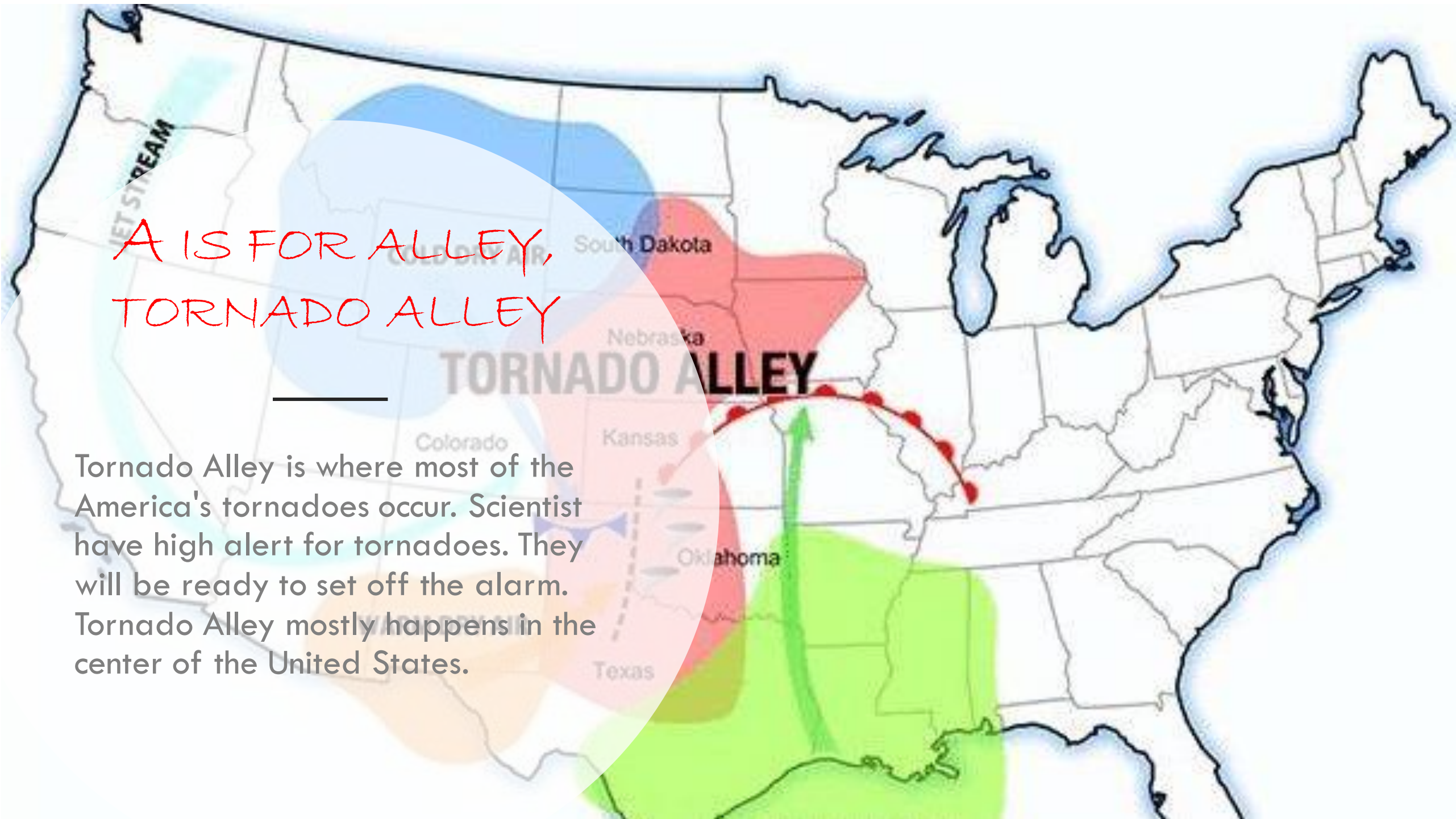




T IS FOR TORNADOES

An A to Z book by:
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A map of the United States with several weather-related features highlighted. A light blue area in the northwest is labeled 'JET STREAM'. A large blue area in the central-northwest is labeled 'COLD FRONT'. A red area in the central-north is labeled 'TORNADO ALLEY'. A green area in the south is labeled 'WARM FRONT'. A dashed line with arrows pointing west is labeled 'DUST BOWL'. A red curved arrow points from the green area towards the red area. State names like South Dakota, Nebraska, Kansas, Oklahoma, Texas, and Colorado are visible. The text 'A IS FOR ALLEY, TORNADO ALLEY' is written in red on the left side of the map.

A IS FOR ALLEY, TORNADO ALLEY

Tornado Alley is where most of the America's tornadoes occur. Scientist have high alert for tornadoes. They will be ready to set off the alarm. Tornado Alley mostly happens in the center of the United States.

