



# Tornado

**STEM Sims**

## Lesson 2: Tornado Features and Storm Damage

Meteorologists are scientists who study the weather. They study various weather conditions around tornadoes. They investigate features of some tornadoes that make them more dangerous than other ones. Can you find out which tornado features affect the amount of damage due to a tornado? Grab a helmet and spin into this investigation.

Here are some definitions to help you in your investigation.

- Tornado - a violently spinning column of air in contact with both the surface of Earth and clouds in the atmosphere
- Atmosphere (air) - the gases above the Earth's surface. The gases that make up air are mainly nitrogen and oxygen.
- Temperature - a measure of the hotness or coldness of something
- Celsius ( $^{\circ}\text{C}$ ) - a unit of measure of temperature. Room temperature is around  $25^{\circ}\text{C}$ .
- Wind Speed - how fast the air is moving over a given location
- Miles/Hour (mph) - a unit for measuring wind speed
- Funnel Width - a measure of the part of a tornado that can be seen that extends from the clouds down to the Earth's surface
- Variable - something that can change
- Direct Relationship - as one variable increases, the other variable also increases
- Inverse Relationship - as one variable increases, the other variable decreases

**Doing the Science**  
Part I. Temperature

1. Start the Tornado Simulation by clicking on the "Simulation" tab.
2. Make sure the Temperature Difference is set on "0°C." Leave the Pressure on "1,000 millibars" and the Funnel Width on "Narrow" for Part I of this lesson.
3. Click the "Run Simulation" button.
4. Note and record in Table 1 the Wind Speed and Damage Rating.
5. Click the "Reset Simulation" button. Change the Temperature Difference to "10°C" and rerun the experiment repeating steps 3 - 4.
6. Continue collecting data for temperature differences of 20, 30, 40 and 50°C. Make sure to keep Pressure and Funnel Width constant.

**Table 1.**

Temperature Difference (°C)	Wind Speed (mph)	Damage Rating
0		
10		
20		
30		
40		
50		

**Part II. Funnel Width**

7. Set the Funnel Width to "1-Narrow." Leave the Pressure on "1,000 millibars" and the Temperature Difference on "0°C" for this part of the lesson.
8. Click the "Run Simulation" button.
9. Note and record in Table 2 the Wind Speed and Damage Rating.

10. Click the "Reset Simulation" button. Change the Funnel Width to "2" and rerun the experiment repeating steps 8 - 9.
11. Continue collecting data for Funnel Widths of 3, 4, and 5-Wide. Make sure to keep Pressure and Temperature Difference constant.

**Table 1.**

Funnel Width	Wind Speed (mph)	Damage Rating
1-Narrow		
2		
3		
4		
5-Wide		

**Do You Understand?**

1. What are the variables in Part I of the lesson?
  
2. What variables were held constant in Part II of the lesson?
  
3. What does the term "temperature difference" mean? That is, what has the temperature difference?
  
4. How are temperature difference and the wind speed associated with a tornado related?

5. Is the relationship between temperature difference and wind speed a direct or inverse relationship? Support your answer with evidence.
  
6. How does temperature difference impact the damage caused by a tornado?
  
  
  
  
  
  
  
  
  
  
7. Why do you think that most tornadoes happen in the United States during the spring months?
  
  
  
  
  
  
  
  
  
  
8. How are funnel width and the wind speed associated with a tornado related?
  
  
  
  
  
  
  
  
  
  
9. How does the width of the funnel impact the damage caused by a tornado?
  
  
  
  
  
  
  
  
  
  
10. Which factor, temperature difference or funnel width, most affected the wind speed of a tornado and the damage caused by a tornado?