AgMag

Agriculture: Helping you every day!

Minnesota Agriculture in the Classroom

Fall • 2017-19

Agriculture is Everywhere!

When you woke up in your bed this morning, you already had your first meet-up with **agriculture**. Somewhere in your bedding and pajamas were probably fibers from cotton plants.

- Did you wash or shower with **soap**? That soap is made from fat from cattle and oil from plants such as palm, corn, and soybeans.
- Did you have cereal, **eggs**, milk, **bacon**, **pancakes**, buttered toast, or juice for breakfast? Thank agriculture again!
- Did you pack a lunch in a **paper** bag or finish your math by writing on paper? That paper comes from another agricultural crop—trees. Corn and soybeans may go into the **soy ink** in your books.
- Did you ride to school today? The **tires** on your bus, car, or bike are made from the rubber plant, cords from cotton, and tallow from cattle. Did you see a windbreak or a sod farm? All of these are agriculture, too.

Agriculture brings us almost everything we eat, wear, or use each day.

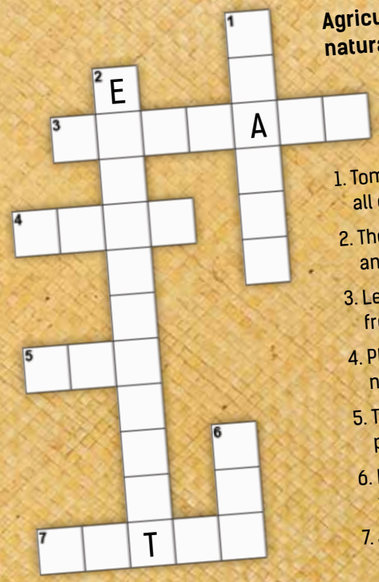
Find teacher guide and student resources at www.mnagmag.org

What is Agriculture?

Yes, agriculture is farming—planting and harvesting fruits and vegetables, raising **livestock** and poultry. But agriculture is more than this. It's the **industry** that grows, harvests, and brings us fiber, trees, turf, and landscaping materials.

- Food comes from plants and animals.
- Fiber is the raw material from plants and animals that we use to make cloth, rope, and more. Cotton, linen, silk, wool, sisal, and hemp are fibers.
- Trees give us fiber that becomes lumber, furniture, and firewood; pulp for paper; and hundreds of other things, including turpentine and medicines.
- Turf and landscaping materials include flowers, plants, and turf (sod) for beauty, pleasure, and recreation.

CROSSWORD
Natural Resources



Agriculture depends on Earth's natural and renewable resources. Solve the puzzle to find out what kinds of resources are needed by agriculture.

1. Tomatoes, strawberries, and soybeans all grow on these.
2. The surroundings in which plants and animals grow.
3. Leather, wool, and meat all come from these.
4. Plants are rooted in this and soak up nutrients from it.
5. This gives energy to plant leaves for photosynthesis.
6. Plants take carbon dioxide from this, which they need to grow food.
7. Just like humans, plants and animals need plenty of this to survive.

Photos Courtesy University of Minnesota Agricultural Experiment Station

Agriculture is more than farming!

Agriculture is our nation's largest industry. More than 20 million Americans work in agriculture. They have jobs in:

- **Production:** growing and harvesting plants; raising animals.
- **Processing:** changing raw materials into many different things.
- **Distribution:** getting the products to us.

1. Which part of agriculture does each group of workers below fit into? Label the three groups: production, processing, distribution.

2. Circle a career that interests you. How can you find out more about it?

A _____

- Food safety inspector
- Epidemiologist
- Sawmill worker
- Biochemist
- Food biosecurity specialist
- Food scientist
- Mechanical engineer
- Fashion designer
- Wood scientist
- Nutritionist
- Carpenter
- Meat scientist
- Microbiologist
- Food processors

B _____

- Rancher
- Forester
- Seed grower
- Veterinarian
- Farmer
- Biotechnologist
- Greenhouse manager
- Gardener
- Animal geneticist
- Soil scientist
- Horticulturist
- Entomologist
- Agronomist
- Climatologist
- Plant breeder
- Viticulturist

C _____

- Exporter
- Truck driver
- Highway engineer
- Restaurant owner
- Florist
- Grocer
- Software specialist
- Ship captain
- Pilot
- Pizza delivery driver
- Farmers market vendor
- Food store inspector
- International trade advisor
- Grain merchandiser
- Ad designer/ writer

Career Corner

Agriculture offers so many careers, not just farming (but that one is very important!). You might not know just how many different ways people work in agriculture. Here are just a few examples. To learn about other careers, visit www.agexplorer.com.