B IS FOR BASEMENT

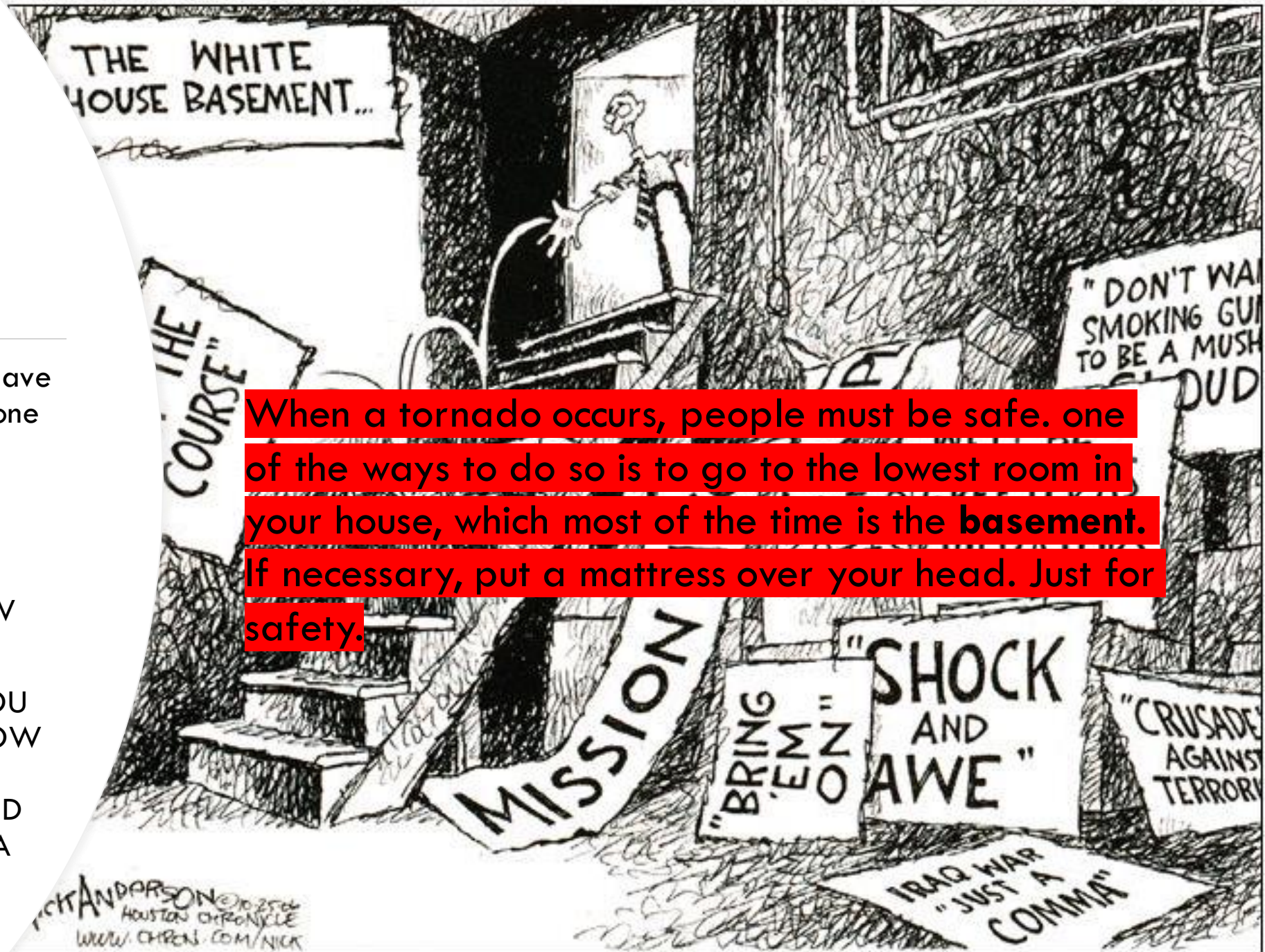
In a bad scenario, if you don't have a basement, you need to have one of the items listed below.

