

Wheat Lesson Plans

Grades 3-6

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Skills: Science

Objective: The student will sequence stages in the life of a wheat plant and identify the six main parts of the wheat plant.

Background

Wheat is classified as having either a spring or a winter growth habit. Most California farmers grow winter wheat, which is planted in the fall or winter and harvested in the spring or summer.

Before planting, the farmer must prepare the soil for the seed. He or she spends many hours on a tractor turning the soil and breaking it into fine particles. At last the soil is ready, the weather is right, and it is time to plant. The farmer puts the seed in the ground, using a machine called a grain drill.

The moisture in the soil is what causes the wheat plant to start growing. A shoot grows up through the soil. As the plant gets bigger, it draws water and nutrients up through the roots and produces carbohydrates (food) in the leaves. A good supply of water, nutrients and food will allow the plants to grow tall and develop green leaves.

In the spring people driving along county roads can see lush green carpets, between two and four feet tall. As the weather turns warmer, the wheat will mature and turn the green to tan and finally to a golden color that tells the farmer harvest is just ahead.

Science

1. In April acquire wheat in various stages of its life cycle—kernels, ground wheat flour, wheat plant with the head and roots still attached. (Contact your county's University of California Cooperative Extension Service educator for help.)
 - a. Discuss the uses of wheat.
 - b. Allow students to examine the wheat plant.
 - c. Point out the various parts of the wheat plant.
2. Hand out student worksheet A, and read it together, as a class, before having students complete it.
3. Pass out student worksheets B and C, and go over the directions before having students complete them.
4. Plant some kernels of wheat in the classroom so students can watch the growth and development. Have students record the plant's progress on a calendar posted near the growing plant.

Materials

wheat kernels
wheat plant with head and roots still attached
wheat flour
string
paper straws
tissue paper
paint
pipe cleaners or craft fur

Vocabulary

awn— a slender, bristle-like terminal process such as those found at the tips of the spikelets in many grasses.

grain drill— equipment used for planting wheat and other grain.

kernel— the inner softer part of a seed, fruit stone, or nut

leaves— green usually flat parts that grow from a stem or twig of a plant and that function mainly in making food by photosynthesis

root— the leafless usually underground part of a plant that absorbs water and minerals, stores food, and holds the plant in place

stem— the main stalk of a plant that develops buds and shoots and usually grows above the ground

winter wheat— a cereal grain that can be made into a fine white flour used mostly in breads, baked goods (as cakes and crackers), and pasta (as macaroni or spaghetti) and that is used in animal feeds

5. Invite a wheat farmer into the classroom to answer questions about wheat production.
6. Create a three-dimensional wheat plant on a door or board display.
 - a. Use string to represent the root system (green for a young wheat plant, yellow for a ripe plant)
 - b. Make the stem of painted paper straws.
 - c. Make the leaves of matching tissue paper.
 - d. The head can be made of fuzzy pipe cleaners or craft fur rolled into a tube shape.
 - e. Label the six parts of the plant.

Extra Reading

Johnson, Sylvia, *Wheat*, Lerner, 1990.

