



The Business of Agriculture

Career & Technology Education Introduction Farming: Seeds of Successful Marketing

Purpose

Students develop an appreciation for the extensive materials and career fields provided by agriculture.

Time: One or two 45-minute sessions

Grade Level: 7–9

Materials

- Seed samples of corn, rice, wheat, and soybeans (available from Utah AITC)
- “Agronomy Specialist” card sets and game boards for each group of four students
- Copies of map handout
- Marketing Integrated Lessons in Business for TLC, distributed by the Utah State Office of Education (optional)
- “Pit” game (optional)

Background

Without the grains grown on American farms, the cereal shelves would be empty (as would other shelves). Consumers and business owners alike need farmers to produce the raw ingredients to fill the factories, trucks and stores, and to provide jobs along the way (graphic designers for packaging, engineers in processing, food scientists, etc.). In fact the person who designs the box for Tony the Tiger’s Frosted Flakes® owes his or her livelihood to the fact that someone grows corn.

About one out of five or 20% of Americans rely on agriculture for employment. It’s hard to imagine an empty cereal aisle at your favorite grocery store, and easy to forget that all of the cereals came from a farmer’s field. Grains are simply the seeds or fruits of grasses. They belong to a group of grasses called cereals or cereal grains and include wheat, corn, rice, oats, rye, buckwheat, millet, sorghum (milo), barley, quinoa, amaranth, and triticale (a high-yield grain developed by crossing wheat for its gluten and rye for its hardness).

All grains have basically the same makeup. Each kernel, or grain, has a tiny “germ,” or seed, at its core. It represents from 2 to 3 percent of the seed’s weight and is the embryo from which new plants develop. The germ is surrounded by the endosperm – a storage packet of starch (a complex carbohydrate) – encased in protein to nourish the young plant in its early growth if the seed sprouts. Gluten is an elastic protein within the endosperm that stretches like bubble gum when wet and expands to hold the gas that yeast generates. Protecting the germ and endosperm is the bran, or hull – a tough, fibrous, hard covering.

Grains are the primary raw material in bread. The kind of grain used largely determines the flavor, texture, and nutrition of the bread. Wheat, rye, oats, and barley were the primary grains in Europe during the Middle Ages. The principal grains grown in the world today are wheat, corn, and rice; these three provide more than half of the world’s food from plants.

This activity exposes your students to the common grains used in cereal and shows where they are grown. If students are designing cereal boxes, they might want to include pictures of the complete grain plant, e.g. if the cereal contains corn, a picture of the cob or plant could be part of the box design. Additionally, making the connection between actual cereal ingredients and what that cereal may taste like will help them to find words that better describe the cereal and assist them in product marketing, i.e., words on the box that will sell.

NOTE: The activities in this lesson are designed to be integrated into the “Marketing Integrated Lessons in Business,” Option #1 “Developing a New Cold Breakfast Cereal.” The first two activities in this lesson plan could be inserted into or between the Product & Price section. This lesson can be downloaded from the UEN website, see Links section.

Activity Procedures

1. Divide your students into groups of four.
2. Distribute to each group a plastic Ziploc® bag with the cut apart Specialist Fact Cards, Agronomy Specialist Matching Cards, and Grain Facts

Information Board.

3. Each student should take one of the Specialist Fact Cards. This will designate him or her as an “Agronomy Specialist” in the areas of corn, rice, wheat, and soybeans. (Option 1 - Each student reads the Specialist Fact Card before he or she begins matching or Option 2 - the matching begins and if the student player needs a clue to complete a match, one Specialist may read his or her card until a match can be made.)
4. Students should mix up or shuffle the Specialist Matching Cards and then place them upside down in a pile.
5. Each student takes a turn picking a Specialist Matching Card and trying to match the card to the appropriate place on the Grain Facts Information Board. If they do not know where to match the card, the “Specialist” reads the Specialist Fact Card down to the place where the student says stop, because he or she has determined a match on the Grain Facts Information Board.
6. The activity is finished when the Grain Facts Information Board is complete. Answers can be posted on the overhead at the end of the activity.
7. Using the U.S. map provided and the Specialist Fact Cards, students should place a colored dot in each of the major grain producing states. (Instructions are on the map.)