-CELLAR

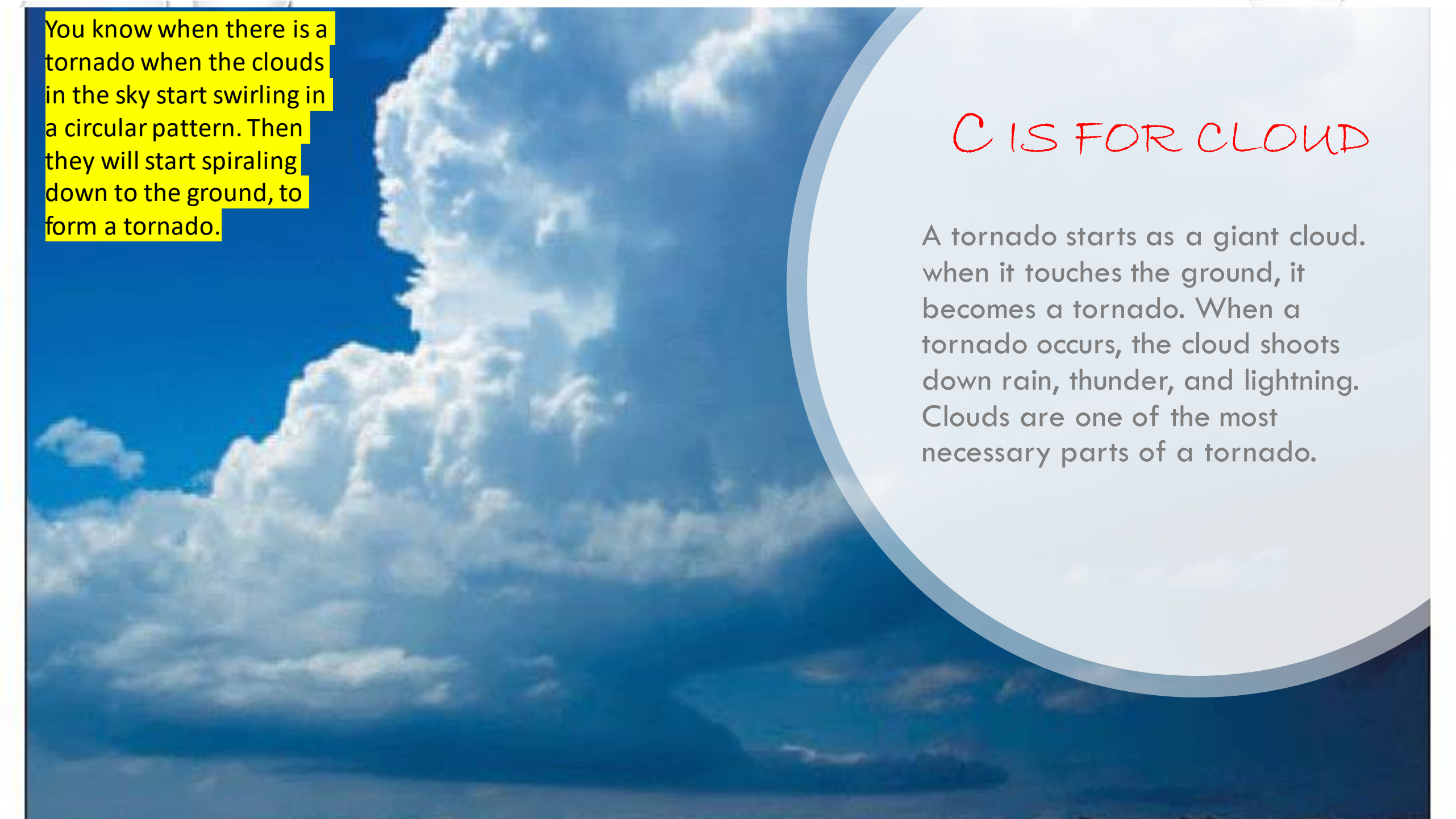
-CRAWL SPACE

-BATHROOM OR NO WINDOW ROOM

WORST THINGS WORST, IF YOU DON'T HAVE ANY OF THESE LOW AREAS OR NO WINDOW ROOMS; GET ON THE GROUND AND COVER YOURSELF WITH A MATTRESS.



When a tornado occurs, people must be safe. one of the ways to do so is to go to the lowest room in your house, which most of the time is the basement. If necessary, put a mattress over your head. Just for safety.



You know when there is a tornado when the clouds in the sky start swirling in a circular pattern. Then they will start spiraling down to the ground, to form a tornado.

C IS FOR CLOUD

A tornado starts as a giant cloud. when it touches the ground, it becomes a tornado. When a tornado occurs, the cloud shoots down rain, thunder, and lightning. Clouds are one of the most necessary parts of a tornado.

D IS FOR DESTRUCTION

Tornadoes can be the cause of destruction to states, cities, towns, neighborhoods, and many other objects. But even though tornadoes are very powerful, humans still have lots and lots of ways to stay safe but the most common one is to leave the area. Some ways are to get in a basement with no windows. If you can't get in a basement get into a windowless tornado safe room and cover yourself with a mattress.



E IS FOR EFFECT

The effect of a tornado can destroy cities, towns, houses, and many other things. tornado in Tornadoes usually cause lots of damage and can travel for miles. The effect of a tornado is very severe. Also, another effect of a tornado is injured people. But that one we don't want to happen is for it to kill any won.



F IS FOR FUJITA

Meteorologists use the Fujita scale to determine the tornado's level of strength. The higher the number the stronger the tornado is. You don't want to be around a very high-level tornado! It could also be a very low-level tornado. But tornadoes ranked EF 2, 3, and 4 are the most common. But an EF 5 is the strongest a tornado's winds can reach.

Rank	Wind Speed	Type of Damage
EF-0	65 to 85 miles per hour	Causes some damage to siding and shingles on buildings.
EF-1	86 to 110 miles per hour	Winds can uproot trees and overturn mobile homes. Flagpoles will bend.
EF-2	111 to 135 miles per hour	Most mobile homes destroyed. Permanent homes can shift off their foundations. Flagpoles often break. Bark comes off softwood trees.
EF-3	136 to 165 miles per hour	All but small portions of houses are destroyed. Bark comes off hardwood trees.
EF-4	166 to 200 miles per hour	Complete destruction of well-built homes and large sections of school buildings.
EF-5	More than 200 miles per hour	Destruction of the structure of mid- and high-rise buildings.