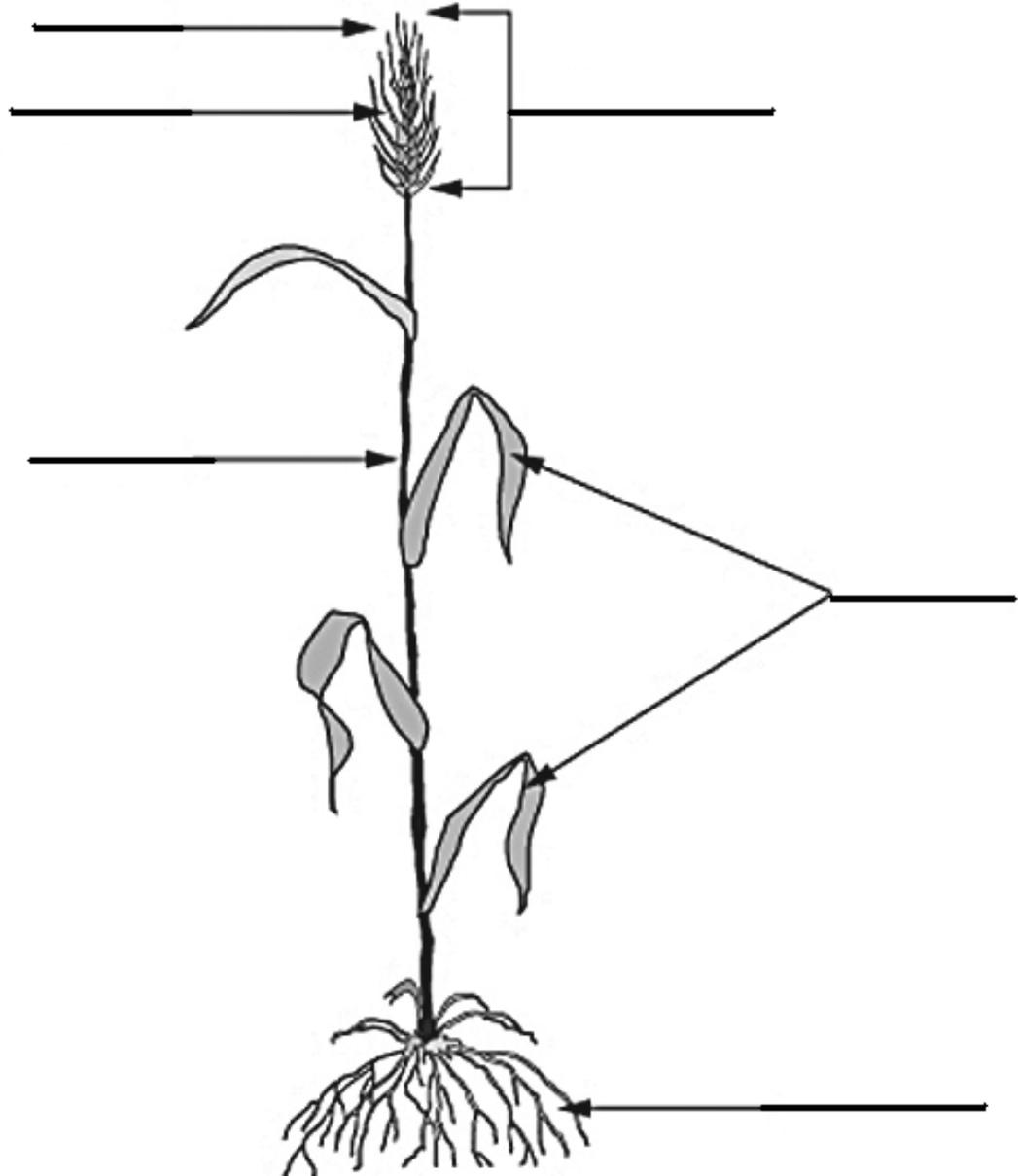
Name _____

The Wheat Plant

A

Fill in the parts of the wheat plant.

