ISSUE 3
VOLUME 27
2012/2013

AgMag

THE MAGAZINE OF MINNESOTA AGRICULTURE IN THE CLASSROOM

Caring for our Natural Resources

Minnesota, "the Land of 10,000 Lakes,"... is really the land of 20,000 lakes, ponds and marshes of five acres or more. Forests cover one-third of our state. Our rivers end-to-end could reach around the world. Our cropland would cover all of Rhode Island, Massachusetts, Connecticut and Vermont. Fresh air, rich soil, lots of rain most years, good climate, crops, livestock—our state has them all.

Minnesota's **natural resources** are our treasures to protect. Our agricultural industries depend on these natural resources. We, the people, depend on agriculture. That's why our farmers and others must act as stewards of the land, or Earth Keepers, protecting these important resources.

- When we protect our soil now, it can grow good food, fiber and fuel (energy) for the future.
- When we clean up our air, we make life healthier for people, plants and animals.
- When we prevent water pollution, we help keep water safe for cooking, swimming, drinking and **aquatic** life.

Nearly three-fourths of the land in Minnesota is owned by farmers and other private landowners. Why is it important that all landowners and users be good Earth Keepers?

Can you have an ag-less day? There's just no way!

Take A Closer Look!

What is this Minnesota crop?

Learn more on page 6.

Photo Courtesy danmarshall.com

Celebrating our

Natural Resources

Turn on a faucet. Where does the water come from? Is it from your local public utilities company? Is it from your backyard well? Either way, it comes from Minnesota's **surface water**, **groundwater**, or both.

CARE FOR THE WATER

How do you like taking a shower in the same water molecules the dinosaurs waded in?

It's true! The water we use today is the same water that has been recycled for millions of years since the earth was formed. We will never have any MORE water. That's why we need to keep our water clean.

If all the world's water could fit into a gallon jug, including salty oceans and frozen glaciers, only a single drop would be fresh and usable for human needs. The amount of fresh water isn't all we care about. We want the water we drink and use to taste good, smell good and look good. We want it to be safe for all human uses and for aquatic creatures, too.

Did you know?

- The earth recycles the same water over and over. This process is the water cycle, or **hydrologic cycle**. Water changes forms—from solid to liquid to gas—over and over again.
- The earth recycles one trillion tons of water every day. A gallon of water weighs 8 pounds. How many gallons are in just one ton (2,000 lbs)?
- The federal Clean Water Act requires states to set water quality standards. These rules protect the nation's waters. They regulate how much pollution can be in lakes, rivers, streams or groundwater before the water becomes unsafe for drinking, fishing, swimming and more.

Soil Savvy

Fine or coarse, wet or dry, black and rich, or brown and sandy—not all soils are the same! They are a result of:

- the environment in which they were formed, including water and air;
- their age;
- the local organic matter (decayed plants and animals).

We've learned the hard way that human actions affect the soil. Wind and water can blow or wash away soil (erosion). Air pollution contaminates soils. Fertilizers wash into lakes and rivers, harming them. Planting the same crops year after year uses up soil nutrients.

Luckily, we've also learned that human actions can help or improve the soil. Farmers rotate crops from year to year to help balance soil nutrients. They use tillage equipment and practices to protect the soil. They plant cover crops to hold soil in place in fall and winter. Read on to learn more.

Holding Onto Soil

Farmers fight soil loss in many ways. Draw lines to match each method with its description. Then write each title number on the matching picture.

1. Strip cropping

2. Windbreak

3. No Tillage

4. Grassed waterways

A. Farmers leave stubble from last year's crop on the field to hold soil in place rather than plowing it under.

B. Farmers plant grass in main drainage areas in the field to slow running water and hold soil in place.

C. Farmers plant trees or shrubs to block prevailing winds. This reduces wind erosion. It protects crops and creates wildlife habitat.

D. Farmers plant crops in strips, alternating row crops (such as corn) with hay or perennial pasture crops. These grass crops provide ground cover, which helps reduce wind and water erosion.

Soil–not oil—is our greatest wealth.

CARE FOR THE SOIL

What four-letter word does all these things?

- holds roots in the ground so plants don't fall over
- holds water so roots can absorb moisture
- holds minerals and nutrients that plants use for food
- is home to other living things helpful to plants

Without it, life on land would come to a dead stop!