A Fujita Scale showing
Damage Rank for tornado
from EF 0- EF 5



G IS FOR GUST

Many gusts of wind circulate inside of a tornado. Gusts of wind can be so powerful they can rip houses off the ground. They can also lift cars and trucks into the air. Powerful gusts will spiral around the tornado until the tornado stops or it has been released.

Windmills creating gusts of wind. This is another way that gusts of wind can be formed.

H IS FOR HELMET

If a tornado is outside, then go to a downstairs bathroom and grab any type of helmet. Put the helmet on. Sit in the bathtub and place a mattress over your body. In this way, your head and rest of your body is protected from glass and other dangers objects.



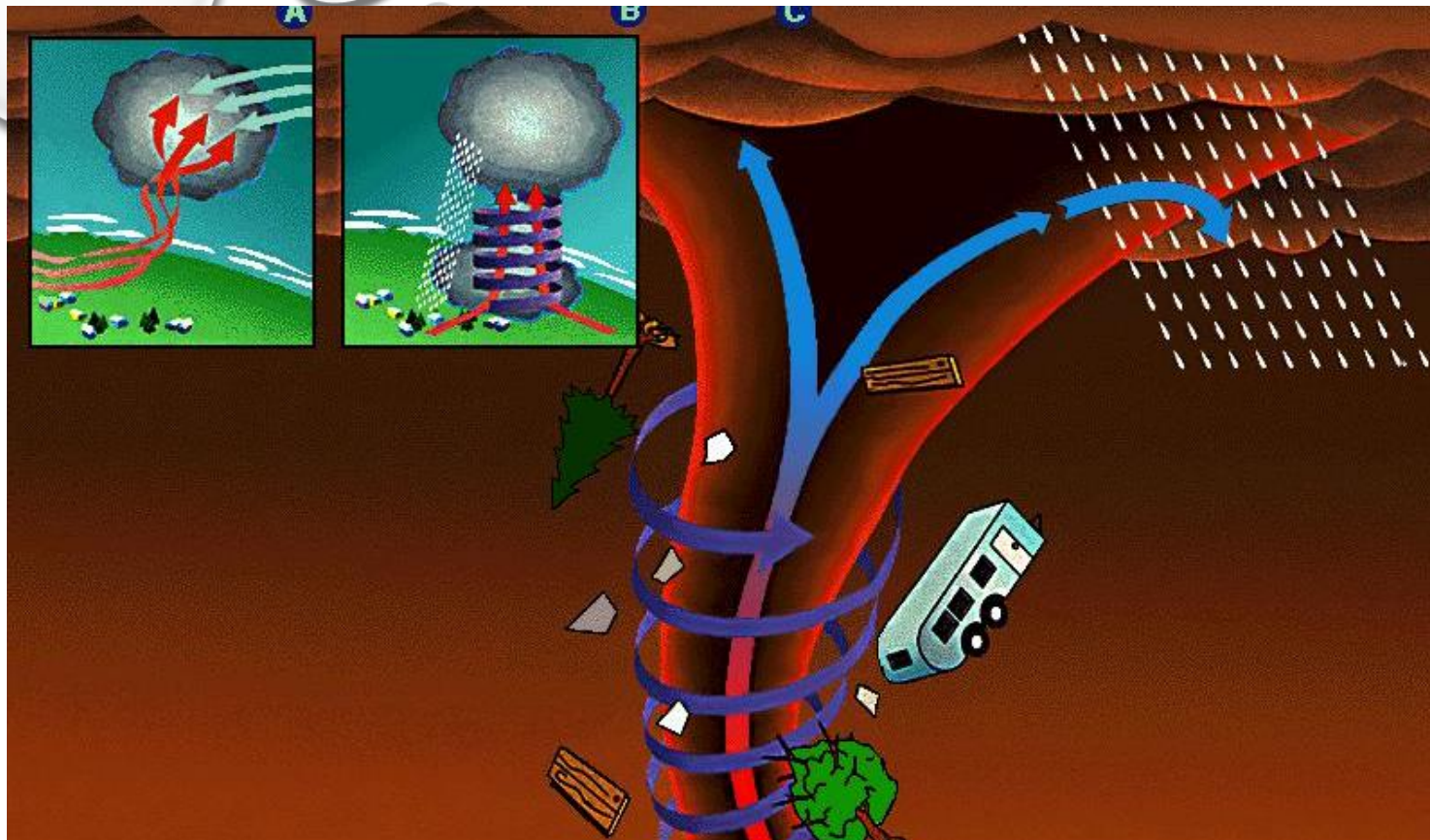
THE WORLD ALMANAC FOR KIDS 2004

Any kind of helmet you can find should protect you, even a Viking helmet.



I IS FOR INTENSE

Intense winds circulate around the tornado picking up all materials including houses, cars, buildings and much more! You must be cautious of a tornado's powerful winds. The winds can reach up to 210 miles per hour in the most severe and most powerful tornadoes. The Fujita scale gives tornados a number between 1 and 5. The higher the number the more intense the winds are, and the stronger the winds are.

