AgMag
Exploring Minnesota Agriculture with Today's Youth
ISSUE 2
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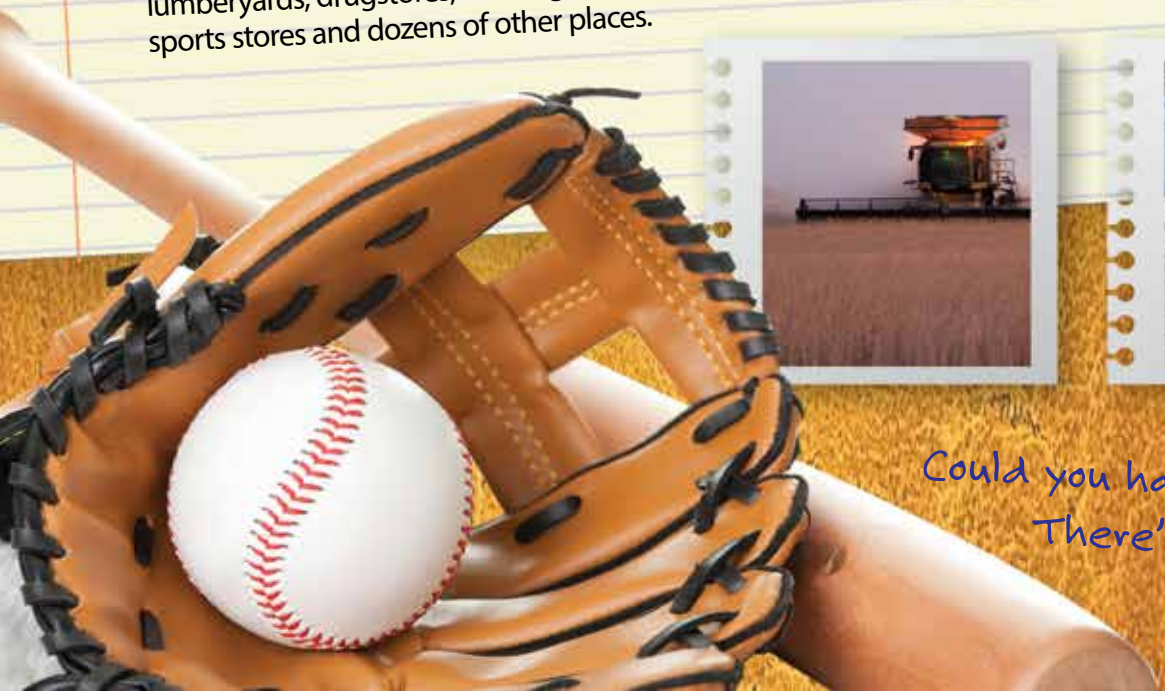
Agriculture the land & you!

What would people living in towns and cities do if there were no farmers?

Where would they get food? Wool? Building supplies? Flowers, trees and shrubs? What would growers do if there were no **consumers** to buy their food or wool or wood or shrubs? What would it be like if each of us had to grow everything we need all by ourselves?

- City people and growers need each other. We are **interdependent**. We buy and sell among ourselves so everyone can get the food, shelter and clothing they need. It all starts with agriculture.
- Agriculture grows what we need and changes it to forms we can use. Getting those things into our hands is part of agriculture, too.
- When you put on a baseball uniform and play with a wooden bat, do you think about an agriculture connection? When you write a note, do you think about the tree fiber that went into the paper? As you eat your cereal, do you think about the soil, the water and the workers between the grain field and your cereal bowl?
- Agriculture starts with soil, seeds, water and energy from the sun. It continues as millions of workers and billions of dollars change and move agricultural products from the land to you. Agricultural products come to you through supermarkets, lumberyards, drugstores, clothing shops, restaurants, Christmas tree lots, sports stores and dozens of other places.

What connections to agriculture can you find on this page?



Could you have an ag-less day? There's just no way!

