Minnesota Agriculture in the Classroom

AgMag

Exploring Minnesota Agriculture with Today's Youth

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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?

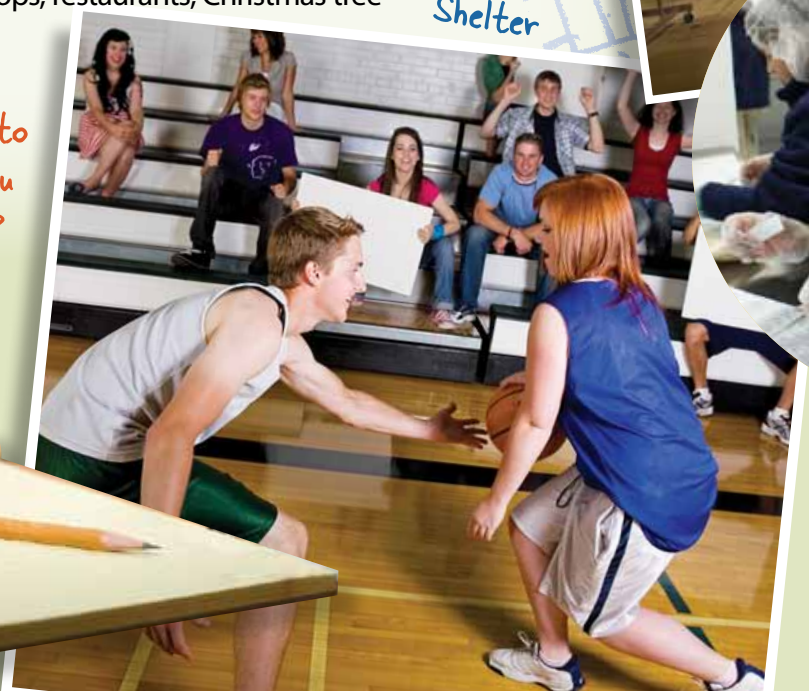
Food

Clothing

- 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 basketball uniform and play on a wooden floor, 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.

Shelter

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:

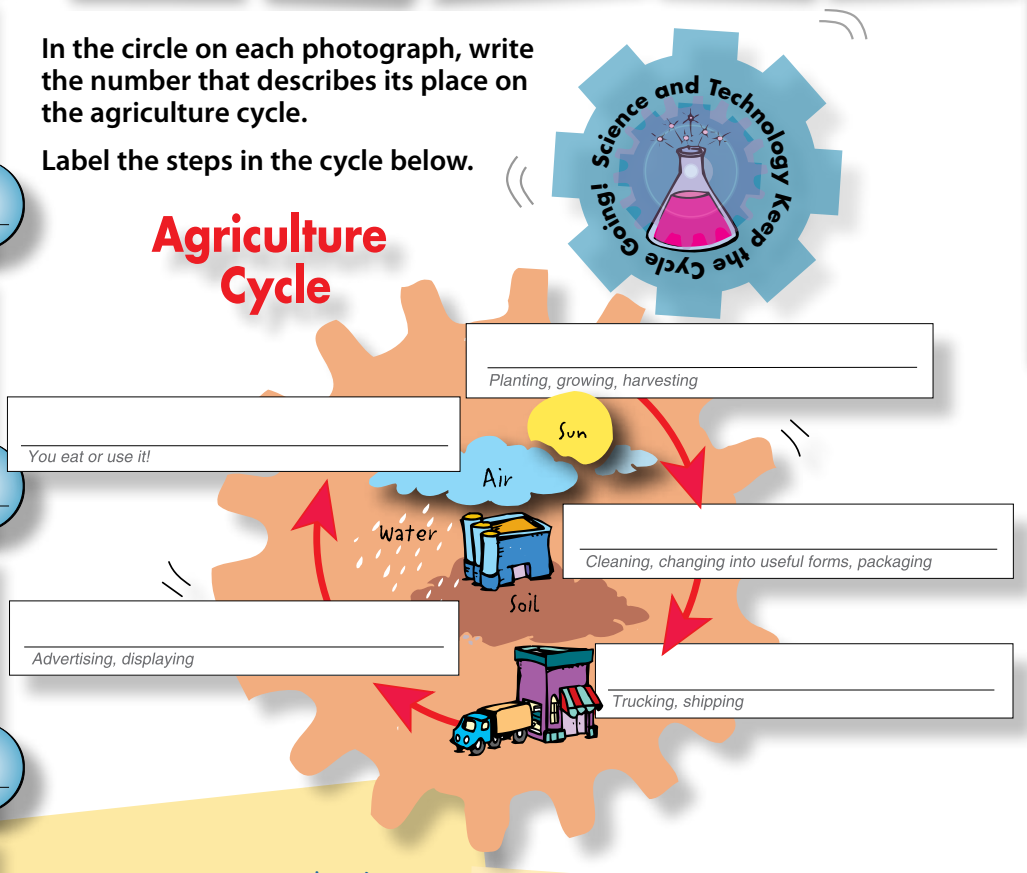
- starts with sunshine, air, water, soil and plants
- uses energy and equipment
- changes raw materials into many different things
- gets agriculture products to us in forms we can use!

