INDIANA TORNADO PROJECT

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adapted from activities by
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Spring, 2003

Grade Levels: 4-12

Purpose: To be aware of the number of tornadoes that impact Indiana.

National Geography Standards:

1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information for a spatial perspective.
2. How to use mental maps to organize information about people, places, and environments in spatial context.
3. How to analyze the spatial organization of people, places, and environments on Earth's surface.
4. How physical systems affect human systems.

Indiana Social Studies Academic Standards:
Fourth Grade – 4.3.3.
High School World Geography – 1.3, 1.5, 3.7, 3.9, 5.2, 5.3, 5.4, 6.1, and 6.2.

Indiana Earth Science Academic Standards:
High School Earth Science – 1.15 and 1.16.

Materials Required:

- a list of Indiana counties (attached)
- a county map of Indiana with each county labeled (see Black-Line Maps)
- colored pencils
- web address --- www.tornadoproject.com
- copies of Tornado Quiz (attached) for each student
- United States map (optional)
- Book ***Night of the Twisters*** by Ivy Ruchman (extension)

Objectives: Upon completion of this activity, the student will

1. be familiar with the use of geographic information systems (GIS) for research,
2. be familiar with natural phenomena in Indiana,
3. be familiar with analyzing collected information, and
4. learn some basic facts about tornadoes.

Pre-activity work by the teacher:
Divide the number of counties by the number of students in the class.
Assign that number to each student.
Copy Indiana county maps--6 per student (one for each of the possible required points of information plus an extra).
Number and label each of the maps:
1- Total Number of Tornadoes
2- Total Number of Tornadoes in 1990's
3- Number of People Killed
4- Number of Injuries
5a- Majority # of "F scale" Tornadoes
5b- "F4 and F5" Tornadoes
Make a transparency of the Indiana counties list.
Copy of the map instruction sheet for each student.
Remind students that they need colored pencils.

Procedures:

1. Place *Tornado Quiz* on overhead. Give students a few minutes to complete.
2. Once they have completed the Quiz, reveal the answers and discuss each one.
3. Next, explain that they will be creating maps of various tornado data.
4. Assign a group of counties to each student.
5. Give each student at least four blank Indiana county maps. Have them number the maps 1 through 4 and title the maps as indicated above. Students write their names on each map.
6. Go to the computer lab, log in, and visit the web site www.tornadoproject.com
7. Scroll to "All Tornadoes."
8. Scroll to "all states."
9. Scroll to map and click on Indiana.
10. Scroll to their assigned county(ies) and begin to work.
11. Students are to color-code each map with the scale provided on the assignment sheet. As they complete each map, go on to the next one until all are finished.

**For maps 5a and 5b, students can get 2 or more levels (F-scale) of equal impact numbers. If this happens divide the county into the 2 or 3 colors required and place the number with the appropriate color

Evaluation Mechanisms:

1. The completed maps will be graded based on accuracy and neatness.
2. Each student will clearly present their results to the class.
3. Upon completion, all students will compare and contrast their maps as an oral discussion. Identify trends and discuss as a class.

Adaptations/Extensions: Indiana tornado impact can easily be compared to other states. All you need is an outline county map of any state. This map can be obtained by going to www.census.gov/, go to Tiger, scroll to "1990 State and County Outline maps." There are 55 total maps. You can print out any or all.

Find the population numbers for each of the counties affected and compare this with the total population of the state. Computing percentages will help with ISTEP.

Compute the total population of the counties in Indiana or other state(s) that are NOTaffected.

Read the novel, ***Night of the Twisters*** by Ivy Ruchman. Discuss.

Map the total number of tornadoes per state on a United States map. Analyze and discuss.

Related Web Sites:

The Tornado Project Online,
http://www.tornadoproject.com/#index%20top

U.S. Census Bureau,
http://www.census.gov/
At census go to Tiger and click, scroll down to "1990 State and County Outline maps." There are a total of 55 maps, you can print out anyone or all.

National Weather Service: Natural Hazards Statistics Page,
http://www.nws.noaa.gov/om/hazstats.shtml#

Tornadoes Going Around in Circles,
http://whyfiles.org/013tornado/index.html

Twisters at The Independent.com,
http://www.theindependent.com/twisters/

The Grand Island, Nebraska Tornadoes of June 3, 1980,
http://www.gi.esu10.k12.ne.us/SDGI/Gates/tornado%20web/titletornado.html

FEMA for Kids: Tornadoes,
http://www.fema.gov/kids/tornado.htm

Cyberguide to ***Night of the Twisters***,
http://www.sdcoe.k12.ca.us/score/twist/nighttg.html
National Geographic Expeditions Lesson Plan K-2,
http://www.nationalgeographic.com/xpeditions/lessons/15/gk2/tornadowhat.html
World Map of Tornadoes and Agriculture Areas,
http://www.windows.ucar.edu/tour/link=/earth/Atmosphere/tornado/agri_map.html&edu=elem&file=/new
Night of the Twisters *Lesson*,
http://www.hesperia.k12.ca.us/euc/euc/sbrown/NOT/notforward.htm

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Answers to the Tornado Quiz:

1. **True**

2. **False**; no place is safe from tornadoes. Yellowstone National Park was affected by a tornado in the late 1980's. This tornado left a path of destruction up and down a 10,000 foot mountain.