Jason Resch, Zone Operation Manager

Jason works for General Mills. In his work, He brings food products that came from ingredients grown on farms to places where people can buy them. These are things like Cheerios made from oats and Betty Crocker cake mixes made from wheat. That means he visits stores like Target, Walmart, and many grocery stores. But he also works with the General Mills marketing teams and supply chains. All of these groups work together to get the food products into stores to make sure people have access to them. As part of his job, Jason travels all over the U.S. and even to Mexico.

Myah Walker, Quality Manager

Myah has a Master's degree in Public health. She works for Sparboe Farms, which raises chickens and eggs. She helps make sure Sparboe's farms and processing plants follow food safety and quality rules. These rules determine how food is produced, how it is packaged, and how it is stored. Myah divides her work time between traveling to food sites and being in an office. Every day brings something different because of the wide range of areas her department covers.

Dr. Devan Compart, Ruminant Research Specialist

Dr. Compart has also worked as a zoo nutritionist.
Photo courtesy of Meleah Maynard, Slow Dog Studios

Dr. Compart works for Land O'Lakes. She does research on ruminants. These are animals like cows, sheep, goats, and bison that have stomachs with four parts. The research looks at whether feeding animals special feed additives helps the animals be healthier, or helps them produce more milk or meat. Her job takes her all over the U.S. to work with universities and farmers on her research. Because of the high level of scientific knowledge needed, this job usually requires a doctorate degree.

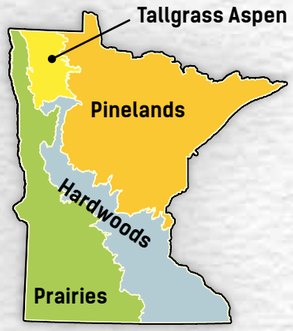
Mohamed Yakub, Science Outreach and Education Coordinator

Mohamed works for the College of Food, Agricultural and Natural Resource Sciences at the University of Minnesota. He works to connect scientists, teachers, and students about science research. The university conducts agricultural research using government funds. Those funds require that the research results must be shared widely. Mohamed brings the results to the wider community and to high schools. While doing that, he meets with people in academia, business, and government. He will even travel to Africa to learn about agricultural projects.

So Many Ag Career Choices!

Research a career in agriculture. Choose one you did not know much about before you started researching. (Hint: Look at the careers listed in the activity on the previous page.) On a separate piece of paper, write 2–3 paragraphs about that career. Talk about what the person doing that job does and why it is important for agriculture. For more information, visit this website: https://www.agriculture.purdue.edu/usda/careers:

Minnesota Grown



What makes Minnesota such a great state for agriculture? Many **soil types**, **terrains**, and **climate** that are good for growing plants and animals.

What Is a Biome?

Soil types, terrains, and climate are some of the things that caused **biomes** to form in our state. Biomes are part of the earth's surface that are divided by climate, soil types, and the kinds of plants and animals that live within them. Minnesota has four major biomes. These biomes greatly affect what can be grown in them. Something that can be grown easily in southwest MInnesota may not grow well in northeast Minnesota. The biomes and rainfall have a big impact on what grows best where in our state.

Tallgrass Aspen

This biome is in northwestern Minnesota. It is made up of a mix of prairie and hardwoods. Although it is the smallest in Minnesota, it also reaches up into three Canadian provinces. Farming is hard here because of its rocky, dry terrain. It is better for cattle farming instead.

Pinelands

The glaciers created ridges of rocky, sandy moraines and hundreds of lakes and swamps. This biome has many evergreen trees that like a short summer growing season. Peatlands occur on the flat bottoms of former glacial lakes.

Prairies

The receding glaciers left flat land and rich black topsoil. Most of the land is farmed. Our famous Red River Valley is in this biome. This is Minnesota's driest biome. Winds blowing across the soil can carry it away.

Hardwoods

This biome is warmer than pinelands, but cooler and moister than prairies. Most land has been cleared for farms and towns. There are many broadleaf trees and some pines. Blocks of glacial ice dropped large boulders, and melted and formed lakes.

Think & Discuss

1. How are the biomes different from one another?
2. Why do you think the Pineland biome's main crop is forests, not field crops?
3. What could you grow if you lived in the Hardwoods biome?
4. Why is the Prairie biome so good for farming crops?
5. If you were going to start a farm, which biome would you select? What would you grow on your farm?

Did you know? Find these counties on the map:

- Minnesota is the TOP producer in the country of turkeys. Kandiyohi County raises the most.
- The Mississippi River transports **59%** of all grain exported from the United States. The headwaters of the Mississippi River are in Clearwater County.
- Minnesota raises more sugarbeets than any other state in the U.S. Polk county leads Minnesota in sugarbeet production with **2.5 million tons**.
- Martin County has the most hogs of any county: **700,000!**
- Otter Tail County leads the state in bison (buffalo) production.

