5. Map Literacy:
Looking for the Big Picture

Overview
This lesson provides instruction on teaching basic map literacy – Looking for the “Big Picture” with maps.

Most teachers would define literacy as a competency of understanding, conveying, and interpreting one’s written and spoken language, but recently the definition has expanded. Literacy is now “the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying contexts”.

Not only should we expect students to be literate with the written and spoken word, we should strive for spatial literacy as well. Geographers deal with the basic fundamental questions, “Who or what is where?” “Why are they there?” and “So what?” Comprehension of places and locations, seeing patterns of connections, and finding commonalities among them are the spatial literacy basics, just as comprehension of words and sentences, seeing word and language patterns or finding commonalities among words and literature are reading literacy basics.

In Lesson 1. “How to Read a Map”, teachers are encouraged to see that the skills needed to read and interpret books and articles closely parallel the skills needed to read and interpret maps.

Teachers should also see the parallels in literature genre to a genre of maps. Just as there are different forms of literature, there are different categories of maps – thematic maps, reference maps, physical maps, and topographical maps, to name a few. Primary teachers help students to look for certain patterns of letters or words, which expedite comprehension. Likewise, geographers look for basic patterns in maps. An important skill of a primary or intermediate teacher is to teach the “phonics” of maps, or more simply put, “What are some of the basic patterns in maps we should be aware of and look for?” Just as importantly, once a pattern is discerned, students should immediately look for things that don’t fit the pattern.

Think of maps as “data pictures”. By careful observations and asking good questions, students can accurately interpret what a place looks like and feels like just by studying a map, identifying patterns and looking for connections.

Grade Levels: 4 & 5
Time: Four to five 20 minute class periods.

Minnesota State Standards: Geography

GRADE 4
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 5
Benchmark: 5.3.4.10.1
For example: Geographic factors—climate, landforms, availability of natural resources.

Objectives
• To develop a schema that facilitates the interpretation of maps.
• To identify patterns in maps that offer clues about their content.
Materials:
- Food for Thought Maps found at http://www.mda.state.mn.us/fft
  - Corn for Grain in MN Counties (2007) (Map 3)
  - Corn for Grain in MN Counties (2012) (Map 4)
  - Soybeans in MN Counties (2007) (Map 5)
  - Soybeans in MN Counties (2012) (Map 6)
  - MN Annual Precipitation (Map 36)
  - MN Annual Frost Free Days (Map 37)
  - Minnesota Counties (named) (Map 41)
- Food for Thought Color Student Desk Map, one for each student (Order this free resource at http://www.mda.state.mn.us/fft)

Key Words
- thematic maps, political maps, choropleth maps, isoline maps


Procedure

Looking for patterns
1. Using the Minnesota Counties (named) Map (Map 41) have students look for patterns that seem to pop out at them. For instance, many of the counties have at least two or three straight sides and right angles. Several counties seem to have boundaries that align to create a long vertical or horizontal line through Minnesota, such as across southern Minnesota, or the north to south line through the Arrowhead portion of Minnesota. Note: When determining boundaries in the new territories, lines of latitude or longitude were often used for both states and counties within states.
2. Are there counties that seem to have only one or two straight edges? (Answer: Scott, Nicollet, and Cook counties are examples) What might account for this? What other physical landforms might be used to create boundaries? (Answer: Rivers or other physical barriers created “natural” boundaries that are reflected in our political dissection of the earth’s surface.)
3. The Minnesota River and I-94 run parallel following the same angle across Minnesota. Minnesota has a straight line only for its southern border.

Compare two maps for similarities and differences:
1. Use the two maps about Corn for Grain (Map 3 and 4). What looks the same? What differences do we see? Just as we encourage students to make connections to text from themselves or the world, encourage them to identify some connections that can be made to these maps based on what they know about new uses for corn.
2. What predictions would they make about Corn for Grain in 2017?
3. Use the two maps about Soybeans (Map 5 and 6) and repeat instructions from 1.

Patterns on isoline maps give clues about the map’s theme or topic
1. Compare the maps of Annual Precipitation (Map 36) and Frost Free Days (Map 37). Have students identify the predominant patterns of each map. (Answers: The precipitation map has long and generally vertical stripes that lighten from East to West. The Frost Free Days map is divided more horizontally and lightens from South to North.) Help students make the general connection that temperatures decrease from the equator to the poles, and that precipitation follows wind and weather patterns that tend to move east and west.
2. Next, compare altitude or topographic isoline maps and help students discover that the closer the lines of altitude the steeper the terrain. Temperature maps will also follow altitude – higher altitudes generally have lower temperatures, therefore accounting for those little circle anomalies.
Look for similar patterns between maps of different information:

1. Compare maps of corn and hogs, or hay and native vegetation, soybeans and frost-free days or precipitation. Are there some maps that seem to have similar pattern areas? (Answer: Crops such as soybeans and corn are heaviest in the prairie or flatter parts of the state, whereas hay and dairy production seem to follow the river valley and hilly terrain from southeastern Minnesota and along the I-94 corridor in central Minnesota.)

Using an atlas of the World or United States find and locate thematic maps:

1. Compare different maps to find overlapping or similar patterns and make generalizations about the connections. If possible, compare maps of the same topic from different time periods or several years apart to see changes over time.

Assessments

1. Students can look at untitled precipitation and temperature maps of Minnesota or the United States, identify them, and explain how they know.
2. Students create a climate, altitude and/or precipitation map, and their map reflects the correct general patterns for each type of map. (Temperatures drop from equator to pole or as altitude increases.)
3. Students can make and verbalize connections from mapped information to themselves, the world and/or other maps.

Extensions

North American colonies

Using the National Agriculture in the Classroom website, State Agricultural Facts page (www.agclassroom.org/teacher/ag_facts.htm), assign students a colonial state to research. Ask students to look for information about the landforms, climate, resources and agricultural products of that state. Using data from the colonial period, students will then examine the resources and agricultural products of that state during the colonial time period.

Students examine the differences and analyze the causes. Consider the following questions:

What differences and similarities do you notice? Why do you think these are present?
How do climate and landforms affect the agricultural development of the state?
What changes have you noticed in agricultural products? Why do you think these changes have occurred?

Using the USDA Census of Agriculture, examine various agricultural maps (www.agcensus.usda.gov/Publications/2012/Online_Resources/Ag_Atlas_Maps/). Focusing on the colonial states, engage students in a discussion about how these maps might have looked different in the colonial period. Suggested Crops and Plants: Corn for Grain, Harvested Acres; All Cotton, Harvested Areas; Tobacco, Harvested Acres; Soybeans, Harvested Acres; Potatoes, Harvested Acres; Total Acres of Apples, Total Acres of Pecans. Suggested Livestock and Animals: Milk Cows, Inventory; Beef Cows, Inventory; Hogs and Pigs, Inventory; Sheep and Lambs, Inventory. Additional discussions with these maps can include the distribution of agricultural production across the United States. Students can continue to examine how landform and climate affect agricultural production.