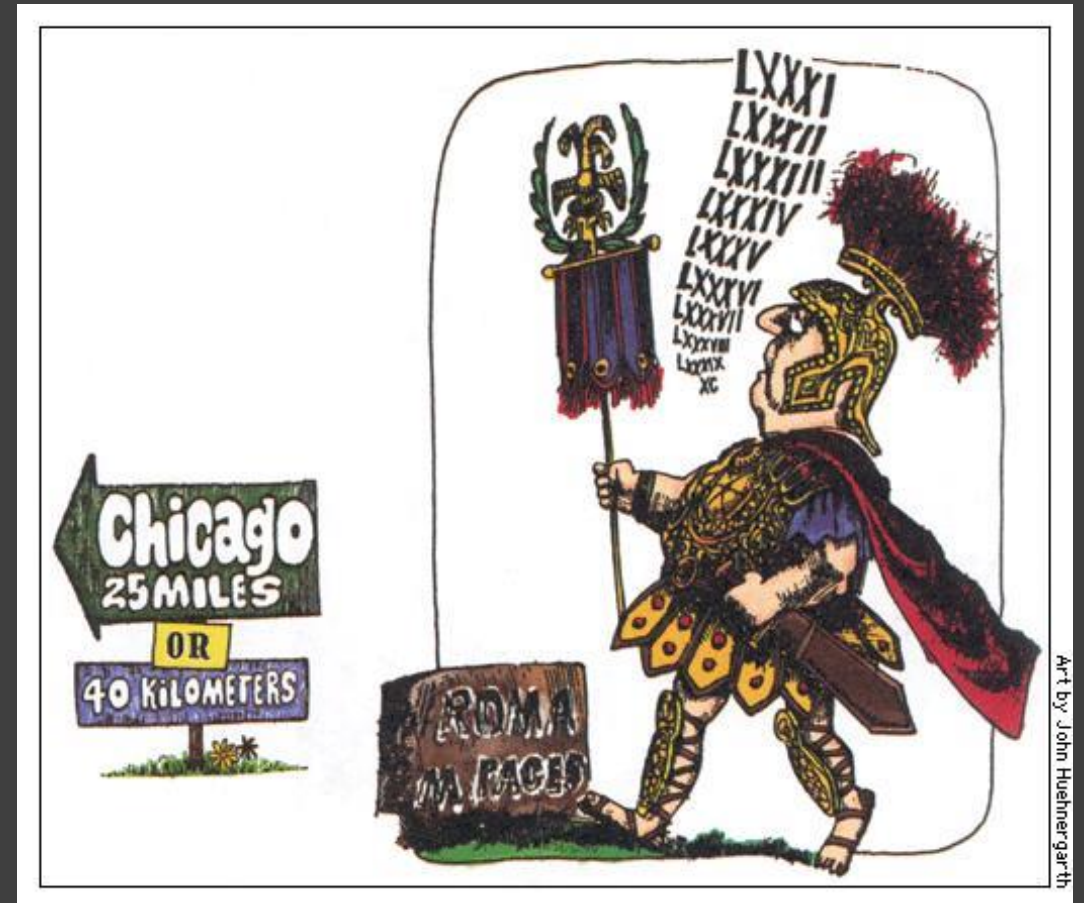


J IS FOR JUGGLE

As tornadoes travel throughout cities and towns, they juggle buildings and other things like trucks and cars. At the end of a tornado, it leaves a gigantic mess that includes many broken objects. The objects can be very dangerous to poor people that don't have any shoes, sandals, flip-flops, boots, or other types of foot protection. Just try to stay inside during a tornado!

K IS FOR KILOMETERS

TORNADOES TRAVEL MANY KILOMETERS WHILE CAUSING LOTS OF DESTRUCTION. WHEN A TORNADO OCCURS, IT'S VERY POWERFUL. TORNADOES CAN EVEN TRAVEL STATE TO STATE! SO, THINK TWICE ABOUT COMPLAINING WHEN TAKING A 5-MINUTE WALK.



Lightning on Venus is shown in this image. It can be just as severe as lightning on Earth.



L IS FOR LIGHTNING

Most tornadoes come from thunderstorms, and same with lightning. These extremely fast bolts of electricity can strike over a tornado and can cause a lot of damage. Even though the chances aren't very high of you getting struck by a lightning bolt, you can still get hit. For your safety, don't go outside during a tornado!

M IS FOR METEOROLOGIST

Meteorologists work around the clock watching the wind speed of each storm. If a storm starts to make high powered winds, the meteorologist will tell the area were the storm is predicted to occur to sound off the alarm. Meteorologists try to **predict** the weather. If the condition is just right, a tornado will form.



N IS FOR NATURE

Even though tornadoes usually travel through towns and cities, they also travel through nature. They also destroy things like forests, caves and swamps. As tornadoes travel through nature, they might injure or kill many plants and animals. Lots of nature is destroyed due to humans. So we as humans should start preserving our forest so nature can rebuild.



O IS FOR OKLAHOMA

Oklahoma is one of the states that gets the most tornadoes. There have been many powerful tornadoes in the state of Oklahoma. This state is in Tornado Alley, a zone where a lot of the tornadoes in the U.S come from. You probably won't want to live in Oklahoma due to the crazy amount of tornadoes it receives!

