

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 consumers and 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:

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

(Geography Strand) Standard: The student will identify how technology made some parts of Minnesota more valuable at particular times in history.

SCIENCE (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.

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

MATHEMATICS (Data Analysis, Statistics and Probability Strand) Standard: The student will represent and interpret data in real-world and mathematics problems.

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. You'll receive three issues this school year: October, January and March.

This second issue of your AgMag is designed to help you:

- introduce a basic agricultural production cycle: producing, processing, distributing, marketing, consuming
- highlight the plant and animal connection
- offer expanded information about sugarbeets and their production cycle
- present information about world population and world hunger, and the challenges they present for agriculture
- highlight significant achievements in agricultural engineering over the past 100 years



Hello Out There (Resources)

MINNESOTA AGRICULTURE IN THE CLASSROOM

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MAITC has great free educational resources. Try these!

- Food for Thought geography mapping curriculum
- Fields of Energy DVD featuring renewable energy
- Full-color Minnesota Commodity Card Series (20 cards)
- Farm Animal bookmarks and other supplemental resources
- AgMag Jr. for your primary grade colleagues to use

\$\$\$\$ Grants Available \$\$\$\$

Don't forget to apply for a MN Ag in the Classroom Ag Literacy Grant! The next application deadline is Feb. 1, 2011. You can request up to \$400. We are encouraging applications in the areas of youth gardening, ag-related field trips, unique integration and innovation ideas. Give it a try!

If your students are studying the states, have them visit the National Ag in the Classroom web site (click on State Profiles, then State Websites on the home page) to learn about each state's unique agriculture. You'll also find a wealth of teacher resources (mostly free) from other state programs: www.agclassroom.org



MORE ABOUT SUGARBEETS

Southern Minnesota Beet Sugar Cooperative: www.smbc.com
Minn-Dak Farmers Cooperative: www.mdf.coop
American Crystal Sugar: www.crystalsugar.com

Or just Goggle sugarbeets and you'll find tons of video and information!

MINNESOTA HISTORICAL SOCIETY

For great Minnesota historical images go to the Society's Photo and Art Database at: www.mnhs.org/collections

To enhance Agriculture's Biggest Leaps (AgMag page 7) access the Agricultural Mechanization Timeline at: www.greatachievements.org/?id=3725

Integration

Your AgMag materials are created by experienced classroom teachers. An Editorial Review Committee provides content ideas and reviews each issue.

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 agriculture activities to integrate into other curriculum areas.

Language Arts, Reading Literacy: Use the articles and activities to develop a variety of skills: webbing, outlining, non-fiction reading, reading for the main idea, vocabulary development (bold words throughout, pretest/post-test, activities throughout the AgMag, reproducible pages in Teacher Guide).

Social Studies, History: Social Studies appear everywhere in the AgMag. See especially *More Mouths to Feed* and *One World: Helping Each Other*, page 6 and the significant achievements on page 7. In the Teacher Guide, see pages 3 through 5.

Creative Writing: Examples: Stories from the points of view of plants or animals that depend on humans; predictions for the future of agriculture; letters to children in other countries, with descriptions about life here and questions about life there.

Geography, Map Skills: See AgMag pages 4 and 5, 8 and Teacher Guide page 5.

Science: See *Plants and Animals*, page 3; *From Beet to Sweet*, pages 4 and 5; and *Agriculture's Biggest Leaps*, page 7.

Math: See graphs and activities pages 3, 6 and 7 and Teacher Guide page 5.

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.
- Four reproducible activities: *Inventors and Inventions* (page 3); *Why are They Hungry?* (page 4); *Food: Everybody Pays* (page 5); *Show What You Know* (page 6).

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 might wish to pre-teach are:

interdependent (cover); **raw materials, natural and renewable resources, agriculture cycle, livestock** (pages 2-3); **topper, lifter, co-products, beet molasses** (pages 4-5); **consumers, developed country, less-developed country** (page 6); **site-specific agriculture, crop rotation** (page 7).

