

WHEAT USES:

bread, cookies, pancakes, waffles, ice cream cones, macaroni, spaghetti, pizza, pet foods, soap, newsprint, wallboard, cosmetics

WHAT IS WHEAT?

Wheat is a grain (a plant that produces a dry edible seed called a kernel) used mostly for human consumption. Wheat is an annual grass plant that will grow 2 to 3 feet tall. There are two major types of wheat planted in the United States. They are winter wheat and spring wheat. Winter wheat is planted in September and harvested the following summer. Spring wheat is planted in April or May and is harvested in August or September. Wheat starts as a seed and begins to grow when there is enough moisture in the soil. The first signs of growth are tiny root hairs that stretch down into the soil while a small shoot pushes upward through the soil. Tissue within the wheat seed provides the plant with its first nourishment. As the plant grows, it uses the sun to make food in its leaves. The roots get food from the soil. Wheat grows many leaves and sends up 3-12 stems called tillers. A group of flowers called a spike develop at the top of each tiller and mature into the wheat head. Kernels within the head grow and turn golden brown before harvest.



VOCABULARY

AWN: a bristle-like attachment of a wheat plant.

BEARD: the bristle-like parts of the wheat plant that cover and protect the kernels.

BRAN: the outer coating of the wheat kernel.

BUSHEL: a way to measure a crop. One bushel of wheat weighs 60 pounds and contains about 1 million kernels.

CHAFF: the husks of grains and grasses that are separated during threshing.

GERM: the embryo or nucleus of the wheat kernel, used in or on foods as a concentrated source of vitamins.

HEAD: the part of the wheat plant that contains the kernels.

MILL: the place where wheat kernels are ground into flour.

SPIKE: an ear of grain, as of wheat.

STALK: the entire wheat plant.

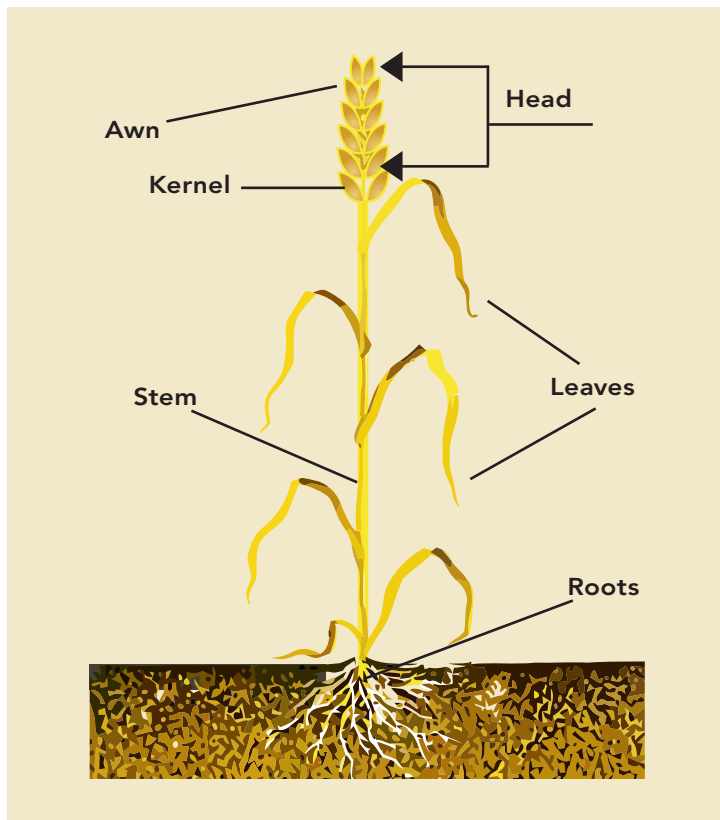
STRAW: a single stalk or stem, especially from certain species of grain, mostly wheat, rye, oats and barley.

THRESH: to beat the stems and husks of grain or cereal plants with a machine to separate the grains and seeds.

TILLER: an erect shoot arising from the crown of a grass.

WHEAT GERM: the embryo of the wheat kernel that will develop into a wheat plant.

WHEAT KERNEL: the seed, sometimes called a wheat berry, from which the wheat plant grows.



WHEAT FUN FACTS:

Wheat is grown in nearly every state. Because it is such a versatile crop, it is being harvested somewhere in the world every month of the year.

