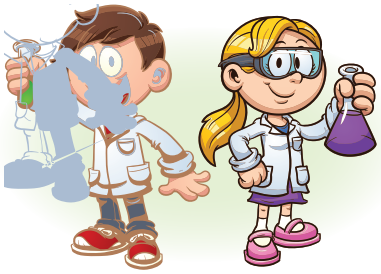
Hurricane Science

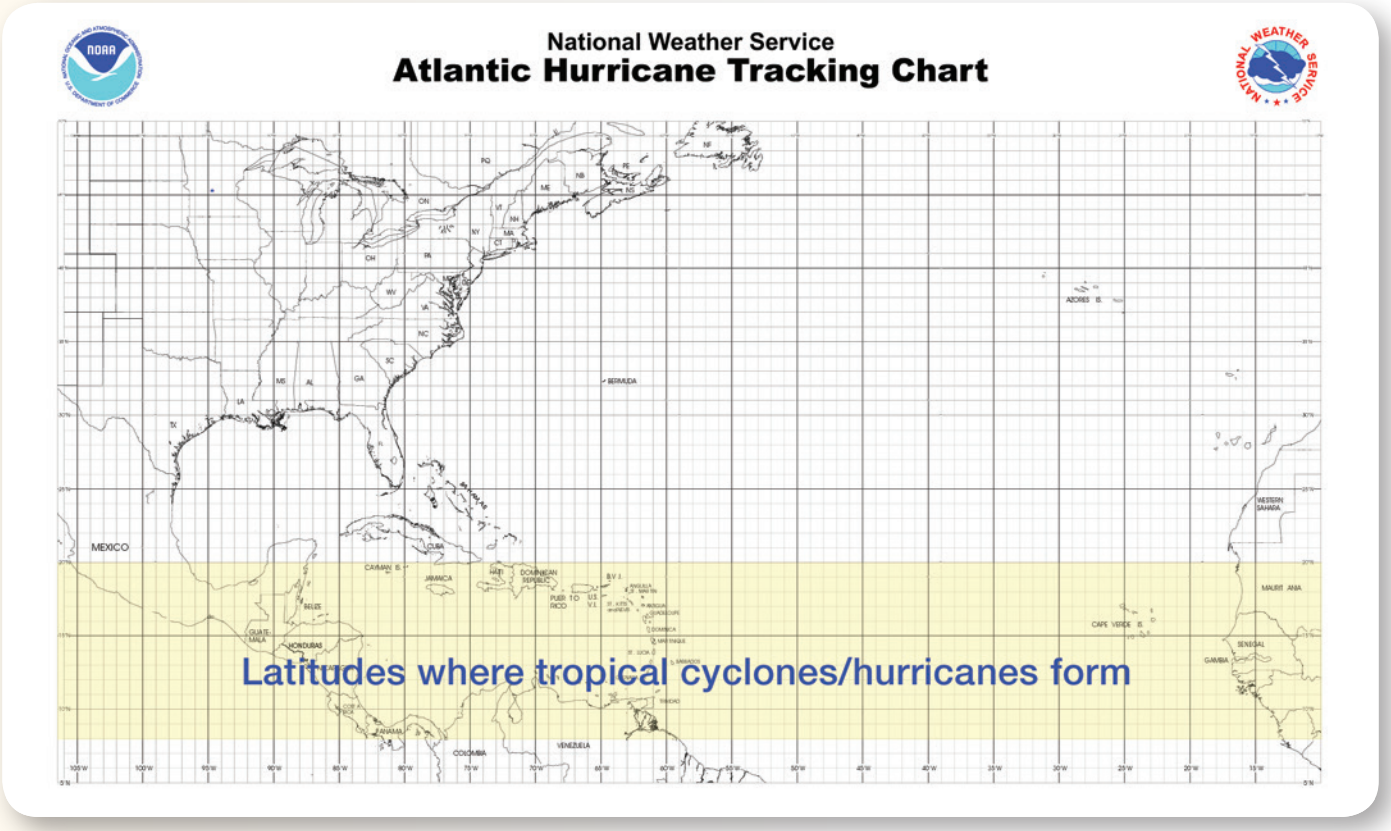


The National Hurricane Center defines a hurricane as a tropical cyclone, found in the Northern Hemisphere, with a maximum sustained surface wind of 74 miles per hour. The cyclone is accompanied by thunderstorms and, as a hurricane, creates a counterclockwise circulation of winds near the Earth's surface.