Picture of Oklahoma shown in the United States. One of the main places where tornadoes occur.





P IS FOR PREDICT

Based on what the NOAA (National Oceanic and Atmospheric Administration's) Storm Prediction Center **predicts** in Norman, Oklahoma there is an average of around 1,200 tornadoes in the U.S. every year. All of these tornadoes kill about an average of 74 people and 1,900 injuries a year. The National Weather Service sends 92 weather balloons in the air twice a day from their office across the country. Weather balloons are balloons that carry instruments aloft to send back information on atmospheric pressure, temperature, humidity, and wind speed by means of a small, expendable measuring device called a radiosonde.



Q IS FOR QUICK

Tornadoes can be very quick. If you think you can drive away from a tornado, your chances aren't very high. The wind speeds of a tornado can reach up to 200 mph! No wonder tornadoes are fast! In 1974, a series of 148 tornadoes touched down to 13 states during a period of 15 hours. That's how fast tornadoes can be in 13 states in only 15 hours.

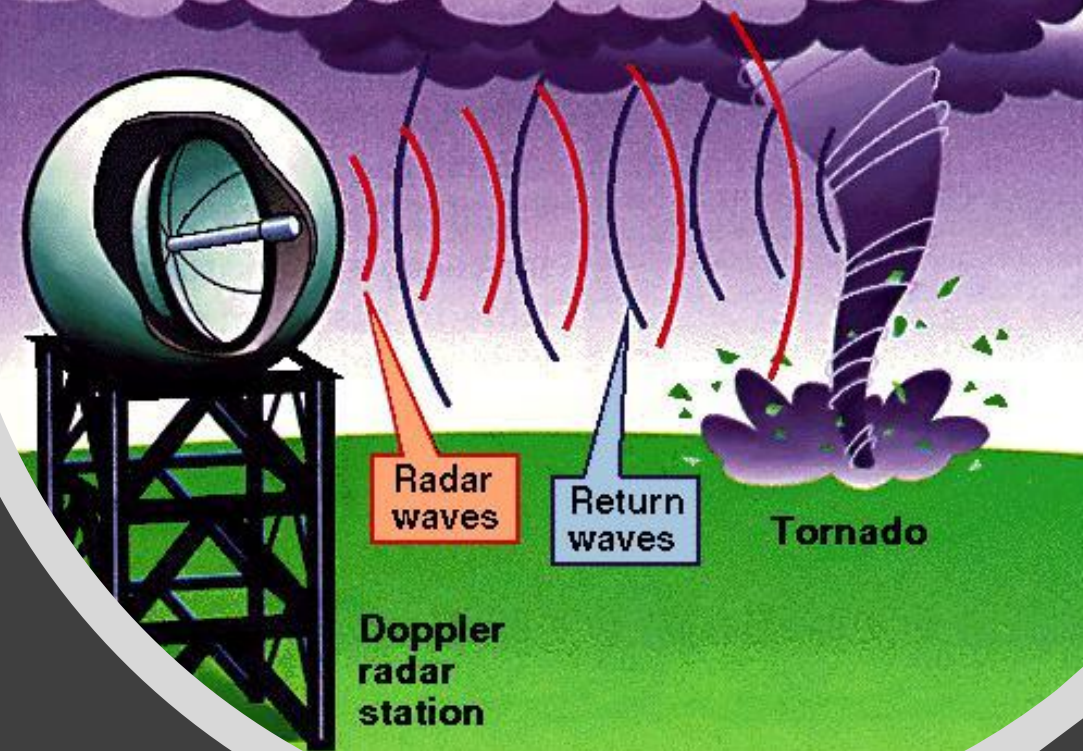
R IS FOR RADAR, DOPPLER RADAR

A doppler radar is a radar to scale a tornado. It tracks storms, then sends the information to a building where Meteorologists take the information about the strength and speed of the tornado and put it into a computer where they put it into an active map.

Many doppler radars are placed around the world to track every kind of storm. If a storm is found that has a potential to create a tornado, the data will be sent straight back to the meteorologist.

How Doppler Radar Works

The Doppler radar machine sends out radar waves. When the waves pass into a storm, they bounce back to the radar machine, telling forecasters about the storm's strength, speed, and direction.



S IS FOR SHELTER

During a tornado, you need to get to shelter, quick! The safest place to hide during a tornado is a place with no windows or doors. The best place to stay safe during a tornado would probably be a basement. If you are outside you should try to find shelter because before and after a tornado, comes with lots of rain and lightning. A cause for tornado could be a thunderstorm or a giant cloud.

Small shelter from a giant storm

Safe rooms and public storm shelters could have saved many lives in Joplin, the Missouri city devastated by a 2011 tornado, according to weather scientists' new analysis.

