# AgMag Teacher Guide

Volume 24, Issue 3 2009/2010

## 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 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:

**SOCIAL STUDIES** (Geography Strand) Standard: The student will give examples that demonstrate how people are connected to each other and the environment.

(Geography Strand) Standard: The student will identify examples of the changing relationships between the patterns of settlement and land use in Minnesota.

(Economics Strand) Standard: The student will understand the concept of interdependence in relation to producers and consumers.

**SCIENCE** (Earth and Space Science Strand) Standard: The student will investigate the impact humans have on the environment.

(History and Nature of Science Strand) Standard: The student will know that science and technology are human efforts that both influence and are influenced by society.

(History and Nature of Science Strand) Standard: The student will recognize that science and technology involve different kinds of work and engage men and women of all backgrounds.

**LANGUAGE ARTS** (Reading and Literature Strand) Standard: The student will use a variety of strategies to expand reading, listening and speaking vocabularies.

## Hello Out There (Resources)

**MINNESOTA AGRICULTURE IN THE CLASSROOM**

Attn: Al Withers, Program Director
625 Robert Street North
St. Paul, Minnesota 55155
Telephone: 651-201-6688 • E-mail: alan.withers@state.mn.us
www.mda.state.mn.us/maitc


Visit the National Ag in the Classroom website to find great educational resources available from other state programs.
www.agclassroom.org

**AGRICULTURAL LITERACY INSTITUTE 2010**

Consider attending this unique and very educational four-day teacher workshop to be held June 28 - July 1 at South Central College at Mankato. You'll have lots of fun, meet new teachers and learn a lot about how food and agriculture are a part of your every day. This year, one day will feature tours of agriculture in the Twin Cities metro area. Scholarships available! Call 507-389-7205 for more information. Access the full institute brochure at
www.southcentral.edu/programs/agbs/news.cfm

Check out these websites to enhance AgMag Issue 3 content:

**Minnesota Land and Water Resources**


www.mda.state.mn.us/protecting.aspx
www.dnr.state.mn.us/waters/index.html
www.pca.state.mn.us/water/basins/
www.mgwa.com
www.dnr.state.mn.us.snas/naturalhistory.html

**Gardening/Plants**


www.mg.umn.edu
www.mnla.biz/
www.mda.state.mn.us/mngrown
www.arboretum.umn.edu/childrensgarden.aspx
www.kidsgardening.com
www.garden.org

# 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 2009 - 2010 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 water resources and water pollution challenges
- encourage students to develop home, school or community gardens
- define organic foods, and why farmers and consumers value them
- offer historical insights about Minnesota's food supply from 1970 to 2010
- highlight contributions of immigrants to Minnesota's food industry.

# 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:** 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:** 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 take on to further help and understand the environment. Some of their ideas will bridge into science, environmental education and other areas.

**Geography:** See map and related activities on page 8 in the AgMag.

**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 and page 6 for information about organic farming.

**History:** Page 7 offers some highlights of Minnesota's food history from 1970 through the present.

**Math:** See immigration trends in Minnesota, page 7; Home Connection, page 8.

# 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 prompters, background information, extended activities and answers.
- Reproducible activities designed to increase understanding of Minnesota's water resources on pages 4 and 5.

# 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, ground water, hydrologic cycle, percolates, aquifers, precipitation, sedimentary, photosynthesis** (pages 2 and 3); **organic, biology, ecology, biodiversity, erosion, contamination** (page 6).

# Discussion Prompters

**AgMag 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. 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.)
3. Why do people plant seeds in containers instead of just planting them in the ground? (Planting seeds indoors in containers gives gardeners a head start on the growing season. The seeds will be sturdy seedlings by the time the frost is out of the ground and the plants can be moved to the garden.)

**AgMag Pages 2 and 3** (Economics, Social Studies, Science)

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.)*
2. Minnesota is richly blessed with water resources, but easy access to usable water varies across the state. Why might one well hit water at 30 feet and another might not reach water until 75 feet or more? (It depends on the distance water is from the surface of the earth. The depth of aquifers and usable ground water varies.)
3. What are some challenges to our water resources? (Growing population; greater per capita water use; industry and agricultural needs; excessive suburban water use; development decisions like cutting trees; animal and human activities around shorelines; trash or pollution, etc.)

**AgMag 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. Check out the websites in the AgMag and in this Teacher Guide (page 1) for a host of garden-related information and activities.

