6. Minnesota Apple Pie

Overview
Apples are the fruit associated with education, school, teaching, learning, and the "Back to School" season in Minnesota. In the fall, Johnny Appleseed stories are read and shared in classrooms. Apples are sorted and examined in science and they are weighed, measured and counted in math. But, have you ever stopped to think about the geography of apples and their history here in Minnesota?

The following interdisciplinary lesson leads students to discover where apples and other agricultural crops grow in Minnesota and to identify some of the geographical conditions that had to be overcome for apples to grow here. There are several lesson extensions suggested, which could be developed into a thematic unit on apples. Teachers are encouraged to adapt the questions and activities to meet their grade level's interests and learning needs.

(Note: Part I and II Activities are appropriate for 1st and 2nd grade and also K with adaptations; all parts are appropriate for upper intermediate using the suggested extensions.)

Grade Levels: K – 4

Time: Two to three 15 - 20 minute sessions or longer if extensions are used.

Minnesota State Standards: Geography

GRADE K
Benchmark: 0.3.1.1.1
Describe spatial information depicted in simple drawings and pictures.

Benchmark: 0.3.1.1.2
Describe a map and a globe as a representation of space.

Benchmark: 0.3.2.3.1
Identify the physical and human characteristics of places, including real and imagined.

GRADE 1
Benchmark: 1.3.1.1.1 and 2.3.1.1.1
Create sketch maps to illustrate spatial information about familiar places; describe spatial information found on maps.

Benchmark: 1.3.1.1.2
Use relative location words and absolute location words to identify the location of a specific place; explain why or when it is important to use absolute versus relative location.

Benchmark: 1.3.2.3.1
Compare physical and human characteristics of a local place and a place far away on a globe or map (such as a place in an equatorial or polar region).

GRADE 2
Benchmark: 2.3.1.1.2
Locate key features on a map or globe; use cardinal directions to describe the relationship between two or more features.

Benchmark: 2.3.1.1.3
Use maps, photos or other geographic tools to identify and locate major landmarks or major physical features of the United States.

Benchmark: 2.3.1.1.4
Use maps, photos, or other geographic tools to answer basic questions about where people are located.

Benchmark: 2.3.4.9.1
Identify causes and consequences of human impact on the environment and ways that the environment influences people.
GRADE 3
Benchmark: 3.3.1.1.1
Use maps and concepts of location (relative location words and cardinal and intermediate directions) to describe places in one’s community, the state of Minnesota, the United States or the world.

Benchmark: 3.3.1.1.2
Create and interpret simple maps of places around the world, local to global; incorporate the “TODALS” map basics, as well as points, lines and colored areas to display spatial information.

GRADE 4
Benchmark: 4.3.1.1.1
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.

Benchmark: 4.3.1.2.1
Choose the most appropriate data from maps, charts, and graphs in an atlas to answer specific questions about geographic issues in the United States, and also Canada or Mexico.

Grade Levels: 6 – 8
Time: Two to three 20 - 30 minute sessions or longer if extensions are used.

Minnesota State Standards: Geography

GRADE 6
Benchmark: 6.3.1.1.1
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.

Benchmark: 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. For example: Land use might include agriculture, settlement, suburbanization, recreation, industry.

GRADE 8
Benchmark: 8.3.1.1.1
Obtain and analyze geographic information form a variety of print and electronic sources to investigate places or answer specific geographic questions; provide rationale for its use.

Benchmark: 8.3.1.1.2
Create and use various kinds of maps, including overlaying thematic maps, of places in the world; incorporate the “TODALSS” map basics, as well as points, lines and colored areas to display spatial information.

Benchmark: 8.3.1.2.1
Formulate questions about topics in geography; pose possible answers; use geospatial technology to analyze problems and make decisions within a spatial context.

Benchmark: 8.3.2.3.1
Use appropriate geographic tools to analyze and explain the distribution of physical and human characteristics of places.

Prior Knowledge
Directional words and meanings, cardinal directions, and basic map reading skills.
Objectives

- To locate places on a map from a story.
- To relate information about places in a story to their geographical location on maps.
- To use and interpret choropleth maps and other thematic maps.
- To identify regions in Minnesota most conducive to certain crops.
- To explain how location and landforms affect “what grows where” in Minnesota.