Steps Along the Way

Where do the supplies come from that are made (processed) into the things we eat, wear and use every day? The **raw materials** come from the land, through the work of farmers and growers. Those raw materials are possible only because of the **natural** and **renewable resources** of Planet Earth. Your wool sweater, your strawberry jam sandwich, your hockey stick—they're all thanks to renewable resources.

What happens to the raw materials between the land and you? It depends on the product. Which goes through more steps: grain between the field and your cereal box or carrots between the field and your salad bowl? What about your quarter-pound burger? It started out as a thousand-pound steer eating corn, soybean meal and grass. Your bread began as "amber waves of grain" and your wooden hockey stick as a tree.

Raw materials go through a cycle of processes before they get to us in forms we can use. After all, a handful of wheat kernels or a hunk of wool freshly sheared from a sheep wouldn't do us much good in these forms. The food, clothes and other things we use from agriculture all go through a cycle that:

- starts with sunshine, air, water, soil and plants
- uses energy and equipment
- changes raw materials into many different things
- gets agriculture products to us in forms we can use!

The five steps below are part of most agriculture cycles.

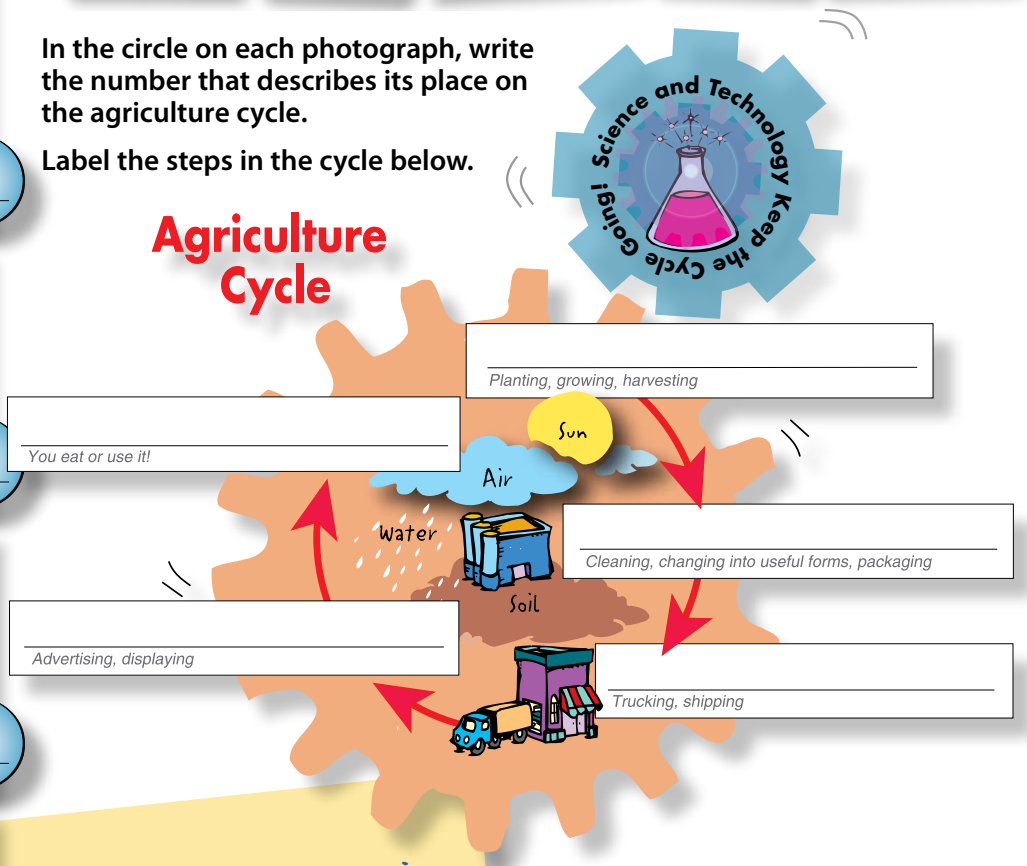
1 Producing → 2 Processing → 3 Distributing → 4 Marketing → 5 Consuming (People Using)

Photos Courtesy University of Minnesota Agricultural Experiment Station

In the circle on each photograph, write the number that describes its place on the agriculture cycle.