Matching

Match these 4 clues with the names of the growing areas on the right (A, B, C, or D). Then write the name of each area in its space on the map.

1.
- Flat terrain where large machinery can operate.
- Produces crops like wheat, soybeans, sunflowers, sugarbeets, and potatoes.
- Fertile prairie soils.

2.
- Fertile soils with good moisture.
- Produces corn, soybeans, cattle, and hogs.
- More southern location (longer growing season).

3.
- Hilly with moisture.
- Big producer of hay, pasture-lands, dairy cattle, and turkeys.
- Soils include rich, shallow, poorly drained, and sandy.

4.
- Rough terrain.
- Short frost-free season, lots of snow.
- Big producer of forests, but few field crops.

What Grows Where?

Which plants and animals grow where? Check out the map and clues. You'll discover Minnesota's four main growing areas. Which one do YOU live in?

Growing Areas

You'll find crops and livestock in every part of Minnesota, but this map shows their main growing areas.

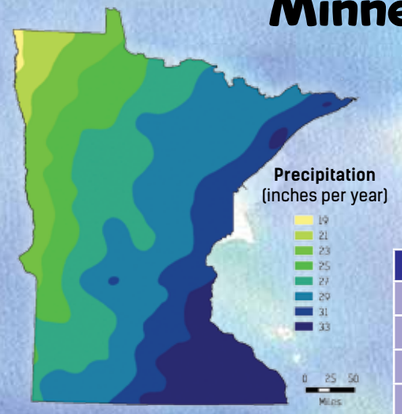
A Northeast

B Northwest

C Central / Southeast

D Southwest

Minnesota Rainfall: What and Where?



Data Source: National Weather Service, MN DNR, Soil & Water conservation Districts, and others; compiled by the MN DNR.

1. Which biome normally gets the least rainfall each year?

   _____

   Which biome gets the most?

   _____

Crop	Which Growing Area?
Hay and Pastureland	
Sugarbeets	
Corn and Soybeans	
Forest and Pine Trees	
Wheat	

2. Why must farmers understand rainfall patterns when they choose which crops to plant?
3. What happens to crops when rainfall is way above normal? Way below normal?
4. Imagine you're a farmer. In which of the four growing areas would it make the most sense to to raise the crops listed in the chart on the left? Write your answers, then use the Matching clues and Growing Areas information above to check your work.

State Agriculture Symbols

State Tree: Red (Norway) Pine Chosen: 1953

Red (Norway) pine trees can grow over 100 feet tall. What is the average life span of a red pine tree?

State Grain: Wild Rice Chosen: 1977

This was a staple food of the Ojibwe for centuries. Minnesota produces over half of the world's hand-harvested wild rice. Where does our wild rice grow? What are two ways it's harvested in Minnesota?

State Drink: Milk Chosen: 1984

Minnesota cows produce over one billion gallons of milk each year! Can you think of 10 milk products?

State Fruit: Honeycrisp Apple Chosen: 2006

Fourth graders from Anderson Elementary in Bayport lobbied the State Legislature to give us this state apple. Where was this juicy, crisp apple developed?

Are you symbol savvy? A symbol can take the place of words when it's the right picture or design. You quickly understand what the symbol stands for.

When we see the state flag or state seal, we think "Minnesota." A symbol can also be something that is not a design or photo but represents special things about Minnesota. Our state legislature has chosen many items from agriculture as official symbols to represent our state. See some of them below, and test your Minnesota symbol savvy!

Name the Symbol

Clue: Thriving in swamps, bogs, and damp woods, they grow slowly. They can live for 50 years or longer. It is illegal to pick them.

State Flower

Clue: These large black-and-white water birds have long black bills. Clumsy on land, they are excellent divers, underwater swimmers, and high-speed flyers.

State Bird

Clue: Minnesotans love to eat this fish which inhabits waters in all parts of the state, but mainly the large, cool lakes in northern Minnesota. Their eyes are sensitive, so they go to deep, dark waters during the day and move to shallow lake areas at night.

State Fish

Did you know?

Minnesota has an official state soil type. In 2012 Gov. Dayton signed a bill naming Lester as the official state soil of Minnesota. What is Lester, and where is it found?

... and Events

Minnesota's State Fair

Have you been to the State Fair? Besides being a lot of fun, the fair is also about agriculture. In fact, it was started by the Minnesota Agricultural Society as a way to promote agriculture. The first State Fair was held in 1859, one year after Minnesota became a state.

Photos Courtesy Minnesota State Fair

County Fairs

Just about every county in Minnesota has its own fair. Each county fair will spotlight the agriculture that is important in that region. Have you been to your county fair? What kinds of plants and animals did you see there?

