

AgMag



2

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THE MAGAZINE OF MINNESOTA
AGRICULTURE IN THE CLASSROOM

Agriculture, the land and 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 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.



Take A Closer Look!
What is this Minnesota crop?

Learn more on page 7.

Ag makes the
world go round!

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:

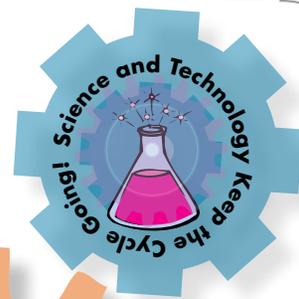
- starts with sunshine, air, water, soil and plants
- uses energy and equipment
- changes raw materials into many different things
- gets agriculture products to us in forms we can use!

The five steps below are part of most agriculture cycles.

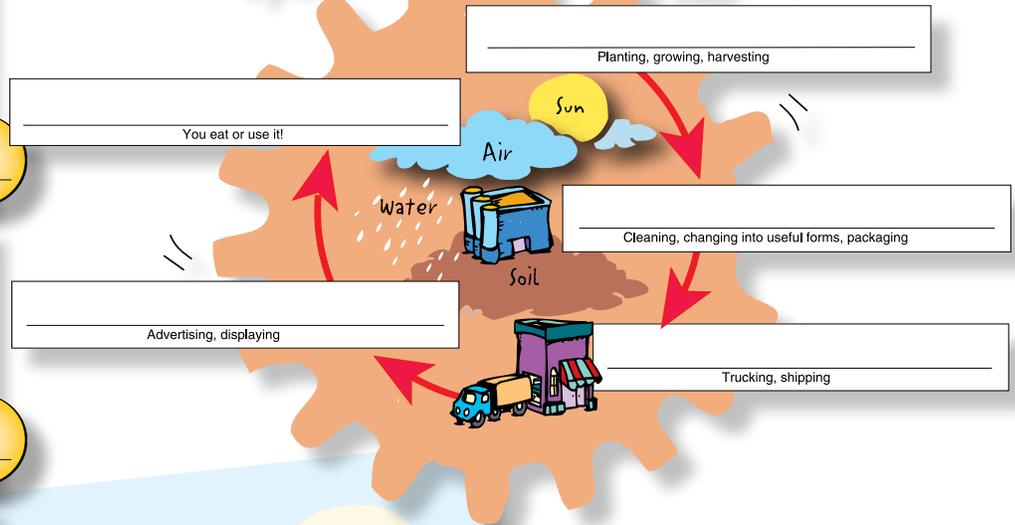


In the circle on each photograph, write the number that describes its place on the agriculture cycle.

Label the steps in the cycle below.



Agriculture Cycle



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

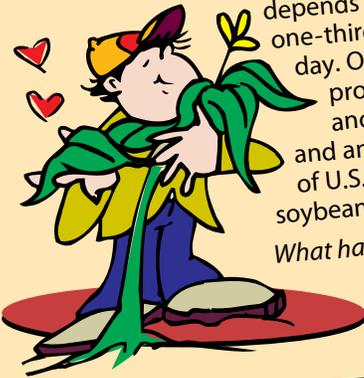
Why are sun, air, water and soil part of the agriculture cycle?

A Tale of Two Kingdoms

Plants

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.

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?

A N D

Animals

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

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!

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?

Dig In

and Find Out More!

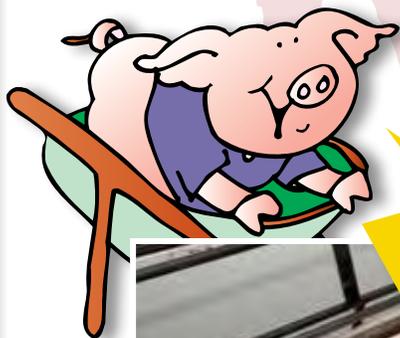
The world is home to about 380,000 species of plants. About 100 kinds are regularly grown and eaten as human food. More than half of the world's food comes from only four crops. They are wheat, rice, corn and potatoes.

Q. 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.



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.

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.

3



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

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.





Packaging hams



Inspecting and drying pepperoni



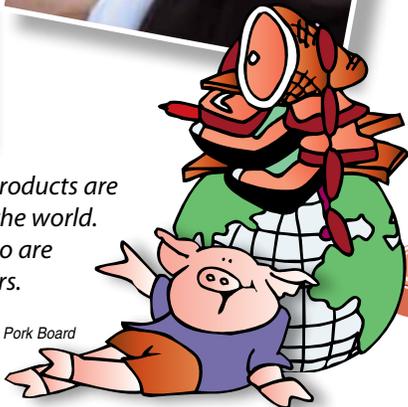
These and many other pork products are sold to restaurants, grocery stores, schools and other places.

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

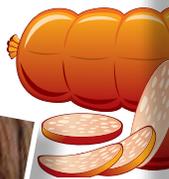


Minnesota hog products are shipped all over the world. Japan and Mexico are our leading buyers.