The five steps below are part of most agriculture cycles.

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

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

Label the steps in the cycle below.



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?

Photos Courtesy University of Minnesota Agricultural Experiment Station

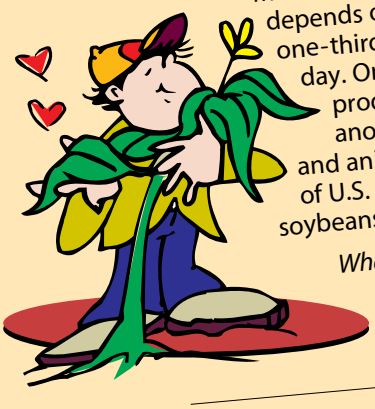
A Tale of Two Kingdoms

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

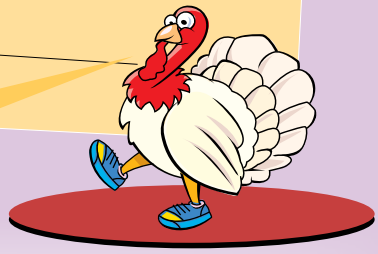
Millions of people around the globe depend on animals for food, clothing and shelter.

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

_____

Did you say pepperoni?

Read pages 4 & 5!



Thanks Animals

Soil Builders

Where there are animals, there is also manure. **Manure** passes out of an animal's digestive system after most nutrients have been absorbed by the intestines. **Think:** *cow pies!*

Animal manure adds vital nutrients to the soil and helps plants grow. Manure is worth a lot!

Dig In and Find Out More!

Leftover Munchers

Farm animals eat things we don't—such as soybean meal, sugarbeet pulp, corn stalks and pea vines. They help us recycle the leftovers when we process grains, vegetables and other foods for human use. Some animals, such as pigs, eat leftovers from processing plants, school lunches, bakeries and even cereal companies. It all adds up to less in our landfills!

Job Creators

Farm animals provide jobs and income for many people, both on and off the farm. How many such jobs can you name?

_____

_____

_____

_____

_____

_____

_____

The world is home to about 380,000 species of plants. About 100 kinds are regularly grown and eaten as human food. More than half of the world's food comes from only four crops. They are wheat, rice, corn and potatoes.

Other than humans, who farms? Gorillas, ants or groundhogs?

Answer: ants

Hogs from Producers to Plates

A hog farmer is someone who raises pigs on a farm. Some hog farmers raise piglets from birth until they are full grown and sold. This is a "farrow to finish" operation. Other hog farmers handle just one part of raising pigs. Some keep the piglets only until they are weaned from their mother's milk. When piglets reach weights of 30 to 60 pounds, they are sold to a different farmer who raises them until they are full grown.

1

Sows are pregnant for about 114 days before they give birth. Average litters are 10 to 14 piglets.

114 days! That's 3 months, 3 weeks, and 3 days!

Sows rest, give birth and nurse their new babies in pens called farrowing stalls. The stalls protect piglets from being rolled on or stepped on by the sow.

*Keeping pigs healthy is a farmer's first concern. Pigs are fed carefully balanced **rations** matched to their age and weight. They always have fresh water.*

2

On most Minnesota farms, pigs live in clean, modern buildings that protect them from weather and predators. Temperature is carefully controlled. Fans and sprinkling systems cool pigs in summer. Heat lamps warm them in winter.

3

Hogs go to market when they reach 260 to 280 pounds. Trucks carry them from farms to meat processing plants.

4

Government inspectors check hogs for health and quality when they arrive at the processing plant. Pork is inspected many times as it moves through the processing cycle. Food safety and healthy meat are the top concerns.

5

Curing bacon

Pork is cut or ground during processing. Some pork cuts are processed (smoked, cured, marinated, etc.) further.

*After the fat, bones and organs are removed, a 270-pound hog ends up as a carcass of about 185 pounds. From this, about 140 pounds will become cuts of meat. The rest are used as **by-products**.*

Think & Discuss

Which step in the production cycle does each of these photos show?

Measuring up — A newborn piglet weighs about 3 pounds and is about 11 inches long.