- leaves*
- head*
- roots*
- awn*
- stem*
- kernel*



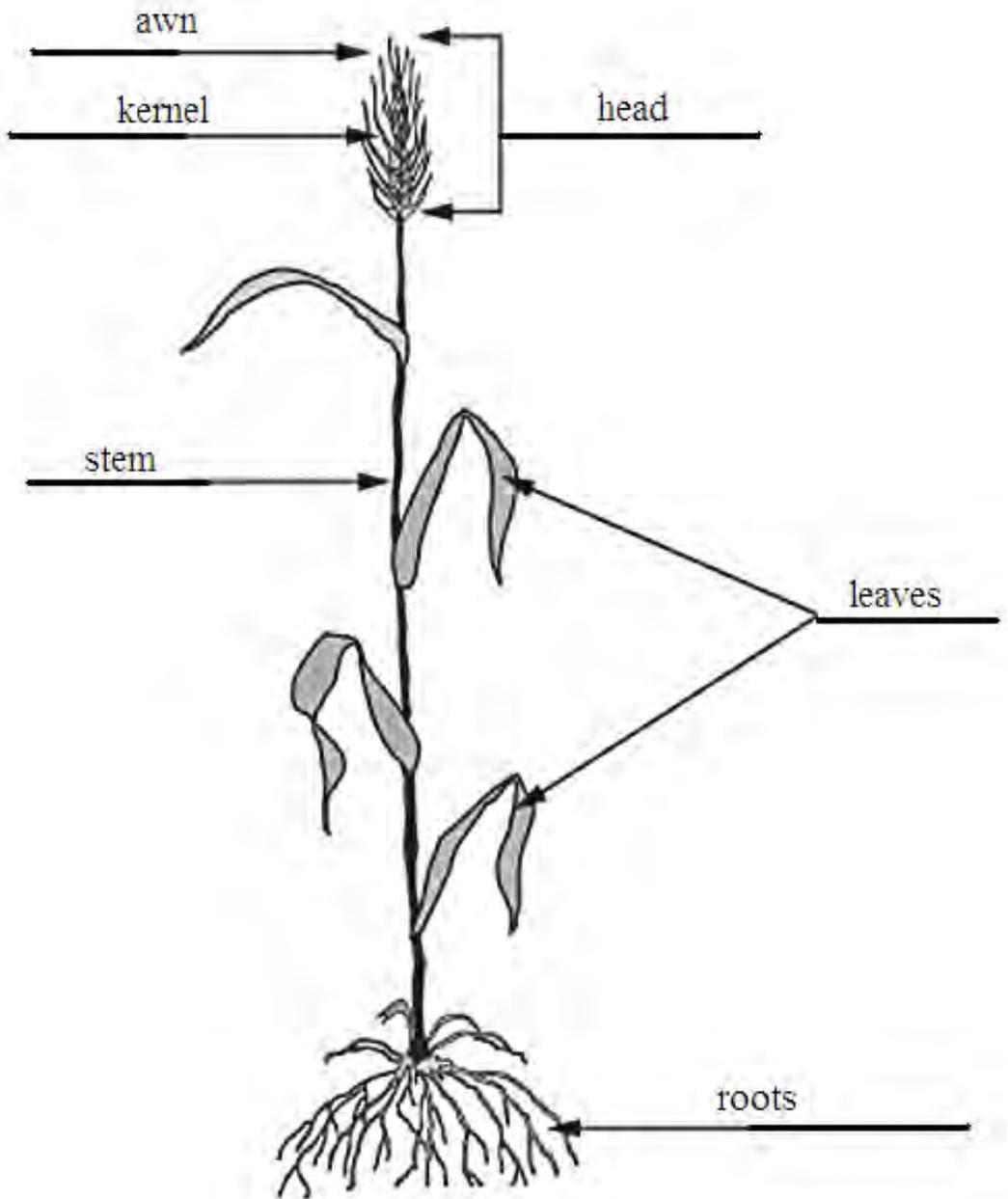
Name _____

The Wheat Plant (Answers)

A

Fill in the parts of the wheat plant.

- leaves*
- head*
- roots*
- awn*
- stem*
- kernel*



Name _____

The Wheat Plant

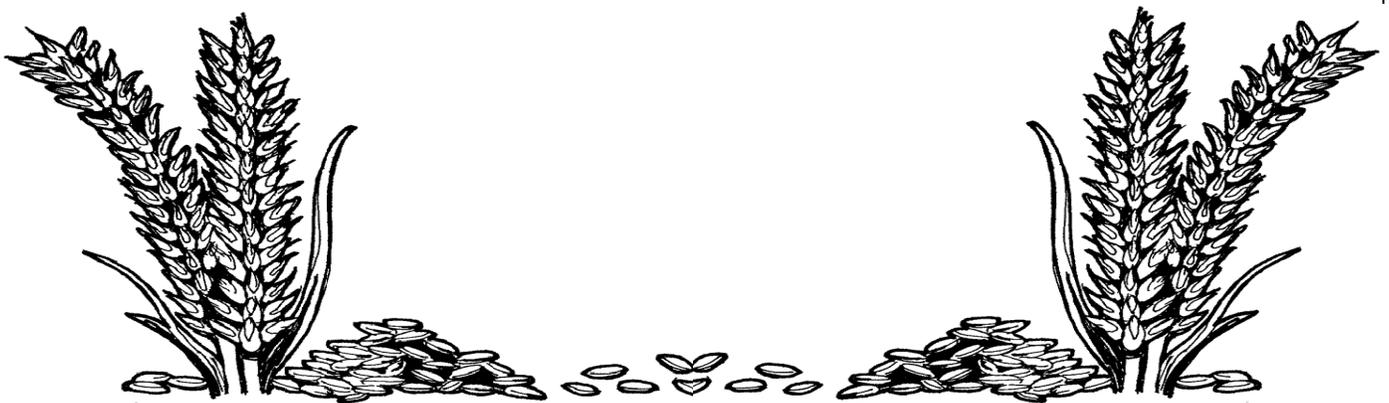
B

Most California farmers grow a kind of wheat called winter wheat. This wheat is planted in the fall or winter and harvested in the spring or summer.

First, the farmer prepares the soil. He or she spends many hours on a tractor turning the soil and breaking it into fine particles. At last the soil is ready, the weather is right, and it is time to plant. The farmer puts the seed in the ground, using a machine called a grain drill.

A shoot grows up through the soil. The moisture in the soil is what causes the wheat plant to start growing. The plant gets bigger. It draws water and nutrients up through its roots and produces carbohydrates (food) in its leaves. The plants grow tall and develop green leaves.

In the spring, the plants grow quickly. As the weather turns warmer, the wheat turns from green to tan and finally to a golden color that tells the farmer it is time for harvest.



Name _____

The Wheat Plant

C

Read the sentences below. Number the steps in order from one to nine to retell what happens to wheat, from seed to harvest.



- ___ The wheat is harvested.
- ___ A shoot grows up through the soil.
- ___ The full-grown plant turns from green to tan to a golden color.
- ___ The plant grown tall and develops green leaves.
- ___ Before planting, the farmer prepares the soil.
- ___ In the spring, the plant grows quickly.
- ___ The farmer puts the seed in the ground, using a machine called a grain drill.



Name _____

The Wheat Plant (Answers)

C

Read the sentences below. Number the steps in order from one to nine to retell what happens to wheat, from seed to harvest.



