Tornadoes in North Carolina:

Tornadoes are deadly. They can kill, injure, and destroy in practically an instant. Some parts of the country are especially vulnerable, but every location that experiences thunderstorms could be subjected to these extreme weather events.

Tornadoes seem to occur with some frequency for a few years, and then North Carolina may have several relatively quiet years, with little tornado activity. It is not possible to determine if this will be an active tornado year, but plans should be made as if it will be.

Most North Carolina tornadoes are small, rapidly developing, and weak as tornadoes go. Most have about the same level of damaging winds as severe thunderstorms. A typical North Carolina tornado might be an F1 on the Fujita Scale, with a width of tens of yards and a path length of a mile or two. However, Carolina tornadoes sometimes become strong or violent with damage paths many miles in length hundreds of yards wide, and with rotational wind speeds of more than 200 mph. These type tornadoes are responsible for most tornado injuries and fatalities nationwide.

Several relatively recent dates come to mind. Large damaging tornadoes affected the western half of North Carolina on May 5, 1989. On that date, there were four F4 intensity tornadoes within 60 miles of Charlotte. On Palm Sunday in 1994, several strong tornadoes affected Western North Carolina, including the Charlotte area. On May 7, 1998, a tornado outbreak caused a number of tornadoes east of the mountains, including one tornado that briefly reached F4 intensity between Lenoir and Taylorsville. On May 6, 1999, a tornado struck the western part of Asheville around 6 am.

Tornadoes happen more often in the plains states. However, the relative infrequency of tornadoes here is offset by the rapid movement of the storms. Many of the tornadoes happen at night and because approaching tornadoes and thunderstorms are often hidden by trees, hills and other obstructions. Also, the population density is quite a bit higher in North Carolina than in the plains and there is more opportunity for a tornado to affect people. Community warning systems are not as extensive as in the plains. On an a real basis, the tornado casualty rate is actually higher here than in the plains.

The Fujita Tornado Scale

F-Scale Number	Intensity Phrase	Wind Speed
F0	Gale Tornado	40-72 mph
F1	Moderate Tornado	73-112 mph
F2	Signficant Tornado	113-157 mph
F3	Severe Tornado	158-206 mph
F4	Devastating Tornado	207-260 mph
F5	Incredible Tornado	261-318 mph
F6	Inconceivable Tornado	319-379 mph

Tornado Summary (by State) for 2000

Alabama	44
Alaska	0
Arizona	0
Arkansas	37
California	9
Colorado	60
Connecticut	1
Delaware	0
Washington DC	0
Florida	77
Georgia	28
Hawaii	0
Idaho	13
Illinois	55
Indiana	13
Iowa	45
Kansas	59
Kentucky	23
Louisiana	43
Maine	2
Maryland	8
Massachusetts	1
Michigan	4
Minnesota	32
Mississippi	27
Missouri	28
Montana	10
Nebraska	60
Nevada	2
New Hampshire	0
New Jersey	0
New Mexico	5
New York	5
North Carolina	23
North Dakota	28
Ohio	25
Oklahoma	44
Oregon	3
Pennsylvania	5
Puerto Rico	2
Rhode Island	1
South Carolina	20
South Dakota	18
Tennessee	27
Texas	147
Utah	3
Vermont	0
Virginia	11
Virgin Islands	0
Washington	3
West Virginia	4
Wisconsin	18
Wyoming	5
Pacific Islands	0

Average Number of Tornadoes (by State) 1953-2001

Alabama	23
Alaska	0
Arizona	3
Arkansas	23
California	6
Colorado	30
Connecticut	1
Delaware	1
Washington DC	0
Florida	52
Georgia	21
Hawaii	0
Idaho	3
Illinois	31
Indiana	20
Iowa	35
Kansas	50
Kentucky	10
Louisiana	26
Maine	1
Maryland	4
Massachusetts	2
Michigan	16
Minnesota	23
Mississippi	25
Missouri	27
Montana	6
Nebraska	42
Nevada	1
New Hampshire	1
New Jersey	2
New Mexico	9
New York	6
North Carolina	16
North Dakota	20
Ohio	15
Oklahoma	56
Oregon	1
Pennsylvania	11
Puerto Rico	0
Rhode Island	0
South Carolina	12
South Dakota	27
Tennessee	13
Texas	134
Utah	2
Vermont	0
Virginia	7
Virgin Islands	0
Washington	1
West Virginia	2
Wisconsin	19
Wyoming	10
Pacific Islands	0

