



## Why Ag in the Classroom?

Agriculture means survival. Over time, fewer and fewer people have close contact with farming and the total agricultural sector. They're not aware of their own and society's total dependence on agriculture. Our citizens must be agriculturally literate in order to make responsible decisions affecting this giant lifeline.

Teaching students to be agriculturally literate brings their learning to life! Helping students understand the farm-to-table process and the connection to natural resources is important in our consumer-driven society. That is what the student Minnesota AgMag Series is all about.

## Integration Ideas

### Social Studies

- Research the role that water and other natural resources have played throughout the history of Minnesota. Ideas include formation of cities, transportation, moving goods, power source for manufacturing, etc.
- Use the information on pages 6 and 7 to discuss the reasons that bring Hmong, East African, Hispanic, Asian Indian and other immigrants and refugees to Minnesota. Compare and contrast their experiences with earlier immigrant groups in the nineteenth century.

### Science and Health

- Use the agricultural examples in the AgMag to focus on environmental science and natural resources.
- Utilize the information on pollinators (pages 4-5) to identify opportunities to increase habitat and encourage pollinators on your school grounds or in your community.
- Assist students in discovering the pollinators that allow plants to produce their favorite fruits and vegetables. Research the nutritional value of these foods and their location on the MyPlate diagram.

- Use the science and technology connections to agriculture on pages 6 and 7 to discuss the impact of STEM on food production and the agricultural industry.

## Glossary

Some words in your AgMag may be unfamiliar to your students. These words often appear in bold type or in italics. Many are defined in the articles. Words you may wish to pre-teach are: **natural resources**, **aquatic** (cover); **surface water**, **groundwater**, **hydrologic cycle**, **photosynthesis**, **strip cropping**, **buffer strips**, **irrigation**, (page 2 and 3); **precision farming**, (page 6); **immigrants**, **crop rotation**, **minimum tillage**, (page 7); **aquifers**, (page 8).

### MINNESOTA AGRICULTURE IN THE CLASSROOM

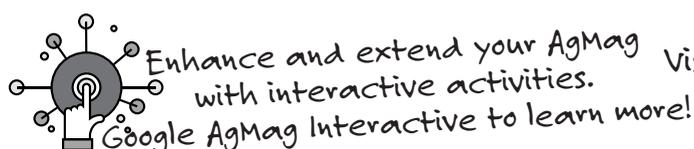
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#### Check out these new MAITC opportunities:

- 2nd Annual Summer Teacher Tour – *The Many Faces of Minnesota Agriculture*. Download the brochure and register at [www.mda.state.mn.us/maitc](http://www.mda.state.mn.us/maitc)
- AgMag History Archive – View or download our history content from past issues at [www.mda.state.mn.us/agmaghistory](http://www.mda.state.mn.us/agmaghistory)
- AgMag Issues Archive – View or download AgMag and Teacher Guides back to Volume 21 (2006/2007) at [www.mda.state.mn.us/agmagarchive](http://www.mda.state.mn.us/agmagarchive)

## Minnesota K-12 Academic Standards

Subject	Standard Code	Benchmark
Social Studies	4.3.4.9.1	Explain how humans adapt to and/or modify the physical environment and how they are in turn affected by these adaptations and modifications.
Social Studies	6.3.3.6.1	Locate, identify and describe major physical features in Minnesota; explain why physical features and the location of resources affect settlement and the growth of cities in Minnesota.
Social Studies	6.3.4.10.1	Describe how land was used during different time periods in Minnesota history; explain how and why land use has changed over time.
Social Studies	6.4.4.23.2	Identify the major Minnesota political figures, ideas and industries that have shaped or continue to shape Minnesota and the United States today.
Science	5.4.2.1.1	Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts as well as inputs and outputs.
Science	5.4.4.1.1	Give examples of beneficial and harmful human interaction with natural systems.
Health	Standard 5	Students will demonstrate the ability to use decision-making skills to enhance health.