3. **False**; most structural damage associated with a tornado is due to the violent winds and flying debris slamming into buildings.

4. **False**; opening windows allows more damaging winds to enter the structure. Leave the windows alone and, instead, quickly go to a safe place.

5. **True**; In Indiana, between 1950-1994, 316 reported tornado touch-downs occurred during the 3:00-6:00 p.m. period followed closely by 249 touch-downs between the 6:00-9:00 p.m. period and 231 between noon and 3:00 p.m. The three-hour time period in which the least number of tornadoes occurred was 30 between 3:00-6:00 a.m.

6. **True**

7. **False**; Between 1950-1994, June had the most reported tornado touch-downs with 258. April was a close second with 244, May had 118 and March 103. January was the month with the fewest reported touch-downs over the time period with 10 touch-downs.

8. True; Between 1950-1994, 5,490 tornadoes were reported in Texas. Indiana had 886 tornadoes.

9. **False**; Between 1950-1994 (in adjusted dollars to reflect inflation) Texas was the first with about $1.96 billion dollars in damage, but Indiana was a close second at about $1.65 billion dollars in damage. 10. (fill in the appropriate answer from the teacher's experiences)

TORNADO QUIZ

(For each of the following, put a "T" for true statements and an "F" for false statements.)

1. **Tornadoes occur more frequently in the United States than in any other country on Earth.**

2. **Areas near rivers, lakes and mountains are safe from tornadoes.**

3. **As a tornado passes overhead, low pressure associated with it can cause buildings to explode.**

4. **Windows should be opened before a tornado approaches to equalize pressure and minimize damage.**

5. **In Indiana, tornadoes touch down more frequently between 3-6 p.m. than in any other three hour time period.**

6. **Tornadoes can occur during every month in Indiana.**

7. **More tornado touch-downs in Indiana have occurred in April than in any other month.**

8. **Texas ranks first in the number of reported tornadoes.**

9. **Indiana ranks first in the total cost of damage as a result of tornadoes.**

10. **Mr. /Mrs. (insert teacher's name) has never experienced a tornado "up close and personal".**

1. Adams County
2. Allen County
3. Bartholomew County
4. Benton County
5. Blackford County
6. Boone County
7. Brown County
8. Carroll County
9. Cass County
10. Clark County
11. Clay County
12. Clinton County
13. Crawford County
14. Daviess County
15. De Kalb County
16. Dearborn County
17. Decatur County
18. Delaware County
19. Dubois County
20. Elkhart County
21. Fayette County
22. Floyd County
23. Fountain County
24. Franklin County
25. Fulton County
26. Gibson County
27. Grant County
28. Greene County
29. Hamilton County
30. Hancock County
31. Harrison County
32. Hendricks County
33. Henry County
34. Howard County
35. Huntington County
36. Jackson County
37. Jasper County
38. Jay County
39. Jefferson County
40. Jennings County
41. Johnson County
42. Knox County
47. Lawrence County
48. Madison County
49. Marion County
50. Marshall County
51. Martin County
52. Miami County
53. Monroe County
54. Montgomery County
55. Morgan County
56. Newton County
57. Noble County
58. Ohio County
59. Orange County
60. Owen County
61. Parke County
62. Perry County
63. Pike County
64. Porter County
65. Posey County
66. Pulaski County
67. Putnam County
68. Randolph County
69. Ripley County
70. Rush County
71. Saint Joseph County
72. Scott County
73. Shelby County
74. Spencer County
75. Starke County
76. Steuben County
77. Sullivan County
78. Switzerland County
79. Tippecanoe County
80. Tipton County
81. Union County
82. Vanderburgh County
83. Vermillion County
84. Vigo County
85. Wabash County
86. Warren County
87. Warrick County
88. Washington County

43. **Kosciusko County**
44. **LaGrange County**
45. **Lake County**
46. **LaPorte County**

89. **Wayne County**
90. **Wells County**
91. **White County**
92. **Whitley County**

MAP INSTRUCTIONS FOR "INDIANA TORNADO PROJECT"

Map #1
On this map put the total number of tornadoes to hit that county. Write the number of total tornadoes in the county then color code it, using the *scale* below for all your maps. Color code the numbers:

0-black	1-5 blue	6-10 yellow
11-15 green	16-20 red	21-25 purple
26-30 orange	30+ brown	

Map #2
Write the total number of tornadoes in your counties for only the 1990's. Color-code the same as map #1.

Map #3
Write in the total number of people killed by tornadoes in your counties. Color-code the same as map #1.

Map #4
Write the total number of injuries to the people in your county. Color-code the same as map #1.

Map #5a
Place the majority number of "F scale" tornadoes to hit your counties using the following *scale*:

O-black	1-blue	2-yellow
3-green	4-red	5-purple

Map #5b
If your county (or counties) has an "F4 or F5" put the number of such tornadoes and color-code it appropriately.