Discussion Prompters

Cover (Social Studies)

1. What makes "Agriculture, the Land, and You" a good title for this page? (*Each of the products mentioned in the article and many shown in the photos started out with a connection to the land, the soil. They end up being used by people.*)
2. What connections to agriculture do you see in these photos? (*Soccer player's clothes and ball, students' food, clothes, napkins, decorations, tablecloth, plastics, wood*)

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

1. How many things in your classroom came from agriculture?

2. What have you eaten or worn today that came from an animal? A tree or plant? The soil? Which came from beef or dairy cattle? Corn or soybeans?
3. Why do we say agriculture depends on natural and renewable resources? (*The agricultural products that are produced, processed and distributed all are dependent on soil, sun, air and water in some way. Animals and plants are considered renewable resources.*)
4. What foods do NOT come from plants and animals? (*Mushrooms and yeast are fungi, not plants.*)

Student Pages 4 and 5 (Science, Social Studies)

1. Sugar comes to us from two main sources: sugar cane and sugarbeets. Minnesota's sugar industry is all based on sugarbeets. Why don't we have both? (*Sugar cane requires tropical and subtropical growing conditions such as in Hawaii and the southern states; sugarbeets grow well in temperate climates like ours.*)
2. Beet harvest is done within about three weeks. Once the plants are ready to harvest, they must be pulled up before the ground freezes. Processing can last until about May. Cold winters are good for preserving the beet piles. Why is spring a problem? (*Warm weather thaws the beets and they start to deteriorate.*)
3. Do sugarbeet processors make powdered sugar? (*Yes. Powdered sugar, also called confectioners' sugar, is granulated sugar ground to a smooth powder and then sifted. It contains about three percent cornstarch to prevent caking. A machine fills, bags and boxes the powdered sugar in the same way it does sugar crystals.*)

Student Page 6 (Social Studies)

1. What does the population trend of the future (more people in cities and less-developed countries) mean for agriculture? (*Production must keep increasing in order to feed everyone. Transportation and distribution will be even more important than they are today. Growing urban populations will use resources in greater quantities than their fewer rural neighbors who produce the food. Conserving land, water and energy resources and using new technologies to increase production will grow in importance. Marketing new products will continue to be a growing business.*)
2. Because of war, drought, political instability, high food prices, poverty and joblessness, hunger now affects one in six people in the world. (Estimate is from the United Nations.) How can we help hungry people?

Student Page 7 (Social Studies, History)

The agricultural achievements on this page were selected by agricultural engineers. People from other segments of agriculture may have included other achievements, but this list highlights significant science and technology advances.

1. Tillage is plowing, cultivating or turning over soil in preparation for planting. Conservation tillage includes a range of farming practices intended to save and protect soil. How might people who have gardens and lawns limit soil erosion? Why is it especially important in towns and cities? (*Eroded soil ends up in storm sewers, water runoff areas, rivers and lakes. The runoff carries lawn and garden chemicals as well, adding to pollution.*)
2. Precision farming, or site-specific farming, has also been called "farming by the foot." Soil and growing conditions vary throughout a field. Thanks to GPS and computer technology, farmers are able to match their seed, fertilizer, crop protection chemicals, etc. to the exact needs of a portion of the field. The end result is higher yields.

Inventors & Inventions

Word Bank:

Thomas Edison
 Louis Pasteur
 Charles Birdseye
 John Deere
 Cyrus McCormick
 Samuel Morse
 Charles Goodyear
 Alexander Graham Bell
 Rudolph Diesel

Circle which came first

pasteurized milk or tv dinners
 gasoline engine or steam engine
 telephones or tractors
 canned foods or frozen foods
 electric lights or telegrams
 vacuum milkers or pasteurized milk

Many inventors and inventions have changed agriculture. Fill in the missing inventors. How is the name sometimes the clue? How can you find answers you do not know?

Invention	Inventor	Year
Canned Foods	Nicolas Appert	1787
Cotton Gin	Eli Whitney	1793
Steam Locomotive	Richard Trevithick	1804
Reaper	_____	1834
Refrigerator	Jacob Perkins	1834
Steel Plow	_____	1836
Vulcanized Rubber	_____	1839
Telegraph	_____	1840
Gas Engine	Jean Lenoir	1860
Pasteurization	_____	1864
Margarine	Hippolyte Mourles	1869
Barbed Wire	Joseph Glidden	1873
Telephone	_____	1876
Vacuum Milking Machine	Anna Baldwin	1878
Electric Light	_____	1879
Internal Combustion Engine	_____	1892
Tractor	Benjamin Holt	1904
Frozen Food Process	_____	1925

NOTE: Lay a piece of plain paper across the answers to block off the lower part of this sheet before photocopying. Invite students to use the resulting blank space to write about things they think are really cool inventions or things they wish could be invented.