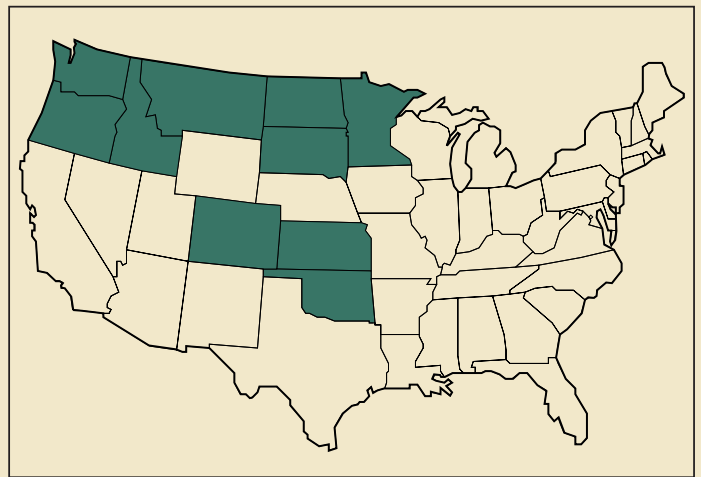
A bushel of wheat weighs about 60 pounds and yields about 42 pounds of white flour or 60 pounds of whole wheat flour.

Bread, pasta, cereal, pretzels and licorice are all foods made with wheat. Cosmetics, pet foods, paper, soap and trash bags also contain wheat.

A kernel is a wheat seed. There are about 50 kernels in a head of wheat and 15,000 to 17,000 kernels in a pound.

The average price received by U.S. farmers in 2011 was \$5.70 per bushel.

2011 UNITED STATES WHEAT PRODUCTION



Top wheat producing states

Kansas, North Dakota, Montana, Washington, Idaho, South Dakota, Colorado, Oregon, Minnesota, Oklahoma

WHEAT HISTORY TIMELINE

15000 B.C. — Seed gathering.

10000-9000 B.C. — Early people learned cultivation and stayed in one place to farm grain. Villages formed. Civilization began.

7000-6000 B.C. — Swiss lake dwellers ground wheat kernels, mixed flour with water and baked the first flatbreads.

3000 B.C. — Egyptians cultivated wheat and baked bread.

B.C./A.D. — Chinese cultivated wheat and baked bread.

1683 — The first bagel rolled into the world when a baker from Vienna, Austria was thankful to the King of Poland for saving Austria from Turkish

invaders. The baker reshaped the local bread so that it resembled the King's stirrup. The new bread was called "beugel," derived from the German word stirrup, "bugel."

1777 — Wheat is planted for the first time in the U.S.

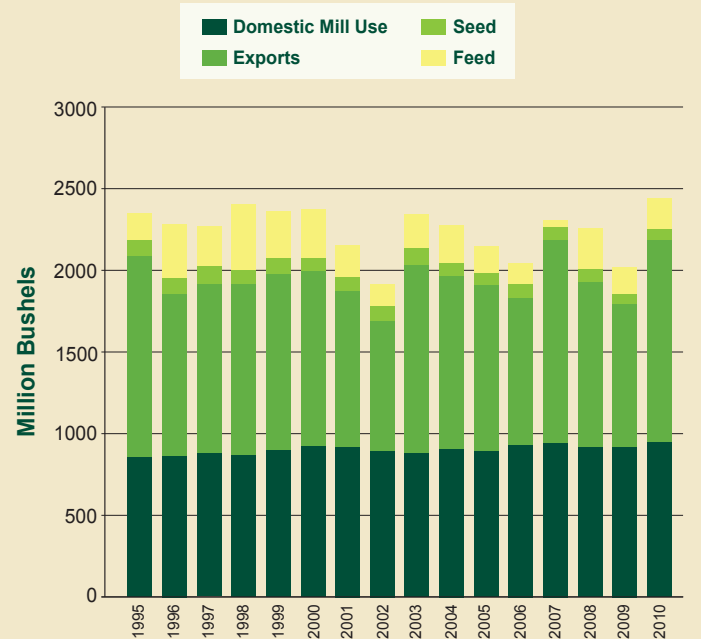
1800 — U.S. harvest rate is 8 acres per day.

1921 — Wonder Bread was originally produced by the Taggart Baking Company. It was named by Vice President Elmer Cline.

1999 — U.S. harvest rate is 120 acres per day.

2008/2009 — U.S. farmers grew nearly 2.4 billion bushels of wheat on 63 million acres of land.

U.S. Wheat Use



WHEAT

CAREERS: Remote Sensing Specialist, Commodity Broker, Farmer, Soil Scientist, Food Process Engineer, Human Nutritionist

SPOTLIGHT ON CAREERS:

REMOTE SENSING SPECIALIST — **Remote Sensing Specialists** interpret and analyze many types of aerial photographs and satellite images. They may use color infrared photos to map irrigated cropland, or to determine areas of insect or disease infestation in croplands. They use computers to analyze satellite scanner data and create maps of land cover and changes in land use.

