

# How do tornadoes form, what do they look like and how do I keep myself safe?

**Unit Essential Question: What are tornadoes?**

**Teacher Background:**

**Lesson Overview:**

Students will learn how a tornado forms, the environment a tornado forms in, and the many different shapes and sizes tornadoes can become. The students will also watch a short video to watch where to go during a tornado warning. The primary emphasis of this lesson will be how tornadoes form and how to stay safe.

**Potential Misconceptions:**

Tornadoes only form in the central and southern plains in the United States. While tornadoes are most common in this region, tornadoes can form all over the country. Roughly 1,200 tornadoes touch down in the U.S. every year. Tornadoes often develop in the southeastern portions of the United States as early as February (across Georgia, Alabama, and Mississippi), then shift westward towards the central southern plains (Texas, Oklahoma) by April, and slowly shift northward towards the northern plains (North Dakota and Minnesota region) by June. This region described is also known as tornado alley. The prime time for the northeast to see tornadoes is May/June. It is not uncommon to see tornadoes in the northeast late April through early September.

**Lesson Goals:**

Objective:	Students will be able to demonstrate knowledge of terms through question and answer.
Learning Target:	Use provided weather graphics to describe the atmospheric conditions that are favorable for tornadoes to develop in, how tornadoes form, and their features.

**Standard Information**

<b>Performance Expectation (PE)</b>	<b>KESS3-2: Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.</b>
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Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Obtaining, Evaluating, and Communicating Information</b> Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <ul style="list-style-type: none"> <li>Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.</li> </ul>	<p><b>ESS2.D: Weather and Climate</b> Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.</p> <p><b>ESS3.B: Natural Hazards</b> Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.</p>	<p><b>Cause and Effect</b> Events have causes that generate observable patterns.</p>

**Lesson Preparation:**

Materials:	Group Size:	Management:
<p>Tornado graphic -What environment do tornadoes form in (graphic at end of lesson)</p> <p>How do tornadoes form graphic (graphic at end of lesson)</p> <p>Get Weather Ready Video – How to take cover during a tornado warning (link provided at suggested Texts)</p> <p>VORTEX2 2009 Tornado Video (link provided at suggested Texts)</p>	<p><b>Whole class</b></p>	<p>At the end of this lesson table, you will find a graphic explaining what atmospheric conditions are favorable for tornadoes to develop in, and a graphic showing how tornadoes form. Two internet links will be provided below: a link to a video on tornado safety, and a video showing a live tornado provided by VORTEX2.</p>

Lesson Plan:	
Suggested Timing	Agenda:
15 min 10 min 15 min	How do tornadoes form? Where do you go when a tornado warning goes off? What do tornadoes look like?
Teaching Procedures:	Teaching Notes
<p>Engage</p> <ol style="list-style-type: none"> <li>1. Ask the students if they have any thoughts to how tornadoes are formed. Try to get as much creativeness out of your students as possible. Show the graphics labeled "Tornadoes". Quickly explain that tornadoes often form in very warm and moist environments. Tornadoes often form in the vicinity of a cold front. Now, move onto the next graphic. Tornadogenesis is the technical term for how tornadoes develop. This process is still scientifically unknown and is a hot topic at many universities. Though, a few facts are known. Show the "How do tornadoes form" graphic to the students. Go step by step explaining a simplistic process on how tornadoes form. Step one, is technically known as wind shear. A variation of wind speed at two different heights in the atmosphere. If the students have a hard time understanding a column of air spinning, have them think of how a pinwheel spins. You blow at the top of a pinwheel to make it spin. Thus, that is how the atmosphere spins. It is like one giant pinwheel. Step two, is when the giant column of horizontal rotating air shifts into the vertical (the updraft portion of the storm). There are essentially two motions in a storm, rising motions (updraft) and sinking motions (downdrafts). The sinking motion (downdraft) is rain. The rotating column becomes a funnel, and then speeds up. It is the result of conservation of angular momentum. Explain to your students the funnel is like an ice skater spinning and bringing their arms close together. When they bring their arms close, they spin faster; it is the same with a funnel cloud. The third step is the funnel reaches the ground. This is where scientists don't quite understand what happens. Meteorologist do not understand why some funnels reach the ground and some do not. There are multiple factors that come into play with tornadogenesis, but this is the most simplistic explanation.</li> <li>2. Watch the video "Get Weather Ready". Ask the students if they have been in a tornado warning before? Did they learn anything new from this video?</li> <li>3. Tornadoes come in all shapes and sizes and develop all over the U.S and even all over the world. Show your students each graphic. Ask your students to point out features in each photograph. What difference do they see? What is unique about each tornado? It can be the color, shape, the lighting behind the tornado. Watch the video from the link provided below. The video is from a live storm chase from VORTEX2. VORTEX2 was a national research project that involved hundreds of scientists to improve knowledge of tornadogenesis and to increase tornado warning lead times.</li> </ol>	
Science Notebook:	
<b>Make sure students DATE each page of their notebook.</b>	
Ask the students to draw a picture of a tornado and explain what type of environment tornadoes form in.	
Assessment:	
Formative Assessment: In their Science Notebooks draw and write about how they think tornadoes form.	
Literacy Connections:	
Vocabulary	Included or Suggested Texts or links (Title; Author, Year, Type (book/article), Grade, LEXILE)

New or Recently Introduced	Familiar Terms	Get Weather Ready <a href="https://www.youtube.com/watch?v=5TiTfuvotc&amp;feature=youtu.be">https://www.youtube.com/watch?v=5TiTfuvotc&amp;feature=youtu.be</a>
Tornado		National Severe Storms Laboratory. (NSSL) – Scroll down to bottom of page, See VORTEX2 2009 June 5 tornado. Click “Download high definition video”. Video is (1:25 min). <a href="http://www.nssl.noaa.gov/news/resources/">http://www.nssl.noaa.gov/news/resources/</a>
<b>Differentiation:</b> <i>Below are some suggestions for modifying lessons for individuals or groups of students.</i>		
Students that may need more challenge:	Students that may need more support:	
<b>Think Outside the BOX!</b>		
ELA Math Others:		
<b>Reproducible Student Materials:</b>		
<b>See next pages</b>		

# Tornadoes

Tornadoes develop in warm and moist environments.