- 7 The wheat is harvested.
- 3 A shoot grows up through the soil.
- 6 The full-grown plant turns from green to tan to a golden color.
- 4 The plant grown tall and develops green leaves.
- 1 Before planting, the farmer prepares the soil.
- 5 In the spring, the plant grows quickly.
- 2 The farmer puts the seed in the ground, using a machine called a grain drill.



Skills: Language Arts, Science

Objective: The student will read some paragraphs about wheat production and identify the main idea and supporting statements for each one.

Background

Most California wheat producers grow winter wheat. Late in the summer, they prepare the soil for planting. They drive a tractor that pulls the plow through the fields. The plow turns the soil over and kills all the weeds. Then the farmer connects the tractor to a disk harrow and drives it over the field. The disk harrow breaks the soil down into smaller pieces. When the soil is ready for planting, the farmer uses a grain drill to plant the seed.

Each plant grows by producing more leaves and new stalks from the base of the plant. The new stalks are called “tillers.” In the spring, the warm moist days make the wheat plants grow quickly. Each tiller can form another head of wheat.

Most varieties of wheat grow between two and four feet tall. During the early summer, the plants begin to fade from dark green to tan and then to a golden brown. Then the wheat is ripe and nearly ready for harvest.

Now the wheat producer must determine the best time to harvest. Many farmers take a sample of wheat to the local elevator for testing. There the wheat is checked to see if it’s dry enough. Some farmers may check their wheat the “old-fashioned” way. They rub a wheat head between their hands, blowing the chaff away and then chewing some of the grain. If the kernels crack easily and get soft as they are chewed, the wheat is ready to harvest.

The farmer drives a combine across the fields to harvest the grain. When the storage bin of the combine is full, he empties it into a truck. Someone else drives the truck to the nearby grain elevator. Workers at the grain elevator help empty the wheat into a very deep pit or pile on the ground. Machinery in the grain elevator raises, or elevates, the wheat into a tall bin.

The wheat stays in the grain elevator until the farmer is ready to sell it. Workers keep an eye on the wheat kernels to make sure they stay cool and dry. If the wheat kernels get wet or too hot they will spoil. Some of the wheat is sold to people who use it to make food for people and animals. The rest is cleaned and saved until it is time to plant again. One kernel of wheat can grow several hundred new kernels next harvest. The wheat that is sold for food is taken to a mill. At the mill, huge machines grind the wheat kernels into flour. First the wheat must be cleaned several times. A series of disks separate the wheat kernels from other weed seeds, dirt and small stones. A giant magnet removes any metal pieces, like nuts or rivets that might have shaken loose from the farm machinery and fallen in with the wheat.

Materials

paper towel
wheat kernels

Ag in My Community

1. Invite a wheat producer to class to talk about the daily routine on a wheat farm.
2. Visit a bakery and watch the end process of the wheat cycle.

Finally the kernels go into a giant water bath where any remaining stones or other heavy materials drop to the bottom. Light materials float to the top and are washed away. Now the wheat is cleaned and ready to be milled.

Rollers crack the kernels into smaller pieces. Huge machines shake the wheat pieces through several screens to make the pieces even smaller. If the wheat is to be made into white flour, air currents blow the bran – the outer layer of the kernel – away from the rest of the wheat. The wheat bran and germ that have been removed are used in animal feeds. The pieces are now ready for grinding. Smooth rollers grind the wheat finer and finer. After grinding, the wheat is sifted through more screens, sometimes as many as 25 times. Each screen has smaller openings than the one before. Special ingredients are added to age the flour and whiten it. Vitamins and iron are also added to replace those that have been removed with the wheat germ and bran. Now the flour is ready for baking.

Language Arts

1. Read and discuss background.
2. Hand out the student worksheets.
 - a. Review with students the method used to identify the main idea and supporting details of a paragraph.
 - b. Read the worksheet directions with your class.
 - c. Students will complete the worksheets.
 - d. Students will cut out the worksheet pages and staple them together to make a booklet.
3. Students will summarize or write the main idea of each paragraph in their own words.
4. Students will set up a display in the library or media room showing the different stages of wheat.
 - a. Students will draw pictures of the different stages or acquire samples of wheat in the different stages of growth (clean wheat, sprouting wheat, stalks with wheat heads still attached, wheat with the “thresh” still in it).
 - b. Students will record messages for each stage to make the exhibit a self-guided display
5. Bring white flour, whole wheat flour, wheat germ and wheat bran to class.
 - a. Students will examine and write compare/contrast paragraphs.
6. Bring samples of white, part whole wheat and 100 percent whole wheat bread to class.
 - a. Students will taste and write descriptions of the differences in texture.

Extra Reading

Barton, Bryan (illustrator), *Little Red Hen*, HarperCollins Juvenile, 1997.

Ada, Alma Flor, Zubizarreta, Rosa, and Simon Silva, *Gathering the Sun: An Alphabet in Spanish and English*, Lothrop, 1997.