Photos Courtesy Minnesota Pork Board and Hormel Foods



Hot dogs



Pepperoni



Pork chops

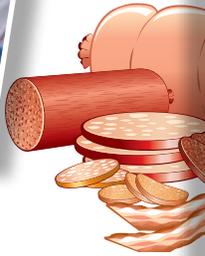


Ham

Bacon



Sausage



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.

- | | |
|------------------------------------|--|
| 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

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.

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



Photo Courtesy Dave Hansen

More Mouths to Feed

Our world population passed 7 billion in October 2011. 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? _____

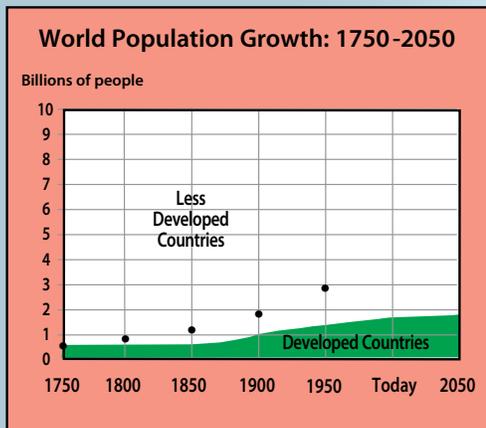
How many more by this time tomorrow? _____

Watch the clock on the website below to show what's up in world population. Why is this important for us to know?

www.worldpopulationbalance.org



By 2050 the world could have 9.5 billion at the current growth rate. 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. Much farmland continues to be taken out of food production to meet the other demands.



What's Ahead?

Use information above to add dots to the graph for today and for 2050. Then connect all the dots. What trend do you see?

Like today, most of the world's future population will live in less-developed countries, where people have less money and fewer resources. They 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?

Agriculture: The Heart of Survival

When Things Go Wrong Imagine life without enough food to eat, fuel to heat or clothes to wear. That's bad enough. But then add the fear of violence, bombs and gunshots. This is everyday life for people in some countries.

What happens to food supplies in any country where war goes on and on? Growing and harvest seasons are interrupted. What else happens?

What happens to food supplies when drought or poor growing seasons cause crop failures? When there are few good roads or railways? When people have no money to buy food? When hurricanes, tsunamis, earthquakes and other weather events occur? Natural disasters can happen anywhere. The demands on agriculture are sudden and urgent. Food, water, shelter and clothes are first concerns.

Hope for starving or suffering people lies in help from others. Countries with good agriculture, like the U.S., can help. Ag is the heart of survival. Still, getting food and farm products to hungry people is only the first step. More important is making it possible for them to end their own hunger by producing more of their own food. What stands in the way? Ask your teacher for the Why Are They Hungry? crossword in the AgMag Teacher Guide.



Our country, too, has disasters. In October 2012, Superstorm Sandy took lives and destroyed property in the eastern U.S. How was agriculture needed immediately?

One World: Food for Thought

To keep up with changing expectations and population growth from 7 billion now to 9.5 billion in the next 50 years, food production will have to double.

Q: Why is food demand expected to double even though the population doesn't double? And what does this do to Earth's natural resources?

As people in developing countries are lifted out of poverty, they want and can afford more food options. More people will want foods like hamburgers, pizza, fast food and ice cream. These foods require many resources to produce and distribute. Agriculture's big challenge is to meet the world's food demands while also protecting the environment.

Q: How would your life be different if you had to spend most of your time just getting water?

www.waterforlife.org



Everyone needs water for survival. Most Americans take water for granted. Getting water means no more than reaching for a faucet. But imagine living where you need to walk 7 or more miles one way for water each day. This is the reality for many people around the world.

Q: Why might food grown in a country not stay in that country?

Food is a global business. Just because food is grown in a country doesn't mean it's available for the local people to eat. Example: The biggest producers of cacao are the African countries of Ivory Coast and Ghana. The average African, however, eats only about 4 ounces of chocolate per year. Each American eats about 11 pounds of chocolate per year, yet the only state growing cacao is Hawaii. Why is this happening?

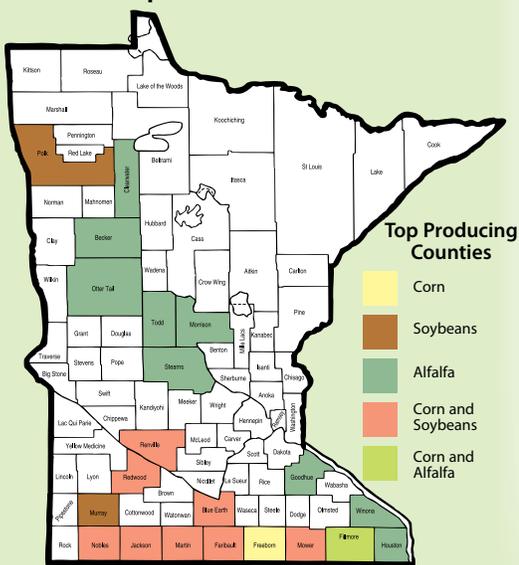
How has agriculture changed Minnesota's landscape?