Not just any storm in the ocean becomes a hurricane. Hurricanes have a few key ingredients that help them become so powerful. A hurricane forms over tropical waters at latitudes between eight and 20 degrees north of the equator.

Those key ingredients are a mixture of high humidity, light wind, and warm ocean temperatures. Most often, the ocean temperatures are 80 degrees fahrenheit (26 degrees celsius) or higher! That is pretty warm water!

In the United States, these weather ingredients usually occur during summer until early fall. Thus, the months of June through November are designated as hurricane season for the United States.



Only tropical cyclones with warm air at their center become hurricanes; while cyclones with cold air at their center are known as mid-latitude or extratropical cyclones.

A tropical cyclone in the North Atlantic rotates in a counterclockwise direction; likewise, in the Southern Hemisphere, tropical cyclones rotate in a clockwise direction. This rotation is because of the Coriolis effect (for further explanation, Ready.gov/kids). This force is generated by the rotation of the Earth. Here is an example of the Coriolis effect. Imagine you are sitting on a merry-go-round as it is rotating. You throw a ball to someone sitting on the opposite side of the merry-go-round. If you throw the ball directly at the person, you will miss them.

However, if you throw the ball a small distance away from them, they will catch it. While it seems that you are not throwing the ball in a straight line, you really are. The ball's motion in a rotating reference frame tricks our minds in to thinking that its path is not straight. Now that you have an idea of what a hurricane needs to form, let's learn more about these storms after their creation.

The word "hurricane" came from the name Hurakan, who was a mythological god of weather, recognized by an ancient tribe in Central America.

Hurricanes aren't called "hurricanes" from the start. They are classified according to their sustained wind speeds. Once the wind speed reaches 23 miles (37 kilometers) per hour the storm is known as a tropical depression. As the wind speed increases to 39 miles (63 kilometers) per hour, it becomes a tropical storm and is given a name, and once the storm reaches 74 miles (119 kilometers) per hour it is known as a category one hurricane.

As a hurricane gains strength, its intensity increases. The intensity of hurricanes is classified using the Saffir-Simpson Hurricane Wind Scale. This scale creates categories corresponding to certain wind speed intervals.