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# Discussion Prompters

## Cover (Social Studies, Science, Environmental Studies)

1. Just what are Minnesota's natural resources? Brainstorm a list; think about all the wonderful things that occupy our air, land and water. Why is it necessary to protect these treasures?
2. What natural resources can you find in these pictures? (*Water, soil, air, trees, plants*)
3. Why do we say farmers are some of our most important environmentalists? (*They manage such a large amount of land—over 46% nationally—so the ways they care for and protect resources are very important.*)

## Student Pages 2 and 3 (Social Studies, Science, Economics)

1. How many ways do you use water each day? How much water do you use? (Showering, 5 gal/min; toilet flushing, 6 gal; brushing teeth, 2 gal; hand washing, 2 gal; automatic dishwasher, 15 gal/load; washing machine, 20-30 gal/load.) How could you save water in your daily activities?
2. Farmers do much more than just the listed activities to protect water and the environment. What are some other things they do? (*Leave some land undisturbed to protect native plants and create wildlife habitat; plant trees as windbreaks to reduce soil erosion; use biofuels; use computer-based precision farming to manage planting, fertilizing, irrigation and crop protection applications, etc.*)
3. Research the agricultural crops grown in California. How can a drought in California affect the rest of the country? (*California is a huge supplier of many agricultural products. Many of the state's farmers are not able to plant crops; others are selling their livestock. The entire U.S.—and other countries receiving California exports—may see lower food supplies and higher food prices.*)

## Student Pages 4 and 5 (Science, Environmental Education)

1. Bees are getting a lot of attention in the media lately because they are so critically important to the worldwide food supply. Bees have amazing social colonies, fascinating communication and so much more. You'll find many good Internet resources for learning all about the captivating world of bees, including [www.buzzaboutbees.net](http://www.buzzaboutbees.net).
2. Where are the beehives in your community?

## Student Page 6 (Science, Social Studies, Health)

1. Why is eating well so important? (*Our bodies thrive on good food, and do not benefit from non-nutritious choices. Good nutrition helps our bodies stay strong and well. The body you have now is the only one you will ever have. Do your best to keep it healthy!*)
2. Today Minnesota welcomes immigrants and refugees from Asia, Africa, Europe, Mexico and many other countries. Regardless of where they came from or where their journey began, these newcomers bring foods and traditions that enrich us all. What foods have you eaten that came to us from other countries? Think Mexico, China, Japan, Vietnam and other Southeast Asian countries, Somalia, Europe. What foods did your ancestors bring from their homelands?

## Student Page 7 (Science, History, Social Studies)

1. Autosteer is one GPS system on the Patsche farm. It automatically drives the tractor, moving it in a straight line. The driver has to steer only when turning around at the end of the field. What are the advantages of Autosteer? (*Crops are planted and fertilized in neat, straight rows. There is less driver fatigue. Wanda and Chuck can use their time in the tractor cab to concentrate on the computerized information that helps them plant, fertilize and minimize the use of pesticides.*)
2. Why is it important for young people to be involved in agriculture and farming? (*Agriculture is the giant lifeline that feeds, clothes and shelters the world. Each generation depends on farmers to provide these things, all needed for survival.*)
3. Imagine you want to be a farmer. What would you need to learn in order to run a farm? To grow crops? To raise livestock? Who could teach you these things? How would you get money to buy or rent land and equipment? (*Many young people get their start in farming because they grow up in farm families, learning from parents and grandparents. They may take over family farms when older generations retire. High school and college courses help, too. The University of Minnesota and many other schools have programs for people who want to study agriculture or become farmers. See UM's College of Food, Agricultural and Natural Sciences (CFANS) at [www.cfans.umn.edu](http://www.cfans.umn.edu). For a list of schools all around Minnesota offering courses in agriculture, natural resources and related fields, see [www.schoolchoices.org/colleges/in/minnesota/field/1](http://www.schoolchoices.org/colleges/in/minnesota/field/1).)*

## ANSWERS: AgMag

### CARE FOR THE WATER, p. 2

#### Did you know?

250 gallons of water equals one ton.

### CARE FOR THE SOIL, p. 3

soil

### WHY DO FARMERS DO THESE THINGS?

#### pgs. 2 and 3

(Accept other logical answers too.)

1. Keeps toxic materials and pollution out of water **a, d, e, f** and **g**
2. Helps reduce loss of soil to wind or water erosion **b, f** and **g**
3. Conserves water **b, c**
4. Helps keep animal waste out of rivers, wetlands and lakes **d, e, f** and **g**

### THINK AND DISCUSS, p. 3

Encourage students to list ANY ways water is used. Use critical thinking skills to rank the importance of those needs and the consequences of not having priority needs met.