In the last AgMag you read about the transition of Minnesota's grasslands and prairies to farmland. The 20th century brought even greater changes in farming and land use. Two world wars, dust storms and drought, new technology and a roller-coaster economy all affected agriculture and the landscape.

Can you name the plant?

Read the clues to discover which of the *Ten Plants That Changed Minnesota* are featured on this page.

- Native Americans were growing this crop long before Columbus arrived. Some of the harvest today goes to livestock feed. Most is used to make human food, fuel and other useful items. This crop covers about 7.5 million acres in Minnesota, making us the fourth largest producer in the U.S.



- As a primary hay/**forage** crop, this plant made it possible to store year-round food for dairy and beef cattle. The growth of this crop and dairy farming went hand-in-hand. This valuable crop helps prevent soil erosion and improves soil fertility. The flowers are a source of nectar.

- Minnesota is third in the nation for growing this "miracle crop," the world's leading source of edible protein and oil. Its oil is used as food for humans and livestock. It is used in ink, cosmetics, fuel, paint, plastic and much more.

As you know more about where these Minnesota crops grow, how would you describe the landscape of these counties today?

Crops Helping Change Minnesota's Landscape

King Corn

Yields have soared from 39 bushels/acre in 1959 to 177 bushels/acre in 2010, due to cold-hardy varieties produced especially for Minnesota. The U of M has introduced nearly 200 **hybrids**. In 1992, *TIME* magazine designated hybrid seed corn as one of the most significant events that shaped our world during the past 1,000 years.

Try This! Corn has more than 3,500 uses in commercial and industrial products and manufacturing processes. Name at least 25!



Top Ten

Awesome Alfalfa

Alfalfa has the high protein and easily digestible fiber that's a perfect food for dairy cattle. This **legume** crop is more nutritious than native pasture grasses. As farmers grew their dairy herds, they planted fields of alfalfa on the landscape.

Winner! Grimm alfalfa is named for the Carver County farmer who developed it with seeds he brought from Germany. It could withstand our cold winters or summer droughts much better than any other alfalfa could. Our soil and topography provide just what it needs.



Top Ten

Super Soybeans

In 1904 George Washington Carver changed the way people thought about soybeans: His studies proved they are not just a forage crop but also a valuable source of protein and oil. Today our landscape includes vast soybean fields as well as the many factories that process soybeans into products.

Try This! Go on a soybean hunt in your kitchen, basement and garage. On how many labels can you find soy listed as an ingredient?



Top Ten

Photos Courtesy University of Minnesota Agricultural Experiment Station



Ten Plants That Changed Minnesota

Alfalfa, American Elm Tree, Apples, Corn, Purple Loosestrife, Soybeans, Turf Grass, Wheat, White Pine, Wild Rice

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 one to begin. Try this all-star snack favorite: popcorn. Did you know that we have been eating it for 8,000 years?

How about apples? Did you know they are related to roses?

Talking Turkey ... and Hogs

In 2011, 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 | 5. Indiana | 8. Oklahoma |
| 2. North Carolina | 6. Nebraska | 9. Ohio |
| 3. Minnesota | 7. Missouri | 10. Kansas |
| 4. Illinois | | |

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?



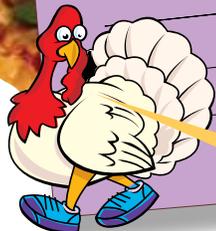
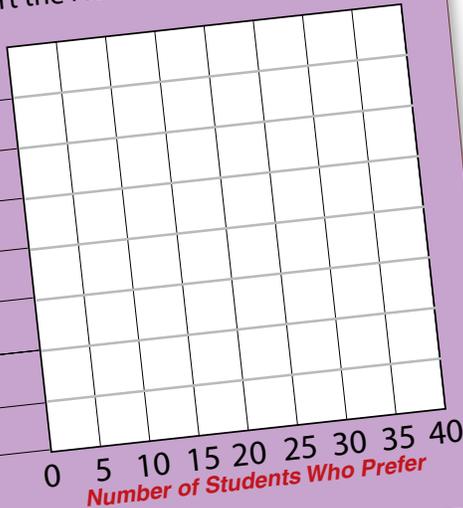
Plants and Animals On Your Plate

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.

Toppings

pepperoni



What's America's favorite pizza topping?

Think & Discuss

Josette Sheeran of the United Nations World Food Program has said:

"Without food, people have only three options: They riot, they emigrate or they die. None of these are acceptable options."

Did you know?

- A black-and-white Holstein is the most popular dairy cow in the U.S. A Holstein's spots are like fingerprints. No two cows have exactly the same pattern of spots!
- The fastest growing part of agriculture isn't a food crop. It's horticulture. Look up the word and list two examples of horticulture!

Country Corn



Q. What football position do pigs like to play?

A. Linbacker.