Label the steps in the cycle below.

Agriculture Cycle



Products with more steps in their cycles have more impact on Earth's resources. Why?

Why are sun, air, water and soil part of the agriculture cycle?

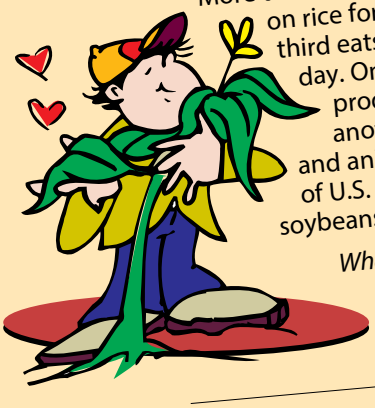
A Tale of Two Kingdoms

Plants and Animals

They're the only living things that make their own food. They are also the source of food for every other living thing. Plants become our medicines, fibers, paper products, cosmetics, spices and building materials. We burn plants for fuels. That includes wood as well as the fossil fuels (coal, petroleum, natural gas) that came from plants eons ago. We eat plants — roots, leaves, stems and fruits. The animals we eat also eat plants! Finally, we depend on plants for the oxygen we breathe. Without plants, we would not survive.

Only about one-fifth of the land in the United States is suitable for growing crops. The rest has poor soil, too little rainfall, or rocky, rough surfaces that machinery can't handle. Forests cover millions of acres. Even though we can't grow food crops on these lands, **livestock** can often graze there. As livestock eat grass, they turn it into food and fiber people can use. Animals provide the eggs, milk, fish, burgers, steaks, chops and roasts that give us protein. They produce the wool and leather people use for clothes, shoes and baseball gloves. Animal fats are important in soaps, cleaners, cosmetics, paints, plastics and much more. Thanks to animals, we have better lives.

Think & Discuss



More than half the world's population depends on rice for a daily meal. Another one-third eats wheat in some form every day. One-fourth uses corn and corn products every day. Soybeans are another major crop for both people and animals. More than three-fourths of U.S. farm animals are fed corn and soybeans.

What have you eaten or used today that came from rice, wheat, corn or soybeans?

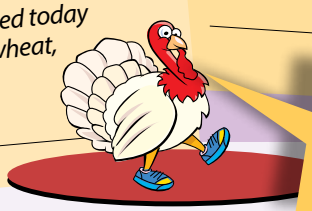
_____

Think & Discuss

Millions of people around the globe depend on animals for food, clothing and shelter.

What have you eaten or used today that came from animals?

_____



Don't forget poultry!

Soybeans & Corn: Terrific Top Crops

In your last AgMag, you learned that soybeans and corn are two of our state's most important crops. But did you know that you are using soybeans and corn yourself in dozens of ways every day? Zoom in for a closer look at these amazing plants.

Soybeans: Miracle Crop

Chinese people have grown and appreciated soybeans for 5,000 years. They called soybeans "Yellow Jewel" and "Great Treasure." We call soybeans "the miracle crop" because they have hundreds of uses. Each of us eats 35 to 40 pounds of soy products every year. People use tons of soy in non-food products, too. Soybeans are one of the world's most efficient and inexpensive sources of protein for both humans and animals.

How many ways have you used soybeans today?

_____

(You'll be surprised as you read further in this AgMag!)

A mature soybean plant averages 3- 3½ feet tall. Mature corn averages 7-8 feet tall!

Corn: America's Gold

Early settlers coming to America often hoped to find gold. But they found an even greater treasure—one that could feed the world—when Native Americans shared corn, the golden grain.

America's native peoples have grown corn for centuries. Corn was such an important crop that many of their villages and cities built up around it. Millions of people around the world still depend on corn as a main food for themselves and their animals. Corn is more than food. Those golden kernels have more than 3,000 uses!