### TRUE OR FALSE, p. 4

Only the first and third sentences are false.

### FOODS GROWN IN MINNESOTA, p. 4

They all need pollinators.

Grown in Minnesota: apple, broccoli, pumpkin, plum, onion, blueberry, melon, cucumber. Not grown in Minnesota: banana, almond, avocado.

### WHAT'S THE FARMER'S DILEMMA? p. 5

All choices should be checked.

### CELEBRATE MINNESOTA WATER, p. 8

- |                |              |
|----------------|--------------|
| 1. Red         | 5. St. Croix |
| 2. Rainy       | 6. Rum       |
| 3. Mississippi | 7. Minnesota |
| 4. St. Louis   | 8. Root      |

### WHAT IS ARBOR DAY? p. 8

Arbor Day is a day set aside each year to honor and plant trees. U.S. National Arbor Day is the last Friday in April. Minnesota and 27 other states celebrate that same day. Other states have different days depending on their growing seasons. Many other countries have tree celebrations and planting days, too. Minnesota Arbor Day 2015 is April 24. (Earth Day, another annual environmental event, is April 22 each year.)

### SALT WATER QUESTION, p. 8

Salt water cannot be used in place of fresh water.

Examples: For drinking water, human and land animal kidneys cannot process the level of salt in salt water. For plant watering, salt changes the soil and plants will die. Salt is also very corrosive and causes pipes and other metals to rust.

Technologists are working on ways to desalinate sea water, but doing so is very expensive.

### ANSWERS: Teacher Guide

#### ARE YOU WATERWISE? p. 3

**Across:** 1. rain; 2. glaciers; 3. aquifers; 4. groundwater

**Down:** 1. gas; 2. fertilizer; 3. surfacewater 4. pollution; 5. agriculture

Minnesota's water borders include the Red, Rainy, Mississippi, St. Louis, Bois de Sioux, Pigeon and St. Croix Rivers and Lake Superior. Our borders with Canada also include boundary waters.