Vocabulary

bin – a box, frame, crib, or enclosed place for storage

blade -- the cutting part of a tool

bran – the edible broden coat of the seed of a cereal grain left after the grain has been ground and the flour or meal sifted out

dormant – having growth or other biological activity much reduced or suspended

combine – a machine that harvests, threshes, and cleans grain while moving over a field

disc – a tilling implement (as a plow) with sharp-edged circular cutting

elevator – a building for elevating, storing, unloading, and sometimes grinding grain

germ – the embryo in the seed of a cereal (as corn or wheat) together with its cotyledon that is usually separated from the starchy part of the seed during miling

grain – the edible seed or seedlike fruit of grasses that are cereals

kernel – the immer softer part of a seed, fruit stone, or nut b
: a whole grain or seed of a cereal (as wheat or corn)

mill – a building with machinery for grinding grain into flour

tiller – a stalk or sprout from the base of a plant or from the axils of its lower leaves

Name _____

Wheat: From Field to Oven

A

Read the paragraphs below, and find the sentence with the main idea. Write the sentence on the lines below each paragraph.

1. Clarence and Susie Brown grow winter wheat. They plant their wheat in the fall. In the summer, the Coldwaters harvest their wheat.



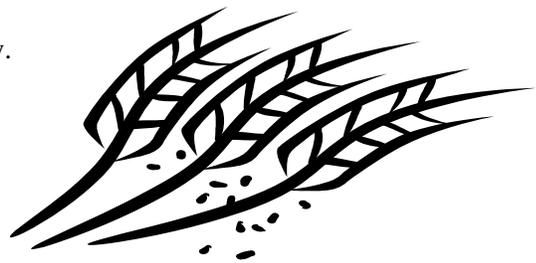
2. Before they plant their wheat, Clarence and Susie must till the fields to get rid of all the weeds. Then they work the soil to break the large clumps into smaller pieces. Getting ready to grow wheat is not an easy job.

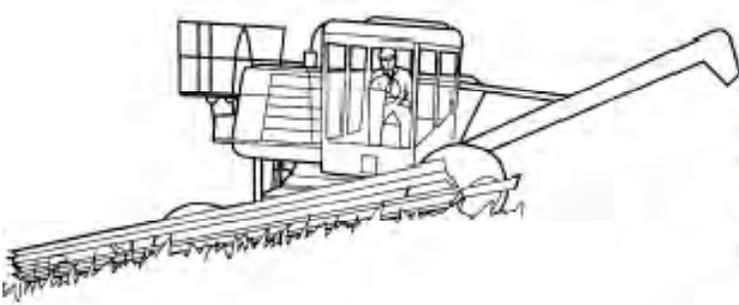


Wheat: From Field to Oven

Read the paragraphs below, and find the sentence with the main idea. Write the sentence on the lines below each paragraph.

3. In the spring the warm, moist days make the wheat plants grow quickly. More stalks of wheat sprout from the root. This is called "tillering." Each tiller can form a head of wheat.





4. The Browns couldn't grow wheat if they didn't have the right kind of machinery. They use a plow and harrow to prepare the field. A grain drill helps them plant the wheat, and they harvest it with a combine. After the wheat is harvested, Clarence and Susie load the wheat on a truck and haul it to the grain elevator.

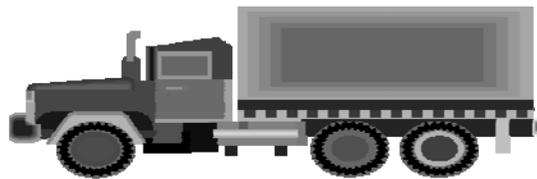
Name _____

Wheat: From Field to Oven

C

Read the paragraphs below, and find the sentence with the main idea. Write the sentence on the lines below each paragraph.

5. After wheat is harvested, the farmer must get it to the mill. Wheat can be transported in many different ways. It can be shipped by barges over water. It can be loaded onto rail cars and moved by train, or it can be hauled by trucks along interstate highways.



6. At the mill, workers test the wheat to decide what kind of flour they can make from it. If the wheat is soft they use it to make flour that can be used in making cakes and pastries. If it is hard they make flour that keeps well and can be used for making bread. Durum wheat is the hardest kind of wheat. It can be used for making macaroni, spaghetti and noodles.



Name _____

Wheat: From Field to Oven

D

Read the paragraphs below, and find the sentence with the main idea. Write the sentence on the lines below each paragraph.

7. The wheat must be cleaned several times before it is ground into flour. Several disks separate the wheat kernels from other weed seeds, dirt and small stones. A giant magnet removes any metal pieces that have fallen in with the wheat. Finally the kernels go into a giant water bath. Heavy materials sink to the bottom. Light materials float to the top and are washed away.

8. Now it is time to grind the kernels into flour. First rollers crack them into smaller pieces. Then the huge machinery shakes them through several screens to make the pieces even smaller. If the wheat is to be made into white flour, air currents blow the bran away from the rest of the wheat. The bran is the outer layer of the wheat kernel. Smooth rollers grind the wheat finer and finer. Then the wheat is sifted through more screens, sometimes as many as 25 times. Each screen has smaller openings than the one before.