AgMag Page 6 (Science, Social Studies, Environmental Studies)

1. Organic food is the fastest growing sector of the American food marketplace. Sales have been growing 15-20% a year for the past decade. What are some reasons? (Several reasons are noted in the article on page 6. Customer demand is the biggest reason. As customers want more organic food, more farmers and processors work to meet the need. That means more foods and a greater variety of organic foods are available.)
2. Why are farmers' markets a good place to shop for organic foods? (Customers can talk directly with the growers to see how the food was produced.)
3. The current American economy means many families have less money for buying groceries. How could this affect the organic foods market? (*Organic foods usually add to grocery costs.)*

AgMag Page 7 (Social Studies, History)

1. How did modern machinery lead to bigger farms? *(Larger, more powerful machines such as tractors, combines, balers and plows with many blades made it possible for a farmer to do much more work in less time. One person could do the work in a day it would have taken whole crews weeks to do a century before. Because the farmer could accomplish so much more, he or she often wanted to get more land and grow more crops or animals. Over time, many farmers bought nearby farms, adding the land to their own. Minnesota has fewer farms today than years ago, but those farms are larger.)*
2. When we walk into a supermarket today, we have thousands of foods to choose from. What is the reason so many new foods appear every year? *(Consumer demands drive the market to develop new things. Science and technology develop new varieties of foods, such as fruits and vegetables. New uses are continuously created for old foods. (How many different forms of potatoes can you name? Raw, frozen tater tots, potato chips, shoestring potatoes, dried potato flakes are just a few.)*
3. When today's new immigrants first came into Minnesota, most moved into the Twin Cities, Duluth or Rochester. Other communities such as St Cloud, Moorhead, Willmar, Worthington, Marshall, Owatonna and Albert Lea also became home to thousands of immigrants during the 1990s and early 2000s. Many moved to rural areas to work in agriculture. Jobs at farms, processing plants and meatpacking businesses drew seasonal workers and new immigrants. By 2000, Worthington was Minnesota's third most racially diverse city, after Minneapolis and St. Paul.
   a. What do you think the toughest part of immigrating has been for our newest immigrants?
   b. Do you know anyone who has moved to Minnesota from another country? Why did they come to Minnesota? How did they feel about leaving their homeland?
   c. How would you feel if your family decided to move to a different country far away? What important things would you need to learn?
   d. What food traditions would you want to take with you to your new home?

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## 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

THINGS TO THINK ABOUT, pgs. 4 and 5

Things to think about in growing a garden:

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

IMMIGRANT TRENDS, p. 7

Many of the new immigrants are from Asia and Latin America. The most immigration came in 1990 - 2000.

CELEBRATE MINNESOTA WATER, p. 8

1. Red
2. Rainy
3. Mississippi
4. St. Louis
5. St. Croix
6. Rum
7. Minnesota
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 2010 is April 30.