ANSWERS: AgMag

Agriculture Cycle, p. 2

1. Producing 2. Processing 3. Distributing
 4. Marketing 5. Consuming

- Photos top to bottom: 1, 5, 2
- Products with more steps use more energy, especially in processing. Example: Fresh potatoes are picked, cleaned, graded, packaged and ready for consumers. Potato chips add slicing, baking or frying, seasoning and inspection to the cycle.
- Sun, air, water and soil are the resources from which all agricultural products develop.

Beet Sugar Content, pgs. 4 and 5

A three-pound beet has about 7.68 ounces of sugar. Each beet would fill about 46 sugar packets.

Think and Discuss, pgs. 4 and 5

- Leaves are left in sugarbeet fields to help preserve moisture, prevent erosion and add nutrients to the soil.
- Communities benefit from the sugarbeet industry because it provides jobs directly as well as a demand for farm equipment, seeds, fertilizer, gasoline and more. Farmers also buy food, clothes, etc. at local businesses.
- Co-ops are businesses that are owned by and operated for the benefit of those using its services.

More Mouths to Feed, p. 6

The world gains about 8,520 people per hour and 204,448 each 24-hour day.

One World, p. 6

Why is good agricultural education important? Science and technology are continuously finding better ways to farm, to increase crop yields and to better care for livestock. Teaching good agricultural practices to farmers around the world increases the amount of food produced. That leads to less starvation, better nutrition, better health and higher family incomes.

Agriculture's Biggest Leaps p. 7

- Topsoil erodes when wind blows or rains fall.
- Acres in conservation tillage today: 112.6 million; 1990 73.2 million. Trend is for farmers to use more conservation tillage.
- Crop rotation is planting different crops on fields instead of the same crop year after year. This prevents depleting the soil of the same nutrients.
- Global Positioning System (GPS) satellites orbit the earth. They transfer signals to receivers on the ground. A receiver locates four or more satellites, figures out the distance to each and can then pinpoint its own location.

ANSWERS: Teacher Guide

Inventors and Inventions

Missing inventors, in order: Cyrus McCormick, John Deere, Charles Goodyear, Samuel Morse, Louis Pasteur, Alexander Graham Bell, Thomas Edison, Rudolph Diesel, Charles Birdseye.

Which came first: pasteurized milk, steam engine, telephones, canned foods, telegrams, pasteurized milk.

Why Are They Hungry?, p. 6

Across: 5. transportation; 10. crop; 12. drought; 13. spoiling.

Down: 1. stealing; 2. wars; 3. government; 4. poverty; 6. storage; 7. trade; 8. processing; 9. floods; 11. pests.

Food, Everybody Pays

Think and Discuss: The connection between food costs and fuel costs is that all parts of the agriculture cycle (production, processing, distribution) use fuel. As fuel costs more, these increases are passed on to the customer. Increased costs of feed, seed, fertilizer, etc. on the farm are also passed on. As demand for anything goes up, prices go up. As supply goes down, prices go up.

Countries paying the most of their income are generally less-developed countries. Developed countries tend to pay less. People in the United States pay least of all.

Show What You Know, PreTest/Post-Test

1. producing, processing, distributing, marketing, consuming
 2. b 3. c 4. b 5. b 6. a 7. c 8. b 9. b

Agriculture in a Hungry World

Why Are They Hungry?

There is enough food to feed everyone in the world. So why are some people starving? They simply can't get the food they need. Solve the crossword puzzle and you'll see some of the reasons food does not reach people who need it in many parts of the world.

List some places you've been hearing about in the news where people suffer from hunger. What are some reasons their needs are not met?