Wheat: From Field to Oven

Read the paragraphs below, and find the sentence with the main idea. Write the sentence on the lines below each paragraph.

9. After the flour has been ground, workers add the extra ingredients. Some ingredients age the flour. Others whiten it. Vitamins and iron are also added to replace those that have been removed with the wheat germ and bran. Now the flour is ready for baking.



10. People buy the flour from the grocery store and take it home. Sometimes they use it to make birthday cake or cookies for classroom parties. Sometimes they make biscuits or pancakes for breakfast. Sometimes they use it to make bread. Wheat can be prepared in many different ways to make nutritious, delicious food.



Tortilla in a Bag

Background

Bread may be the ancestor of all prepared foods. The first bread was made in Neolithic times, nearly 12,000 years ago. It was probably made by crushing grain and mixing it with water. The dough was then baked in the sun or laid on heated stones and covered with hot ashes. The Hopi of New Mexico still make a traditional bread, called “piki bread,” by mixing juniper ash with cornmeal and spreading it on a hot stone. Then they lift the paper-thin layer from the stone by rolling it like a jelly roll.

Bread can be unleavened or leavened with yeast. When flour comes in contact with water and remains idle for a period of time, it begins to rise. In modern processes, yeast is added to aid in the rising, but even without yeast, dough will begin to ferment, and the resulting gases will cause the dough to rise. The Egyptians were the first to discover that this process would produce a light, expanded loaf. The Egyptians also invented a closed oven in which to bake the bread.

The ancient Hebrews were in such a hurry to get away from their Egyptian captors that they made their bread without leavening. Today Jewish people celebrate Passover, their escape from the Egyptians, with unleavened bread—matzo. Bread without leavening also represents truth in Jewish tradition, because bread that is unleavened retains the true flavor of the grain from which it is made.

Traditionally, people made bread from whatever grain grew best in the area where they lived. Wheat, rye, corn, barley, millet, kamut and spelt are some of the grains used around the world. Wheat flour is preferred because of its gluten content. Gluten is what gives bread its elastic quality.

Bread is such a powerful food that ancient Egyptian governments controlled its production and distribution as a means of controlling the populace. In France the shortage of bread helped start the French Revolution.

Wheat originated in the Middle East and came to our continent with European settlers. Before that, maize was the grain used for bread-making in the Americas. Maize is what we now call corn, but the word “corn” actually means any kind of grain. For centuries, maize was used to make a flat bread that we know as tortillas. According to Mayan legend, tortillas were invented by a peasant for his hungry king. The first tortillas were made over 12,000 years ago. Today they are also made with wheat.

Among native Mexicans, tortillas are commonly used as eating utensils. In the Old West, cowpokes realized the versatility of tortillas and used tortillas filled with meat or other foods as a convenient way to eat around the

P.A.S.S.

Grade 4

Reading—1.4; 3.2,3; 5.2

Writing—1.5,6; 2

Oral Language—1.1,2,3;
2.1,2,5; 3.1,2

Math Process—1.1,2; 4.4

Math Content—4.4;5.1

Science Process—1.1,2;
3.1,2,3; 4.3,4; 5.2,4

Social Studies—1.1; 2.1,2;
3.2; 4.2

Materials

assorted breads, especially flat breads like tortillas, pita bread and any others you can find in the grocery store

assorted grains and flour made from different kinds of grains

dictionaries

world map

ingredients for tortillas (See recipe—storage bags flour, baking powder*, shortening, hot tap water, salt)

campfire.

The average American eats 199 tortillas each year. In 2000, Americans consumed about 85 billion tortillas (not including tortilla chips).

Flour tortillas are a low-fat food and contain iron along with other B vitamins. They have about 115 calories with 2-3 grams of fat per serving. Corn tortillas are a low-fat, low-sodium food and contain calcium, potassium and fiber. An average serving contains about 60 calories with 1 gram of fat.

Social Studies / Language Arts

1. Read and discuss background.
 - As a class, students will brainstorm and list different kinds of bread. Write the names of the breads on the chalkboard.
2. Show students some of the different kinds of breads and grains you have brought to class, and ask students to name them if they can.
 - Students will compare and contrast the breads, especially the leavened and unleavened breads.
 - Students will brainstorm and list reasons that people in different parts of the world eat different kinds of food. Why do people in different families eat different kinds of foods?
3. Hand out the student worksheet, “Breads Around the World.”
 - Students will work in groups or individually to complete the worksheet.
 - On a map of the world, students will place map pins showing where the different breads described on the worksheet originated.
4. Students will research to find the origins of the following grains used in bread making: wheat (Middle East), rye (southwestern Asia), corn (Americas), barley (Ethiopia), millet (Africa or Asia), kamut(Egypt or Asia Minor) and spelt (Middle East).
5. After students have made tortillas in a bag (recipe included with this lesson), students will write instructions in their own words to share with their parents or another class.
6. Students will write invitations to parents for a multicultural night, and serve a variety of breads from around the world. Assign students to report on the origins of the different kinds of breads.