COMMODITY BROKER — A **Commodity Broker** is a firm or individual who arranges transactions, on behalf of clients, to buy or sell contracts for commodities such as corn, soybeans, livestock and wheat.

WHEAT USE IN THE UNITED STATES

ONE BUSHEL OF WHEAT:

Weighs about 60 pounds, yields about 42 pounds of white flour and around 60 pounds of whole-wheat flour.

Makes 90 one-pound loaves of whole-wheat bread.

Fills 53 boxes of cereal.

Makes 72 pounds of flour tortillas.

Bakes into 800 sponge cakes.

Rolls into 420 three-ounce cinnamon buns.

Makes 5,000 four-inch cookies.

The average price received by U.S. farmers in 2011 was \$5.70 per bushel.

* Depends on the class of wheat



WHEAT PATH

The wheat seeds are put into the ground by a machine called a grain drill. The drill is pulled by a tractor and digs narrow rows in the earth and drops the wheat seeds into the rows. Then it covers the seeds with soil so they can take root.



The seed begins to grow when there is enough moisture in the soil. The tiny root hairs stretch down into the soil and eventually a small shoot pushes upward through the soil. The tissue within the wheat seed is how the plant is nourished. As the plant grows it uses the sun to make food in its leaves. The roots get food from the soil.



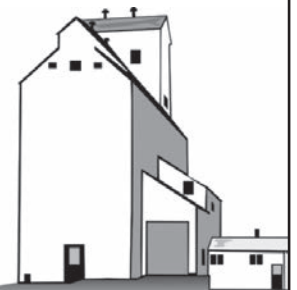
The wheat plant grows many leaves and sends up 3 to 12 stems called tillers. A group of flowers called a spike develop at the top of each tiller and mature into a wheat head.

Kernels within the head grow and turn golden brown before harvest. The wheat must be dry before it can be harvested.



A combine is used to cut the wheat stalk. It also does the threshing, separating the kernels from the rest of the plant. The threshed grain is stored in a bin on the machine. The bin is emptied into a grain truck and taken to the grain elevator.

From the elevator, the wheat will be sold to be processed into food for humans or livestock feed. Wheat is ground into flour at a mill. The flour is then used to make products, such as rolls, cookies, bagels, and tortillas.



SCIENCE AT HOME

WHEAT MILLING

Materials: Wheat Stalks, Salt or Pepper Grinder

Directions:

- Show students wheat stalks.
- Go over the parts of the wheat stalk with the students to familiarize them with the parts so they can understand the directions for dissection.
 - STALK** — the entire plant.
 - HEAD** — the part of the wheat plant that contains the kernels.
 - BEARD** — the bristle-like parts of the wheat plant that cover and protect the kernels.
 - KERNEL** — the seed from which the wheat plant is grown or that people harvest from the wheat plant to grind into flour.
 - STEM/STRAW** — the part of the wheat plant that supports the head and is known as straw after harvest.
- Dissect the wheat using the following steps:
 - Hand out stalks of wheat to the students.
 - Break the head off the stem.
 - Make a straw out of the stem by breaking it to avoid the nodes.
 - Lay the wheat head flat on a hard surface and pat with your hand to shake out the kernels.
 - Have the students count their kernels.

WHEAT

- Put the kernels of wheat into a salt or pepper grinder and have the students mill their wheat into flour. What simple machines are being used?
- Talk about different ways to grind wheat. The Native Americans did it using rocks, etc. Have students design their own method of grinding wheat and then test their machines.
- Talk about the uses of wheat flour to make pastas, breads, desserts, etc.

Lesson Extender!

- Have students find the gluten in wheat by chewing the kernels. Before there was chewing gum in the store, farmers made their own with grains of wheat! This and other activities can be found in the back of the book *Bread Comes to Life*.

2011 WHEAT STATISTICS

Class and Market Year	Planted acreage (million acres)	Harvested acreage (million acres)	Production (million bushels)	Yield (bushels per acre)	Weighted average (dollars per bushel)
All Wheat (2011/2012)	54.41	45.71	1999.35	43.7	7.25
Hard Red Winter (2011/2012)	28.480	21.441	780.09	36.4	--
Hard Red Spring (2011/2012)	11.589	11.295	397.69	35.2	--
Soft Red Winter (2011/2012)	8.561	7.420	457.54	61.7	--
White (2011/2012)	4.410	4.237	313.55	74.0	--
Durum (2011/2012)	1.369	1.312	50.48	38.5	9.90

