1. Why are hurricanes such dangerous weather events?

2. List two factors that must be present in order for a hurricane to form.

3. Explain how a storm surge happens.

4. Scientists and meteorologists have ways to monitor storms such as hurricanes. Write to describe some of the ways they do this. Use details from the book to support your answer.

5. Main Idea and Details
   Hurricanes are severe storms. What details from the book support this idea?

Vocabulary
- hurricane
- storm surge
- tornado
- tropical depression
- tropical storm
- vortex

Extended Vocabulary
- atmospheric pressure
- cyclones
- landfall
- lull
- torrential
- typhoons
- wall clouds

by Peggy Bresnick Kendler
A hurricane is a dangerous storm with very strong winds. A hurricane is made up of many groups of thunderstorms that are wrapped around its center.

Tropical storms form from heat and water vapor from the ocean. Warm, moist air rises, causing a tropical disturbance. The clouds in a tropical disturbance can become thunderstorms. The storms’ winds increase and begin to swirl, causing a tropical depression. Winds blow faster and form a tropical storm. When winds reach a speed of 119 kilometers per hour, the tropical storm becomes a hurricane. The center of a hurricane is called the eye. Winds are calm in the eye.

A hurricane can knock down trees or change the shape of a coastline. A slow-moving hurricane can produce many inches of rain in one place. This can cause dangerous mudslides and floods. A hurricane’s winds can push large waves of ocean water onto the shore. This rise in sea level is called a storm surge.

Computer models can predict a hurricane’s strength, direction, and speed. Satellites can send data on storms and hurricanes to meteorologists. Many scientists work together to forecast storms.

A funnel cloud is a rapidly spinning column of air that drops down out of a thunderstorm. It is called a tornado when it touches the ground. A tornado forms from a spinning area inside a thunderstorm. A vortex is an area where air or liquid spins in circles. A tornado is a vortex that forms in a thunderstorm.

Tornadoes form and move quickly. They are difficult to forecast. Their strong winds can cause a great deal of damage.

Hurricanes and tornadoes are both strong storms. Tornadoes have faster winds than hurricanes have. Hurricanes are bigger than tornadoes, and they last longer. Keep reading to learn more about hurricanes.
What are hurricanes?

Hurricanes are very large tropical storms that form over warm water. Hurricanes, typhoons, and cyclones are all different names for the same type of storm. In the western Pacific Ocean, hurricanes are called typhoons. In the Indian Ocean, they are called cyclones. In the Atlantic Ocean, they are called hurricanes.

Hurricanes have winds that have reached a constant speed of at least 119 kilometers per hour. These winds blow in a spiral pattern around a calm center area called the eye.

The strong winds of a hurricane can knock over trees.

The eye of a hurricane is usually between twenty and one hundred kilometers wide. The storm can bring heavy rains, powerful winds, and storm surges. A single hurricane can spend more than two weeks over open water.

Hurricane season in the Atlantic Ocean north of the equator lasts from June 1 through November 30. During these months, the water in the Atlantic Ocean is warmest. Most hurricanes happen in August and September.

All tropical storms are given male or female names. The names help meteorologists identify and track storms—especially when more than one happens at the same time.
How Hurricanes Form

Hurricanes start as small thunderstorms over warm, tropical oceans. They begin over a warm layer of water at the top of the sea. This layer has a surface temperature of at least 26.5°C, or 80°F. The warm seawater is absorbed by the air. This moist, warm air affects the atmospheric pressure. Atmospheric pressure is the pressure caused by the weight of air.

The map shows the places where severe storms are most likely.

Most hurricanes in North America happen when different water currents meet. When these currents come together, they produce a group of thunderstorms called a tropical disturbance. The disturbance grows as warm, moist air moves upward. As the air rises, it cools and the water in it condenses and releases heat. This causes lower atmospheric pressure, which pulls even more air into the system.

As the wind moves faster, the tropical disturbance becomes a tropical depression. As air moves into it, the system begins to spin around. When the storm’s winds grow to 62 kilometers per hour or greater, it becomes a tropical storm, and it is given a name. If the storm keeps growing and its wind speeds reach 119 kilometers per hour, it is a hurricane.

