AgMag 5 Fall 2024 Teacher's Guide

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. People 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's what the student Minnesota AgMag Series is all about.

About Your AgMag

The AgMag is a great supplement to your social studies, science, or language arts curriculum. You'll get two issues per school year: October and March.

AgMag Theme: Agriculture Connects Us All!

- **Overview of the What and Why of Agriculture**
- **What makes Minnesota such a great state for Agriculture**
- **Growing a future in Agriculture: profiles of different careers in agriculture**
- **Why are plants important?**
- **Hydroponic farming and how lettuce is grown without soil**
- **Minnesota students connected to agriculture.**

Integration Ideas

Science/Math

- Read about hydroponic farming on pages 6-7, then grow your own hydroponic farm in your classroom.

Social Studies

- Have students interview someone they know who works in agriculture. Invite someone with a career in agriculture to come speak to the class about how they got involved in agriculture. What might their interaction with the Dakota and Ojibwe people have looked like if they were farming in MN in the 1800's? How does farming differ for people living in more/less populated areas?

English Language Arts

- Ask students to identify key ideas and details and build their vocabulary through the AgMag's informational text.
- Use agriculture as an inspiration for creative writing activities and group discussions. Ideas: Stories with characters who have agriculture careers; predictions for agriculture in 2050 (or future years); letters to children in other countries with descriptions about agriculture here and questions about agriculture there.

Glossary

Some words in your AgMag may be unfamiliar to your students. Many are defined in the articles. There is also a glossary on the AgMag website: http://mnagmag.org/glossary/ Words you might wish to pre-teach are:

AGRICULTURE: Growing plants and raising animals that people use for food, clothing and many other things every day. It's also harvesting those farm products and getting them to us so we can use them. Agriculture is the **industry** that grows, harvests, processes, and brings us food, **fiber**, fish, forests, sod, **landscaping materials**, and more. It uses soil, water, sun, and air to produce its products. The process starts on farms, **orchards**, gardens, and ranches with the growing and the harvesting of crops and **livestock**, then moves to **processing** plants before finally traveling as finished products to stores, farm markets, lumberyards, greenhouses, and more where **consumers** buy the products. Agriculture is connected in some way with almost everything we eat, wear, and use.

Quote from an Unknown Source: "Agriculture is not simply farming. It's the supermarket, the equipment factory, the trucking system, the overseas shipping industry, the scientist's laboratory, the houses we live in, and much more. It has an effect on the air we breathe, the ground we walk on, the water we drink, and the food we eat."

PRODUCER: a person, company, or country that makes, grows, or supplies goods or commodities for sale. Farmers are producers.

CONSUMER: a person who purchases goods and services for personal use.

TERRAIN: a stretch of land, especially with regard to its physical features.

FORGED: create (a relationship or new conditions).

HORTICULTURE: the art and science of growing plants

HYDROPONIC: the technique of growing plants using a water-based nutrient solution rather than soil.

Minnesota Academic Standards Connection

Subject	Standard Code	Benchmark
Science	5L.1.2.1.4	Plan and conduct an investigation to obtain evidence that plants get the materials they need for growth chiefly from air and water. (P: 3, CC: 5, CI: LS1) Examples of plants may include aquatic plants that grow without soil. Examples of observational evidence may include growth patterns for plants grown in different environments.
Geography	5.3.14.1 5.3.16.1	Places and Regions: Explain how physical and human characteristics and power structures are used to create regions on the land. Describe how the choices people make have impacted a physical environment over time.
English Language Arts	5.1.5.3	Apply knowledge of text structure to understand and evaluate a wide variety of complex literary and informational texts.

AgMag Cover: Agriculture Connects Us All

Discussion Prompts:

- In what way are we connected to agriculture?
    - Most of the products we use everyday come from agriculture. From the fiber in your clothing to the rubber in the tires on your car.
- What is Agriculture?
    - Agriculture is **the industry that grows, harvests, and brings us food, fuel**, fiber/fabric, forestry and flowers.

Page 2: What is Agriculture?

Discussion Prompts:

What do Forests, Food, Flowers, Fuel, and Fiber all have in common?

- They are all parts of agriculture that help to make products that we use everyday.

The 5 F's of Agriculture

Consider finding examples of agriculture businesses or products that fit under each of the five F categories. You could bring in examples, or brainstorm examples together as a class. Draw a T chart on the board and make a list of agricultural products that fit under each of the five F categories.

Why Agriculture?

Explain that more people have jobs in the agriculture industry than one might think. Ask for volunteers of students whose parents/guardians have careers in any of the fields listed. After the class has read about the different career categories, have them share with a partner in class which agriculture career field they would be interested in pursuing.

Page 3: What Makes Minnesota Such a Great State for Agriculture?

Minnesota has 4 Growing Areas

As a class, have students identify the growing region where your school and community is located.

Discussion Questions

What agricultural products are grown where you live?