Safe room was all that remained of a wood-frame home destroyed in Joplin tornado



Air vents with filters

Heavy doors

Room bolted to concrete garage floor

Wood frame covered with steel plates

Construction

Concrete and steel (shown below)

Up to 8 x 14 ft.
(2.4 x 4.3 m)

Steel sheet

Welded joints

Base 1 mi.
(1600 m) wide

Killer tornado

- Wind up to 210 mph (330 kph)
- 22 mi. (35 km) path
- Killed 161 people
- Destroyed 8,000 homes

Thunderstorm facts

T IS FOR THUNDERSTORM

Most tornadoes happen in the spring and summer. Thunderstorms form big tornadoes. Thunderstorms can be very severe during a tornado. They can also cause damage by themselves, not only with tornadoes.

- The United States has about 100,000 thunderstorms a year. These storms cause between 800 and 1,000 tornadoes a year.
- In the United States, more than 80 people are killed by tornadoes every year.
- 7 out of 10 tornadoes that happen on Earth occur in the Great Plains.

U IS FOR UNEXPECTED

A tornado can form unexpectedly, so everyone should be prepared. This type of natural disaster can form in any state, and luckily meteorologists will warn you when one is coming. If you hear a warning that a tornado is coming your way, pack a helmet, a flashlight, a few batteries, and a jug of water.



V IS FOR VORTEX

A vortex is another word for tornado. Tornadoes form when warm, humid air collides with colder air to form a vortex. It will then extend down from the clouds and sometimes reaches the ground. When it touches the ground, it will cause a lot of damage.

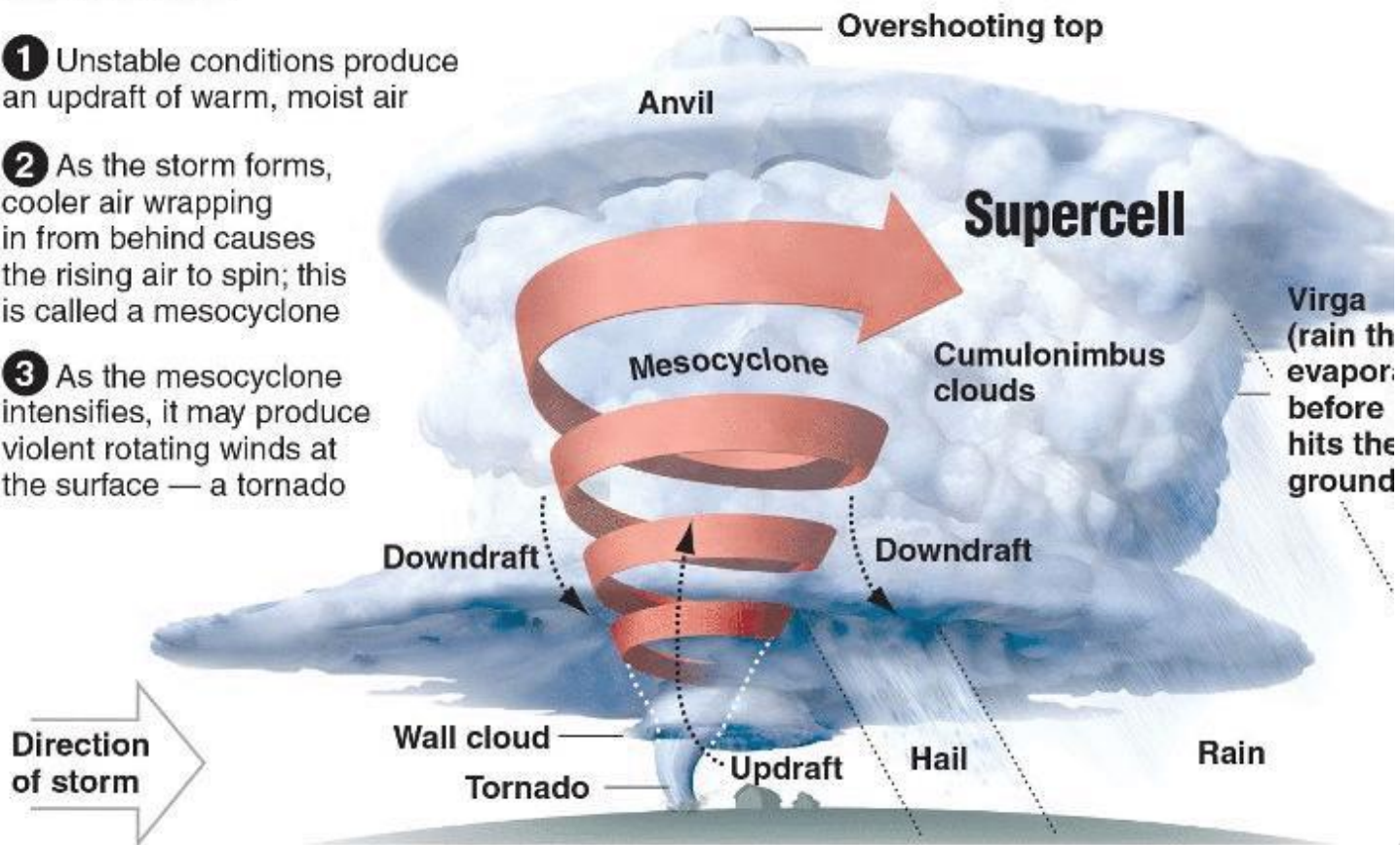
Destructive vortex

Tornadoes develop out of thunderstorms, where there's a steady, upward flow of warm, low-pressure air. Some tornadoes consist of a single vortex, but other times multiple suction vortices revolve around a tornado's center.

