Expedition to the Caribbean Sea and the Gulf of Mexico to Learn About Tropical Storms

Part 1. Introduction.

Narrator: Hold on to your hats; there's a big storm coming in! Summer in the Caribbean is hurricane season.

Hurricanes are large tropical storms that form over the warm parts of the ocean. These storms are called hurricanes when they are in the Atlantic Ocean or the eastern Pacific Ocean, but in other parts of the world they are called tropical cyclones or typhoons.

Did you know that the Caribbean gets some of the strongest tropical storms of any part of the world?

Part 2. Hurricane Damage.

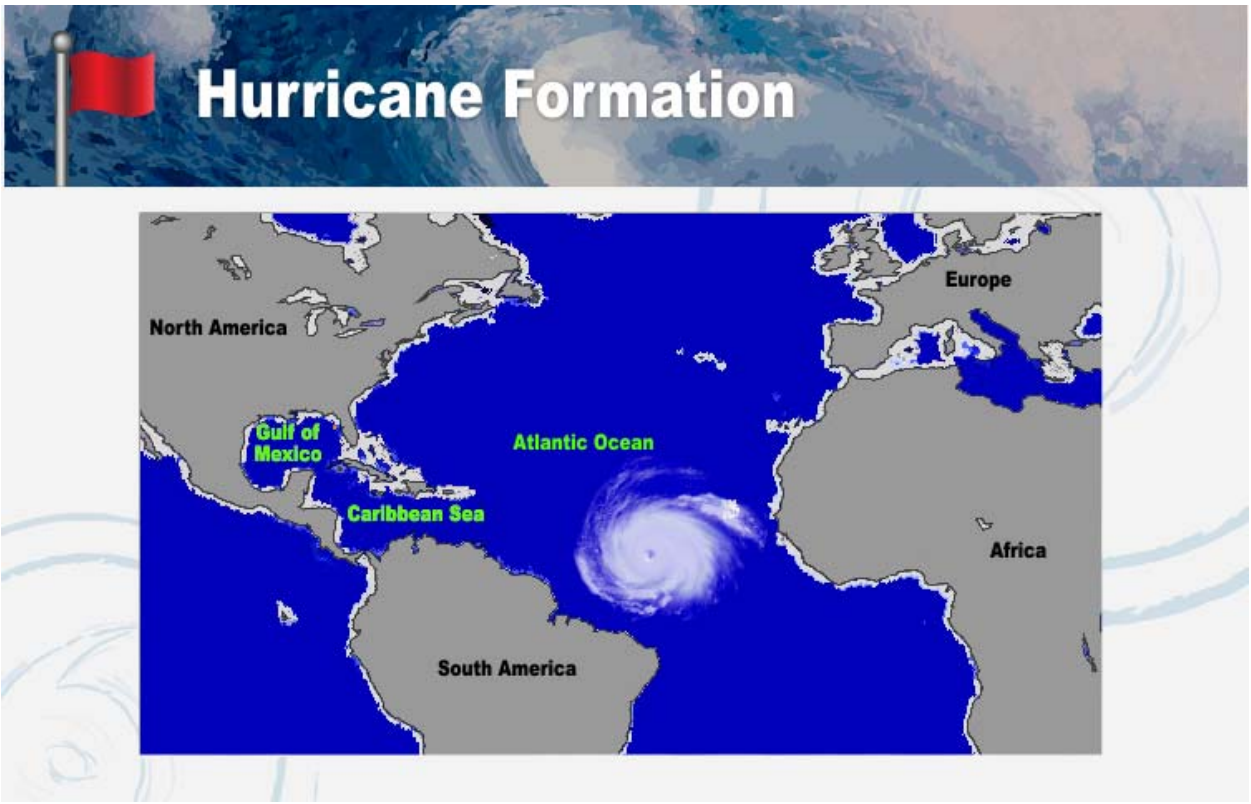
Narrator: Hurricanes are very destructive. Their wind speeds can reach over 185 miles per hour, and they can dump more than a foot of rain in just a day or two.

Plus, hurricanes can cause serious wind damage and major flooding. The flooding seen during and after hurricanes is most often caused by the "storm surge," which is the wall of ocean water that the storm pushes toward the shore until it crashes on the land.