Science

1. Discuss what makes flat (unleavened) breads different from leavened breads. Experiment with leavening, as follows.
 - Mix one batch of dough using water, flour and yeast and another batch using flour and water only.
 - Students will hypothesize what will happen with each batch, then observe them over several hours and record their observations.
2. Make Tortillas in a Bag (See recipe on Student Worksheet B).
3. The tortilla recipe included with this lesson calls for baking powder, which provides a small amount of leavening. Have some of your students make the tortillas with leavening and some make them without.

—Students will compare texture, flavor, appearance, etc.

5. Substitute whole wheat flour for white flour in the tortilla recipe.

—Students will compare flavor, texture, appearance, etc.

Extra Reading

Anaya, Rudolfo, Amy Cordova and Enrique R. Lamadrid, *The First Tortilla: A Bilingual Story* (English and Spanish Edition), University of New Mexico, 2007.

Chavarria-Chairez, Becky, Julia Mercedes Castilla, and Anne Vega, *Magda's Tortillas / Las Tortillas de Magda*, Children's, 2000.

Dooley, Norah, and Peter J. Thornton, *Everybody Bakes Bread*, Carolrhoda, 1995.

Green, Emily K., *Grains: The New Food Guide Pyramid*, Bellweather, 2006.

Hayes, Joe, and Antonio Castro Lopez, *The Day it Snowed Tortillas / El Dia Que Nevaron Tortillas: Folktales told in Spanish and English*, Cinco Puntos, 2003.

Morris, Ann, and Ken Heyman, *Bread, Bread, Bread*; HarperTrophy; 1993.

Paulsen, Gary, *The Tortilla Factory*, Harcourt, Brace, 1995.

Vocabulary

barley— a cereal grass with flowers in dense spikes; also : its seed used especially in foods (as soups and cereals), or as feed for livestock

bread—a baked food made of flour or meal

fiber— mostly indigestible material in food that stimulates the intestine to move its contents along

gluten—a tough elastic protein substance in flour especially from wheat that holds together dough and makes it sticky

kamut—an ancient relative of durum wheat

leavened— raised (dough) with a leaven, or material (as baking powder) used to produce a gas that makes dough or batter rise and become light

maize—Indian corn

rye—a hardy annual cereal grass widely grown for grain and as a cover crop

spelt—a kind of wheat

tortilla—a thin round of unleavened cornmeal or wheat flour bread

unleavened—made without leavening.

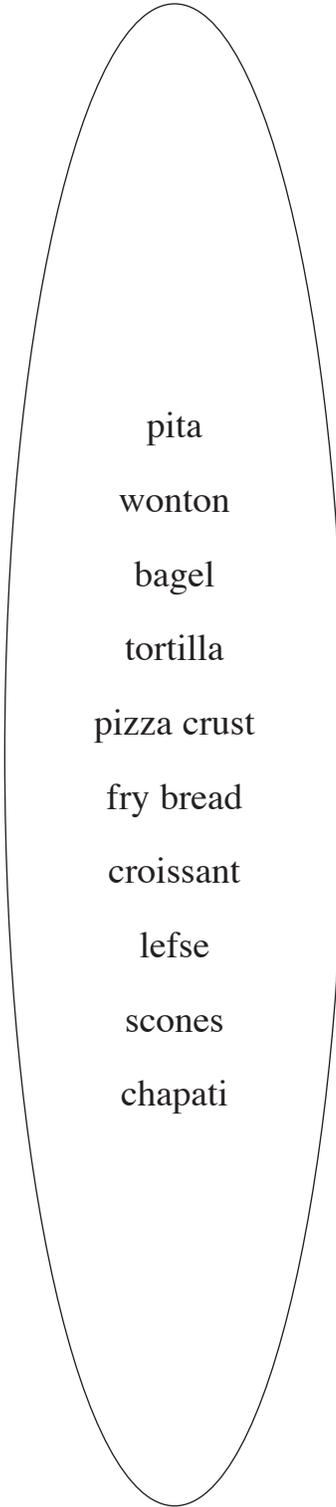
wheat—a cereal grain that can be made into a fine white flour used mostly in breads, baked goods (as cakes and crackers), and pasta as (as macaroni or spaghetti) and that is used in animal feeds

yeast—a one-celled fungus that produces alcohol during the process of fermentation; a commercial product containing living yeast cells that is used mostly as a leaven especially in baking bread

Name _____

Breads Around the World

Write the name of the bread in the space provided next to its description. Use a dictionary if you need one.



1. _____

Asian noodle dough dumplings filled with spiced meat. They are boiled in soup or fried and eaten as a side dish.

