

Bread in a Bag

Grade Level: 4

Approximate Length of Activity: One to two class periods

Objective

Students will learn how processing adds value to agricultural products by making bread in a bag.

Michigan Content Standards: (Science) S.I.P.E.1: S.IP.04.11; S.IP.04.12; S.IP.04.14; S.IP.04.15; **S.IA.E.1:** S.IA.04.12; **S.RS.E.1:** S.RS.04.11; S.RS.04.16; S.RS.04.17; S.RS.04.18

Vocabulary

- **Bran** – The outer layer of a wheat kernel which is included in whole wheat flour for additional fiber.
- **Endosperm** – The white, inner part of a wheat kernel that is ground for wheat flour.
- **Germ** – The embryo or sprouting section of a wheat kernel that is high in oil.
- **Gluten** – A protein in wheat allowing bread dough to rise and stretch.
- **Gross profit** – Total income before expenses are subtracted.
- **Mill** – To grind wheat into flour or meal.
- **Net profit** – The final profit after all expenses have been subtracted.
- **Value-added product** – A product that has been through some kind of processing which adds value to it.
- **Yeast** – Tiny fungi which produce carbon dioxide to make bread rise and beverages to ferment.

Background

Nearly all agriculture products must be processed in some way before we can use them. Pork is processed into sausage, wool into sweaters and its lanolin into hand lotions. Timber is processed into furniture and lumber for construction.

Wheat is processed into bread, rolls, muffins, buns, cereals, crackers, spaghetti, macaroni, cakes and cookies. Rollers scrape off the outer bran layer and break the endosperm of wheat. The wheat continues through a series of rollers and sifters until it is fine enough for flour, and the bran and germ have been separated. For whole-wheat flour, the bran, and sometimes the germ, remain with the ground endosperm.

After the wheat has been ground into flour, it goes through another stage of processing where it is mixed with other ingredients and baked into bread, other baked goods or shaped into pasta. Each step of processing adds more value to the final product. For that reason, a product that has been processed is called a value-added product. Consumers are willing to pay more for wheat when it is sold as bread than they would if it was sold as wheat kernels.

Activity Outline

1. If possible, acquire a handful of wheat kernels from a local farmer or seed dealer. Hand them out so students can feel them and see what they look like. Share background information.
2. Draw a wheat kernel on the chalkboard, or use the worksheet illustration on an overhead projector. Discuss the endosperm, bran and germ of the kernel. Explain that normally the bran and germ are removed and endosperm is ground into flour during wheat processing.
3. Guide the students through the steps of the following recipe to make bread in a bag.
4. While measuring and mixing dough, discuss the scientific process with students and have them hypothesize or predict what occurs in the bread making process, i.e. why sugar is necessary, why use warm water, what makes the bread rise, etc.

Related Activities

1. While you wait for the bread to rise and bake, have students make butter to eat with it. Divide your class into groups of four or five. Provide each group with one-half pint carton of whipping cream (at room temperature), a pint jar with a tight fitting lid, a large spoon and a small bowl. Have students pour the whipping cream into the pint jars, screw the lids on tightly, and take turns shaking the jar. When the cream separates noticeably, have students pour the buttermilk off into a large bowl and transfer butter to a small bowl with the spoon and add one teaspoonful of salt.
2. Have some products in their raw forms on hand and in different stages of their processing (unshelled peanuts/salted peanuts/peanut butter/peanut butter candy, fresh tomatoes/canned tomatoes/tomato sauce/ketchup, corn on the cob/canned corn/corn chips). Students can discuss the advantages and disadvantages of buying foods in their raw and processed forms (including discussion of cost, nutritional value, convenience, taste, etc.)
3. Supply examples of fresh and processed foods so students can have a tasting party, deciding which food tastes better processed and which tastes better fresh.
4. Substitute different types of flour in the recipe. While making the bread, examine different dough for similarities and differences. After baking, hold a taste test to determine the best tasting bread.
5. Use Ag Mag available from Michigan Farm Bureau. They have an educational magazine geared for kids entitled "Pizza Ag Mag" which contains activities and facts that are fun to do. Contact Michigan Farm Bureau's Promotion and Education Department to obtain copies for your classroom at (800) 292-2680, ext. 3202.
6. The lesson "Foods Amazing Journey" located in the social studies section of this curriculum guide.

