Where Did All the Farmland Go?

OVERVIEW & OBJECTIVES

Agricultural land is disappearing in part because of urban development. The loss of agricultural land will impact the food supply of our nation and the livelihood of Minnesota farmers. Students will investigate Olmsted County as a case study of lost farmland, but other Minnesota counties could be used.

Students will be able to...

- Describe Minnesota's biomes.
- Identify where Minnesota's best farmland is located and where their community's best farmland is located.
- Explain how urban development is causing the loss of prime farmland.
- Predict future use of prime farmland in their community.

GRADE

4th and 6th

TIME

3 Days

REQUIRED MATERIALS

- ✓ Computer Internet access with projector
- ✓ Computer Internet access for students
- ✓ Poster paper, markers, masking tape
- ✓ Handout: "Minnesota's Biomes"; "Conserving Agricultural Land"; "Carousel Brainstorming"

MINNESOTA SOCIAL STUDIES STANDARDS & BENCHMARKS

(4th GRADE)

Standard 1. People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.
4.3.3.1.1 Create and use various kinds of maps, including overlaying thematic maps, of places in the United States, and also Canada or Mexico; incorporate the "TODALS" map basics, as well as points, lines and colored areas to display spatial information.

Standard 9. The environment influences human actions; and humans both adapt to and change, the environment.
4.3.4.9.1 Explain how humans adapt to and/or modify the physical environment and how they are in turn affected by these adaptations and modifications.

Standard 10. The meaning, use, distribution and importance of resources changes over time.

4.3.4.10.2 Analyze the impact of geographic factors on the development of modern agricultural regions in Minnesota and the United States.

(6th GRADE)
Standard 1. People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.

6.3.1.1.1 Create and use various kinds of maps, including overlaying thematic maps, of places in Minnesota; incorporate the "TODALSS" map basics, as well as points, lines and colored areas to display spatial information.

Standard 10. The meaning, use, distribution and importance of resources changes over time.

6.3.4.10.1 Describe how land was used during different time periods in Minnesota history; explain how and why land use has changed over time.

SUGGESTED PROCEDURE

Day 1

Students write in their journals each food item they had for their last meal and identify where it came from. Clarify that their foods came not from a store, but from a farm. Students will then identify foods that come from Minnesota and the Upper Midwest.

The teacher will ask: In what environments are these foods produced? The teacher will explain that the different environments are called "biomes" and identify the four biomes in Minnesota using the map at "Minnesota Biomes". The students will describe the biome they live in. Show the map, "Bird's Eye view of Rochester, Olmsted County, Minnesota 1869". Ask students: What evidence do you see that would verify Rochester is in the biome you identified? Describe what makes this biome good for agriculture.

The teacher will distribute the handout, "Minnesota's Biomes". Students will use the website to complete the chart. Students will answer the questions and the class will discuss their responses.

Discuss whether Minnesota is a good state for agriculture. Show students the map, "Farmland in Minnesota Counties" (#25) and discuss the locations and the expanse of Minnesota's agricultural lands. Referring to their answers from the handout, "Minnesota Biomes", explain that Minnesota has rich soils, adequate rainfall, and a long growing season, which gives it prime farmland.

Ask students how important agriculture is to Minnesota. Show students the "Minnesota Agricultural Profile" from the Minnesota Department of Agriculture. Discuss and identify its major livestock and crops—hogs and corn (#1 nationally in turkeys and sugar beets). Review the map of products and where they are produced. Ask: Whom do we sell these products to? How important is agriculture to Minnesota in comparison to the other industries we have? Could Minnesota be labeled an agricultural state?

Day 2

The teacher will begin by reviewing with students that prime agricultural land has rich soils, adequate rainfall, and a long growing season. Ask students what would happen if Minnesota were to lose its prime agricultural lands. Students will learn about the loss of agricultural lands due to urban development by reading texts and examining maps and data while working in small groups, individually, or as a class.

