

Why Ag In the Classroom?

In times past, people were very aware of the role agriculture played in their lives. It meant survival! Nearly everyone - men, women and children - worked the land.

Agriculture still means survival. That will never change. But as time goes on, fewer and fewer people have close contact with farming. They're not aware of their own - and the nation's - total dependence on agriculture. Think about it:

- Less than two out of 100 Americans work in production agriculture (farming). This small group meets the food and fiber needs of the nation as well as many people abroad.
- Agriculture, along with its related occupations, is the nation's largest industry. It generates billions of dollars each year; one out of every five jobs depends on it in some way. It has massive impact on the American economy, greatly influences the U.S. international balance of trade and directly affects the number of jobs here at home.

Our citizens must be agriculturally literate in order to make responsible decisions affecting this giant lifeline. Building that literacy in tomorrow's leaders is what Ag in the Classroom is all about.

Academic Standards Connection

The student Minnesota AgMag and other educational materials from Minnesota Agriculture in the Classroom can meet many of the new academic standards. These materials can serve as a wonderful "real life" connection and supporting piece as you incorporate the standards into your classroom activities. Here are a few examples of potential connections:

Minnesota Academic Standards Alignment

Minnesota K-12 Academic Standards in Social Studies

1. (Grade 6, Geography Strand, Human Systems Sub-strand, Standard 6) Benchmark: Locate, identify and describe major

physical features in Minnesota; explain how physical features and the location of resources affect settlement patterns and the growth of cities in Minnesota.

2. (Grade 6, Geography Strand, Human Environment Interaction Sub-strand, Standard 10) Benchmark: Describe how land was used during different time periods in Minnesota History; explain how and why land use has changed over time.

Minnesota K-12 Academic Standards in Science

1. (Grade 4, Earth Science Strand, Interdependence within the Earth system Sub-Strand, Standard 3) Benchmark: 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.,
2. (Grade 5, Earth Science Strand, Human Interactions with Earth Systems Sub-strand, Standard 1) Benchmark: Identify renewable and non-renewable energy and material resources that are found in Minnesota and describe how they are used.
3. (Grade 5, Life Science Strand, Interdependence Among Living Systems Sub-Strand, Standard 1) Benchmark: 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.

Common Core/Minnesota K-12 Academic Standards in English Language Arts

1. (Grade 4-6, Reading Informational Text Sub- Strand, Key Ideas and Details Standard) Benchmark: Explain events, procedures, ideas or concepts in a historical, scientific or technical text, including what happened and why, based on specific information in the text.

National Health Education Standards and Minnesota Benchmarks

1. Standard 1: Students will comprehend concepts related to health promotion and disease prevention to enhance health.
2. Standard 5: Students will demonstrate the ability to use decision-making skills to enhance health.

MINNESOTA AGRICULTURE IN THE CLASSROOM

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Go to www.mda.state.mn.us/maitc for:

- MN AgMag and AgMag Jr. Series
- Food for Thought MN Geography Curriculum
- Standards-based Lessons and Activities
- Supplemental Resources
- Professional Development Workshops
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About Your AgMag

Your AgMag is distributed primarily to teachers in grades studying Minnesota (usually fourth or sixth). If the magazine fits better into the curriculum program at another grade level, we encourage you to pass the material on to the appropriate teachers. Offered at no cost to you, the AgMag is a product of Minnesota Agriculture in the Classroom. Here is your third and final Minnesota Agriculture Magazine for the 2012-2013 school year. This issue of your AgMag is designed to help you:

- provide students with a base of information for identifying and understanding the connections between agriculture and natural resources
- foster a stewardship ethic toward land, water and air
- develop awareness of Minnesota's soil resources and soil protection challenges
- encourage students to develop home, school or community gardens
- build awareness of incorporating local foods into school lunches
- provide information about MyPlate and the importance of good nutrition
- offer insights about how and why Minnesota's landscape has changed over the past several hundred years
- introduce students to ten plants that have been designated by a panel of experts as most shaping our state. (The first six were introduced in Issues 1 and 2; the final four are featured in this issue.)

Integration

Experienced classroom teachers create your AgMag materials. An Editorial Review Committee of teachers and subject matter experts provides content ideas and reviews each issue for accuracy and relevance.

Some teachers use the magazine as a separate lesson; others integrate magazine content into specific areas of the curriculum. The subject matter and skills listed will help you select appropriate AgMag activities to integrate into other curriculum areas.

Language Arts, Reading Literacy: Use the articles and activities to develop a variety of skills: outlining, reading for the main idea, vocabulary development and spelling words (bold words).