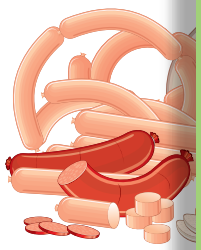
Vacuum sealing bacon

Packaging hams

Inspecting and drying pepperoni

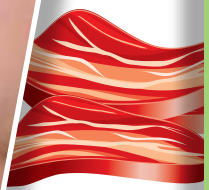
Bacon

Sausage



Hot dogs

Pepperoni



Pork chops

Ham

6

These and many other pork products are sold to restaurants, grocery stores, schools and other places.

Pork chops, ham, bacon, sausage, lunch meat, hot dogs, ribs, steaks, roasts and pepperoni are some products that come from hogs.

Minnesota hog products are shipped all over the world. Japan and Mexico are our leading buyers.

Photos Courtesy Minnesota Pork Board and Hormel Foods

Makin' Bacon... and more!

A hog is not all chops and bacon. Nothing is wasted. The parts that can't be used as food go into by-products. A by-product is something of value that's made in addition to the main product.

Parts of hogs have an important place in our lives. Pig heart valves are used to replace damaged human heart valves. Skin from pigs is used to treat serious burns. Match the numbers and letters to learn more about hog by-products. z

1.	Blood	**A.**	Chewing gum, lard, paints, lubricants, candles, crayons
2.	Bones Hooves	**B.**	Adhesives, plastics, fabric dyes, inks, leather finishes, glue
3.	Hair	**C.**	Gelatin for use in ice cream, combs, bone china
4.	Hide	**D.**	Air filters, bristle brushes, upholstery
5.	Fats Oils Glycerol	**E.**	Drum heads, wallets, luggage, gloves, fertilizer

Did you Know?

- A hog can eat up to 9 pounds of feed per day. They need a balanced diet, just as humans do: protein, carbs and fat. They eat mostly corn and soybean meal.
- A pig eats 2.5 pounds of food to gain a pound of weight.
- U.S. citizens eat about 50 pounds of pork per person each year. People of some religions don't eat pork at all.
- To protect pigs from germs, many pig farmers wear special boots and coveralls (or clothing) while in their hog buildings.
- While most pigs are raised in modern buildings, a few farms raise them outdoors.
- Pigs won't overeat, unlike humans!
- Pigs cannot sweat.

Think & Discuss

Many hogs are produced in states that also raise a lot of corn and soybeans. Why do you think this is so?

Pigs and hogs are also called swine.

What's a Pig? What's a Hog?

Pigs are younger and weigh less than 120 pounds. Hogs are older and weigh over 120 pounds. Either word means the same to most people.

Pigs are not native to North America. Where did they come from?

Global Markets for Minnesota Agriculture

Just because food is grown in a country doesn't mean it stays there. Most countries **export** at least some of their agriculture products. Minnesota exports one-third of our agriculture products! We **import** (buy) from other countries, too. Why do countries buy and sell ag products from one another?

Some places have little suitable land to grow food. They may have poor climates, or be on islands, mountains or deserts. Much of the land may be covered with cities. With limited land and water, they can't grow enough food to feed the people. These places must import.

Most people enjoy eating foods that don't grow in their locale. Did you have a banana or cinnamon toast for breakfast? Did someone drink cocoa, coffee or tea? Importing made it possible; these things don't grow here. We use products from other countries, and they use products from us. Food exports and imports bring variety and flavor to our meals.

The demand for our exports is increasing. In countries where family income is rising, people who can afford more variety welcome our exports (especially meat). Many countries buy our raw commodities for ingredients in their own food. Imported soybeans for tofu or corn for tortillas are examples. We're not just feeding people, either. Countries growing more livestock need **feed** (corn, soybeans, etc.) for their animals. In countries where populations are exploding, people need more of everything.

Minnesota agriculture helps keep our state's **economy** strong! Our top four exports are soybeans, corn, pork and livestock feed. China is our largest export customer.

Minnesota Connections

Follow the Exports

You may need a Minnesota map and a world map to locate these places. The dots on your Minnesota map mark each of the communities named below.

Chickens from Worthington are served in a restaurant in Canada. *Draw an arrow from Worthington to Canada.*

Rochester pork is served at a wedding in Japan. *Draw an arrow from Rochester to Japan.*

Sugar from Moorhead sugarbeets is sold at a German grocery. *Draw an arrow from Moorhead to Germany.*

Duluth timber is sold to a Mexican paper mill. *Draw an arrow from Duluth to Mexico.*

More Mouths to Feed

Photo Courtesy Dave Hanson

The world population gains about 150 people (births minus deaths) every minute around the clock. At this rate, how many more people will be added to the world in one hour? _____

How many more by this time tomorrow? _____
Why is this important for us to know?