What is it? _____ _____ _____ _____

The soil beneath our feet is as important as the air we breathe and the water we drink. Farmland and forested land represent two-thirds of our state's landscape. Whose responsibility is it to care for the soil? Farmers and foresters have a big role to play. But each of us must also help. These soil-care tips are things we all can do:

1. Cover bare soil with new plants or mulch so soil won't wash or blow away.
2. Stay on sidewalks and trails. What happens when people don't? Do you see any places where sidewalks should be built to protect the soil?
3. How can you help protect the soil of football and soccer fields, parks and other public places?

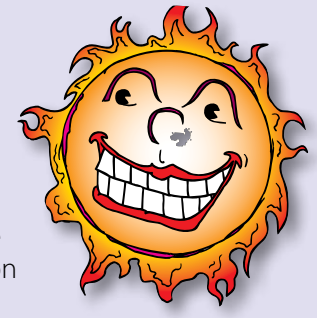
For more on soils see: **http://soils.usda.gov/education**

CARE FOR THE AIR

Take a deep breath. Can you tell the difference between fresh air and polluted air?

Air travels. That means polluted air can blow in from near and far. Lucky for us, many people work hard to clean up the air. Car makers build engines that pollute less. Laws regulate industrial waste disposal. Many people—including farmers—are making electricity from cleaner, renewable energy sources instead of coal or petroleum. They are using solar power, wind and field crops as energy sources for our cars, homes and factories. It all adds up to cleaner air!

Thanks, plants!



Did you know that green plants help to clean air? They take in carbon dioxide, trap fine dust and release oxygen during **photosynthesis.** Those green plants include grasses on prairies, algae in oceans, crops in fields and trees in forests. About one-third of the oxygen released comes from grasses and other non-woody plants. One-third comes from ocean plants. Another third comes from forests. Take a breath . . and thank the plants!

Photos Courtesy University of Minnesota Agricultural Experiment Station

Think & Discuss

The year 2012 was the warmest year on record across the continental U.S. This century's first 12 years rank among the 14 warmest since records have been kept.

"Lake water levels are down, aquifers are running low and precious little water is in our topsoil or under the thin veil of snow cover. The pattern better shift soon; otherwise, drought will be the big story of 2013."

Paul Douglas, Meteorologist:
Minneapolis StarTribune, Jan 23, 2013

Q: What's your prediction about drought in 2013? Track the weather to see if you're right.

Q: What impact do dry or drought conditions have on soils, plants, animals and humans?

BLOOM and GROW!

Adventures in Gardening

Photo Courtesy danmarshall.com

So you think you might want to grow a garden at home or at school. What things must you think about?

Photo Courtesy U of M Extension Master Gardener Program

PLAN AHEAD:

1. Do you have a space for a garden? Pick a spot. It can be a plot of soil, a window box, a big container or even a group of flower pots.
2. Growing plants need soil, moisture, heat and light. How can you provide each of these?
3. What will you want to plant? What grows in your space, soil and type of weather?
4. What do you need to buy? Tools? Seeds or seedlings? Plant food? Soil? What else?
5. When will you need to start your garden to allow enough time for plants to mature?
6. What daily or weekly tasks must gardeners do? Will you need help? Who can help you learn what you need to know?
7. Anything else?

DIG IN:

1. Prepare the soil. What do you need to do? Do you need to add anything to make your soil healthier for growing plants?
2. Plant! Directions on your seed packages will guide you. How big will each plant get? How much space does each plant need? How can you make your garden colorful and attractive? How can you pair plants that do well together, or mature at different times? (Packages tell you how many growing days are needed.)
3. Label the rows so you remember what's planted where. As they grow, you'll learn to recognize each type of plant.
4. Water, weed and watch your garden. Observe and learn. Are plants thriving? Are some plants wilting? Is there any pest damage? Ask for help when you need it.

AFTER THE HARVEST

Imagine it's the end of the gardening season. Think about this: Were your expectations met? What were some surprises? What might you do differently next time you have a garden?

Lots of great help is just a mouse click or a phone call away. Check out the library, or check out the Web.

www.kidsgardening.com

What did you grow?

_____

_____

_____

Did you have extra produce to share or sell? ☐ Yes ☐ No

How did you clean, prepare, cook and serve your food?

Gardening is a business for some growers. Visit a farmers market and you'll meet them.

Photo Courtesy Minnesota Grown Program

FARMS & SCHOOLS:
NEW PARTNERSHIPS

Did you know that many schools and farms are teaming up to make food better for kids? They are getting food grown by local farmers onto school lunch trays. Kids in many school districts see winter squash, corn on the cob, melons, potatoes and apples from local farmers on their lunch trays. Less salt, more fruits and vegetables and whole grains are all part of the goal of healthier eating. Best of all, locally-grown food tastes great and is miles fresher.

