

STEM Sims

Lesson 1: Twister Danger

Storm hunters are scientists who search out tornados, often called twisters, to learn about the weather conditions in the atmosphere that cause their forming. One such condition is the air pressure. The hunters collect data about the air using many tools. They can measure air pressure using a device called a barometer. Get your storm shelter ready because you are about to enter a tornado.

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.	
Force -	any push or pull on something	
Area -	a specific part of a surface	
Pressure -	a measure of the force over a given area	
Air Pressure -	a measure of the pull due to gravity on a column of air over a given area of Earth's surface	
Millibars (mb)-	a unit for measuring air pressure. "Normal" air pressure at sea level on Earth is about 1013 millibars.	
Wind Speed -	how fast the air is moving over a given location	
Miles/Hour (mph) -	a unit for measuring wind speed	
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

- 1. Start the Tornado Simulation by clicking on the "Simulation" tab.
- 2. Make sure the Pressure is set on 750 millibars. Leave the Temperature Difference on "0°C" and the Funnel Width on "Narrow" for this entire 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 Pressure to 800 millibars and rerun the experiment repeating steps 3 4.
- 6. Continue collecting data for pressures of 850, 900, 950, and 1,000 millibars. Make sure to keep Temperature Difference and Funnel Width constant.

Table 1.

Pressure (millibars)	Wind Speed (mph)	Damage Rating
750		
800		
850		
900		
950		
1,000		

Do You Understand?

- 1. What were the variables you studied in this simulation?
- 2. How are pressure and the wind speed associated with a tornado related?

3. Give a reason or two why you think air pressure and wind speed are related.

4. Is the relationship between air pressure and wind speed a direct or inverse relationship? Please support your answer with evidence.

5. How does pressure impact the damage caused by a tornado?

6. Provide a reason or two for the relationship between air pressure and amount of damage caused by a tornado.

7. Imagine you climbed to the top of Mount Everest. Would you expect the air pressure there to be higher or lower than the normal pressure of 1013 mb on the surface of Earth? Please provide a reason for your answer.