



UNIT 2: PROCESSING

Peanuts to Peanut Butter

Grade level: Upper elementary

NATIONAL
STANDARDS
NM-MEA.3-5.2
NS.K-4.2
NSS-EC.K-4.3

Student Learning Objectives

After completing this lesson, students will be able to:

1. Identify the difference between a raw material and a finished product.
2. Explain the steps a peanut takes from farm to finished product.
3. Discuss the economics of processed versus raw product.

Time: 1 hour, 30 minutes

Tools, Equipment, and Supplies: Writing surface, copies of Activity Sheet 8:1, a jar of peanut butter, a handful of peanuts with shells, an ear of corn (unhusked), corn tortillas or corn chips, a fresh tomato, ketchup, raw wool or cotton (you can use a cotton ball), wool or cotton cloth, a piece of wood and a piece of paper, 1 cup hulled, roasted peanuts, 1.5 tbsp. peanut oil, salt, a blender, a rubber spatula, and a classroom set of encyclopedias or textbooks with common agricultural commodities included as part of the text.

***NOTE: Students may have food allergies! Check student records with parents and administration before completing this activity.**

Key Term(s): Economics
Finished Product
Processing
Raw Product

Background Information

Most agricultural products must be processed in some way before they can be used. **Processing** changes a raw agricultural commodity into something we can eat, wear or use in building. Each **processing** step adds value to the product's final form. For example, pork is processed into sausage, wheat is processed into bread, wool is processed into sweaters and timber is processed into construction lumber. **Processing** also adds cost. But consumers are willing to pay more for the sausage, bread, sweaters, and lumber than they are for the raw commodities.

Today U.S. agricultural **processing** is a multi-billion dollar industry. Engineers design machines that will process agricultural products quickly, efficiently and in large quantities. Commercial agricultural **processing** is much different from the



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way you might make a small quantity of a product at home since the machines do so much of the work. The agricultural industry is able to supply low-cost, quality products because of the high technology used in **processing** today.

Americans spend a lower percentage of their family income on food than people in any other nation in the world. In some developing nations—India, for example—families spend over 50 percent of their income on food. Percentages in other developed countries include: Italy, 25.7 percent; Japan, 19.1 percent; France, 16.3 percent; Sweden, 15.3 percent; and the United States, 9.3 percent.

Interest Approach

Put students into groups using nametags on desks before they enter the class.

Today we are going to be machines and turn peanuts into peanut butter! What do you think? Who likes peanut butter? Let's get into groups before we begin the manufacturing process. You will find your name taped to the table where you and the rest of your group will make peanut butter magic.

Here is what we will use today to make peanut butter!

Show each item as you list it.

One cup hulled roasted peanuts, 1.5 tbsp. peanut oil, a pinch of salt, a blender, and a rubber spatula.

Did you know there were so many items in peanut butter? Me neither! Let's focus our attention on learning three things today: 1.) The difference between a raw and processed product, 2.) The steps a peanut must go through to become peanut butter, and 3.) Why processed peanuts are more valuable than raw peanuts.

OBJECTIVE 1: Identify the difference between a raw material and a finished product.

We have assembled our peanut butter making equipment, but before we get started let's take a look at some other items I brought with me today.

Assemble the following: a jar of peanut butter, a handful of peanuts with shells, an ear of corn (unhusked), corn tortillas or corn chips, a fresh tomato, ketchup, raw wool or cotton (you can use a cotton ball), wool or cotton cloth, a piece of wood and a piece of paper. Arrange the products on a table so that all students can see them.

Today we're going to learn about **processing**. Most agricultural products must be processed in some way before they can be used. Recall that **processing** simply changes a raw agricultural commodity into something we can eat, wear,



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or use for building. Before products are processed they are referred to as **raw product**. After **processing** the products are referred to as a **finished product**.

Use an Almanac and Encyclopedia e-Moment® to identify three other raw agricultural commodities besides the peanut and one finished product for each raw agricultural commodity.

*Great job! We identified lots of **raw products** and their **finished products**.*

Ask a student to come to the table and match the raw material with its finished product.

As you can see, **processing** changes a raw agricultural commodity into something we can eat, wear or use for building.

tomato → ketchup
wood → paper

corn → corn chips
cotton/wool → cloth or clothing

peanuts → peanut butter

However, not all agricultural products require **processing**.

Hold up the tomato.

You can eat the tomato as it is. But it can also be processed into ketchup or other products. What other products might tomatoes be processed into?

Answers: tomato sauce, tomato soup, salsa.

Ask students to think about other products into which the raw materials on the table might be processed.

Wood: furniture, construction lumber, oils and medicines

Peanuts: cooking oil

Corn: Students might be especially interested to learn about all the uses for corn. They include plastic, cooking oil, animal feed, corn sweetener (used in soft drinks and many other products), diapers, biodegradable packing pellets and ethanol.

OBJECTIVE 2: Explain the steps a peanut takes from farm to finished product.

Now that we know the difference between a **raw product** and a **finished product**, let's see how a raw peanut turns into a **finished product**, peanut butter.



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Hand out Activity Sheet 8:1, "Peanuts to Peanut Butter." Activity Sheet 8:1 includes a recipe for peanut butter. You may wish to make it with your students in class. Or you can send the Activity Sheet home for students to make peanut butter at home with their families.

Trace the steps with the students.