Additional Activities

- The game “Pit” (commercial card game) could be used to demonstrate how agricultural commodities such as grains are traded. This game works best when played with 4-6 players and can be obtained in discount stores or online at websites including www.amazon.com.
- After the matching activity has been completed once, take away the Specialist Fact Cards and see which group can correctly match the items in the fastest time.
- Students may want to include the Food Guide Pyramid as part of their cereal box design.
- Students should include an ingredients list on the cereal box they design.
- This cereal activity could be adapted to virtually any product, e.g., pickles, garden seeds, yogurt, etc.
- Design a menu (using classroom software) that conveys the theme “Farm Fresh to Your Table.”

Links

- Lesson plans can be downloaded from:
<http://www.uen.org/Lessonplan/preview?LPid=228>.

Specialist Fact Cards

Dr. Chris R. Patty

Rice, the world's third-leading grain, is the staple food of over half the people in the world today. For many it is their main source of protein, and for some it is their only protein. To most Americans, however, rice is casually treated as "filler food" to go along with meat, fish, or poultry. Rice is a native of Asia, where it was grown and used for food even before written records were kept. It arrived on the shores of North America in 1694.

Rice thrives in tropical areas because of the warm, wet climate that it requires. Rice fields are flooded to provide growing plants with moisture and to kill weeds and other pests. Rice can be grown where there is an annual rainfall of at least 40 inches or where water is available for irrigation. During the growing season rice needs an average temperature of at least 70°F.

Rice is inexpensive, easy to prepare, and easy to store, and it mixes well with lots of flavors. It can be made into breakfast cereals. Rice flour, both white and brown, is finely milled and useful in making noodles, pancakes, breads, cakes, and muffins, usually in combination with wheat flour. Rice is grown in more than 100 countries. China and India are the top rice-producing countries, growing more than 50 percent of the world's rice. The United States grows about 1 percent of the world's rice. Like wheat, rice is primarily used to feed people. Rice does have some industrial uses. For example, rice hulls have been used as an ingredient in fertilizer, insulation, cement, and a liquid chemical furfural (used as a solvent and in making plastics). Rice starch is the basis for most face powders. Many people in Asia use the dried stalks (straw) to thatch roofs and to weave items such as baskets, mats, sandals, hats, brooms, and rope. The major producing states are Arkansas, California, Louisiana, Mississippi, Missouri, and Texas.



Dr. Kim D. Legume

Soybeans are technically beans – dicots. Wheat, rice, and corn are grasses – monocots. The soybean probably originated in eastern China and is widely cultivated as a farm crop. The soybean was introduced into the United States in the early 1800s and was grown as a minor forage crop for many years. The development of a soybean – processing industry in the early 1920s gave soybean cultivation a great impetus, and today the soybean is a leading crop in the United States, ranking only behind corn and wheat.

The United States' produces about 50 percent of the world's soybeans. Leading soybean producing states include Iowa, Illinois, Indiana, Minnesota, Ohio, and Missouri. More than 30 percent of the United States production is exported. The soybean plant is 2 to 5 ft. in height, with large leaves, small white, pink, or purple flowers, and short pods with one to four seeds. On maturity, which is reached from 100 to 150 days after planting, depending on variety, location, and weather, the leaves turn yellow and drop, and the pods rapidly become brown and dry. The seeds, which are almost spherical in shape, are usually light yellow, but some rare varieties are black, brown, or green. They have a black, brown, or yellow hilum (seed scar) and contain about 20 percent oil and 40 percent protein. In the United States, soybeans are grown as a row crop, planted in May or June, and harvested with a grain combine in the fall.