Saffir-Simpson Hurricane Wind Scale

1 Category One
Wind Speed: 74-95 mph (119-153 km/h)

2 Category Two
Wind Speed: 96-110 mph (154-177 km/h)

3 Category Three
Wind Speed: 111-129 mph (178-208 km/h)

4 Category Four
Wind Speed: 130-156 mph (209-251 km/h)

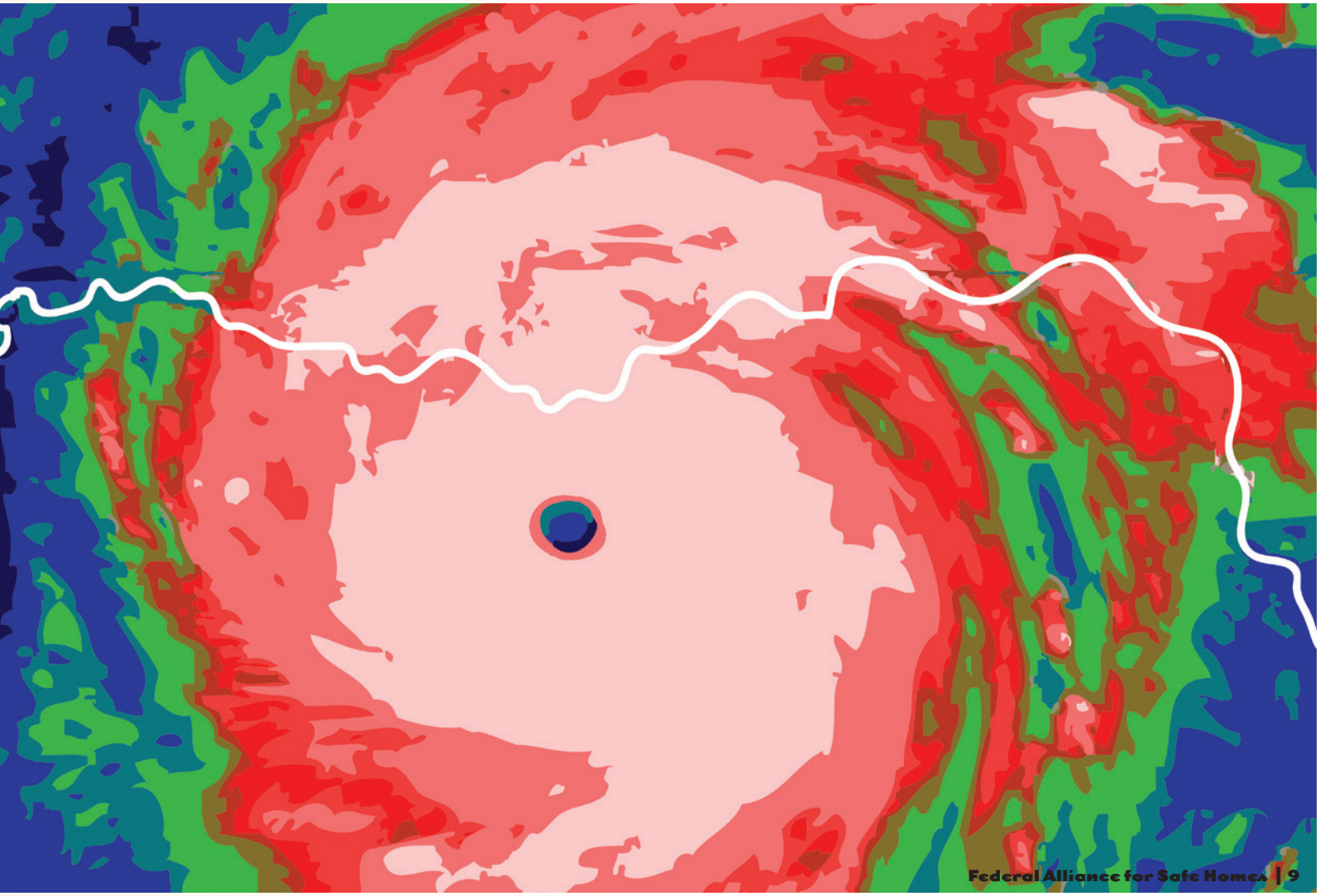
5 Category Five
Wind Speed: > 157 mph (> 252 km/h)

Because outside preparedness becomes more difficult and dangerous as tropical storm force winds approach, hurricane watches and warnings are issued 48 hours and 36 hours in advance of the anticipated strong winds, with the intention of keeping people out of harm's way.

