

# Spinning Thunderstorms

by American Museum of Natural History

This article is provided courtesy of the American Museum of Natural History.

On a spring night in 2007, disaster struck a small town in Kansas called Greensburg. Shortly before 10 p.m., a siren went off. A mile-wide tornado was approaching Greensburg. And it wasn't just any tornado. It was a category EF5, the most powerful kind there is.

Its winds were estimated to be more than 200 miles per hour. In less than ten minutes, the town was destroyed and ten people lost their lives.

When the fury had passed, people clambered through the rubble. Cars and trucks had been thrown about. Homes were crushed, or simply ripped from the ground. "I'm in downtown Greensburg. There's really nothing left," said one resident.



FEMA Photo by Michael Raphael

*The tornado destroyed much of the town. Many residents needed temporary housing.*

## How do tornadoes form?

A tornado is a swirling, funnel-shaped column of wind that gets its start from a thunderstorm. Thunderclouds form when warm, wet air collides with cool, dry air. Then, strong winds form into a wide tube of spinning air. When the tube touches the ground, it becomes a tornado.



Credit: NOAA

*A tornado is a swirling, funnel-shaped column of wind. It stretches from a thunderstorm cloud down to the ground. A tornado gets its start when strong winds at high altitudes set a thunderstorm's winds rotating.*



Credit: The Field Museum

*The 200-plus-mph winds of a tornado can bend a stop sign.*

Kansans are used to tornadoes. The people of Greensburg live smack in the middle of "Tornado Alley," an area that spans eight states in the Central United states. This region is a perfect thunderstorm factory. It has just what storms need to get started: cool, dry air from the Arctic mixing with warm, humid air from the Gulf of Mexico. Above the flat Great Plains, far from mountains and coastal weather, thunderstorms can form undisturbed. These conditions spawn more than 600 tornadoes, on average, in "Tornado

Alley" every year.