Students will read about Agriculture and Large Farms in Northern Lights and then review the introductory page, "What's at Risk", at American Farmland Trust. Ask students to summarize agriculture and the possible loss of farmland in the U.S. and in Minnesota. Is the loss of farmland a problem? What's causing much of the loss? Should we be concerned about the loss of farmland?

The teacher will show the map, "Farming on the Edge", and the class will study and discuss the map, highlighting locations of prime farmland and areas of lost prime farmland. Ask students to hypothesize why prime farmland is lost. Then the teacher should ask: Is Minnesota losing prime

farmland? Scroll to the bottom of the link to examine the Minnesota map. Ask: Where are the areas of high development? What do these areas have in common? Highlight the locations near urban areas by looking at a Minnesota map from their textbook.

Ask students: What is one of the biggest causes of farmland loss? Have students report to one of the four corners of the room to identify what they think is the primary cause: increased houses, increased industries, increased transportation, or increased parks. Discuss as a class.

Share the reading, "Agricultural Lands Lost to Urban Development" on the handout, "Conserving Agricultural Land" with students. Examine the bulleted list. Ask students if the loss of agricultural land is changing the environment and ask them to give examples.

Students will participate in a carousel brainstorming activity by answering five questions. Divide students into five heterogeneous groups, each with a different colored marker. Each group answers one of the posted questions by listing responses in a brainstorm. After 1-2 minutes, students rotate to the next question and respond to it before rotating to the other questions. Returning to the original question, students summarize responses to the question in writing before sharing the question and summary in a class discussion. Details of this activity are provided on the "Carousel Brainstorming" handout. Possible questions include:

- How does building more houses change the environment?
- Why should we protect prime agricultural land?
- Why is prime farmland being lost?
- How are agricultural lands protecting the environment?
- How are people affected by the loss of prime farmland?

Day 3

You've looked at data about loss of farmland in the nation and in our state. Today we are looking specifically at our county—Olmsted. We will examine Olmsted County's conversion from farmland to urban areas.

Read about Olmsted County in the summary, "Conserving Agricultural Land". Ask: Why does Olmsted have good agricultural land? How significant is Olmsted's agriculture? Is Olmsted's agricultural land changing? Next, show the "State and County Profiles" from the USDA Census of Agriculture. This website has a map of Minnesota's counties that is clickable with an agricultural statistical summary for each county. Examine the statistics for Olmsted County and the changes in agriculture.

The "Olmsted County Future Land Use Map" is the most up-to-date plan for Olmsted. Study the legend. Ask students: Where do you see the most current urban development? Where do you see the most planned urban development? Where is the potential growth expected in this plan?

Review the reasons students selected yesterday to protect prime agricultural land. Discuss with students strategies to reduce farmland loss. Among the strategies to conserve farmland include:

avoid development of prime farmland; concentrate development rather than allow sprawling development; encourage land conservation practices. [Note: The complete list is at "Saving Farmland, Growing Cities"] Ask students to identify how these strategies could be actualized; that is, what could be done to retain prime farmland? Do a Think-Pair-Share where students think about their response, share the response with a partner, and discuss the responses as a class.

Explain to students that they will complete a project to show their understanding of the loss of prime farmland. Students will select among the following suggested projects to demonstrate their understanding of "Where did all the farmland go?"

- Write a letter to one of your ancestors that lived in Olmsted County and describe to them what has happened to their farm.
- Make a diorama of an old farmstead and an urban setting of the same location.
- Write a poem about the transformation of a farmstead to an urban setting.'
- Write a skit to show what is happening to our county's farmland.
- Write a letter to your district's congressman discussing your opinions about urban sprawl.
- Write a letter to the editor of your local newspaper describing concerns you have about urban development.

The evaluation for all choices includes an explanation of why Olmsted County has good farmland, data describing what is happening, and a prediction about what will happen if this trend continues.