1 Unstable conditions produce an updraft of warm, moist air

2 As the storm forms, cooler air wrapping in from behind causes the rising air to spin; this is called a mesocyclone

3 As the mesocyclone intensifies, it may produce violent rotating winds at the surface — a tornado



Source: National Oceanic and Atmospheric Administration, Weather Underground; San Francisco State University, AccuWeather
Graphic: TNS, Los Angeles Times

W IS FOR WORLDWIDE

Tornadoes happen all around the world. Many people say the United States has the most tornadoes. In the United States, there is a place called Tornado Alley which has the most tornadoes. Japan, South Africa, Bangladesh, Argentina and Australia also have lots of tornadoes.





X IS FOR EXHAUSTED

The **Red Cross** organization and volunteer's get exhausted by working all day to clean up debris from tornado. They work all day trying to make Earth a better place to live. They are not the only people who clean up after tornadoes. Volunteers do a lot of work cleaning up after tornadoes too.

Y IS FOR YOU

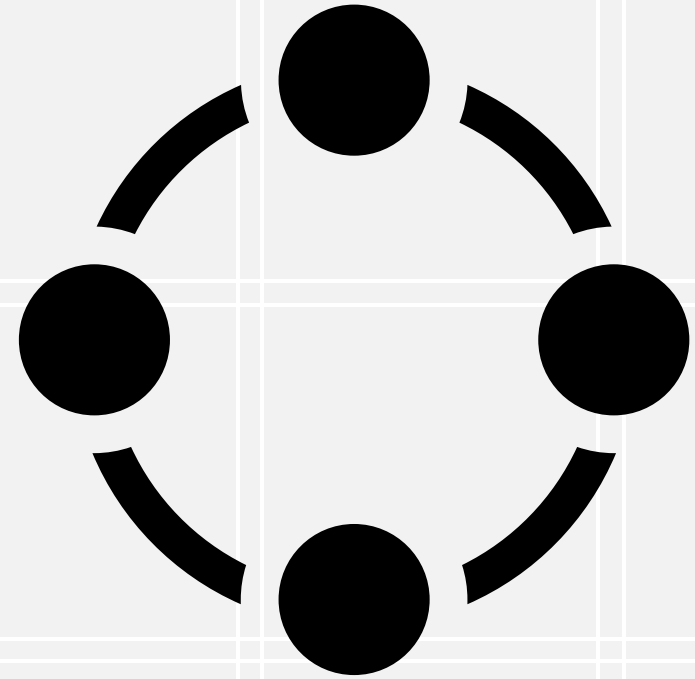
In order to be safe from a tornado, run to the lowest room in your house. Most of the time, the basement. But before you go there, get a few items that will make you more prepared. Grab a biking helmet, a few batteries, and a jug of water. When you enter the basement, put on the biking helmet and crawl up into a ball near a wall with no windows. Try to stay safe at all times.



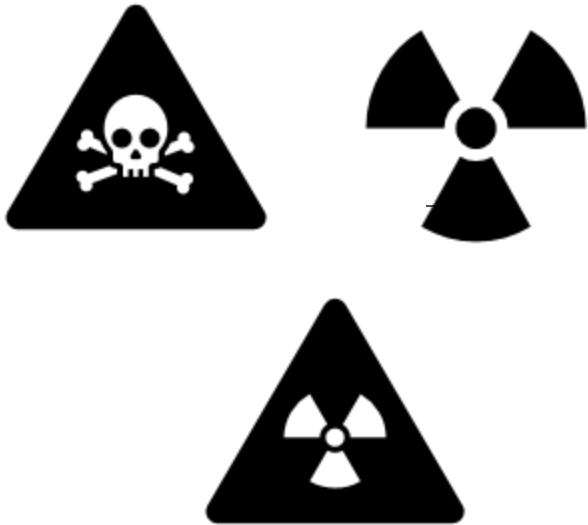
If you do not have a basement, your only choice to hide from a tornado is to go to an interior room. An interior room is a room with no windows, or other exterior things like a door. This type of room might not be exactly like a basement, but it will still keep you very safe from a tornado.

Z IS FOR ZONE

When a tornado occurs, it occurs in a tornado zone. Tornado zones can be found all over the world. This means when a tornado happens it is in a certain city, state, country, or continent. So make sure whenever you are in an area that his a tornado zone, you must stay alert at all costs.



GLOSSARY



- **Basement-** A story of a building, partly or wholly underground.
 - **Cellar-** A room, or set of rooms, either wholly or partly underground.
 - **Crawl Space-** (In a building) An area accessible by crawling, having a clearance less than human height.
 - **Determine-** To settle or decide by an authoritative or conclusive decision.
 - **Natural Disaster-** A calamitous event, especially one occurring suddenly and causing great loss of life, damage, or hardship.
 - **Predict-** To foretell the future; make a prediction.
 - **Red Cross-** An international philanthropic organization that cares for the sick and wounded.
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