Social Studies, History: After reading pages 2 and 3, invite students to tell about things they are doing to help the environment. Encourage ideas about things they would like to study or projects they would like to do to further help and understand the environment. See pages 4 and 5 for community and school gardening activities. See page 6 for Eat Well, Be Well and page 7 for plants that changed Minnesota.

Geography: See Minnesota's changing landscape on Page 7. See the map and related activities on page 8.

Science, Environmental Education, Health: The entire AgMag is directed toward environmental education. Pages 2 and 3 focus on natural resources. See pages 4 and 5 for science, nutrition and technology in creating gardens. Page 6 features nutrition and page 7 highlights significant Minnesota plants.

In This Guide: Don't Miss...

- SHOW WHAT YOU KNOW pretest and post-test on page 6. Check your students' knowledge of key agricultural concepts before and after reading the AgMag.
- Discussion prompts, background information, extended activities and answers.
- Reproducible activities designed to increase understanding of human actions that help protect trees and soil.

Glossary

Each AgMag contains several words that may be unfamiliar to your students. You may wish to preteach these words, or take time to define them as they appear throughout the magazine. In most cases, the words appear in bold type and/or are defined in the magazine. Highlighted words in this issue are: **natural resources, aquatic** (cover); **surface water, groundwater, photosynthesis, hydrologic cycle, tillage** (pages 2 and 3); **legumes** (page 6); **aquifers** (page 8).

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. Don't forget people!*) Why is it necessary to protect these treasures?
2. What natural resources can you find in these pictures? (*Water, soil, air, trees and plants. People are also natural resources.*)
What connections to agriculture do you see? (*Clothing, furniture, books, notebook, backpack, trees, grass and water.*)
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.*)
4. What is the Minnesota crop in the magnifying glass? (*Turf grass. More on page 7.*)

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. What is topsoil, and why is it important? (*Topsoil is the upper layer on the surface of the earth's crust. It is usually about two to eight inches deep and is the rich soil that plants thrive in. It can take more than 500 years for an inch of topsoil to form. It forms from the top down as organic materials decay and rocks break down.*)
Without topsoil, plants can't get the nutrients they need, so they wither and die. Since we depend on plants for survival, protecting topsoil is critically important.
3. What are some challenges to our soil resources? (*Wind and water erosion; pollution; drought; flooding; growing populations with more urban, industrial and agricultural demands; animal and human activities on ground surfaces, etc.*)
4. How is soil damage increased by drought? (*Dry soil is easily eroded (blown away) by the wind. The Dust Bowl Days of the 1930s showed us that.*)

Student Pages 4 and 5 (Science, Social Studies)

1. School and community gardens are popular all across Minnesota. What are some of the reasons you would want to grow a garden? What are some of the reasons you may not want to? What would it take for kids to have a successful garden in your area? A challenge for school and community gardens is that most of the growing season occurs during the summer months when students are not in school. How might you cover the needs and responsibilities of a garden when school is closed?
2. On Dec. 2, 2010, Congress signed into law the first (big) improvements to child nutrition and school lunches. The new law means funding for healthier meals. It means rules to kick junk food out of school vending machines. It means \$50 million for farm-to-school programs. Many schools have already made

improvements. Have you seen any changes in your own cafeteria?

3. Many schools have made headlines for helping kids change how and what they eat. What is your school doing to promote healthier eating? Could you put up “MyPlate” posters in the cafeteria, create your own healthy eating posters to display, change the food in the vending machines, or have a “switch your beverage” campaign? Better health rewards everyone—now and in the future!

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 can 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. How did purple loosestrife get to Minnesota? Why did colonists value it? (*Purple Loosestrife was well established in New England in the 1800s. The first seeds and plant parts were transported accidentally in ballast water of 19th century sailing ships from Asia and Europe. Seeds also arrived stuck to the wool of sheep brought by colonists and moved westward. In time it was deliberately planted. Colonists knew it had medicinal uses and they admired the lovely blooms. This plant also attracted butterflies and bees to help pollinate food crops. They did not know that the plant would become an invasive species, harming our native environment. It is the only plant on the Ten Plants That Changed Minnesota list that is harmful.*)
2. Do you know of other tree species that are being threatened by pest or disease and might be lost to us? (*Oak (Oak wilt); Ash (Emerald ash borer); Pine (rusts, blights, mold and more) are a few diseases that can affect and kill our trees.*)

ANSWERS: AgMag

Please Note: *If answers are supplied in the AgMag itself, they are not repeated here.*

NATURAL RESOURCES. (Cover)

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

CARE FOR THE WATER, p. 2

Did you know?