Minnesota's Early Farmers From Ancient Days to 1900

Native Americans

Long before immigrants arrived and Minnesota became a state, the Ojibwe (sometimes called Anishinaabe) and the Dakota Native Americans farmed. The Ojibwe lived in the northern lakes and forests. They hunted and fished. They harvested wild berries, other plants, and wild rice. The Dakota settled in the prairie areas in southern Minnesota. Their villages dotted the Mississippi, Minnesota, St. Croix, and Cannon River banks. Dakota men were hunters and warriors; Dakota women were farmers. They grew corn, beans, and squash, a crop trio called the Three Sisters in native lore.

Today, Native Americans honor their agricultural heritage by growing and harvesting traditional crops like hominy (a type of white corn), wild rice, wild berries, maple syrup, buffalo meat products, and use birchbark to make baskets and crafts.

Early Immigrants

Immigrants from Europe began arriving in the early 1800s. They settled on small plots of land and were **subsistence farmers**. They grew just enough food to feed themselves and their farm animals, with some left over to trade for things they needed. It was a hard life, with little money, meager tools, crude homes, and few household goods. Subsistence farmers raised a variety of crops and livestock. Farms that grow a variety of crops are called **diversified farms**. Many farmers at that time planted oats, potatoes, corn, and beans. They kept a cow or two, a few chickens and pigs, and maybe a few sheep.

Free Land ... Westward Rush

The Homestead Act of 1862 provided free land to settlers. To earn 160 free acres, settlers had to live on and farm the land for five years. This brought 75,000 people, mostly from Europe, to Minnesota within three years. The new homesteaders plowed the prairie soil and planted crops, creating many small family farms. Many of the first homes were built from prairie sod. Farm machinery like steel-blade plows, mowers, reapers, and harvesters were invented to help with the work.

Bonanza Farms

Wheat production grew as new railroads connected farms to markets. Between 1875 and 1890, huge **bonanza farms** were created, especially in the Red River Valley. Funded by rich business people from eastern states, wheat farms covered thousands of acres. Hundreds of horses and huge teams of farmhands and machines worked these **specialized farms** (farms that grew mainly one crop). Most of the wheat was shipped to flour mills in Minneapolis.

Eventually, bonanza farms produced so much wheat that a surplus (oversupply) was created. Wheat was no longer profitable. Many bonanza farms were divided and sold, making smaller family farms again. Families began growing corn, oats, and a new hay crop called alfalfa. Some planted fruit trees. Others chose dairy farming, especially in the rolling countryside of southeastern Minnesota.

From earliest Native American farmers to arrivals from another continent—all were pioneers of Minnesota agriculture. Today, there are many kinds of farms in Minnesota, from family farms large and small, to large farms specializing in corn, soybeans, or sugarbeets, to cattle, sheep, poultry, and goat farms, to organic farms, to Native American wild rice sites—even farms raising llamas!

For more information about Minnesota's agriculture and farming history, visit http://www.mnagmag.org/archive.


Family homestead, late 1800s


Bonanza farm, late 1800s


Indian family guarding corn from blackbirds


Sod home, mid 1800s

Photos Courtesy Minnesota Historical Society

Technology on Farms

Many of today's farms are high-tech places.
How much do you know about technology on farms?

Which of the following is not used on farms today?

- Robots to milk cows
- Self-driving tractors
- Self-planting seeds
- Temperature and moisture sensors

Farmers today can use robots to help them milk cows more frequently. There are self-driving tractors. GPS helps farmers plan and map crops, guide tractors, and track crop yields. Temperature and moisture sensors allow farmers to know when crops may be overheated or in danger of cold, or when they need irrigation. Drones are used to check on crops, spray chemicals or irrigate, analyze field conditions, and even plant seeds. All of these technologies help farmers be much more efficient, safer, and environmentally sound.

A robotic milking machine milks a cow.

Blue Earth County farmer Pat Duncanson plants corn using iPads and other technology to read about the soil, seeds, path of the tractor, and much more.

Dairy farmers use technology to follow the milk production for each cow on their farm.

Acres of Pizza

Americans eat 75 acres of pizza every day!

Think about having a pizza delivered to your home. Match the pizza part with its agricultural source.

Cardboard for pizza box	Wheat
Crust	Pig
Pepperoni	Tree
Sauce	Cow
Cheese	Tomatoes

Learn about and order our free educational materials at **mn.agclassroom.org**.

Quirky Questions

Q. What do you get when a chicken lays an egg on top of a barn?

A. An eggroll.

Q. Why shouldn't you tell a secret on a farm?

A. Because the potatoes have eyes and the corn has ears.

What is it?:

This root vegetable grows underground and can weigh as much as 5 pounds. When it is harvested, it is processed into sugar! Minnesota is the leading provider of this sweet vegetable. What is it?

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