Resources

Student Books

- Curtis, N. (1992). *I Wonder How Bread is Made*. Lerner.
- DePaola, T. (1989). *Tony's Bread*. Putman
- Duyff, R. (1987). *The Bread That Grew*. Milliken.
- Gershator, D. & P. (1995). *Bread is for Eating*. Trumpet.
- Galdone, P. (1973). *Little Red Hen*. Seabury.
- Stevens, C. (1975). *How to Make Possum's Honey Bread*. Seabury.
- Wolff, F. (1993). *Seven Loaves of Bread*. Tambourine.

Teacher Resources

- *Little Red Hen (Thematic Unit)*; Teacher Created Materials, Inc. 1989; #302 Literature activities for Young Children, Book 3; pp. 72-79.
- Red Star Yeast and Products, Consumer Service Department; 433 E. Michigan St.; Milwaukee, WI 53202 "Exploring Yeast, From Budding to Baking," a multi-disciplinary educational tool including a cookbook, some copy masters, projects, and equipment card (one copy available).
- Retail Bakers of America, Educational Director; Suite 250; 6525 Belcrest Road; Hyattsville, MD 20782 "Is Baking the Career For You?" (single copy available).

Related Internet Web Sites

- Bread Recipes: <http://www.cs.cmu.edu/~mjw/recipes/bread>
- Fleischmann's Yeast: <http://www.breadworld.com/>

Acknowledgement

This lesson was adapted from Food for America, National FFA Organization, P.O. Box 68960, Indianapolis, IN 46268-0999.

Bread in a Bag



This recipe makes two large or four small loaves of bread. Enlist a few adult volunteers to help measure and mix, and ask the school cafeteria staff to assist with baking. Before beginning, have students cover desks with clean butcher paper for quick clean up. Instruct students to wash their hands. Ask volunteers to fill large bowls with warm water and warm milk (105-115°F), from which students will measure out the amounts needed.

Mix in a two-gallon heavy-duty freezer bag:

- 1 cup all-purpose flour
- 2 packages yeast
- 1 cup warm water
- 2 tablespoons sugar

Squeeze upper part of bag to force any air out. Close the top of the bag tightly. Mix well by working the bag with your fingers until all ingredients in the bag are completely blended. Allow mixture to rest 15 minutes.

Add: 1 ¼ cups warm milk

- 1 tablespoons salt
- 2 tablespoons shortening, softened

Mix well by working bag with your fingers. Gradually add 5-6 cups of all-purpose flour. Add enough flour to make the dough stiff or until it pulls away from the bag. Turn dough onto floured surface. Divide dough in halves. Knead each half for five minutes or until smooth and elastic. Add more flour if the dough is too sticky. Cover the dough with a plastic bag, and let it rise for ten minutes.

Flatten dough into a 12x7-inch rectangle. Start from a narrow end and roll dough toward you. Pinch edges to seal. Tuck under the ends. Press each end to seal.

Place seamed side down in a greased 9x5x3-inch pan. Repeat for other loaf. Cover loosely with plastic bag, and let rise in a warm place until it doubles in size (about 45-60 minutes). Uncover. Bake in 400°F oven 35 - 45 minutes. Remove from pans. Cool on wire racks.

If you prefer, dough can be flattened into a 7 ½ x 5-inch rectangle and placed in four 5 ¾ x 3 ¼ x 2-inch baby loaf pans. Baking time is slightly shorter.

As you go through the various processes, lead a discussion about the bread making asking the following:

- Why does the bread dough rise? (Yeast is a living fungi that gives off gasses when it is moistened with a warm liquid. Wheat flour has gluten that allows the dough to stretch like a balloon.)
- In addition to all-purpose flour, what other kinds are there? (Whole-wheat flour contains the bran and sometimes the germ of the wheat kernel. Cake flour is fine flour from soft wheat. Rye flour is from the rye plant and must be mixed with wheat flour to form dough that will rise correctly. Bread flour has a higher gluten content than all-purpose flour and is used specifically for baking breads. Unbleached flour is white flour that has not been artificially whitened.)
- What products besides bread are made from flour? (Rolls, muffins, buns, cereals, crackers, spaghetti, macaroni, cakes, cookies, etc.)