October 22, 1998: A storm begins to form over the Atlantic Ocean.

October 25, 1998: As the storm develops into a hurricane, the eye becomes visible.

October 26, 1998: Hurricane Mitch becomes larger and more powerful.

Inside a Hurricane

At Earth’s surface, the air pressure in a hurricane is low. When the air moves from areas of high pressure to areas of low pressure, strong winds develop. The warm, moist air from the ocean moves to areas of low pressure. There the air rises and forms bands of rain. These rain bands can produce more than five centimeters of rain per hour.

The powerful winds of a hurricane swirl around the eye of the storm. A hurricane’s eye is calm. Within the eye, there are few winds or clouds.

Storm clouds called wall clouds surround the eye to form the eyewall. A hurricane’s strongest winds and heaviest rains happen within wall clouds that spin around the eye. In the eyewall, warm air spirals upward, causing the most powerful winds of the storm.
Storm Damage

When a hurricane strikes land, we say it has made landfall. As the hurricane moves over land, powerful winds and heavy rains can remain over an area for several hours. Its raging winds can reach a speed of more than 250 kilometers per hour. The winds and rains can do tremendous damage. Hurricane winds can rip trees out of the ground, tear the roofs off buildings, and shatter windows. The torrential rains can cause heavy flooding.

As the hurricane's eye passes over an area, the winds slow and the sky might clear. There is a lull, or a brief calm, in the storm. When the lull passes, the intense winds and heavy rains resume. This is because the most powerful winds of the storm surround the hurricane’s eye.

Hurricanes weaken as they move over land. They need energy from the warm sea air to stay powerful.

This destruction was caused by Hurricane Frances, which battered Florida in 2004.
Storm Surge

A hurricane can cause storm surges. A storm surge occurs when the hurricane pushes ocean water onto the shore. During a hurricane, ocean water is pulled up into the eye. This makes enormous waves that gain even more power from the strong hurricane winds. The result is a wall of seawater that crashes onto land.

Some of the worst damage from a hurricane is caused by storm surges. They are especially dangerous in areas where the coast is at almost the same level as the ocean. During a storm surge, ocean water pours onto land with tremendous force, flooding streets and buildings. Buildings on hills are not as likely to flood, but they are sometimes damaged by mudslides that result from the heavy rain.

Besides flooding coastal areas, storm surges can do plenty of damage to property. Rapid rises in sea level can damage or destroy portions of bridges. Storm surges also can lift large boats, wrecking them as they wash up on the shore or even onto roads. Storm surges can also be very dangerous for animals and people who get caught in the rushing water.
Monitoring Storms

Predicting and tracking hurricanes are important jobs of weather forecasters and meteorologists. They alert people to the growing storm. People in areas where the hurricane might strike have time to prepare for the storm.

Weather forecasters use images from satellites to help them follow a hurricane’s development over the ocean. The images help them track a hurricane’s progress and its path. This way, the forecasters can have a good idea where the storm will make landfall.

The National Oceanic and Atmospheric Administration, known as NOAA, sends specially equipped planes to fly right into the center of hurricanes. The planes carry meteorological equipment that gathers data inside the storms. The data are fed into computer models that help forecasters make accurate predictions during a hurricane. Data also help researchers better understand what goes on inside storms and hurricanes. This information helps meteorologists to be better hurricane forecasters.

Meteorologists study satellite images to help them understand and predict hurricanes.

Devices on the weather-research planes measure air pressure, humidity, temperature, and wind direction and speed. This gives scientists a good idea of the structure and intensity of the storm.

Hurricanes are very powerful storms. They can cause great damage when they reach land. Their strong winds and heavy rains can destroy anything in their path. Scientists study hurricanes so they can learn as much as possible about these dangerous storms.
What did you learn?

1. Why are hurricanes such dangerous weather events?

2. List two factors that must be present in order for a hurricane to form.

3. Explain how a storm surge happens.

4. Scientists and meteorologists have ways to monitor storms such as hurricanes. Write to describe some of the ways they do this. Use details from the book to support your answer.

5. Main Idea and Details Hurricanes are severe storms. What details from the book support this idea?