## ANSWERS: Teacher Guide

ARE YOU WATERWISE?, p. 4

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

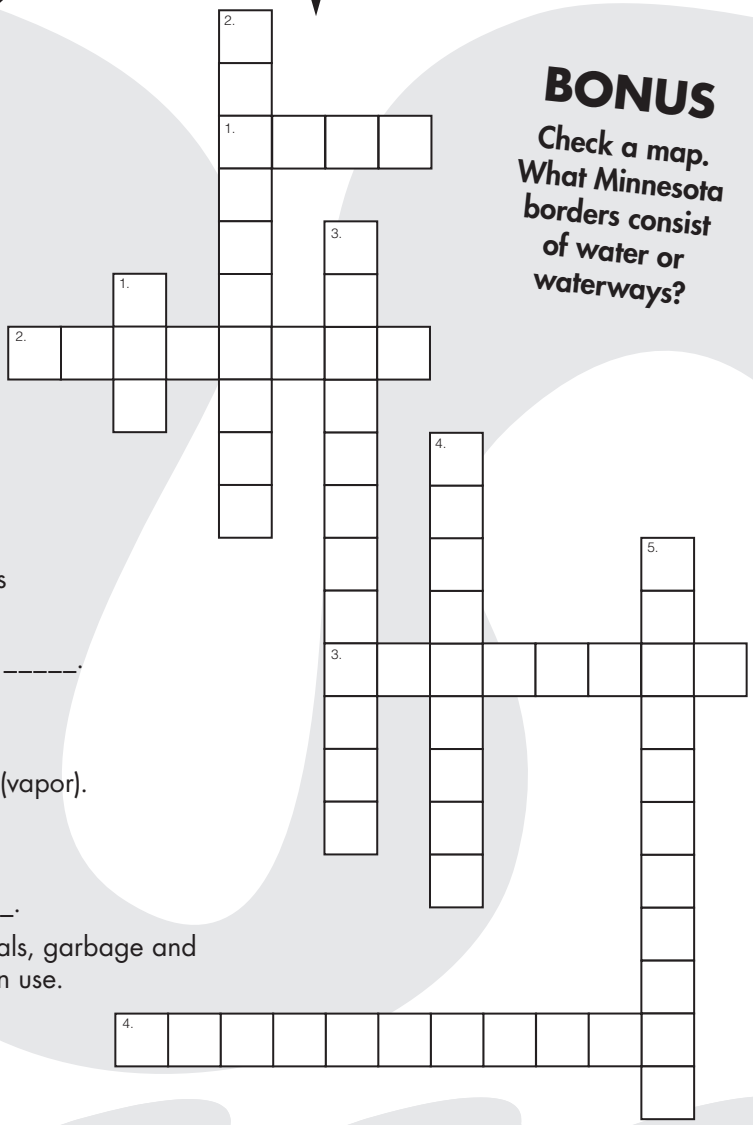
Down: 1.gas; 2. fertilizer; 3. surfacewater 4. pollution; 5. agriculture

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. 6

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

# Are You WATERWISE?



**BONUS**

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

## Across

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

## Down

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

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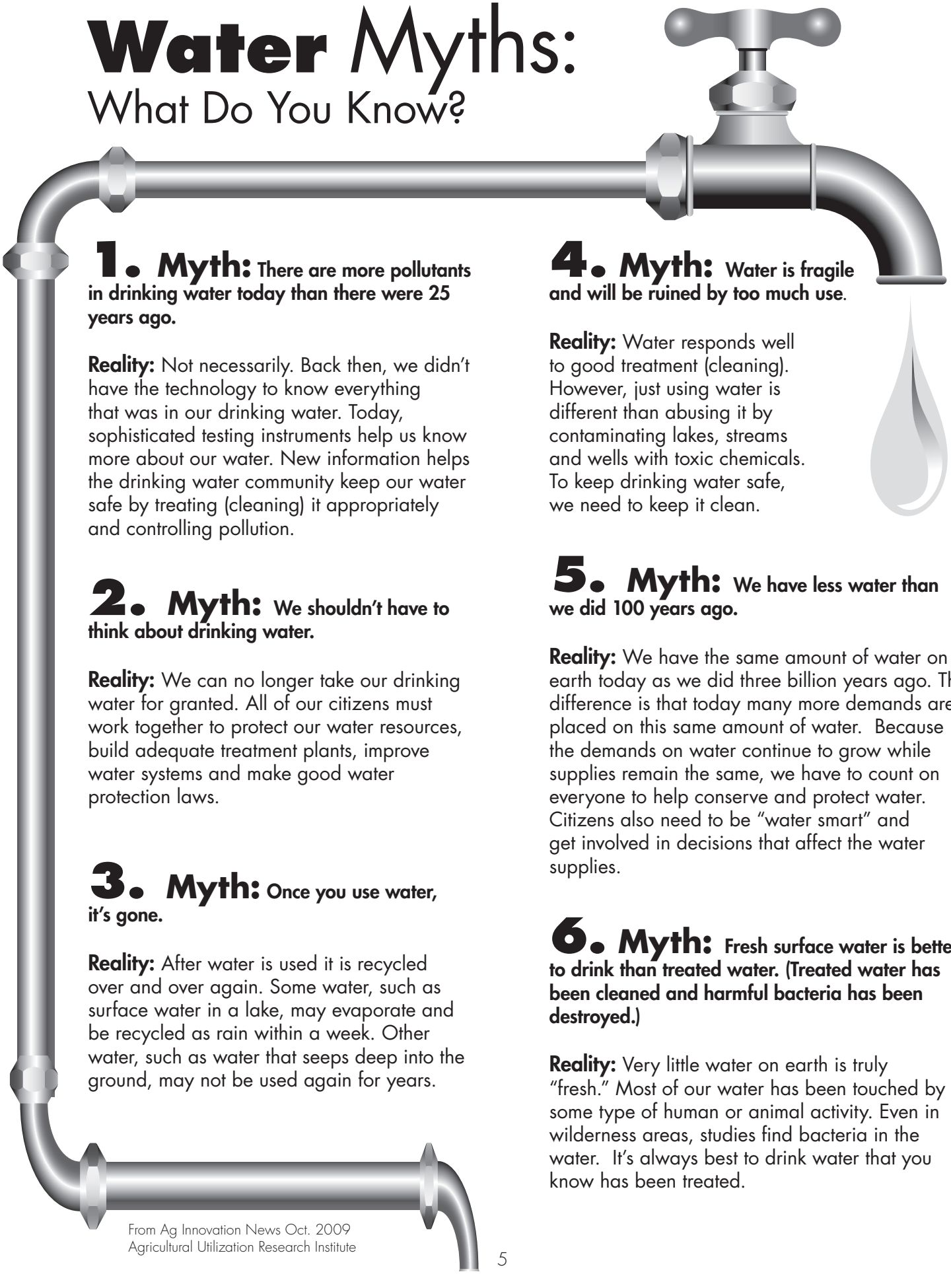
# KIDS can take care of ground water, too!