1. First peanuts are shelled.
2. Then the shelled peanuts are roasted. Roasting gives them their crunch and makes them easier to digest.
3. The roasted peanuts are blanched to remove their skins.
4. Then they're ground. As they are being ground, oil begins to separate from the peanut.
5. More oil, sugar, salt and an emulsifier (to keep the mixture from separating) are added and mixed.
6. The mixture is heated. Heating and mixing turns the mixture into a liquid.
7. The hot liquid is poured into jars and sealed. It is now peanut butter.

Wow, there is a lot involved with turning peanuts into peanut butter.

Use the Cartographer e-Moment® to map the steps needed for making peanut butter.

If you will be making your own peanut butter in class, you will need:

- 1 cup hulled, roasted peanuts
- 1.5 tbsp. peanut oil
- Pinch of salt
- Blender
- Rubber spatula

Let's make some peanut butter. We now should have all of the ingredients for our peanut butter at the table with us. Follow my directions carefully.

1. Place the peanuts and oil in the blender.
2. Start on low speed. (Hold the lid down.)
3. Switch to high, stopping occasionally to scrape down the sides with the spatula.
4. Spread on bread or crackers.



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5. The fresh peanut butter needs to be kept in the refrigerator.

OBJECTIVE 3: Discuss the economics of processed versus raw product.

Now that we know a little bit about processing and have even done some of it ourselves, let's discuss the economics of processed versus raw product. Economics is a word used to describe the financial considerations of processing.

- It takes 540 peanuts to make a 12-ounce jar of peanut butter. Although you paid \$____, (insert the price you paid) for peanuts in the store, the peanut butter costs about \$____.
- Why is this so?
- Good answers! You see, it costs money to transport the peanuts to the factory. The machinery costs money. The additional ingredients add more cost. So do the jar and the label. All the people who do these jobs need to earn money so they can support their families. This is called a labor cost.
- Why do you think people buy a processed food instead of a raw agricultural product if it costs more? Great answers! Processed food is more convenient and is quicker to use.
- A typical large supermarket includes about 10,000 different products.

REVIEW/SUMMARY

REFLECTIVE REVIEW QUESTIONS:

- We know the steps a peanut must take to become peanut butter. What steps do you think frozen peas must take to make it to your grocer's freezer?
- At one time peanut butter was a new and innovative processed food. What new cool processed foods have you tried lately?
- We know that processing is done for our convenience. What would we have to do just to make whipped cream if it was not already processed for us?

(separate cream from milk, sweeten the cream, agitate cream until it whips into a solid)

- Let's remember that Americans spend a smaller percentage of their family income on food than do people in any other country in the world, even though the food has been processed.



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APPLICATIONS

APPLICATION 1: Have students learn more about George Washington Carver. What were some of the things he developed to use from the peanut?

APPLICATION 2: Ask students to use peanut butter as an ingredient in a healthy snack. Examples might include apple slices spread with peanut butter, celery stuffed with peanut butter, or peanut butter and banana sandwiches.

APPLICATION 3: Learn more about how corn is used to make everything from fuels to pharmaceuticals. "Corn: A National Renewable Resource" is a teaching kit developed for upper elementary school students. Contact the National Corn Growers Association, 1000 Executive Parkway, #105, St. Louis, MO 63141.

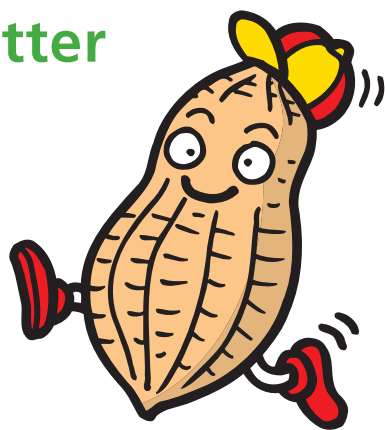
APPLICATION 4: Have students research the impact of using renewable resources on the environment. For example, some gasoline could be replaced with ethanol.



ACTIVITY SHEET 8:1

Peanuts to Peanut Butter

You can make your own peanut butter.



You'll need:

- 1 cup hulled, roasted peanuts
- 1-1/2 tbsp. peanut oil
- Pinch of salt
- Blender
- Rubber spatula

Place the peanuts and oil in the blender. Start on low speed (hold the lid down.) Switch to high, stopping occasionally to scrape down the sides with the spatula. Spread on bread or crackers. This fresh peanut butter needs to be kept in the refrigerator.

Peanut Facts:

A peanut isn't a nut! It's a legume (a pod that grows underground). It takes approximately 540 peanuts to make one 12-ounce jar of peanut butter. A St. Louis, Missouri physician was the first to make peanut butter in 1890. He used it as a food for the elderly because it was easy to digest. George Washington Carver made more than 300 products from peanuts. They included face powder, printer's ink, soap and a substitute for milk.

Nine states grow the entire U.S. peanut crop—Georgia, Texas, Alabama, North Carolina, Virginia, Oklahoma, Florida, South Carolina and New Mexico.

Here's how peanuts become peanut butter.

- Peanuts are shelled.
- The shelled peanuts are then roasted. Roasting gives them their crunch and makes them easier to digest.
- The roasted peanuts are blanched to remove their skins.
- Then they're ground. As they are being ground, oil begins to separate from the peanut.
- More oil, sugar, salt and an emulsifier (to keep the mixture from separating) are added and mixed.
- The mixture is heated. Heating and mixing turns the mixture into a liquid.
- The hot liquid is poured into jars and sealed. It is now peanut butter.

