to food production.

Related Activities

1. Have students bring in food labels. Examine them for additives. Discuss the purpose for the additives in processing the food.
2. Compare different brands of the same type of food -- canned green beans for example.
3. Bring in news articles about recalls of food products. Have the students explain why the food was “recalled.”
4. Make a class list of as many words as possible that end with “cide” and their meanings.

Pest Popping

Farmers use pesticides to control pests that harm crops and livestock. Each kind of pesticide is named for the kind of pest it kills. Match the pest with the pesticide used to control it. You might need to use a dictionary.

Pests

1. _____ Plants, especially weeds
2. _____ Worms of the phylum Nematoda which have unsegmented, threadlike bodies and may be parasitic, microscopic worms
3. _____ Insects
4. _____ Mammals of the order Rodentia, such as rats and mice characterized by large front teeth adapted for gnawing or nibbling
5. _____ Plants that are not green, such as yeasts, molds, smuts and mushrooms, which cause diseases on other plants

Pesticides

- a. rodenticide
- b. herbicide
- c. nematicide
- d. insecticide
- e. fungicide

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Pests

1. **B** Plants, especially weeds
2. **C** Worms of the phylum Nematoda which have unsegmented, threadlike bodies and may be parasitic, microscopic worms
3. **D** Insects
4. **A** Mammals of the order Rodentia, such as rats and mice characterized by large front teeth adapted for gnawing or nibbling
5. **E** Plants that are not green, such as yeasts, molds, smuts and mushrooms, which cause diseases on other plants

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Risks vs. Benefits

The use of agricultural chemicals has both risks and benefits. Determine whether each statement represents a risk or a benefit and write your answer on the line.

1. _____ More food can be produced using agricultural chemicals.
2. _____ Farmers may become ill if they apply agricultural chemicals improperly.
3. _____ Agricultural chemicals destroy disease-carrying insects.
4. _____ Federal, state and local governments strictly regulate usage of agricultural chemicals.
5. _____ Excessive use of agricultural chemicals may cause runoff into rivers, ponds and lakes, harming fish and other wildlife.
6. _____ Agricultural chemicals can lower crop production costs for farmers.
7. _____ If the wind blows agricultural chemicals onto other kinds of plants, those plants may be harmed.
8. _____ Agricultural chemicals help the United States have the most abundant supply of safe food in the world.

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2. **RISK** Farmers may become ill if they apply agricultural chemicals improperly.
3. **BENEFIT** Agricultural chemicals destroy disease-carrying insects.
4. **BENEFIT** Federal, state and local governments strictly regulate usage of agricultural chemicals.
5. **RISK** Excessive use of agricultural chemicals may cause runoff into rivers, ponds and lakes, harming fish and other wildlife.
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7. **RISK** If the wind blows agricultural chemicals onto other kinds of plants, those plants may be harmed.
8. **BENEFIT** Agricultural chemicals help the United States have the most abundant supply of safe food in the world.