Over 880 schools Minnesota schools, representing some 560,000 students, participate in farm-to-school programs. That number is growing each school year. Many of these same schools also plant vegetable gardens to provide home-grown produce for school lunches. Urban, suburban and rural, food served in schools is constantly changing due to local farm-to-school nutrition programs.

Farm-to-school programs make everybody winners. Linking schools with local farms means healthier meals in school cafeterias. It means improved student nutrition. It means learning lifelong health habits. It helps fight child obesity and it supports local farmers. Do you know where YOUR school lunch comes from?

Even Closer Than the Farm

Some schools are growers, too. Alexandria's Food and Nutrition staff planted apple trees at two schools to provide Honeycrisp and Sweet 16 apples for school meals and snacks.

Students at Solway Elementary in Bemidji planted a school garden and the fresh produce was used in their summer food service program.

Benson Public Schools initiated a "Greenhouse Connections" program. The schools teamed up with a local florist, using extra greenhouse space to grow mustard greens and arugula.

All Kinds of Gardens!

Maybe you'd like to grow just one type of plant in your garden. Check theme gardens that interest you.

- ☐ Just flowers
- ☐ Vegetables
- ☐ Native plants
- ☐ Salsa ingredients
- ☐ Berries
- ☐ Herbs
- ☐ Salad greens
- ☐ Plants to attract butterflies or hummingbirds
- ☐ A "Three Sisters" garden with corn, beans and squash—like the Native Americans taught the settlers
- ☐ An A to Z garden, with something for each letter of the alphabet
- ☐ A garden of just one color

Gardens are Good for You!

You will:

- get exercise and fresh air
- improve nutrition through really fresh food
- learn about ecosystems, plants and growing things

_____

_____

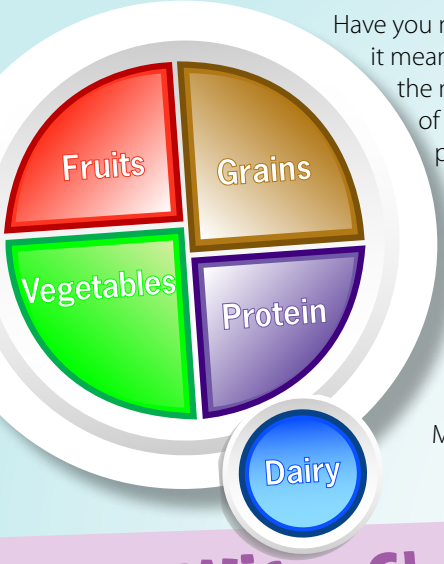
Why grow a garden?

"I would grow a garden to experience the thrill and excitement of feeding the plants and eating your own food. Seeing your plant sprouts growing toward the light is inspiring and unique! Also, I love the thought of eating your own food, and gardens are very pleasing to the eye! It makes our front and backyard look and feel so welcoming.

"I would like to have a squash, like a pumpkin or some brightly colored one, daisies, peapods, morning glories, strawberries, and carrots."

Anna K., Minneapolis

Eat Well, Be Well!



Have you noticed all the buzz about better food choices? What does it mean to eat more healthfully? MyPlate is a great reminder. It's the newest healthy eating guide from the U.S. Department of Agriculture (USDA). MyPlate shows how to divide your plate for a healthful meal. It shows the proportions and also details the food groups of vegetables, fruits, grains, proteins and dairy. A look at MyPlate reminds us to:

- eat less by avoiding oversized portions;
- eat more vegetables, fruits and whole grains;
- choose from a big variety of proteins, and
- include calcium-rich foods.

Q: The USDA hopes that MyPlate becomes your plate! Why?

Taste Test

Talk about food with classmates or neighbors. In your group, try to come up with the names of three foods that you have never tried. Find out more about these foods and their nutritional value.

List your discoveries below and make plans to taste them.

Do a word search on Food-A-Pedia for quick facts about more than 8,000 foods.

www.supertracker.usda.gov/foodapedia.aspx

Wiser Choices

My Plate helps us remember to avoid foods that are high in sodium or empty calories. Empty calories have the same energy as other calories but none of the vitamins, minerals or other nutrients you need. Examples are sugary drinks; sweets like cookies, ice cream and candy; white bread and white rice.

Check your menu! Which of these is a better choice, and why?

Today's Menu

Beverage: ☐ soda pop ☐ water or milk

Sandwiches:

☐ bacon cheeseburger with fries

☐ turkey wrap with serving of raw veggies

Dessert:

☐ Cookie ☐ Apple ☐ Hot Fudge Sundae

Proteins and Whole Grains

What counts as proteins and whole grains? Meat offers protein, but so do beans and **legumes**. Whole grains like whole wheat and whole oats may be familiar, but there are many other whole grains, too. Millet, quinoa (say "KEEN wah) and teff are popular in many African and South American countries. Beans and legumes are important sources of protein in most countries around the world.