Extensions

1. Students may complete two optional activities—answer questions and paste a picture. For the first activity students go to the "Activities" tab on the left for "What's your biome?" with a downloadable black and white map at "Minnesota's Biomes". They answer the questions: What biome does your community belong to? Create a list of plants and animals in your community. Would you expect to find similar animals and plants throughout your entire biome? Why or why not? For the second activity students draw or paste a picture of their biome with a major plant or animal on the blank Minnesota biome map.
2. Students complete a cause-and-effect graphic organizer explaining the loss of farmland.
3. Invite a local farmer to speak to the class about farming and the difficulties farmers have finding good farmland in the area.
4. Invite a local city planner to speak to the class about how decisions are made about zoning—which land to zone for housing and business, or which land to save for farmland or a protected wildlife refuge.
5. Students can also be given an extended project to interview these people and give a report to the class.

Assessments

- "Minnesota's Biomes" handout
- Class discussions
- Project

Website Resources

"Minnesota's Biomes" at Minnesota Department of Natural Resources
http://www.dnr.state.mn.us/biomes/index.html
This link contains a Minnesota biomes map, descriptions of biomes, and comparisons of biomes

"Bird's Eye View of the city of Rochester, Olmsted County, Minnesota 1869" at Library of Congress
http://www.loc.gov/resource/g4144r.pm004050/
This link has an historical map of Rochester

"Farmland in Minnesota Counties" from Food for Thought Mapping Curriculum at Minnesota Department of Agriculture
http://www.mda.state.mn.us/kids/food4thought.aspx
This website has a valuable map (#25) as well as other maps, lessons, and resources

"Minnesota Agricultural Profile" from the Minnesota Department of Agriculture
https://www.mda.state.mn.us/~/media/Files/agprofile.ashx
The link summarizes Minnesota's agriculture with a map and charts

Northern Lights from Minnesota Historical Society
This is the 6th grade Minnesota textbook

"What's at Risk" at American Farmland Trust
http://www.farmland.org/actioncenter/no-farms-no-food/7-ways-to-save-farmland.asp
This link summarizes effects of reduced farmland

"Farming on the Edge" at American Farmland Trust
https://www.farmland.org/farming-on-the-edge
This link contains maps of U.S. and Minnesota threatened farmlands

"Conserving Agricultural Land" from Olmsted County General Land Use Plan at Rochester-Olmsted Planning Department
http://www.co.olmsted.mn.us/planning/ordinances/Documents/Olmsted%20County/CountyGLUPlan.pdf
This link contains the full report from which the summary derives

"Minnesota" from 2007 Census Publications at Census of Agriculture, USDA
http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Minnesota/
This link contains agricultural statistics for every county in Minnesota

"Olmsted County Future Land Use Map" at Olmsted County (2011)
http://www.co.olmsted.mn.us/planning/ordinances/Documents/Olmsted%20County/CountyGLUPmap.pdf
This link contains a zoning map for future development

"Saving Farmland, Growing Cities" at American Farmland Trust
https://www.farmland.org/publications
This link lists strategies to conserve farmland

Additional Websites

"County Land Use Maps" at Minnesota Geospatial Information Office
http://www.mngeo.state.mn.us/maps/LandUse/
This website links to land use maps for every Minnesota county

"State Agricultural Facts" at National Agriculture in the Classroom
http://www.agclassroom.org/teacher/ag_facts.htm
This website gives agricultural facts about Minnesota as well as all the states

Minnesota's Biomes

Directions: Complete the chart below. Begin by going to "Minnesota's Biomes" at http://www.dnr.state.mn.us/biomes/index.html and click on the tabs to the left for descriptions of each biome. A biome is described as a distinct habitat for specific plants and animals. Examples of biomes include desert, forest, tundra, grassland, but these are often divided into specific categories, such as coniferous forest or deciduous forest. After writing the descriptions, click "Biome Comparison" on the left to complete the chart.