On days when thunderstorms develop, if conditions are just right, tornadoes can form.

The sun provides energy to the storm to help it grow and become strong. The longer the sun heats the ground, the greater the chance a tornado can form and the larger it may become.

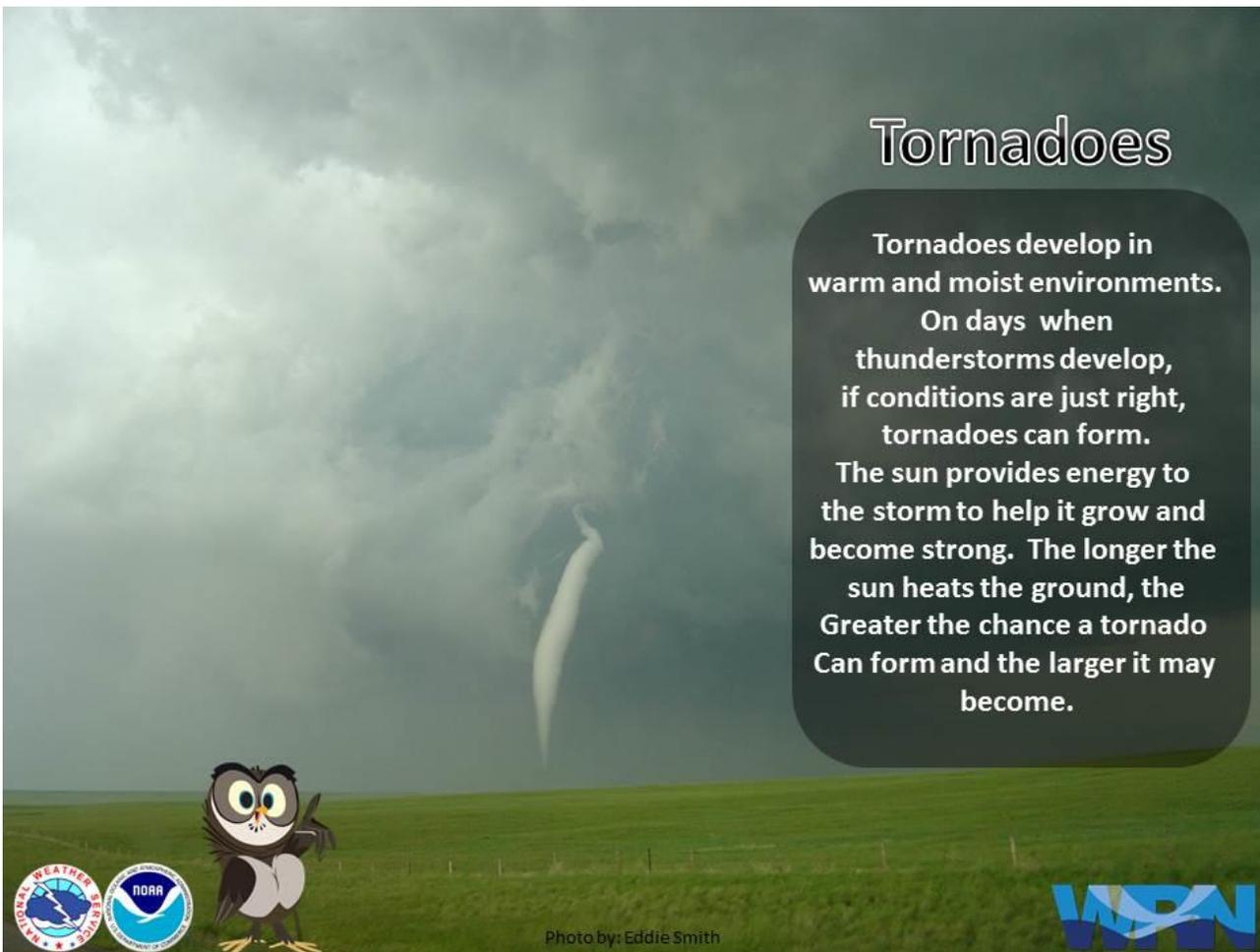


Photo by: Eddie Smith

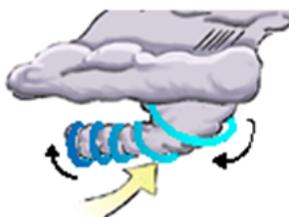
## How Do Tornadoes Form?

### Step 1



A column of air starts to rotate at two different heights. For example, the wind at 1,000 ft above the ground is blowing 5 mph, and the wind 5,000 ft above the ground is blowing 25 mph. This causes the air to roll.

### Step 2



Sometimes, this column of air gets pulled upwards. When this happens a funnel forms. The funnel then speeds up as an ice skater speeds up in a spin. They pull their arms together and the movement speeds them up.

### Step 3



Sometimes, the funnel will reach the ground and become a tornado. Scientists are still not sure why only some funnel clouds reach the ground and others do not.



[www.weather.gov/bgm](http://www.weather.gov/bgm)

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**If you have any suggestions to improve the lesson, please contact us at:  
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