- The link below gives a clickable county by county view of what products are grown across the state of Minnesota.
  https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/index.php

Think & Discuss Question: If you were a new farmer moving to Minnesota

where would you choose to live? How does the climate and soil affect your decision? Would you raise livestock, crops or both?

- Using the map on page 3 have your students pick a county or region in the state. Using the information about that region, have them decide from a list of livestock, crops or both what would do well in that region and what would not.
  You could provide a list of various livestock and crops and have them place each into the best region for their success.
  Example -If you wanted to raise cattle as a new farmer would you choose to raise them in the Southwest Region or the Northeast Region of the state and why?
  Answer - The Southwest Region because the climate is milder making it easier on livestock and the ground is more fertile making it easier to grow the crops that cattle eat.

Page 4-5: Grow Your Future In Agriculture!

Minnesota is a land of opportunity. With so many valuable and diverse resources in our great state, there are unlimited ways one can have a career in agriculture. Have students read about these people who have careers in Agriculture.
Check out the new Careers Beyond the Farm videos featuring Elvin Peyton, Jr. and Sherri Tatro, among others! https://maitcfoundation.org/stories/lakeland-pbs-ag-career-videos/

Discussion Question:

- Post reading: What agriculture career was most interesting to you? Which one was least appealing? Which career would you like to learn more about? Ask students if they know anyone who works in agriculture.
- What agricultural careers are in the area you live? List examples. Consider inviting someone who works in agriculture to come and speak to your class and answer questions.

Page 6-7: Why Are Plants Important?

How Do These Lettuce Plants Grow If They Aren't in Soil?

Why do lettuce plants do well in a hydroponic system?

- Lettuce has a shallow root system which works best in a hydronic system. Lettuce is fast growing so students can see the full growth in a short amount of time.
- Hydroponic systems allow nutrients to be added directly to the roots so there is less waste and faster growth.

Direct students' attention to the Plant Comparison box on page 8. Read and discuss the questions in the box together as a class or have students divide up into pairs to discuss the questions.

Discussion Question:

- Why are plants important?
    - Clean air - plants convert carbon dioxide and water into oxygen.
    - Food Source - Plants provide food to other organisms in the food chain.
    - Soil Protection - Roots of plants help to hold soil in place which prevents the erosion of the soil.
    - Shelter - Plants provide shelter for animals and are used in the materials we need to build houses.
- What are the benefits and challenges of hydroponic farming?
    - Some challenges may include building the structure and ordering the materials, like a grow tower, to start farming with hydroponics.
    - Some benefits include being able to produce fresh vegetables year round in cold climates. Because there is no soil, pests are less likely to affect the growth and health of a hydroponically grown plant.
- Why would a farmer choose to grow plants in a hydroponic system instead of planting in a traditional field?
    - Space. A hydroponic system takes up much less space than a traditional field.
    - Cost. A farmer in Minnesota can grow in a hydroponic system year round and sell their crop. A grocery store can sell that crop from a local farmer and not have to pay to have it shipped from warmer climates.

Page 8: Look at them Grow!

Encourage students to read over the examples on this page. What ways can your students connect with agriculture? Consider discussing ideas and potentially having a field trip or creating an agriculture connection in your classroom!

Ideas for connecting your classroom to Agriculture:

- Watch the full West Central Area School PBS video about their hydroponics here https://www.pioneer.org/pyg/

    Prairie Yard & Garden

    - Learning to Grow in Barrett: Growing at WCA Schools
    - Episode | 28m 45s | 2024/04/06 |
    - Eric Sawatzke and his students at West Central Area School in Barrett are on the grow. They are learning how to raise flowers and food to benefit themselves and many others in the community as they help stock the area's food shelves with fresh produce.
- Take a field trip to a nearby local farm
- Farm in a glove activity https://minnesota.agclassroom.org/matrix/resource/196/
- Build a hydroponic farm in your own classroom
    - Test Tube Hydroponics https://agclassroomstore.com/test-tube-hydroponics/
    - Build and maintain hydroponic units from soda bottles.

https://minnesota.agclassroom.org/matrix/lesson/300/

Guess the Picture:

Answer: Pluck Flower Farm, page 4

Crack the Code:

Answer: Iceberg

AgMag 5 Fall Quiz

1. Which segment of agriculture involves changing raw materials into different products?
   A. Production
   B. Processing
   C. Promotion
   D. Distribution

2. Which growing area in Minnesota is known for fertile soils and good moisture, ideal for growing fuel crops like corn and soybeans?
   A. Northwest
   B. Southwest
   C. Northeast
   D. Southeast

3. Which of the following areas does involve Minnesotans with agricultural careers?
   A. Flowers
   B. Fiber
   C. Forestry
   D. Fuel
   E. Food
   F. None of the above. They all involve agriculture.

4. What do plants NOT use in a hydroponic growing system?
   A. Nutrients
   B. Soil
   C. Sunlight
   D. Water

5. Students at West Central Area Schools in Minnesota are growing plants all year round using which two structures?

A. Grow towers and greenhouses
B. Raised beds and straw bales
C. Grow lights and incubators
D. Soil and plant pots