Turn the page to learn more!

Super Soy & King Corn

The U.S. produces nearly half of the world's soybeans.

Soybeans and corn are Minnesota's leading **cash crops**. These are the top crops that feed our cattle, hogs and poultry. They are processed into hundreds of other uses in human foods, industries, fuels and more.

Large **combines** separate the beans or corn kernels from the plants.

Coffee cups, grocery bags, even surfboards made from corn plastic **biodegrade** in just a few months. The key is proper composting.

1 Planting and Harvesting

Soybeans and corn, both row crops, are planted in April and May. During the summer:

- Soybeans flower and produce pods (beans).
- Corn grows tassels and silks, producing ears with kernels.

Both crops are harvested in the fall.

2 Storage and Transportation

Soybeans and corn are stored in grain bins on the farm or at local elevators. They are kept dry to prevent mold and spoiling. Farmers raising livestock often grind and mix soybeans and corn with other grains to feed their animals. Many farmers sell their crops, which are then hauled away from the farm by truck.

Crop storage bins on a farm.

3 Processing

Cleaning is the first step. Then crops are processed in different ways, depending on how they will be used.

- Soybeans are mainly processed for oil, meal (flour) and **biofuel**.
- Corn is mainly processed for livestock feed, human food and **ethanol**.

Corn on a conveyor belt during processing.

- Soybeans come to the processing plant as whole beans with sturdy hulls. The hulls are usually removed. Beans are warmed and moistened. The heat expands the beans and the hulls pop off. Then the beans are flattened into flakes, making it easier to remove the oil.
- Corn may be soaked, softened, pressed, ground, cooked, mixed or sometimes flaked before it is further processed into many different products.

Henry Ford once built a car from soybeans. It was so tough he could beat on it with an axe! A plastic steering wheel made by Ford was the first industrial use of soybeans.

Corn and soybeans come to us in many different forms. Label the groups.

Groups

- Other Soy and Corn Foods
- Meal and Flour Products
- Industrial Products
- Oil Products

- Biofuels for cars and trucks
- Livestock feed
- Antibiotics
- Paints
- Inks

- Glues
- Plastic eating utensils
- Biodegradable packaging peanuts
- Park benches
- and more!

Which of these products is used in making this magazine?

(Hint: See back page.)

- Bakery products
- Breads
- Pasta
- Cereals
- Grits
- Corn meal
- and more!

- Cooking oil
- Salad dressing
- Soaps
- Lotions
- Candles

- Mayonnaise
- Crackers
- and more!

- Tofu
- Soy nuts
- Soy sauce
- Soy burgers
- Soy yogurt

- Soy milk
- Corn flakes
- Corn syrup
- Tortillas
- Pancake flour

5 To You!

4 Distribution

Processed and packaged soybean and corn products travel mainly by truck, rail and barge to reach customers. We find the finished products in our grocery stores, co-ops, building centers, gas stations, hospitals, restaurants, factories, movie theaters and more.

What do you use that is made with corn or soybean oil?

How can you know if your food or your pet's food has soybeans or corn in them?

Soybean meal and cornmeal add valuable nutrients to our foods.

True or False?

Most of the corn grown in Minnesota is field corn. Its hard kernels are a main ingredient in livestock feed and industrial products. What is the sweet and tasty corn that you eat called?

Minnesota Livestock

Animals are a huge part of Minnesota's agriculture landscape. Our livestock thrives because our state is the perfect place to grow the food they need. Some of them graze on grass in the summer and dried grass or corn (hay or silage) in the winter. All are fed carefully balanced mixed rations with everything they need for a healthy diet. Each animal's ration differs. Vitamins, minerals and grains such as ground corn, oats, sorghum, soybean meal and sugarbeet pulp are often in the mix. Cattle, hogs and turkeys (numbered below) are Minnesota's leading agricultural livestock. Horses and many other animals live on today's farms, too.