2. _____

Corn or wheat dough patted into thin, flat rounds and fried on a hot griddle. They are daily bread in a country on the same continent as the US.

3. _____

Chewy baked rolls with a hole. They are often eaten with cream cheese or other tasty toppings. Polish immigrants brought them to the US.

4. _____

Pocket breads from the Middle East that are round, flat and hollow on the inside.

5. _____

Flaky, tender, crescent-shaped rolls from the land of the Eiffel Tower.

6. _____

Popular Italian pie that began as a leftover created from extra bread dough.

7. _____

Small round breads fried in hot oil. They are made by the thousands for POWs.

8. _____

Flat, chewy rounds of bread served with curries or with peanut butter and honey, cheese and tomato, or just butter. From the country of the Taj Mahal.

9. _____

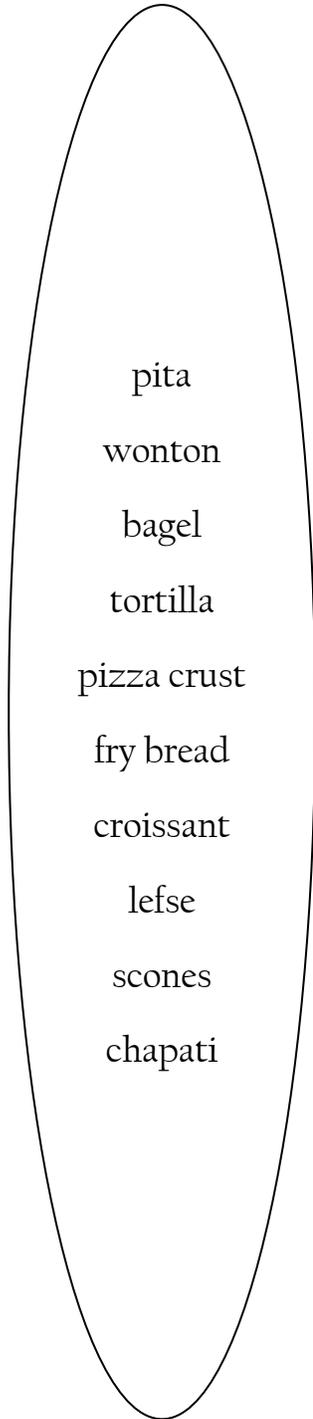
Like biscuits, but cut into big, thick triangles and baked. Great with tea. From a country on the island of Great Britain.

10. _____

Flat bread made from mashed potatoes, flour and liquid. Fried on a griddle and great with brown sugar and butter rolled inside. Scandinavians created it.

Breads Around the World (Answers)

Write the name of the bread in the space provided next to its description. Use a dictionary if you need one.



1. wonton Asian noodle dough dumplings filled with spiced meat. They are boiled in soup or fried and eaten as a side dish.
2. tortilla Corn or wheat dough patted into thin, flat rounds and fried on a hot griddle. They are daily bread in a country on the same continent as the US.
3. bagel Chewy baked rolls with a hole. They are often eaten with cream cheese or other tasty toppings. Polish immigrants brought them to the US.
4. pita Pocket breads from the Middle East that are round, flat and hollow on the inside.
5. croissant Flaky, tender, crescent-shaped rolls from the land of the Eiffel Tower.
6. pizza crust Popular Italian pie that began as a leftover created from extra bread dough
7. fry bread Small round breads fried in hot oil. They are made by the thousands for powwows.
8. chapati Flat, chewy rounds of bread served with curries or with peanut butter and honey, cheese and tomato, or just butter. From the country of the Taj Mahal.
9. scones Like biscuits, but cut into big, thick triangles and baked. Great with tea. From a country on the island of Great Britain.
10. lefse Flat bread made from mashed potatoes, flour and liquid. Fried on a griddle and great with brown sugar and butter rolled inside. Scandinavians created it.

Name _____

Tortillas in a Bag

Ingredients (for four tortillas)

1-qt storage bag
1 1/2 c flour
1 t baking powder
3 T shortening
1/2 c hot tap water
1/4 t salt (or to taste)

1. Place flour, salt and baking powder in bag. Close and shake just a few shakes to mix.
2. Add shortening and reclose the bag. Work bag with hands until the mixture looks crumbly and there are no large pieces of shortening visible.
3. Open the bag, and add the hot tap water. knead in the bag until the dough is one large piece and the sides of the bag come clean.
4. Take the dough out of the bag, and divide into four pieces. Put the pieces of dough on the table, and lay the bag on top of them. Let the dough rest for 15 minutes.
5. After resting time, roll or pat the dough into eight- to 10-inch circles. If dough is too sticky you may add a little more flour. Place the circles on a griddle or frying pan heated to medium or medium high, and cook until dark brown spots appear. Turn and cook on the other side until brown.
6. Fill tortillas with ground beef, beans, salsa, cheese and lettuce to make burritos, if desired, or spread with butter or peanut butter.