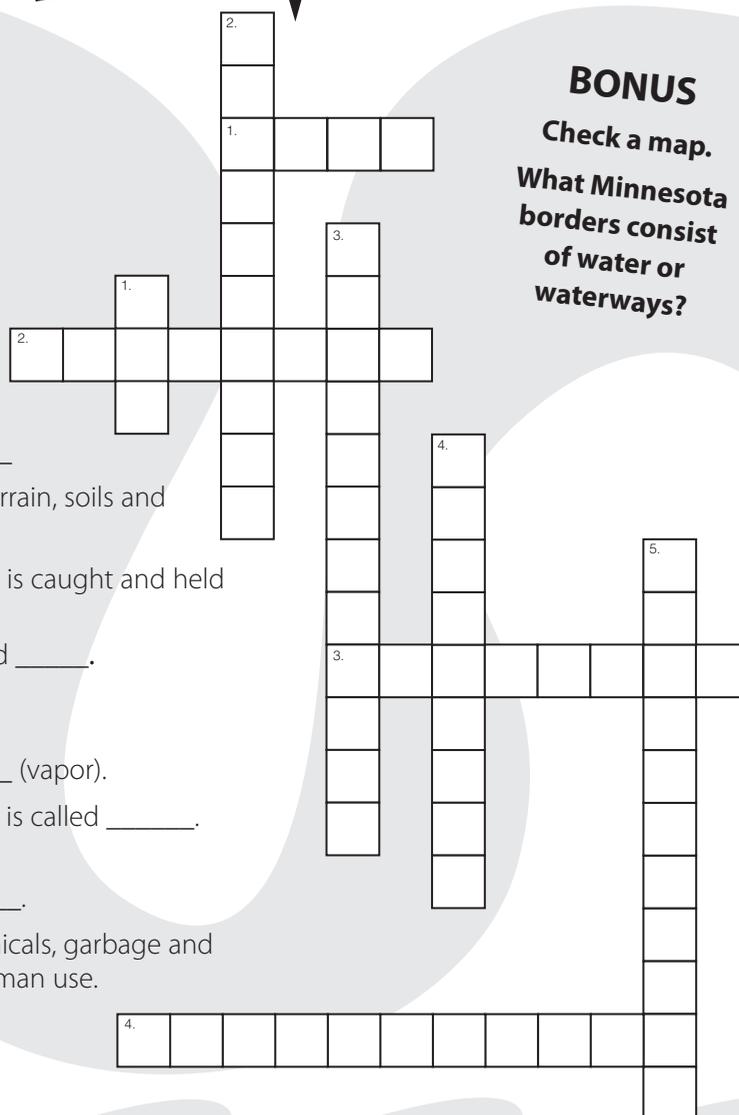
#### SHOW WHAT YOU KNOW! p. 4

1. a; 2. c; 3. b; 4. a; 5. b;
6. d; 7. a; 8. c; 9. d; 10. a.



# Are You WATER WISE?

**BONUS**  
Check a map.  
What Minnesota  
borders consist  
of water or  
waterways?



## Across

- Forms of precipitation include hail, sleet, snow and \_\_\_\_\_.
- The \_\_\_\_\_ in Minnesota eons ago affected our state's terrain, soils and water supplies.
- Underground spaces in rock, sand or gravel where water is caught and held are called \_\_\_\_\_.
- Water located in underground cracks and spaces is called \_\_\_\_\_.

## Down

- The three forms of water are liquid, solid (ice) and \_\_\_\_\_ (vapor).
- Material used to improve the soil and grow better plants is called \_\_\_\_\_. It can contaminate water.
- Water in lakes, streams, rivers and wetlands is called \_\_\_\_\_.
- Water \_\_\_\_\_ happens when things like gasoline, chemicals, garbage and animal waste get into the water, making it unsafe for human use.
- This food-producing industry depends on Minnesota's groundwater.

## KIDS can take care of groundwater, too!

**Groundwater is a big part of our high quality of life in Minnesota. Let's all take care of it!**

- Investigate your home for products (paints, motor oil, cleaners, old medicines, etc.) that could pollute groundwater if poured down the drain or dumped on the ground. Mark all these containers as dangerous. Better yet, set them aside for donation at the next "household hazardous waste collection day" in your community.
- Tell others how hazardous products can contaminate the groundwater when thrown into the trash.
- Use environmentally friendly products instead of hazardous ones. Find recipes for homemade cleaners using less toxic ingredients like vinegar and baking soda.
- Design posters to spread the word about groundwater protection. Ask a local grocery store, library, school or department store to display them.
- Host a school-wide groundwater education day.

*Little things add up to big differences!*

**Note to Teachers:**

You are encouraged to send the Pretest and Post-test results to Ag in the Classroom to help document student learning. Use the attached postage-paid evaluation card.

Name \_\_\_\_\_

Check one  Pretest  Post-test

# Show what you know!

*Take this short quiz before you read your AgMag, then again after reading the magazine. See the improvement!*

1.

The longest river in the United States is the  
a. Missouri.                      b. Mississippi.                      c. Minnesota.

2.

Two main natural resources affected by agriculture are  
a. iron ore and minerals.                      b. air and natural gas.                      c. soil and water.

3.

Bees are critically important to our food supply because they  
a. get rid of crop pests.  
b. pollinate plants.  
c. are a sign of spring planting time.

4.

The water we use today is the same water that was here when dinosaurs roamed the earth.  
a. True                      b. False

5.

Nearly three-fourths of the land in Minnesota is owned by  
a. the state of Minnesota.                      b. farmers and other private landowners.  
c. banks.

6.

Trees and plants help the environment by  
a. releasing oxygen.                      b. holding soil.  
c. providing habitat for animals.                      d. a, b, and c.

7.

California, our leading agricultural state, is having  
a. a severe drought.  
b. a huge invasion of crop-eating grasshoppers.  
c. many farmers going out of business due to earthquakes.

8.

MyPlate is a reminder about  
a. the importance of using clean dishes when we eat.  
b. plates with kids' own names and pictures on them.  
c. good nutrition.

9.

By protecting soil and water, we protect  
a. wildlife.                      b. the human food supply.  
c. trees and plants.                      d. a, b, and c.

10.

Today 75% of Minnesota's drinking water and nearly 90% of the water used in crop irrigation comes from  
a. groundwater in aquifers.                      b. power plants.                      c. lakes and rivers.