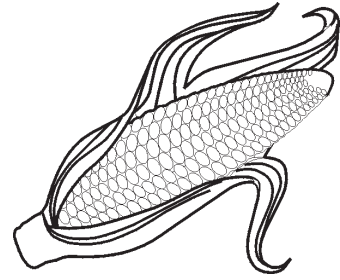
The two basic products of the soybean are protein meal and oil. In the United States, more than 90 percent of the oil is consumed as margarine, shortening, mayonnaise, salad oils, and other edible products; the rest is used in industrial products such as paint, varnish, linoleum, and rubber fabrics. Soybean meal is the major source of the protein supplement used in livestock feeds, which utilize 98 percent of the total meal produced. Soybean use as a flour in cold cereals is limited. However, soybean oil is routinely added to cold cereals as a binding agent.



Specialist Fact Cards

Dr. Cornelius E. Kernel

Corn is a grain that is tens of thousands of years old. Corn pollen grains dated as 80,000 years old were found in rocks about 200 feet below present day Mexico City. Most archaeobotanists agree that corn migrated from Mesoamerica along sea and land routes to South America. It also migrated into North America and was cultivated by various Indian tribes such as the Mogollon, the Hohokam, and the Anasazi. In North America the American Indians were cultivating several different types of maize. Columbus took seeds from the grain back to Spain. Maize had two distinct advantages over wheat: it could be grown in three months and did not require oxen or plows to cultivate the soil. Within one generation it had spread through southern Europe, and within two generations, around the world.



Today, maize, or what we call corn, is one of our nation's top agricultural commodities. (The Pilgrims called maize "Indian corn" and Americans have called it corn ever since. Today corn is still correctly called maize.) Corn can be found in more than 4,000 food and non-food products. It is used to make bread, breakfast cereals, chips, and many other food products. Corn is the leading source of sweetener and is found in thousands of food items including sodas and candy. It is also used to make industrial products such as ceramics, pharmaceutical drugs (e.g., penicillin and other antibiotics), paints, paper goods, textiles, batteries, fireworks, biodegradable packing materials, and much more. In the United States, about 50 percent of the corn crop is fed to livestock (hogs, cattle, sheep, and poultry).

Corn can be grown in most mild and tropical regions of the world. It will grow wherever there is suitable soil, freedom from frost and cold nights, plenty of hot sun when maturing, and ample soil moisture during the hot season. It grows best in those parts of the Northern Hemisphere with daily July temperatures of 70°-80°F and a rainfall of at least 20 inches a year, with ample rain distributed throughout the growing season. The United States is the world's leading producer and exporter of corn, producing 36 percent of the world's supply. Corn is the chief food of most Mexicans, with the tortilla as the primary bread. No other crop is distributed over so large an area of the world, and corn is second (after wheat) in world grain production. The major corn-producing states are Iowa, Illinois, Nebraska, Indiana, Minnesota, and Ohio.

Specialist Fact Cards

Dr. Will G. Wheaton

Wheat has been cultivated and used for human food for many thousands of years. People have used wheat to make bread throughout recorded history. Wheat has been grown in Egypt since about 4000 B.C. and in China since at least 2800 B.C. The ancient Egyptians ground wheat into flour, combined it with liquid, and baked it into bread. They also “discovered” the property of wheat that has made wheat most popular grain for bread baking: the ability of wheat dough to rise and form a high loaf when yeast is added as a fermenting agent.



Today the United States is the world’s largest producer of wheat, but it wasn’t always so. Wheat did not become a major crop in America until after the French Revolution in the late 1700s. In addition to the war, Europe was experiencing large-scale urban growth, crop failures from drought, and potato blight. America responded to the need for grain in Europe by growing more wheat and exporting it to England and France.

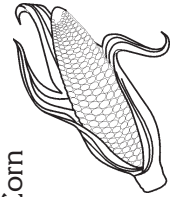
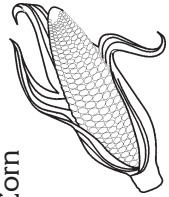
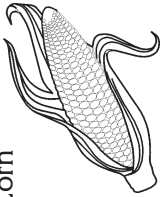
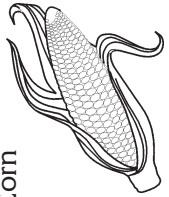
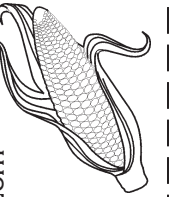










