

Top Ten – Bottom Ten: Mapping Data

OVERVIEW & OBJECTIVES	GRADES
<p>Students will become acquainted with mapping data and recognizing patterns by constructing a map of the top ten and bottom ten data of a given topic. Students demonstrate the skills of geographers to identify patterns and construct hypotheses. This lesson uses data at the state level, but data may be used at a local, national, or global scale.</p> <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> • Acquire skills in data based mapping • Successfully map data • Recognize patterns of distribution • Analyze patterns of distribution • Construct and evaluate hypotheses of those distributions • Explain the concept of region 	4 th - 9 th
	TIME
	1 – 2 classes
	REQUIRED MATERIALS
<ul style="list-style-type: none"> ✓ Blank U.S. maps with states outlined (half sheets) ✓ Atlases ✓ Colored pencils ✓ Data of states' ranking on a variety of topics ✓ Handouts: "Top 10 and Bottom 10 States"; "Topics for Top 10-Bottom 10 States" ✓ Masking tape 	
MINNESOTA SOCIAL STUDIES STANDARDS & BENCHMARKS	
<p>Standard 1. People use geographic representations and geospatial technologies to acquire, process and report information within a spatial context.</p> <p>4th Grade</p> <p>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.</p> <p>5th Grade</p> <p>5.3.1.1.1 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.</p> <p>6th Grade</p> <p>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.</p> <p>7th Grade</p> <p>7.3.1.1.1 Create and use various kinds of maps, including overlaying thematic maps, of places in the United States; incorporate the "TODALSS" map basics, as well as points, lines and colored areas to display spatial information.</p> <p>8th Grade</p> <p>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</p> <p>9th Grade</p> <p>9.3.1.1.1 Create tables, graphs, charts, diagrams and various kinds of maps including symbol, dot and choropleth maps to depict the geographic implications of current world events or to solve geographic problems.</p>	

SUGGESTED PROCEDURE

Begin by showing students a list of the fifty states ranked according to a topic. Ask students to identify the patterns they see. What conclusions can they make about the topic? Highlight the difficulty of discerning patterns of spatial relationships using a list of data. Explain that students will map the data and other data to determine the distribution of the topic and to make hypotheses about the topic.

[Note: The teacher may use any topic for the opening or for students' mapping. The data may be local, national or global. Consider the following categories found at the U.S. Census Bureau to identify specific topics: Population, Income, Births and Deaths, Labor Force, Education, Law Enforcement, Health and Nutrition, Elections, Agriculture.]

Students will work in pairs with each person given a small map of the United States (on a half sheet of paper) and the direction sheet, "Top 10 and Bottom 10 States", along with the handout, "Topics for Top 10- Bottom 10 States", or another list of data. One student will identify the top ten states for their data while their partner will identify the bottom ten states for the same data. Students will color the top ten or the bottom ten states using the same color, but the top ten states will be shaded dark while the bottom ten states will be shaded light. The color intensity is a cartographic skill to highlight information.

When the partners complete their respective maps, they will title their maps and answer the questions on the front side of the handout, "Top 10 and Bottom 10 States", about the patterns they identify on their two maps. Next, students will post their maps and complete the handout.

Students will discuss their findings as a class. Questions may include: What "matches" did you identify? What patterns can you identify? How did making the maps help you understand the patterns? What hypotheses did you make? How would you investigate these hypotheses further? The teacher will be sure to explain that correlation does not mean causation. That is, the "matching" of two topics do not necessarily mean that one topic caused the other to occur.

Assessment

- Handout: "Top 10 and Bottom 10 States"
- Class discussion

Website Resources

U.S. Census Bureau
<http://www.census.gov/>
Provides data for states

U.S. Statistical Abstract
<http://www.census.gov/compendia/statab/>
Provides data for states

Population Reference Bureau
<http://www.prb.org/>
Provides data for countries

CIA World Factbook
<https://www.cia.gov/library/publications/the-world-factbook/>
Provides data for countries

Top 10 and Bottom 10 States

Directions: You and a partner will color-code a U.S. map according to the information provided on the data sheet. You will need 2 blank U.S. maps, 2 colored pencils that are the same color, and the data sheet that the teacher will provide. Atlases to identify the states may be used. Follow the steps below for successful completion of this task.

