



## 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 connection is important in our consumer-driven society. That is what the student Minnesota AgMag Series is all about.

## Integration Ideas

### Social Studies

- Use the information on water (pages 2, 3, 7) to discuss water sources and uses in your community. Invite students to tell how they can help the environment and share ideas about things they would like to study or projects they would like to do to further help and understand the environment.
- Research the role water has played in the history of Minnesota. Ideas include location and development of cities and transportation; moving of goods; power sources for manufacturing, etc.

### 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 and in your community.
- Assist students in discovering the pollinators that allow plants to produce our favorite fruits and vegetables. Research the nutritional value of these foods and their location on the MyPlate diagram.

## 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.
Science	4.3.2.3.1	Identify where water collects on Earth, including atmosphere, ground and surface water and describe how water moves through the Earth system using the processes of evaporation, condensation and precipitation.
Science	5.3.4.1.1	Identify renewable and non-renewable energy and material resources that are found in Minnesota and describe how they are used.
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.
Health	Standard 5	Students will demonstrate the ability to use decision-making skills to enhance health.

## 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**, **photosynthesis**, **hydrologic cycle**, **no-till**, **strip cropping**, **irrigation** (pages 2 and 3); **aquifers** (page 7).

## 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, bees.*)
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.*)

### MINNESOTA AGRICULTURE IN THE CLASSROOM

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**Minnesota School Gardens: A Guide to Gardening and Plant Science**

Featuring 31 K-12 lessons linked to the Minnesota Academic Standards

For your FREE copy go to  
[www.mda.state.mn.us/maitc](http://www.mda.state.mn.us/maitc)

**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 bio-fuels; 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 <http://www.buzzaboutbees.net>

**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, Social Studies)

1. Minnesota's Department of Natural Resources issues permits and regulates water uses for our largest users, which include public suppliers like city water systems. Still, we don't know how much water is used by smaller businesses, private well owners, gardeners and fruit growers, many farmers and rural areas. How could this be a problem as we look to managing our water supplies?
2. Countries with a lot of oil resources have often been the world's richest countries because oil is in such high demand. Why do you think some people are calling water "the next oil"? Research to learn which countries have abundant water resources and which have low water supplies. How could water affect the relationships among countries in the future?

**ANSWERS: AgMag**

NATURAL RESOURCES, (Cover)

Water, sun, air, soil, trees, plants and animals are natural resources.

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 out of water **a** (Some may answer **d** and **e**, but manure and animal waste, while unsanitary, are not classified as toxic.)
2. Helps reduce loss of soil to wind or water erosion **b, f**
3. Conserves water **b, c**,
4. Helps keep animal waste out of rivers, wetlands and lakes **d, e**

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. 4

All choices should be checked.

SALT WATER QUESTION, p. 7

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.

CELEBRATE MINNESOTA WATER, p. 8

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

WHAT'S FOR LUNCH? p. 8

1,645.6 pounds of food

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 season. Many other countries have tree celebrations and planting days, too. Minnesota Arbor Day 2014 is April 24. (Earth Day, another annual environmental event, is April 22 each year.)

**ANSWERS: Teacher Guide**

ARE YOU WATERWISE? p. 3

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

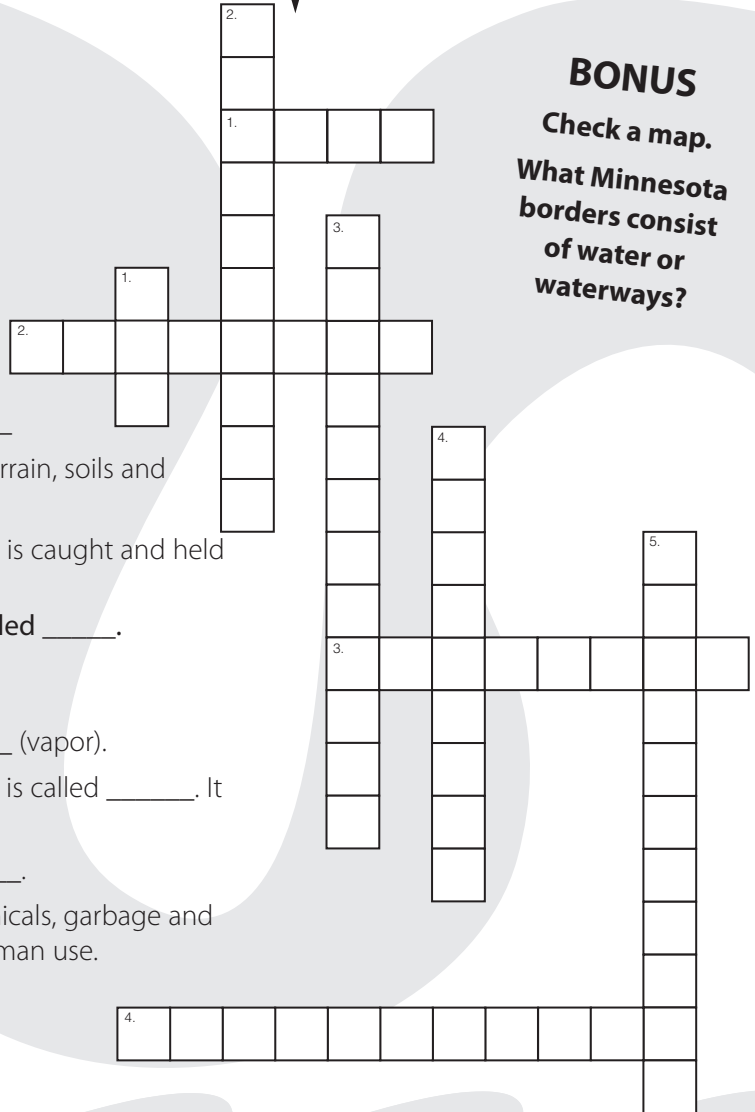
**Down:** 1.gas; 2. fertilizer; 3. surfacewater 4. pollution; 5. agriculture

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.

# 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.** Native Americans. **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.**

The largest users of water in Minnesota are

- a.** power-generating plants. **b.** city water systems. **c.** people irrigating crops.

Minnesota AgMag and Teacher Guide is a publication of Minnesota Agriculture in the Classroom. Minnesota Agriculture in the Classroom is a public/private partnership between the Minnesota Department of Agriculture and the Minnesota Agriculture in the Classroom Foundation. MAITC Program Staff: Al Withers and Sue Knott. The publication is developed and written by Jan Hoppe, B.S. and Jane Duden, B.S. Both are experienced educators and educational materials developers. Design, layout and production are by Northern Design Group.