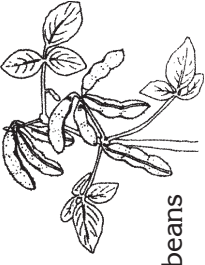
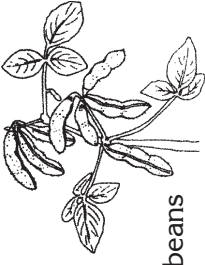
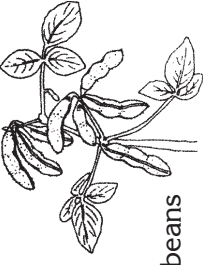


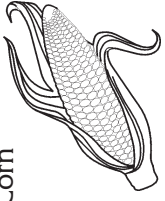
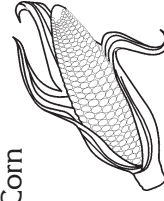



Fairly dry and mild climates are the most favorable for growing wheat. In general, wheat needs lots of sunshine, 12-15 inches of water, and temperatures of 70-75°F. Winter wheat is planted in the fall and harvested the following spring or summer. It needs a period of cold weather with short days and long nights to flower. When the temperature drops below freezing, wheat becomes dormant. Spring wheat is planted in the spring and becomes fully ripe in the summer. Extreme heat or cold and very wet or very dry conditions will destroy both winter and spring wheat. Wheat is by far the world’s largest and most widely cultivated food crop: one-seventh of all farmland around the world is used for growing it. Every moment of the year, some farmer, somewhere, is harvesting this grain as another is planting it. Today American wheat is exported and feeds millions of people all over the world, and new varieties of wheat have made it possible for the king of grains to be grown essentially worldwide. The top six wheat-producing states are Kansas, North Dakota, Montana, Washington, Oklahoma, and Idaho.

Key to Grain Facts Information Board

Wheat	Soybeans	Corn	Wheat	Corn
Soybeans	Corn	Rice	Soybeans	Soybeans
Corn	Corn	Rice	Soybeans	Rice
Rice	Wheat	Wheat	Corn	Corn
Wheat	Rice	Rice	Wheat	Soybeans

Agronomy Specialist Matching Cards

(to be cut apart)

 <p>Corn</p>	 <p>Corn</p>	 <p>Corn</p>	 <p>Corn</p>	 <p>Corn</p>
 <p>Wheat</p>	 <p>Wheat</p>	 <p>Wheat</p>	 <p>Wheat</p>	 <p>Wheat</p>
 <p>Rice</p>	 <p>Rice</p>	 <p>Rice</p>	 <p>Rice</p>	 <p>Rice</p>
 <p>Soybeans</p>	 <p>Soybeans</p>	 <p>Soybeans</p>	 <p>Soybeans</p>	 <p>Soybeans</p>
 <p>Corn</p>	 <p>Corn</p>	 <p>Wheat</p>	 <p>Rice</p>	 <p>Soybeans</p>