My Plate... for Everybody

The variety and quality of food in the U.S. is unmatched anywhere. All the ethnic groups that make up our population bring a rich diversity of foods and menus.

MyPlate is based on a culturally specific way of eating. It assumes that everyone has their own plate. Not all people serve food that way, though. Not all people serve foods in separate groups, as seen on MyPlate. Many ethnic groups are known for wonderful, complex "mixed" foods. Vegetables, grains, proteins and dairy foods are all in one dish.

Q. *If you live in a family that eats a lot of mixed foods, how can you follow the MyPlate guidelines for healthier eating?*

How has agriculture changed Minnesota's landscape?

You have learned that the Minnesota landscape has transformed over the past 200 years. In the 20th century, farms grew in size and productivity. The 160-acre homestead of the 1800s gave way to the thousand-acre farm of the late 1900s. Crop and livestock production intensified, further changing the landscape.

Plants and People On the Move

Technology and modern farm machinery meant fewer people were needed on the land. People flocked to cities. The population grew. Thousands of acres of farmland were converted to suburbs, shopping areas, highways and airports. In 1950 for the first time more Minnesotans lived in the city than in the country.

The rise of cities and suburbs, plus increased travel, trade and transportation, affected plants that changed Minnesota, too.

Can you name the plant?

Read the clues to discover the *Plants That Changed Minnesota* featured on this page.

- *This is the largest irrigated crop in the U.S. Recreation and beauty are two benefits, but it takes many resources to keep it green.*

  _____

- *This beloved shade tree was ravaged by disease. Millions of the sick trees had to be cut down.*

  _____

- *The University of Minnesota is a world leader in developing varieties of these plants, one of which gives us our state fruit.*

  _____

- *Brought into North America from other countries, this pretty but fast-growing plant has become a big problem for fields and wetlands.*

  _____

Shady Sentinels

American Elms were fast growing shade trees that beautified and cooled our neighborhoods. They provided habitat for birds and other critters. Then, in the 1970s, Dutch Elm disease struck. Many trees had to be cut down. Losing them deeply changed the landscape. Luckily, disease-resistant varieties of the American Elm tree have since been developed and elms are on the rise again.

Q. *Why is it smart to plant a variety of trees?*

Going Green

Turf and lawn grass became a big part of the landscape as yards, parks, golf courses and open spaces grew. Grass is the leading agricultural crop in many states today! Well-kept grass is beautiful to look at, but there's a challenge. Keeping grass green uses lots of water and often chemicals, too.

Q. *What can people do to have nice lawns, but use less water or chemicals on the grass?*

Apple-icious

Over 7,000 varieties of apples grow worldwide. Years ago, nobody thought apple trees could grow in Minnesota. The University of Minnesota changed that by developing new varieties that survive our winters. Now we're a world leader for growing these delicious fruits. Unscramble the names of these Minnesota-bred apples. Circle ones you have tried.

ycrpHiones

TeSewanog

teaZsr

bristFote

IdoenHogy

Beautiful But Beastly

Purple Loosestrife is a non-native species brought in to the U.S. from Europe and Asia. It spreads quickly and invades our wetlands and marshes, crowding out native plants. It affects food sources for marsh insects, fish, animals and birds, and impacts the whole marsh ecosystem. It can invade fields and crowd out field crops, too. What once seemed harmlessly beautiful has become an environmental threat.

Q. *How did purple loosestrife get to Minnesota? Why did colonists value it? Find out if it's in your community. What's being done to control its spread?*

Photos Courtesy University of Minnesota Agricultural Experiment Station

The Top Ten

Ten Plants That Changed Minnesota

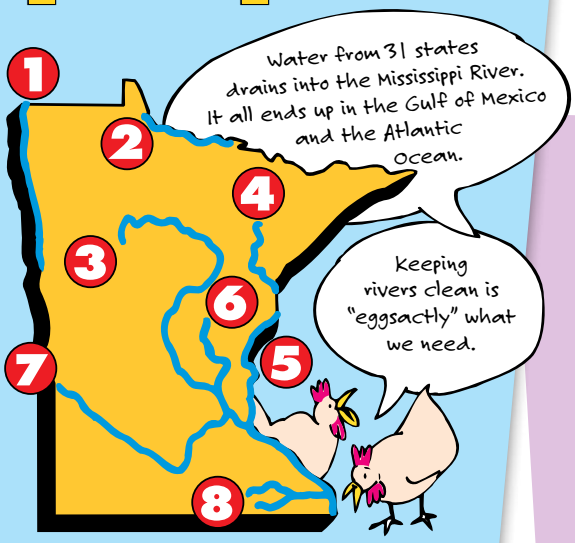
Alfalfa, American Elm Tree, Apples, Corn, Purple Loosestrife, Soybeans, Turf Grass, Wheat, White Pine, Wild Rice