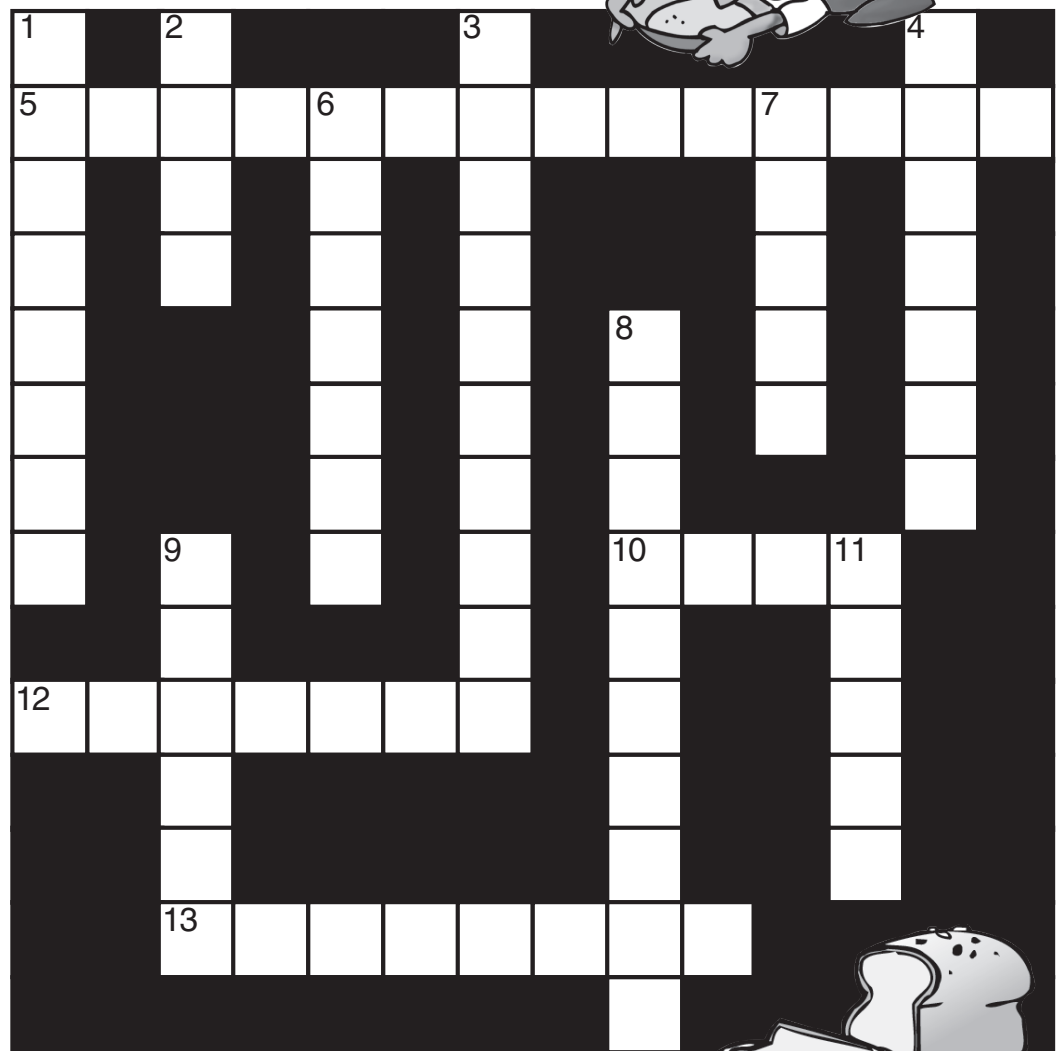


ACROSS

- 5 Reliable ways of moving things from place to place
- 10 Poor growing season; ___ failure
- 12 Too little rain to grow crops
- 13 Rotting and molding

DOWN

- 1 Robbing
- 2 Fighting in or among nations
- 3 Leaders of a country
- 4 Too little money
- 6 Clean, dry places to keep food
- 7 Buying and selling between countries
- 8 Changing raw products into forms we can use
- 9 Overflowing of rivers and streams
- 11 Insects and rodents



What's Your Ecological Footprint?

How many Planet Earths would be needed if everyone lived like your family does? Take the online quiz with your family at Earth Day Network:

www.myfootprint.org



Food supplies are hurt when certain things happen. Sometimes land and water quality goes down. Pollution, natural disasters like floods, droughts, insects and over-planting one kind of crop can cause this damage. Sometimes people don't have the technology to produce and protect crops.

It takes all the world working together to solve hunger problems.

FOOD Everybody Pays

You've been reading how great Minnesota is for growing foods. At the same time you've been hearing people talk about food costing more. Why is the cost of food rising?

Think and Discuss

- The price of fuel has steadily gone up. What's the connection between fuel costs and food costs? Think about food production as well as food distribution (page 2).
- Costs of feed, seed and fertilizer on the farm have gone up. How does that affect the price of food?
- Think about where some of our foods come from. How might weather events, such as a hurricane on the Gulf Coast, floods in Illinois or drought in Australia affect the food supply? If supplies go down, what happens to food prices?
- More people in more countries are demanding and using more fuel and food. We all compete for limited supplies. If demand for fuel and food goes up, what happens to the prices?