Materials

- Food for Thought Maps found at http://www.mda.state.mn.us/fft
  - Wheat in MN Counties (2012) (Map 2)
  - Sugarbeets in MN Counties (Map 15)
  - Apple Growers in MN Counties (Map 21)
  - Dairy Product Processing Sites in MN (Map 29)
  - Landforms of MN (Map 35) (Grades 6-8 only)
  - MN Annual Precipitation (Map 36) (Grades 6-8 only)
  - MN Annual Frost Free Days (Map 37) (Grades 6-8 only)
  - Minnesota Counties (named) (Map 41)
  - Minnesota Counties (unnamed) (Map 42)
- Copy of the book, How to Make an Apple Pie and See the World, by Margorie Priceman
- Blank map of the United States (with state borders)
- Minnesota Crop Puzzle Sheet, one for each student
- Scissors (K-2 only)
- Glue sticks (K-2 only)
- Chart paper
- Colored Pencils

Key Words

Major and intermediate cardinal directions; basic positional words, geographic terms and related words:

- north, south, east, west, northeast, northwest, southeast, southwest, right, left, middle, next to, region, place, location, map legend, orientation, scale, choropleth map, thematic map, ocean, continent, orchard, ingredients, rootstock, growing season, import, export

Background Information

Our state’s geographical location presented challenges to early apple growers. In 1860, Horace Greeley, who urged our new nation to “Go West, Young Man!”, also said, “Never move to Minnesota… you can’t grow apples there.” However, through efforts and research by the University of Minnesota and some dedicated apple growers, Minnesota has become a recognized producer of apples and the birthplace of several famous apples, including our state fruit, the Honeycrisp apple.

Due in part to its rich natural resources and geographic location, Minnesota has become a leader in agricultural research and the development of new cold hardy strains of other fruits and vegetables, allowing Minnesota to become a state of rich agricultural diversity.
Procedure

Part 1
1. Before reading the book, How to Make an Apple Pie and See the World, help students make some personal connections to the text they will hear. Quickly have them share their experiences with apples—eating apples and making different foods using apples, such as caramel apples, apple bread, apple bars, applesauce, apple crisp, apple pie.
2. Show them the cover of the book; read the title together. Predict how and why the (girl) baker could “see” the world just by making a pie.
3. To help students focus on the geographic elements, post a world map on the white board or Smart Board so everyone can see it. Tell the students, “As the baker visits each country, we will mark it on the map”.
4. On chart paper, make a list of the ingredients the students think will be needed to make an apple pie. (It can be imperfect.) Then, compare the student list with the baker’s list on the first page of the story.
5. Read and enjoy the book together. As the baker visits each country, stop and locate it on the map of the world. Color or mark each stop in some way so that students may later retrace the journey.
6. After sharing the book, conclude the lesson by retelling the baker’s journey using the map as a guide. Talk about bodies of water that were crossed, such as the Atlantic and Indian Oceans and the different continents that were visited as the baker collected her ingredients. Label them on the map as well.

Part 2
1. Write the title of the book, How to Make an Apple Pie and See the World, on chart paper or the board. Together with students, use the book pictures to retell the events of the story. Review the list of ingredients the baker collected.
2. On the board, cross out the words “the World” in the book title and substitute the word, “Minnesota”. Explain that most of the ingredients needed to make an apple pie are already grown here in Minnesota.
   (At this time, hand out to each K-2 student, a blank Minnesota map and a Minnesota Crop Puzzle sheet. Ask them to carefully cut each section. Set aside until step 5.)
3. Give each student a blank outline map of Minnesota. Discuss Minnesota’s interesting shape and how it “fits” in the United States.
4. Discuss each of the ingredients and show the map that relates to it. Explain choropleth maps to the students by saying, “when the color is darker on the map, that means there is more _________ (ex. wheat, milk, etc.) than the light color.”
5. Display or ask students to look at the following maps: Wheat in MN Counties (2012) (Map 2), Sugarbeets in MN Counties (Map 15), Apples in MN Counties (Map 21), Dairy Product Processing Sites in MN (Map 29), and Minnesota Counties (named) (Map 41). Draw attention to the various parts of a map: title, orientation, date, author, legend, and scale (TODALS). On each map, mark a red dot or outline the Minnesota county where your school is located.
6. Starting with the ingredient flour, which is made from wheat, have students look at Wheat in Minnesota Counties (2012) (Map 2). Describe in general terms where the wheat is grown in Minnesota (Northwestern MN) and record this on the board.
7. Repeat the instructions detailed in Step 4 for the following: butter/ice-cream (dairy processing sites), sugarbeets, and apples. (As you go through each ingredient, K-2 students will place their Minnesota Crops puzzle pieces on their blank Minnesota map. End the lesson by having students glue the pieces on their map which may then be used as a final assessment.