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

1. Investigate your home for products (paints, motor oil, cleaners, old medicines, etc.) that could contaminate the ground water 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.
2. Tell others how hazardous products can contaminate the ground water when thrown into the trash.
3. Use environmentally friendly products instead of hazardous ones. Find recipes for homemade cleaners using less toxic ingredients like vinegar and baking soda.
4. Design posters to spread the word about ground water protection. Ask a local grocery store, library, school or department store to display them.
5. Host a school-wide ground water education day.

**Little things add up to big differences!**

# **Water** Myths:
## What Do You Know?



**1. Myth: There are more pollutants in drinking water today than there were 25 years ago.**

**Reality:** Not necessarily. Back then, we didn't have the technology to know everything that was in our drinking water. Today, sophisticated testing instruments help us know more about our water. New information helps the drinking water community keep our water safe by treating (cleaning) it appropriately and controlling pollution.

**2. Myth: We shouldn't have to think about drinking water.**

**Reality:** We can no longer take our drinking water for granted. All of our citizens must work together to protect our water resources, build adequate treatment plants, improve water systems and make good water protection laws.

**3. Myth: Once you use water, it's gone.**

**Reality:** After water is used it is recycled over and over again. Some water, such as surface water in a lake, may evaporate and be recycled as rain within a week. Other water, such as water that seeps deep into the ground, may not be used again for years.

**4. Myth: Water is fragile and will be ruined by too much use.**

**Reality:** Water responds well to good treatment (cleaning). However, just using water is different than abusing it by contaminating lakes, streams and wells with toxic chemicals. To keep drinking water safe, we need to keep it clean.

**5. Myth: We have less water than we did 100 years ago.**

**Reality:** We have the same amount of water on earth today as we did three billion years ago. The difference is that today many more demands are placed on this same amount of water. Because the demands on water continue to grow while supplies remain the same, we have to count on everyone to help conserve and protect water. Citizens also need to be "water smart" and get involved in decisions that affect the water supplies.

**6. Myth: Fresh surface water is better to drink than treated water. (Treated water has been cleaned and harmful bacteria has been destroyed.)**

**Reality:** Very little water on earth is truly "fresh." Most of our water has been touched by some type of human or animal activity. Even in wilderness areas, studies find bacteria in the water. It's always best to drink water that you know has been treated.

From Ag Innovation News Oct. 2009
Agricultural Utilization Research Institute

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.** Water pumped from wells comes from
- **a.** underground pipes to the nearest river.
- **b.** aquifers.
- **c.** water factories.

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

**3.** Organic food is
- **a.** grown without soil.
- **b.** grown without pesticides and herbicides.
- **c.** grown only in greenhouses.

**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.** Minnesota has
- **a.** the most water resources of the 48 connected states.
- **b.** a water shortage.
- **c.** no water challenges.

**8.** Children helped First Lady Michelle Obama
- **a.** plant, grow and harvest a garden at the White House.
- **b.** decide what is a good bedtime for her children.
- **c.** design healthful menus for her family.

**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.** All the water we drink or use falls on the ground first.
- **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 Director and AgMag Project Coordinator is Al Withers. 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.