Steps:

1. You and your partner will work together to complete 2 U.S. maps. One partner will shade the 10 states that are identified in the Top 10 data on the U.S. map using one color pencil to color dark so the color is bold. The other partner will shade the 10 states that are included in the Bottom 10 data on another U.S. map using the same color pencil but color lightly.
2. Title each map with an appropriate label for the topic, such as “Top 10 States for High School Graduates” or “Bottom 10 States for High School Graduates” and include a key.
3. Identify regional patterns. Look at your maps to see the distribution. Are the colored states spread out? Are they clustered? Are they **contiguous** or connected to one another? (If your map has **4 states** that are connected, we will label this a ‘region’.) Answer these questions:

Looking at the Top 10 map, what region can be identified? _____
What states make up the region? _____

On the Bottom 10 map, what region can be identified? _____
What states make up the region? _____

4. Using the piece of masking tape provided by your teacher, hang your pair of maps together on the classroom wall so everyone can see them.
5. Next, compare your maps with your classmates’ maps with the information on the back of this sheet. To do this, find maps that have similarities using all the maps in the classroom. You should be looking for maps with matching states. A ‘match’ is any two maps that have 4 states in common. Write the titles of the two maps for each match. List as many matches as you can.

	Matches	

6. Why do you think these topics ‘match’? List as many ideas as you can. These will become your hypotheses.

What questions would you need to ask to investigate whether these are legitimate relationships? Write 3 questions about the matches:

- 1.
- 2.
- 3.

Topics for Top 10-Bottom 10 States

Population Under 18

Top 10	Bottom 10
1. Utah	50. Vermont
2. Texas	49. Maine
3. Idaho	48. West Virginia
4. Georgia	47. Rhode Island
5. Arizona	46. Florida
6. Alaska	45. Massachusetts
7. Mississippi	44. Hawaii
8. Nevada	43. Pennsylvania
9. California	42. New Hampshire
10. New Mexico	41. New York

High School Graduates

Top 10	Bottom 10
1. Wyoming	50. Texas
2. Minnesota	49. Mississippi
3. Alaska	48. California
4. New Hampshire	47. Kentucky
5. Vermont	46. Alabama
6. Montana	45. Louisiana
7. Iowa	44. Arkansas
8. Utah	43. New Mexico
9. Maine	42. West Virginia
10. North Dakota	41. South Carolina

People Below Poverty

Top 10	Bottom 10
1. New Hampshire	50. Mississippi
2. Maryland	49. Kentucky
3. New Jersey	48. Louisiana
4. Alaska	47. Arkansas
5. Hawaii	46. New Mexico
6. Connecticut	45. West Virginia
7. Wyoming	44. Oklahoma
8. Minnesota	43. Texas
9. Utah	42. South Carolina
10. Massachusetts	41. Alabama
11. Delaware	

People Employed (Civilian Employees Rate)

Top 10	Bottom 10
1. Nebraska	50. West Virginia
2. Minnesota	49. Mississippi
3. South Dakota	48. Louisiana
4. North Dakota	47. Alabama
5. Colorado	46. Kentucky
6. Wyoming	45. Arkansas
7. Vermont	44. New Mexico
8. New Hampshire	43. Florida
9. Wisconsin	42. New York
10. Kansas	41. Tennessee

Hispanic (% of Population)

Top 10	Bottom 10
1. New Mexico	50. West Virginia
2. Texas	49. Maine
3. Arizona	48. Vermont
4. California	47. North Dakota
5. Nevada	46. South Dakota
6. Florida	45. Montana
7. Colorado	44. New Hampshire
8. New Jersey	43. Montana
9. New York	42. Kentucky
10. Illinois	41. Ohio

Black (% of Population)

Top 10	Bottom 10
1. Mississippi	50. Montana
2. Louisiana	49. Maine
3. South Carolina	48. Vermont
4. Georgia	47. North Dakota
5. Maryland	46. Idaho
6. Alabama	45. South Dakota
7. North Carolina	44. New Hampshire
8. Virginia	43. Utah
9. Delaware	42. Wyoming
10. New York	41. Oregon

Resource: U.S. Census Bureau at <http://www.census.gov/>