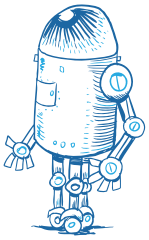
How is each important to our state—and to your life?

1

Cattle were likely domesticated in Europe and Asia way back in the Stone Age. Christopher Columbus introduced cattle to the western world on his second voyage in 1493. The first cattle in Minnesota were for feeding soldiers at Fort Snelling, established in 1820.

Minnesota has two types of cattle: **beef** and **dairy**.

- **Beef cattle** are raised for meat and have more muscular bodies. They efficiently turn the food they eat into meat we call beef.
- **Dairy cattle** are efficient in turning the energy from their food into milk. Milk from dairy cattle is made into dozens of products, including cheese, yogurt, ice cream, butter, sour cream, cottage cheese and kefir. While dairy animals are used for beef, too, milk is their main purpose.



Minnesota currently has about 50 farms using robotic milking machines in one of agriculture's newest technologies!

Cattle can graze on grass and other plants inedible to humans and turn them into meat, milk and more. Cattle by-products improve our lives, too. Soap, shampoo, medicine, leather and sports equipment (footballs, baseball gloves, etc.) are just a few items we use daily.

2

Hogs (also called pigs) are native to Eurasian and African continents. Columbus took eight hogs on his voyage to Cuba in 1493, but "the Father of the American Hog Industry" is Hernando de Soto. This Spanish explorer landed with 13 hogs at Tampa Bay, Florida in 1539. Later, pioneers moving west took their indispensible hogs with them. Baby pigs in wooden crates hung from the axels of prairie schooners. After the Civil War, the pork industry moved to the upper Midwest, where huge fields of feed grains grew. Minnesota ranked second in U.S. hogs marketed in 2013.

China is the world's number one producer and consumer of fresh pork.

3

Turkeys are the only major meat animals native to North America. Turkey consumption has more than doubled over the past 25 years. Every year more turkeys are produced in Minnesota than anywhere else in the nation. The gobbler that shows up on Thanksgiving tables is a descendant of the wild turkey native to our forests. We enjoy turkey year-round as tenderloins, ground turkey, breakfast sausage, deli meat and more.

Compared to a turkey of the 1930s, each turkey today produces twice as much meat with half as much feed. Why? New technologies in animal breeding and feeding make the difference.

Benjamin Franklin wanted the turkey as our nation's official bird! It's a true American original!

Horses in prehistoric forms roamed North America, but they died out long before humans came. Later, Spanish explorers brought horses to the New World. Those first horses were domesticated, but some escaped or were turned out into the wild. Indians captured wild horses and began using them for hunting, traveling and bartering. Settlers and ranchers used horses for helping with farm work, pulling machinery, working cattle, logging and transportation. Minnesota is still home to thousands of horses. Most are used for pleasure riding, horse show competitions, and sports events such as rodeos and horse races. Horses are on some police forces, too, serving as partners with mounted patrols.

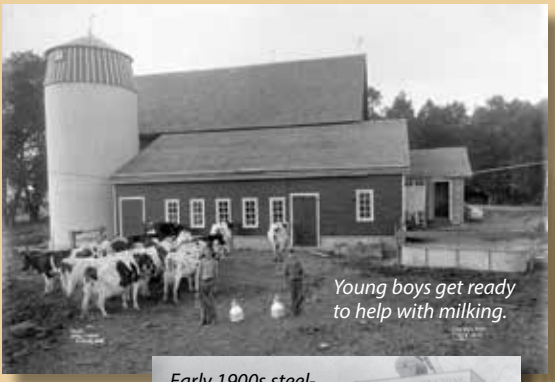
Horses are found throughout Minnesota. The largest concentration is in the Twin Cities metro area. What might explain this?

Llamas, alpacas, sheep, goats, ducks, chickens, red deer, emus, fish and bison are just a few other animals raised on Minnesota farms. Why do you think farmers are interested in raising these animals?