Part 3
1. Review where in Minnesota students found the different pie ingredients. Look at the maps again to identify which counties seem to form the core or main concentration of each ingredient. Tell students they will combine all of this information to make their own “Minnesota Apple Pie” map.
2. Hand out the Minnesota Counties (named) (Map 41) to each student. Students should write a title at the top of the map, such as “Minnesota Apple Pie”.
3. Have students create a map legend for the four main pie ingredients: wheat, sugar, apples, and butter/ice cream. Assign a color for each ingredient, such as brown for wheat, red for apples, yellow for butter and purple for sugarbeets. (Instruct students to avoid using the color blue because it is reserved to identify water elements on maps).
4. Using the map of Wheat in Minnesota Counties (2012) (Map 2), layer and/or compare with the Minnesota Counties (Map 41), outline and color in the two core counties or top eleven counties for wheat. Have students outline those counties on their own maps, using the color they identified in their legend for wheat.

5. Repeat the instructions in Step 4 for the remaining three ingredients.

6. Have students date and sign their maps at the bottom of the page.

7. Finally, review what was learned about Minnesota and the main parts of a map: title, orientation, author, date, legend, and scale (TODALSS).

**Modifications for older students**

Use transparencies, or other GIS programs, to layer the maps and compare. Identify parts of Minnesota you do not see.

1. What might account for this?
2. Identify areas of Minnesota that overlap, such as wheat and sugarbeets, or apples and dairy processing. What might account for this?
3. What else do we know about Minnesota that could help us answer these questions? What other maps might help us? Compare where the different ingredients are found in Minnesota with Annual Precipitation (Map 36), Frost Free Days (Map 37), and Landforms (Map 35).
4. Draw conclusions and record them.

**Assessments**

1. Students correctly use directional words to describe the different regions of Minnesota where four of the pie ingredients are found.
2. Students can name, identify, and locate parts of a map: title, orientation, author, date, legend, and scale (TODALSS).
3. Students can correctly locate and describe in directional terms where their school and county are located in Minnesota.
4. Students correctly complete maps of the four main ingredients for “Minnesota Apple Pie”, using appropriate colors and with proper map components, including title, legend, and author.

**Resources and Links**

- U.S. Apple Association: www.usapple.org
  U.S. Apple’s online resource for educators.
- Minnesota Apple Growers Association: www.minnesotaapple.org/
  A site with information about the growers, orchards and varieties of apples in Minnesota. The varieties page has beautiful full-color pictures of Minnesota apples.
- Minnesota Harvest Homepage: www.minnesotaharvest.net/index.htm
  The home page of a Minnesota apple orchard in Jordan, Minnesota. Includes buttons to pages about Minnesota apple history, pictures and descriptions of apples, an apple glossary, and stories about our state apple, the Honeycrisp.
- Minnesota Department of Agriculture: www.mda.state.mn.us/protecting/sustainable/mfo/apples.htm. Many links to apple information, recipes, and organic growing practices in Minnesota and the U.S.
- University of Minnesota’s Apple Home Page: www.apples.umn.edu/index.html
  Click on the name of a Minnesota apple variety to learn more about it. Click on the “Photos” button to download a wonderful set of pictures of the different varieties of Minnesota apples. The “Gardeners & Consumers” button takes you to a page of questions and answers about growing apples in Minnesota. Finally, the “About Us” button offers a brief history of apple growing and cultivation in Minnesota.
Extensions

1. Five Themes of Geography activities for the book, How to Make an Apple Pie and See the World:

Interconnections

Look for and record the various methods of transportation that the baker uses. Transportation connects us with other places and allows people and things to move around the world, which is one of the five major geographic themes. The baker also brings all of the ingredients back with her including the cow and chicken, “importing” them.

Human and Environmental Interactions

Look at the illustrations and record ways humans and the environment have affected each other—compare the types of clothes worn in different places, things people have added such as buildings and roads, different styles of buildings and materials used, and kinds of animals from place to place.