Number of Tornadoes (by Month) in 2000

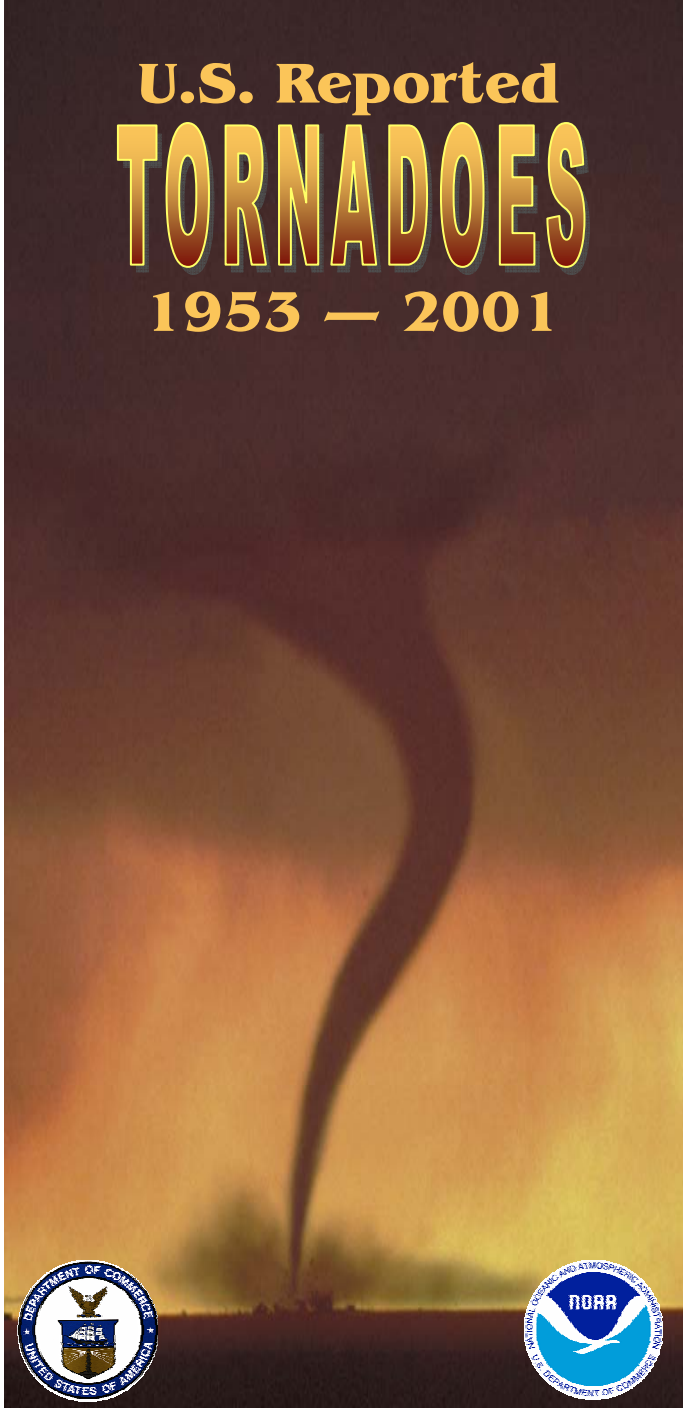
January	16
February	58*
March	103
April	136
May	241
June	136
July	148
August	53*
September	47
October	64
November	50
December	26
Annual	

* Corrected for boundary crossing

Mean Number of Tornadoes in the US (by Month) 1953-2001

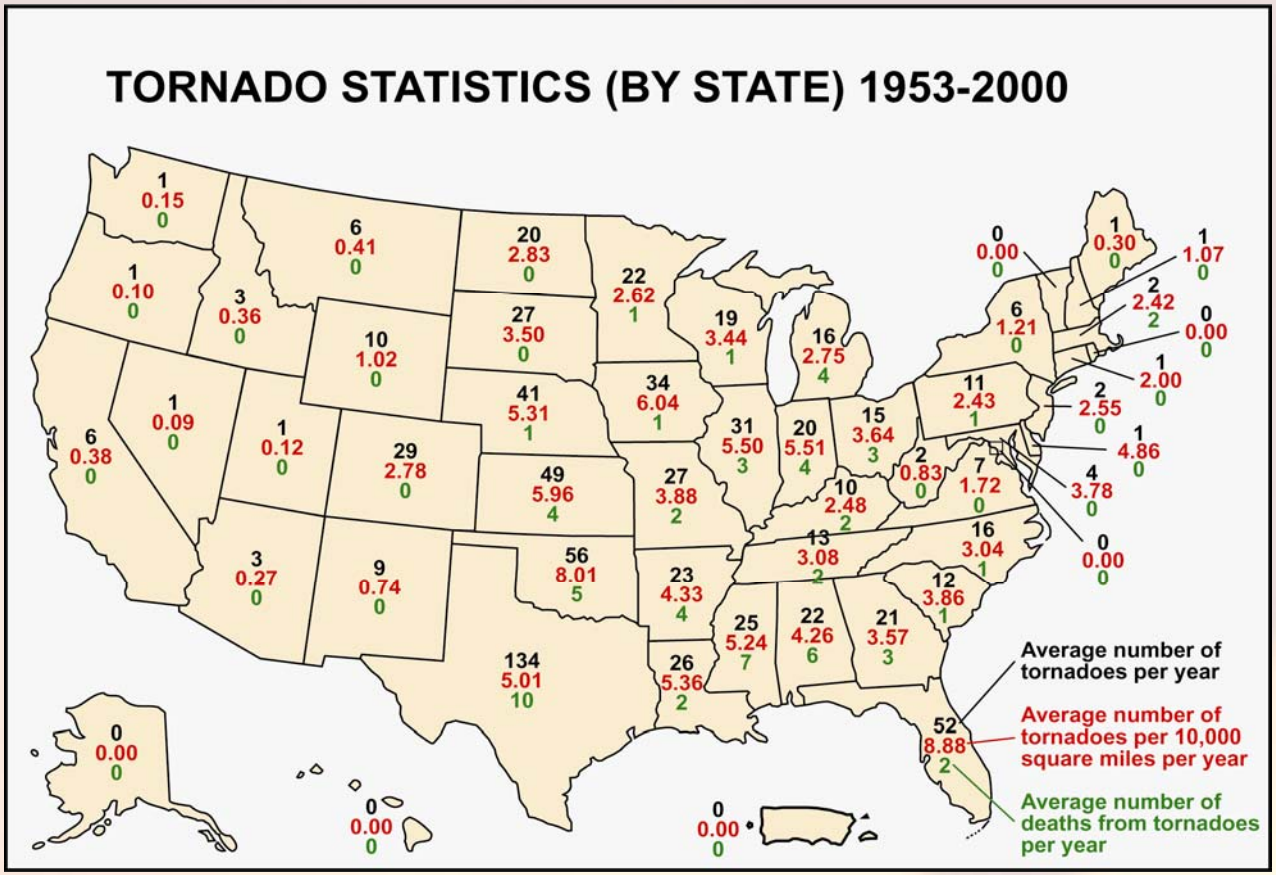
January	21
February	23
March	56
April	115
May	188
June	177
July	100
August	62
September	43
October	32
November	32
December	18
Annnual	865