See U.S. and world population growth with your own eyes:

www.census.gov/popclock

The current world population of 7.2 billion is projected to grow by 1 billion over the next 12 years, with half that growth in Africa. World population is expected to reach 9.6 billion by 2050*. All these people will need food, clothing, water and shelter. Demand will grow for roads, schools, fuel, sewers, power plants, homes, factories, malls and airports.

Like today, most of the world's future population will live in **less developed** countries, where people have less money and fewer resources. Most people will live in cities. They will be consumers, rather than producers, of food and other resources.

How will we meet the needs of a growing population? Who will provide?

*United Nations, June 13, 2013.

Hunger Here At Home

Volunteers package food at Second Harvest Heartland.
Photo Courtesy Second Harvest Heartland

People are hungry everywhere in the world—including Minnesota. Many families do not have enough money to pay for all their needs. Organizations like Second Harvest Heartland and community **food shelves** can help. They collect and distribute millions of pounds of food each year to families needing food. Where do Second Harvest Heartland and your local food shelves get the food? Invite someone who works there to come and share the story. You'll be surprised at what you discover!

Many Minnesota farmers, growers and agribusinesses help supply food for food shelves. Some produce extra food just to help others in need.

Minnesota's Powerhouse 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. Meet four of Minnesota's powerhouse livestock animals.

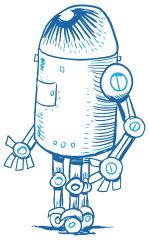
How is each important to our state—and to your life?

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. The "corn belt" also became the "hog belt."

China is the world's number one producer and consumer of fresh pork. Minnesota ranked 3rd in U.S. hog production in 2012.

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!

4

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 markets for meat today.

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/kids

As the choices appear, click on the icon Fresh from the World ... Where Your Food Comes From. See how foods from around the world make their way to your kitchen!

Talking Turkey ... and Hogs

In 2012, Minnesota led the nation in turkey production and we were third in hogs. The top ten turkey and hog-producing states are listed below. The trick for you is to label each state using the postal abbreviation. Then color the turkey states one color and the hog states another. Some colors will overlap.

Turkey States

1. Minnesota
2. North Carolina
3. Arkansas
4. Missouri
5. Virginia
6. Indiana
7. California
8. South Carolina
9. Pennsylvania
10. Ohio

Hog /Pig States

1. Iowa
2. North Carolina
3. Minnesota
4. Illinois
5. Indiana
6. Nebraska
7. Missouri
8. Oklahoma
9. Ohio
10. Kansas

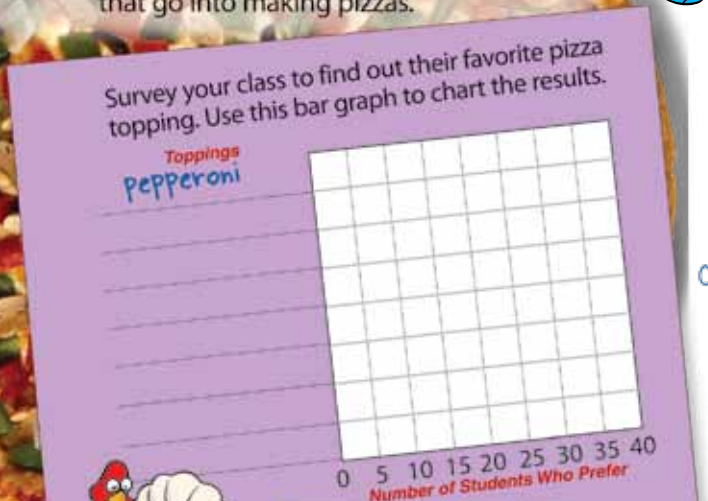
Turkey and hog manure are great fertilizers. Farmers use it to enrich their soils.

What can you **infer** about where turkeys and hogs 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.

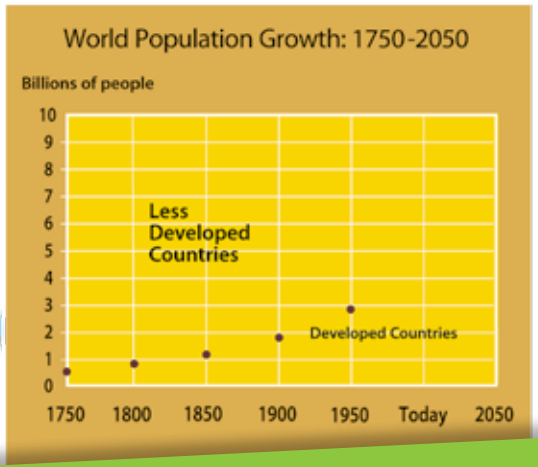


What's America's favorite pizza topping?

World Population: Connect the Dots

Use information on page 6 to add dots to the graph for today and for 2050. Connect 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.



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 will soon be nationwide.

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.

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