Rising Food Costs

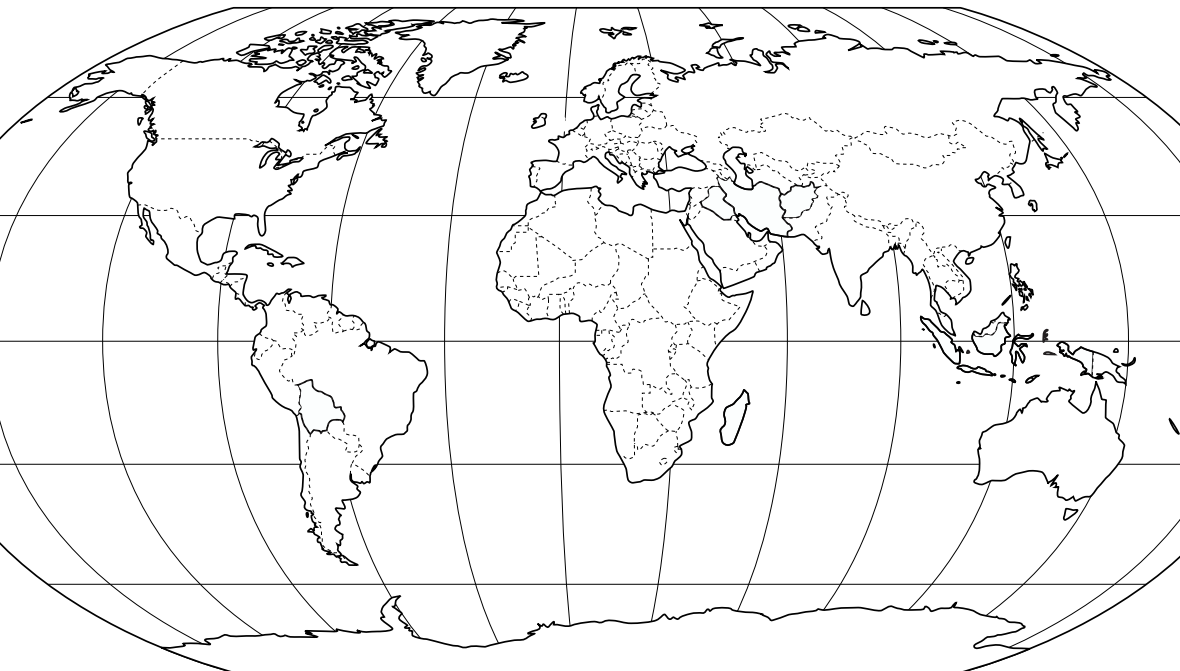
What Can Families Do?

- Take less and waste less. Wasted food equals wasted money and energy.
- Compare prices. Do name brands cost more than store brands?
- Buy foods that are in season. Know the local growing season for different types of food.
- Buy foods that are on sale. Read the ads and clip the coupons before you shop.

What does your family do to save money on food?

Percentage of income spent on food

Look below at some of the world's countries. What percentage of their income do people in each of these countries spend for food? Use the code to color the map. You may need a world map to find the countries.



Code

Red over 50%
 Orange 26 - 49%
 Yellow 11 - 25%
 Green 10% or less

Country	Percentage
Afghanistan	over 50%
Bolivia	over 50%
Iran	over 50%
Iraq	over 50%
Madagascar	over 50%
Brazil	26-49%
China	26-49%
India	26-49%
Philippines	26-49%
Russia	26-49%
Australia	11-25%
France	11-25%
Canada	11-25%
Italy	11-25%
Japan	11-25%
Mexico	11-25%
New Zealand	11-25%
Norway	11-25%
Spain	11-25%
South Africa	11-25%
Sweden	11-25%
United Kingdom	11-25%
United States	10% or less

- What do the countries that pay the **most** of their income have in common?
 What do the countries that pay the **least** of their income have in common?
 Which country pays the least for food?



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. Name five steps in an agriculture cycle.
a. _____ b. _____ c. _____ d. _____ e. _____
2. These are the source of food for every other living thing.
a. animals b. plants c. fungi
3. More than half the world's population depends on this plant for a daily meal.
a. wheat b. corn c. rice
4. How many people are living in the world today?
a. over three million b. over six billion c. over twenty million
5. This Minnesota valley is the nation's top spot for growing sugarbeets.
a. Cannon Valley
b. Red River Valley
c. Mississippi River Valley
6. Minneapolis was once widely known for producing
a. flour. b. salt. c. wild rice.
7. Modern farmers use this device to know their land better.
a. binoculars b. yardsticks c. GPS
8. The world's less-developed countries include
a. Japan and Australia.
b. Bangladesh and Uganda.
c. United States and Canada.
9. Conservation tillage helps protect soil against
a. pollution.
b. erosion.
c. insect invasions.