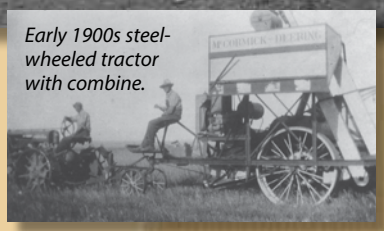
Bison is one of the fastest growing sources for meat today.

Photos Courtesy University of Minnesota Agricultural Experiment Station

Minnesota Agriculture: Big Changes in the 1900s



Young boys get ready to help with milking.



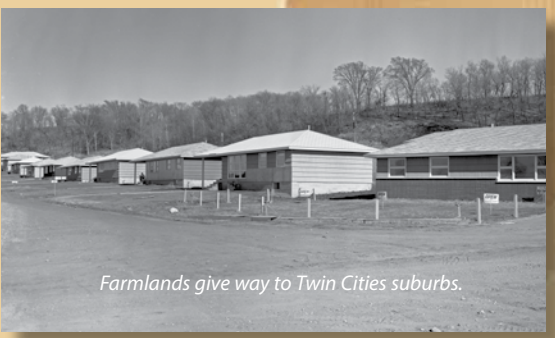
Early 1900s steel-wheeled tractor with combine.

All Photos Courtesy MN Historical Society

Wind moves valuable soil from fields, filling ditches and burying fence posts.

Bagging hybrid seed corn, 1945.

By 1954, tractors outnumbered horses and mules. How did having a tractor make a huge difference to a farmer?



Farmlands give way to Twin Cities suburbs.

Back to Variety

As the 1900s began, most farms were small family farms of an average 170 acres. **Diversified farming** was back. As in the earliest days of agriculture, farmers were raising a variety of crops and livestock instead of one main crop.

Early Technology: New Machines Help Farmers

Cars, trucks and tractors came on the scene in the 1900s. Imagine the change in a farm family's life! Farm machines were gradually replacing animal power and handwork. Timesaving inventions like the combine could cut, thresh and clean crops in just one pass through the field. Cows could be milked by machine instead of by hand. New inventions helped families farm more land. They could produce more food in less time without as much back-breaking labor.

Dust Bowl Days

The Dust Bowl came to the nation in the early 1930s. This sad, tough time lasted for more than a decade. Farmers had spent many years grazing large herds of cattle and plowing the plains for croplands, not knowing that harm was being done. The grasses holding soil in place were destroyed. When drought and wind came, disaster followed. The soil eroded and the Great Plains became the Dust Bowl. Tons of dust killed crops and forced people to flee their homes. Dust choked thousands of farm animals and piled into homes and schools. Many farmers were forced out of business, but people now saw the need to protect the soil. Farmers learned new ways to save soil. They rotated crops, used strip cropping and contour plowing and planted trees to protect soil from wind damage.

Solving New Challenges

Three big developments followed the Dust Bowl days: **Hybrid seeds**, **livestock vaccines** and **commercial fertilizers.** Look up and define each.

- Hybrid seeds _____
- Livestock vaccines _____
- Commercial fertilizers _____

Discuss: *Why do you think people were motivated to develop these things? In the end, how did each help agriculture—and people?*

Crop Protection

After about 1950, scientists developed new **crop protection chemicals** to control weeds, pests, insects and diseases. That means higher crop yields. Farmers are trained to use these chemicals with great care and caution to protect groundwater, air, soil, animals and themselves. The challenge continues to find the best ways to feed the world while protecting natural resources.

Land Use: Farms to Cities

Minnesota cropland once stretched as far as the eye could see. That changed as people began leaving farms for urban jobs, and growing towns and cities took more space. By 1950, more Minnesotans lived in cities than on farms for the first time ever. Thousands of acres of farmland were turned into suburban neighborhoods, factories, businesses, public buildings, shopping malls, golf courses and more.

- Imagine a farm family moving to the city for a new life. How would their lives change?
- What would happen to our food and fiber supplies if everyone moved into towns and cities?
- What happens to rural communities when large numbers of people leave?