250 gallons of water equals one ton.

CARE FOR THE SOIL, p. 3

soil

HOLDING ONTO SOIL, pgs. 2 and 3

1. Strip cropping **D**
2. Windbreak **C**
3. No tillage **A**
4. Grassed waterways . . **B**

THINK AND DISCUSS pgs. 3

Impact of dry or drought conditions: Soils dry out and can not provide moisture and nutrition to plants. Plants grow poorly, or may wither and die. This can cause food shortages for humans and animals. Both humans and animals suffer from heat-related illnesses. In extreme conditions, heat strokes and even death can occur.

THINGS TO THINK ABOUT, pgs. 4 and 5

Things to think about in growing a garden:

Space, soil, moisture, sun, tools and supplies, people committed to maintaining the garden: tilling, planting, weeding, harvesting, etc.

CAN YOU NAME THE PLANT? p. 7

Turf grass, American Elm tree, Apple, Purple loosestrife

APPLE-ICIOUS, P. 7

Honeycrisp, Sweetango, Zestar, Frostbite, Honeygold

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. US 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 2013 is April 26. (Earth Day, another annual environmental event, is April 22 each year.)

ANSWERS: Teacher Guide

SHOW WHAT YOU KNOW!, p. 6

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

Twelve for the Trees

Interview and find out who's "in the know" about trees!

Try to get 12 different signatures in the boxes below. Share and display the results!

1. Has planted more than five trees.

2. Knows what a city "heat island" or "concrete hot spot" is and can explain how trees could help cool these areas.

3. Can tell you where to call to reach a city, county or state forester.

4. Has trees shading the south or west sides of his or her home that cut down the cost of air conditioning.

5. Has trees on the north or west sides of his or her home to block the wind and save heat.

6. Has taken a picture of a beautiful tree.

7. Uses parks for fun and recreation.

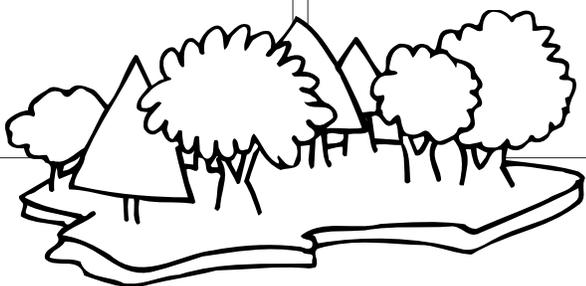
8. Has planted one or more trees in the last year.

9. Has a tree bird feeder or has fed birds in another way.

10. Can explain how trees fight air pollution.

11. Uses leaves or wood chips as mulch for trees, lawns and gardens.

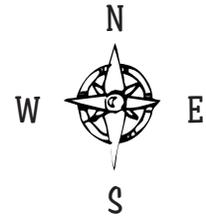
12. Bonus: Can name Minnesota's official state tree. (Don't let them peek at the answer below!)



* The Norway (or red) pine is Minnesota's state tree.
Adapted from "A Teacher's Guide to Arbor Month," Minnesota Arbor Month Partnership

You, The Soil Saver

You have just bought this hilly farm and you want to save your soil. How will you do it? Look at the landscape. Find a place to do each of the soil-saving ideas below. Draw your answers.



- 1. Grassed Waterways**
Plant grass in water pathways and valleys.
- 2. No Tillage**
Leave stubble from last year's crop on the field to help hold soil in place.
- 3. Windbreaks**
Plant rows of trees, shrubs and bushes on the windward side of a field. Hint: The wind usually blows from the west on this farm.
- 4. Strip Cropping**
Plant crops in strips with grassy crops like hay between row crops like corn.

Why is it important to save your soil?

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 Ogallala is our country's largest

- a. desert.
- b. aquifer.
- c. water factory.

2.

Two main natural resources affected by agriculture are

- a. iron ore and minerals.
- b. air and natural gas.
- c. soil and water.

3.

Minnesota schools and farms are teaming up to bring more

- a. animals into schools for hands-on learning.
- b. locally grown foods to school lunch programs.
- c. awareness of hydroponic crops.

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.

The year 2012 was

- a. the warmest year on record across the continental U.S.
- b. the wettest in Minnesota's history.
- c. the snowiest in Minnesota's history.

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.

Purple loosestrife is a beautiful flowering plant that is harmful to fields and wetlands.

- a. True
- b. False

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.