	Coniferous Forest	**Deciduous Forest**	**Tallgrass Aspen Parkland**	**Prairie Grasslands**
Description				
Vegetation/Plants				
Animals				
Growing Season (Number of days)				

Answer the following questions:

1. What biome seems to be the wettest? _____
2. What biome seems to be the driest? _____
3. What biome seems to be the coldest? _____
4. A growing season with at least 120 days is valued as a good farming region. What biome does not have at least 120 days? _____
5. Scroll to the bottom. Click "Minnesota rainfall maps showing county boundaries". What is the normal annual precipitation for your county? _____
6. Click "Minnesota temperature maps showing county boundaries". What is the normal annual temperature for your county**?** _____
7. Which of the 3 agricultural activities (crops, livestock, specialized products) occur in your county? _____

Conserving Agricultural Land

Olmsted County

Olmsted County includes some of the best cropland in the nation, having rich soils, adequate rainfall, and a long growing season. Preserving these agricultural lands is in the interest of the county, state, and nation. Agriculture is one of the major industries in Olmsted County along with manufacturing and health care. Agriculture brings money into the county and it also supplies raw materials to local industries such as AMPI, Marigold, Seneca, and Hormel.

Olmsted County ranks in the top 20% of all U.S. counties in the value of agricultural products sold including crops (grains and vegetables) and livestock and poultry. Farmland is 71% of the land area of Olmsted County making agriculture the most important land use.

Agricultural Lands Lost to Urban Development

Agriculture is dependent on the land as a resource—it is difficult to replace lost land. Where agricultural lands are lost to urban development, marginal lands may be farmed but with great economic, environmental, and energy costs. Marginal lands include wetlands (swamps, marshes), areas with shallow soils, and areas with steep slopes. Agriculture also involves noise, odor, dust, chemical spraying, and farm equipment traffic on roads that are not compatible with development.

Urban development interferes with agricultural land by losing land, changing the environment, and costing more money:

- Removing agricultural land
- Increasing price of agricultural land
- Buying agricultural land in pieces divides the land that can be farmed
- Complaining about nearby livestock—smell and noise
- Loss of flood control with loss of land
- Loss of air quality from loss of vegetation
- Loss of water into the groundwater system
- Loss of plant and wildlife habitat
- Loss of open space
- Greater energy costs for transportation
- Greater costs for more roads and maintenance
- Greater taxes and fees

Most of our current farmland will continue to be used for farming, so maintaining farming should be a priority.

Carousel Brainstorming

Carousel Brainstorming is a Best Practice strategy to enhance your learning. As a group, select a colored marker, go to any posted newsprint, read the question, and record responses as you brainstorm answers. After 2-3 minutes rotate clockwise to the next posted question and, after reading previous responses, brainstorm additional answers. Continue rotating clockwise until you have been at each posted question. When you return to the original question, categorize the responses and write a summary at the bottom to answer the question. Be prepared to present the summary to the entire group. The following summary of Carousel Brainstorming provides further details of this valuable activity.

Carousel Brainstorming

Carousel brainstorming is a strategy to actively engage students in addressing major concepts or questions in groups by identifying their prior knowledge or reviewing and/or evaluating their learning. There are several steps for this activity.

1. Post newsprint paper (3-8 sheets depending on the task and size of the class) around the room, each with a different question related to the topic.
2. Students are placed in groups of 3-5 persons with each group having a different colored marker to record their responses.
3. Roles may be assigned including recorder, timekeeper, facilitator, and encourager
4. Each group goes to a posted paper and brainstorms responses to the question or topic and records their responses using their colored marker.
5. After two to five minutes a signal is given and each group rotates to the next posted newsprint to brainstorm responses to the question or topic using their original colored marker. The colored marker shows the group's progress and assists accountability.
6. As each group rotates, they read previous responses and add their own responses. (They may also "star" previous statements with which they agree.) Each group continues to rotate until it has responded to each posted question.
7. When the groups return to their original question or topic, they should review the posted responses. Next, each group categorizes the responses in order to summarize them to the entire group. Alternatively, the original group may be asked to:
   - Write a summary in exactly 5 words
   - Write a one-sentence summary
   - Identify the potential impact of the responses to the question or topic
   - Identify resources that may be helpful to investigate the question or topic further
   - Share personal experiences or reaction to the question or topic