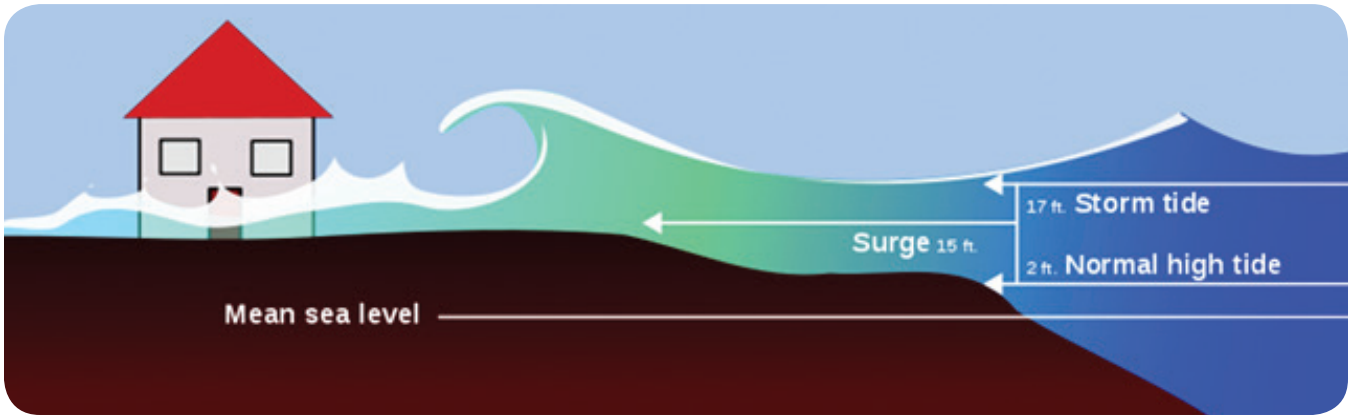
Hurricanes are a common occurrence in Florida, but did you know hurricanes have made landfall in other regions of the United States? Places like Alabama, Louisiana, Mississippi and Texas and all states bordering the Gulf of Mexico, have experienced hurricanes. However, they aren't the only places. In recent years, we have seen hurricanes strike the East Coast as well. Can you think of some of the historic hurricanes that have hit the United States?

Ask a question

What is outside preparedness? Those two words are not commonly seen together, but in the sense of being prepared for a hurricane, outside preparedness is making sure that all objects you have outside of your home are either anchored to the ground or brought inside to prevent these objects from becoming windborne debris.



Hurricanes bring not only strong winds and rain, they cause other events, such as flooding, tornadoes and storm surge, to name a few. Storm surge is the buildup of water higher than sea level, caused by the wind.



Are the states that border these large masses of water the only locations affected by hurricanes? While places further inland don't experience storm surge, they can experience large amounts of rainfall and possibly thunderstorms that could produce tornadoes. Being prepared at any time is the best way to be ready.

Do you live close enough to the coast for storm surge to affect your home? If so, what kind of damage do you think would happen if the storm surge hits your home?

Ask a question

Hands-On Activity:
Unscramble These Vocabulary Words

ihgh iuhmidty _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

jnue _ _ _ _ _

onevmebr _ _ _ _ _ _ _ _ _

ghitl idnw _ _ _ _ _ _ _ _ _ _ _ _

wmra oneca maeetserrutp _

Chapter 1: HURRICANES

1. All hurricanes are?

A. Category 4 Storms

B. Tropical Cyclones

C. Tropical Tornadoes

D. Atlantic Ocean Based

2. What scale are hurricanes measured on?

A. Enhanced Fujita Scale

B. Beaufort Wind Scale

C. Saffir-Simpson Hurricane Wind Scale

D. Magellan Scale

3. A Category 4 hurricane has wind speeds ranging from:

A. 130 – 156 mph

B. > 157 mph

C. 111 – 129 mph

D. 74 – 95 mph

4. A hurricane needs which of the following conditions to form?

A. Warm sea surface temperature

B. Warm air

C. High humidity

D. All of the above

5. Hurricane season begins in _____ and ends in _____.

A. January, March

B. July, October

C. May, September

D. June, November

6. Hurricanes typically make landfall in which of the following places?

A. US East Coast states

B. US Gulf of Mexico states (AL, FL, LA, MS,TX)

C. Alaska

D. Wisconsin

E. Both A & B

7. Hurricanes affect only coastal states.

A. True

B. False

8. Other weather perils that are produced by hurricanes include:

A. Floods

B. Hail Storms

C. Snowstorms

D. Tornadoes

E. Both A & D

9. An important aspect of making sure things don't blow away during a hurricane is:

A. Outside preparedness

B. The color of your house siding

C. The type of grass in your yard

D. All of the above

10. Which direction does a hurricane in the North Atlantic rotate?

A. Sideways

B. Counterclockwise

C. Clockwise

D. In a figure eight