Fast N Fun

Surfing the NET

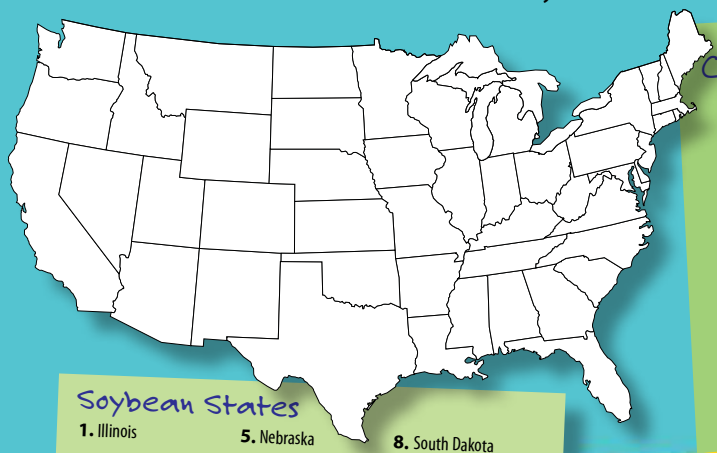
Do You Know Where Your Food Comes From?

Discover the stories behind your food favorites using this menu:

urbanext.illinois.edu/food

Talking Corn ... and Soybeans

In 2013 Minnesota was fourth in the nation in corn production and third in soybean production. The top ten corn-and soybean-producing states are listed below. The trick for you is to label each state using the postal abbreviation. Then color the corn states one color and the soybean states another color.



Corn States

1. Iowa
2. Illinois
3. Nebraska
4. Minnesota
5. Indiana
6. South Dakota
7. Ohio
8. Kansas
9. Wisconsin
10. Missouri

Soybean States

1. Illinois
2. Iowa
3. Minnesota
4. Indiana
5. Nebraska
6. Ohio
7. Missouri
8. South Dakota
9. Arkansas
10. North Dakota

What can you infer about where corn and soybeans are grown?

Plants and Animals On Your Plate

Next time you bite into a pizza, think about all the items from plants and animals that go into making pizzas.

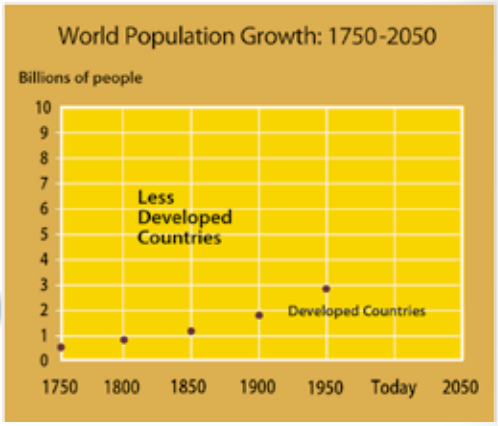
Survey your class to find out their favorite pizza topping. Use this bar graph to chart the results.

What's America's favorite pizza topping?

World Population: Connect the Dots

World population today is about 7.2 billion and growing fast. It is expected to reach 9.6 billion by 2050. Add those dots to the graph below and connect all the dots. What trend do you see? How might this affect you?

It's a fact: China is the world's most populous country today. By about 2028, India is expected to pass China.



www.census.gov/popclock

Thin is in!

1950

Today

Today's pigs are bred and fed to be leaner than the pigs of yesteryear. Compared with pigs from the 1950s, today's slimmer model has 75 percent less fat, thanks to superior **genetics** and new technologies in hog production. Why? Livestock growers know it's what health-conscious Americans want and will buy. Pleasing the customers keeps their business growing.

Look for the Label!

Military veterans who raise crops and livestock have an important new marketing tool. It's the Homegrown By Heroes label! The red-white-and-blue image is an easy way to identify farmer-veteran products and to support our military veterans. The program started in Kentucky but is now nationwide.

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