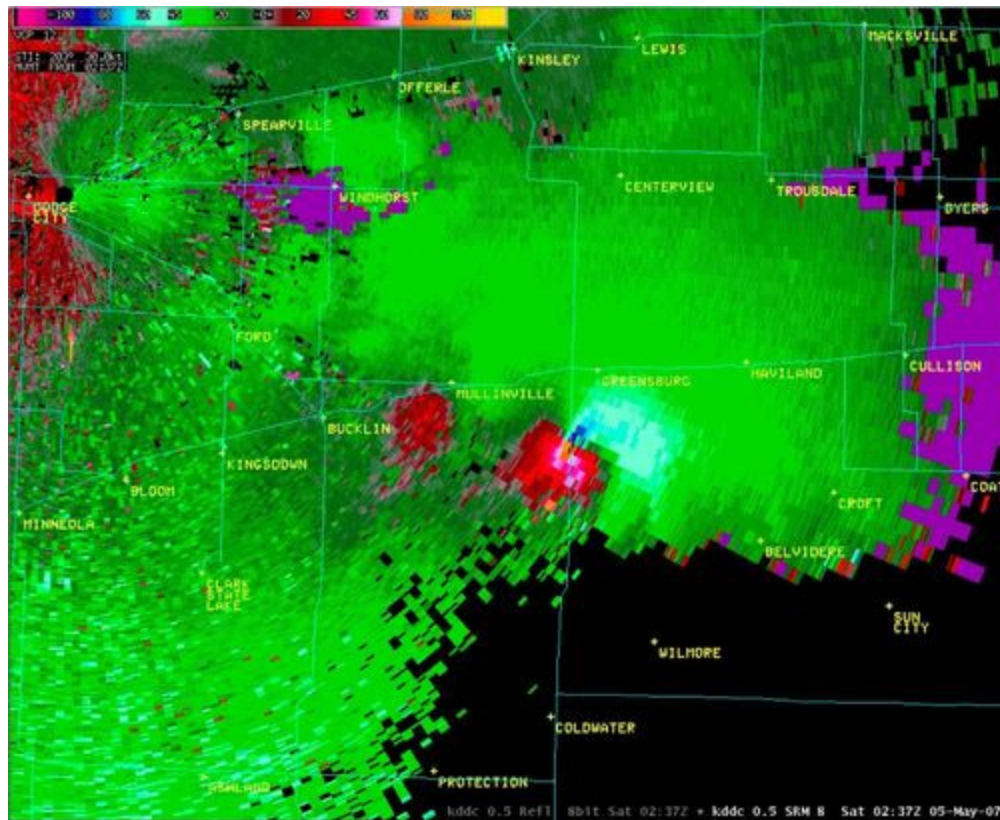
Credit: The Field Museum

*More than 75% of all tornadoes in the world take place in "Tornado Alley."*

## How do scientists predict dangerous storms?

Meteorologists are scientists who study and forecast weather. They use a technology called radar to track storms. Weather radar works by detecting the precipitation (rain, snow, or hail) in approaching storms. The radar unit sends out a radio wave towards the storm. The radio wave bounces off the raindrops, hail or snow that is in the storm, and then returns to the radar unit. The amount of time it takes for the wave to return tells meteorologists how far away the storm is. Most radar units send out about 1,000 radio waves per second. This gives them detailed, up-to-the-minute information about the storm.

Using radar, forecasters can track the formation and path of severe storms like tornadoes. When a tornado takes shape, its winds blow raindrops in a circular pattern. When scientists see that pattern on a radar screen, they know that a tornado is developing. Although tornadoes have fast swirling winds, tornadoes themselves move relatively slowly across the land (18-30 miles per hour). So scientists can make reasonable forecasts about where they are headed. A system of tornado watches and warnings are used to alert the public to danger. A tornado "watch" means thunderstorm conditions exist that could spawn tornadoes. A "warning" means a tornado has touched down and been spotted.



Credit: NOAA

*Doppler radar map shows the tornado shortly before it leveled most of Greensburg, Kansas.*

This system saved many lives in Greensburg. After the tornado sirens shrieked, people had 20 minutes to escape to their basements and storm shelters before the tornado destroyed their town.



# Earth Science: Hurricanes

by ReadWorks



*Hurricane Fran, 1996*

Hurricanes are tropical storms that start in the ocean waters near the equator. The storm moves its way north where the air is cooler. The wind gets stronger and the rain gets heavier. The "eye of the storm" is located in the center of the storm. It is the storm's calmest part. There is no rain in the eye and it can spread across 20 miles. The winds around the eye can blow as much as 200 miles per hour. They have the ability to uproot trees from the ground. They can also blow glass out of windows.

In the United States, summer and early fall are hurricane season. Every new season, tropical storms are labeled. The names follow alphabetical order, and alternate between male and female names. For example, the first hurricane may be Hurricane Andrew, then Barbara, Christopher, Deborah, Ephraim, etc.

Hurricanes can last up to 14 days long. They travel for thousands of miles across the ocean. Most of the time they never reach the coast of the US, but when they do hit the coast, conditions become very dangerous. When water levels rise, there can be floods and mudslides. Houses close to the shore can be wiped out, and the people who live there can be in grave danger.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Use the article "Spinning Thunderstorms" to answer questions 1 to 2.****1.** What did the town of Greensburg look like after the tornado had passed?

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**2.** How do scientists use radar to protect people from tornadoes?

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**Use the article "Earth Science: Hurricanes" to answer questions 3 to 4.****3.** How fast can the winds around the eye of the hurricane blow?

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4. What kinds of damage can hurricanes cause? Be sure to provide at least two examples from the text of damage.

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Use the articles "Earth Science: Hurricanes" and "Spinning Thunderstorms" to answer questions 5 to 6.

5. How are hurricanes and tornadoes similar? Use information from both texts to support your comparison.

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6. Could scientists use radar to help people stay safe from hurricanes? Use evidence from both texts to support your answer.

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