U.S. Reported TORNADOES 1953 — 2001



National Oceanic and Atmospheric Administration
National Climatic Data Center
Asheville, NC

www.ncdc.noaa.gov/oa/edu.html



Activity: Was the year 2000 an average tornado year?
Content Area/ Course: Earth/Environmental Science
Grade level: 9-12

Competency goal:
The learner will build an understanding of the dynamics and composition of the atmosphere and its local and global processes influencing climate and air quality.

Indicators:
Explain that some changes in a planet's surface are due to slow processes (i.e., erosion, weathering) and some changes are due to rapid process (i.e., landslides, tornadoes, hurricanes, volcanic eruption, earthquakes, flooding, and tsunamis).

Project 2061 Benchmarks:
Weather (in the short run) and climate (in the long run) involves the transfer of energy in and out of the atmosphere. Solar radiation heats the land masses, oceans and air. Transfer of heat energy at the boundaries between the atmosphere , the land masses, and the oceans result in layers of different temperatures and densities in both the ocean and atmosphere. The action of gravitational force on regions of different densities causes them to rise or fall- and such circulation, influenced by the rotation of the earth, produces winds and ocean currents.

Upon completing this investigation, the student should be able to:
Describe the overall pattern of tornadoes as they occurred in the United States over several decades.
Compare the occurrences of tornadoes in one year with long-term averages.
Explain the variation in the frequency of tornadoes throughout the year.

Approximate Time required:
A 45 minute time period

Prior Knowledge/ Skills Required for task:
Working knowledge of climate and atmospheric changes.

Materials and resources needed:
Handout and a map of the United States for each student

Activities:

1. Describe the occurrences of tornadoes in your state and region last year.
2. Describe, based on the map accompanying this activity, what regions of the country typically have the most and least number per unit area.
3. Based on this same map, which state has the greatest number of tornadoes in an average year? Which state has the greatest number per unit area?
4. According to the map, which state does not have any tornadoes during an average year? Does this mean tornadoes never occur there?
5. How does the pattern of a year's tornado occurrences compare with the long term average? On the map, shade with a pencil those states which last year experienced more than their average annual number of tornadoes. After shading is complete, describe the pattern. Would you expect the same states to have more tornadoes than the annual average again this year, or might they just as well be fewer?
6. The numbers of tornadoes are listed by month for 2000 and compares the values with long-term averages. What was the peak month for tornadoes for 2000? What is the peak month based on the long term average? On average, which month or months have the lowest number of tornadoes?
7. Tornadoes require immediate action! Is your school prepared in the event of a tornado threat? What procedures are in place to respond when tornado watches or warnings are issued? What procedures should be in place?
8. What have your family and community done to prepare for a possible tornado threat? What should they/you do?

What is "Normal" about Climate?
When a television weather caster says today's "normal" high temperature is 49 degrees, what does he/she really mean and where does the information come from? Answering such questions can help lead students toward an understanding of climate.

Weather "normals" are really averages of what's happened in the past. Such information comes from the National Climatic Data Center in Asheville, NC. The Center is a treasure house of climatic data and is the largest holder of climatic data on the globe.

Information is available in printed form and digitally. The Center's website can be accessed at www.ncdc.noaa.gov.

Some products that educators might want to use are:
Daily normals and precipitation probabilities for 7,926 locations around the Nation. Climatic normals are available for individual weather stations or regions. Local Climatological Data, is issued monthly and yearly for about 285 locations with more detail, and 900 pre-LCD stations with less detail.

The Center's staff can discuss what types of data best fit an educator's needs and take orders. The telephone number is 828-271-4800.

The address is:
National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-2733