AgMag Grab Bag

Celebrate Minnesota Water

Label these 8 rivers

- ☐ Minnesota
- ☐ Mississippi
- ☐ St. Croix
- ☐ Red
- ☐ Rainy
- ☐ Rum
- ☐ St. Louis
- ☐ Root



How can *you* help protect our rivers?

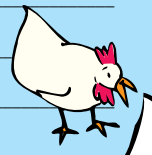
_____

_____

_____

_____

_____



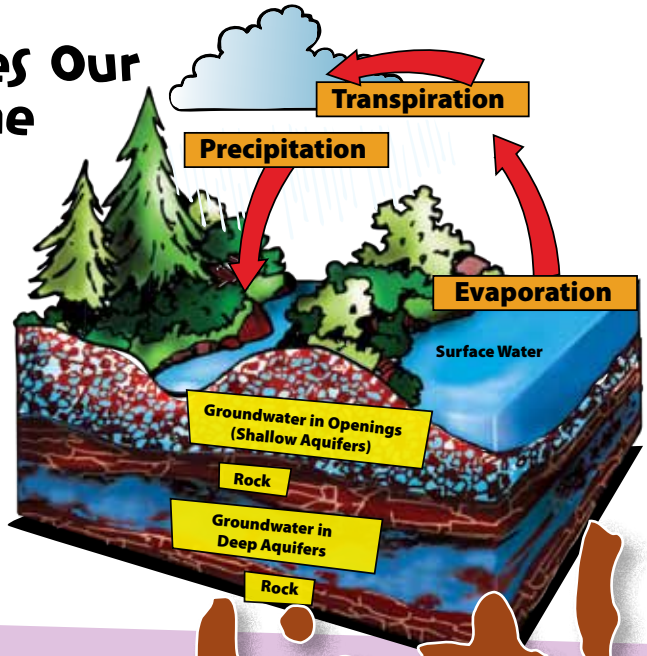
What is Arbor Day? When is it?

Date_____

Where Does Our Water Come From?

Aquifers are naturally formed underground water storage spaces. They can be huge! The largest aquifer in the U.S. is the Ogallala Aquifer. It spreads across 174,000 square miles under the Great Plains. It is under parts of eight states.

Find out: *Is this aquifer under Minnesota?*



Don't treat our soil like dirt!

Soil Facts

- Soil is alive! One tablespoon of soil has more organisms in it than there are people on Earth.
- When you're sick and get medicine from a doctor, the antibiotics that help you feel better probably came from soil.
- It takes 500 years to form an inch of fertile topsoil.

Find more soil facts, interactive games and virtual tours of soils around the world at: **www.forces.si.edu/soils**

www.childrenoftheearth.org

Find more soil facts. Visit the **Dig it! The Secrets of Soil** exhibit at the Bell Musem of Natural History:

www.bellmuseum.umn.edu

Did you know?

There are more than **7 billion** people in the world today. Which countries do you think rank first, second and third in population?

Answers: 1. China; 2. India; 3. United States

Why is it even more important to protect natural resources as population rises?

Think Green

Green Squad

Is your school a safe, healthy place that doesn't hurt you or the environment? The kids on the Green Squad know how to find out! They have a mission for you.

www.nrdc.org/greensquad/intro/intro_1.asp

For Seven Generations...

When making an important decision, an old Native American question was:

How will this affect the people seven generations from now?

What do you think this meant? _____

_____

How would thinking like this make a difference in what we do to the environment today?

_____

_____

The Minnesota AgMag is a publication of Minnesota Agriculture in the Classroom, 625 Robert Street North, St. Paul, MN 55155. The program is a public/private partnership between the Minnesota Department of Agriculture and the Minnesota Agriculture in the Classrom Foundation. Statistics courtesy U.S. Department of Agriculture and Minnesota Agricultural Statistics Service. MAITC Program Staff: Al Withers and Sue Knott. Writers: Jan Hoppe and Jane Duden. Design and Production: Northern Design Group. Printed in the U.S.A.

PRINTED WITH SOY INK™