Place and Location

Using the map on the inside cover of the book or another world map, locate each country the baker travels to while collecting her pie ingredients. After locating each country, describe each place using words like warm, cool, agricultural or rural, urban or city, jungle like, etc. Have students make a list of all the place names they hear; locate those places on a map of the world.

Regions

Places are sometimes grouped together by similar characteristics. These groups are referred to as regions. The traveler goes to the Mediterranean region for wheat, a tropical region for cinnamon, a European region for milk and eggs, the Caribbean for sugar, and the Northeastern United States for apples.

2. Compare two or three types of Minnesota apples. Haralson, Honeycrisp and/or Frostbite would be good selections. Match the actual apple with pictures of the apple. (See Resources and Links). Compare the apples in size and color, taste them for sweetness and texture, measure and weigh them, count their seeds. Make applesauce or a simple apple crisp using the Haralson apples. (See recipes.)

3. Have older students compare the ways the maps display their information. While all four of the ingredients are thematic maps, the information is displayed in different ways—through color intensity or dots/symbols. Have students investigate why map makers might choose different data displays based on the information being shown.

4. Have students read the short article “About Us” on the University of Minnesota’s Apple page website. Then have students read the history of the Wealthy Apple on the MN Harvest website. Using critical reading skills, have students identify some of the obstacles for Minnesota apple growers in the 1800s and 1900s. Identify from the articles, the other country that has a climate similar to ours and from which we imported cuttings and rootstocks of their apple varieties. Identify what climate conditions scientists must artificially create to imitate our Minnesota climate when developing apples that will be hardy and productive here. (Web links are provided in Resources and Links.)

5. After reading the book, How to Make an Apple Pie and See the World, ask the students this question: How did the baker know which country to go to for each ingredient? Together, have the class generate a list of countries or world regions known for a certain type of food or product. What other products is Minnesota known for?

6. Use information found in Resources and Links to determine what growing conditions and environment apples need to flourish. Compare that information with Minnesota’s climate and geography. What obstacles did the University of Minnesota researchers and other apple growers need to overcome?

7. Identify the top ten apple growing states in the United States. Locate them and create a map of that information. Have students look for a pattern to the locations of these states and what geographical similarities they may share. Now, repeat for the countries of the world.

8. Make a timeline of the apples developed and introduced by the University of Minnesota since Minnesota Statehood in 1858.

A natural culmination of these lessons that all students at any grade would enjoy is to make an apple dessert (pie or crisp) that uses these four Minnesota ingredients.
Minnesota Apple Pie

**Filling**

6-8 apples – Haralson’s recommended, pared, cored, and thinly sliced (about 6 cups)
1 c sugar
2 T all purpose flour
3/4 tsp. ground cinnamon
dash of nutmeg
pinch of salt
2 T cold butter, diced into ¼ inch

Preheat oven to 375ºF
Lightly butter a 9x9 inch baking dish.
Mix together first six ingredients until crumbled and well combined. Set aside.
Place apples in the prepared baking dish and pour 1/3 to 1/2 c of maple syrup over the apples and sprinkle with light dusting of cinnamon and nutmeg. Evenly distribute the crumb mixture over the apples.
Bake 40 – 50 minutes or until apples are softened and juicy and the topping is golden and crisp.
Allow the crisp to settle for at least 20 minutes before serving to thicken the juices and keep the apples plump.
Allow to cool for at least 30 minutes before cutting. Serve warm with ice cream or sweetened whipped cream.

**Crust**

1 T cream
2 tsp. sugar
Purchased or homemade pie crust

Minnesota Apple Crisp

**Ingredients**

1/3 c flour
1/2 c brown sugar
1/3 c old fashion oatmeal
1 tsp. cinnamon
¼ c butter – softened
Optional: 1/4 c pecans, chopped
5-6 apples - pared, cored and thinly sliced (about 6 cups)
1/3 to 1/2 c maple syrup
3/4 tsp. ground cinnamon
dusting of nutmeg and cinnamon

Preheat oven to 375ºF
Lightly butter a 9x9 inch baking dish.
Mix together first six ingredients until crumbled and well combined. Set aside.
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Minnesota Crop Puzzle Sheet

Wheat

Trees

Sugar-beets

Apples

Dairy