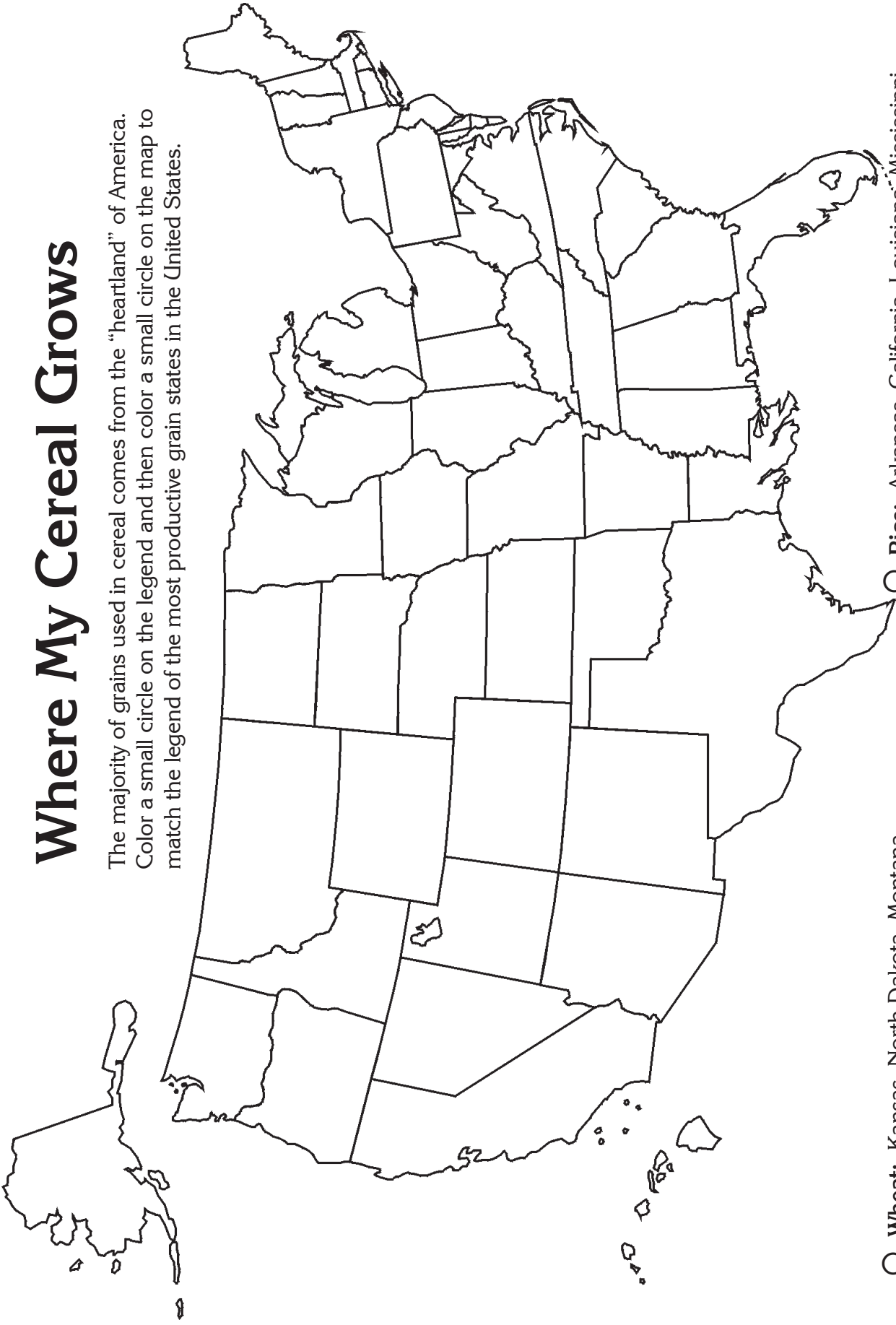
Grain Facts Information Board

(do not cut apart)

World's most widely grown grain.	Oil is the primary product of this crop.	U.S. produces 36 percent of the world's supply.	Grown by the Egyptians.	Second in world grain production.
The U.S. produces 50% of the world crop.	Native of Mexico.	Thrives in tropical climates.	Seeds are round and usually light yellow.	Plant is 2 - 5 feet tall.
Found in more than 4000 food products.	Used in batteries.	Needs an average temperature of 70° F.	Dicot.	Arrived in U.S. in 1694.
Fields are flooded.	King of grains.	Needs 12-15 inches of water.	Prefers 20 inches of rain per year.	Leading sweetener.
Planted in either spring or fall.	Native of Asia.	Used in face powders.	Remains dormant in the winter.	The seed is 40% protein.

Where My Cereal Grows

The majority of grains used in cereal comes from the "heartland" of America. Color a small circle on the legend and then color a small circle on the map to match the legend of the most productive grain states in the United States.



Wheat: Kansas, North Dakota, Montana, Washington, Oklahoma, and Idaho

Rice: Arkansas, California, Louisiana, Mississippi, Missouri, and Texas.

Corn: Iowa, Illinois, Nebraska, Indiana, Minnesota, and Ohio

Soybeans: Iowa, Illinois, Indiana, Minnesota, Ohio, Missouri