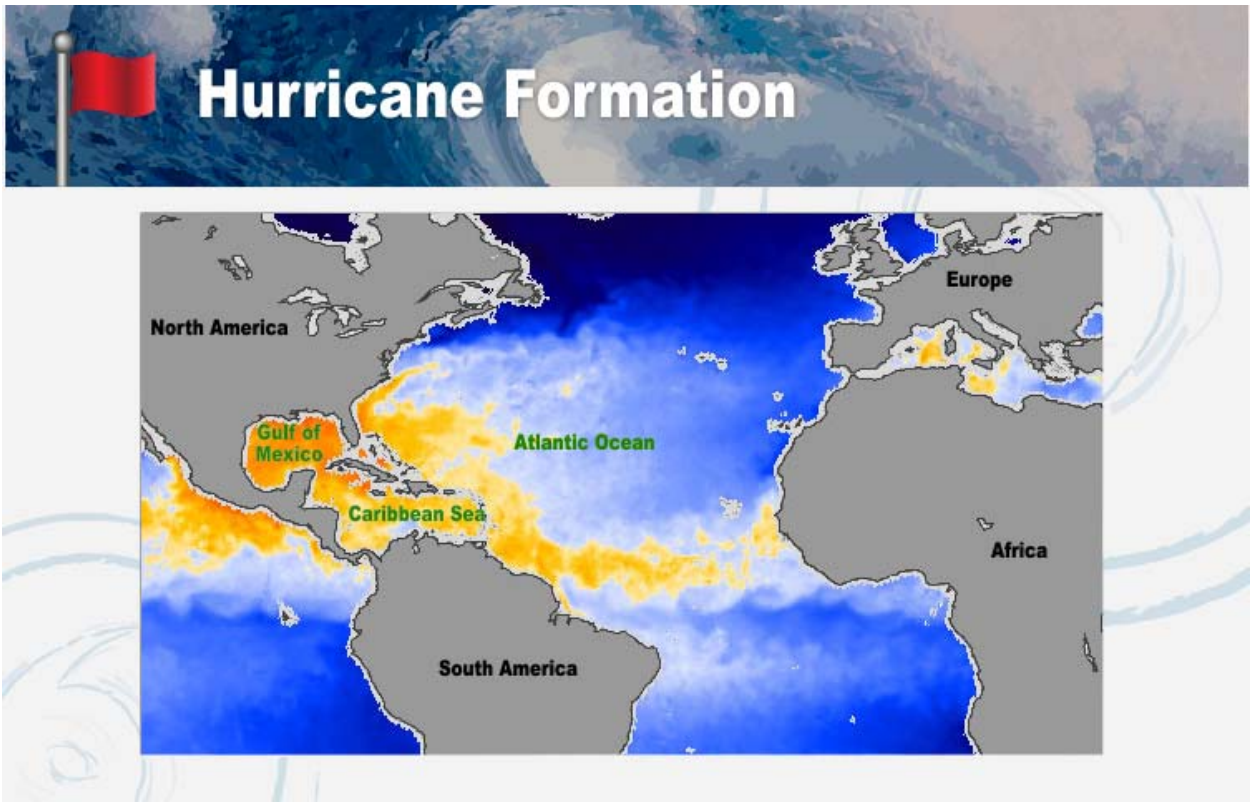
Hurricanes also kill trees, damage wildlife habitats, and reduce the amount of food available for many types of animals.

Part 3. Hurricane Formation.

Narrator: So where do hurricanes come from? In the Atlantic, hurricanes begin as thunderstorms off the west coast of Africa. From there, they travel west—across the ocean towards the Caribbean Sea, the Gulf of Mexico, and sometimes the east coast of the United States.



Narrator: But not all thunderstorms turn into hurricanes. For that to happen, a thunderstorm needs a plentiful supply of warm, moist air. That's why hurricanes form over warm, tropical ocean waters during the hot summer months.



Narrator: Take a look at the orange and red colors in this map. They show where the ocean is warmest. Do you see the path of warm water running straight from the west coast of Africa to the Gulf of Mexico? That's called Hurricane Alley, and storms follow that route as they move from Africa to the Americas.

Part 4. The Climate Connection.

Narrator: As a storm moves across warm ocean water, it gets bigger and stronger because the warm water and warm, moist air provide it with energy.

With climate change ocean temperatures are getting warmer, so tropical storms will become even stronger, with higher wind speeds and heavier rain.

When a thunderstorm gets large enough, the clouds of warm, moist air begin to swirl around the center of the storm, just like they're doing in this picture. Have you ever heard of the eye of a hurricane? That's the calm area in the center that the clouds circle around.

When a hurricane reaches land, it can be very powerful at first, but as it moves over land it gets weaker quickly because the warm ocean is no longer giving it strength.

Part 5. Test Your Knowledge!

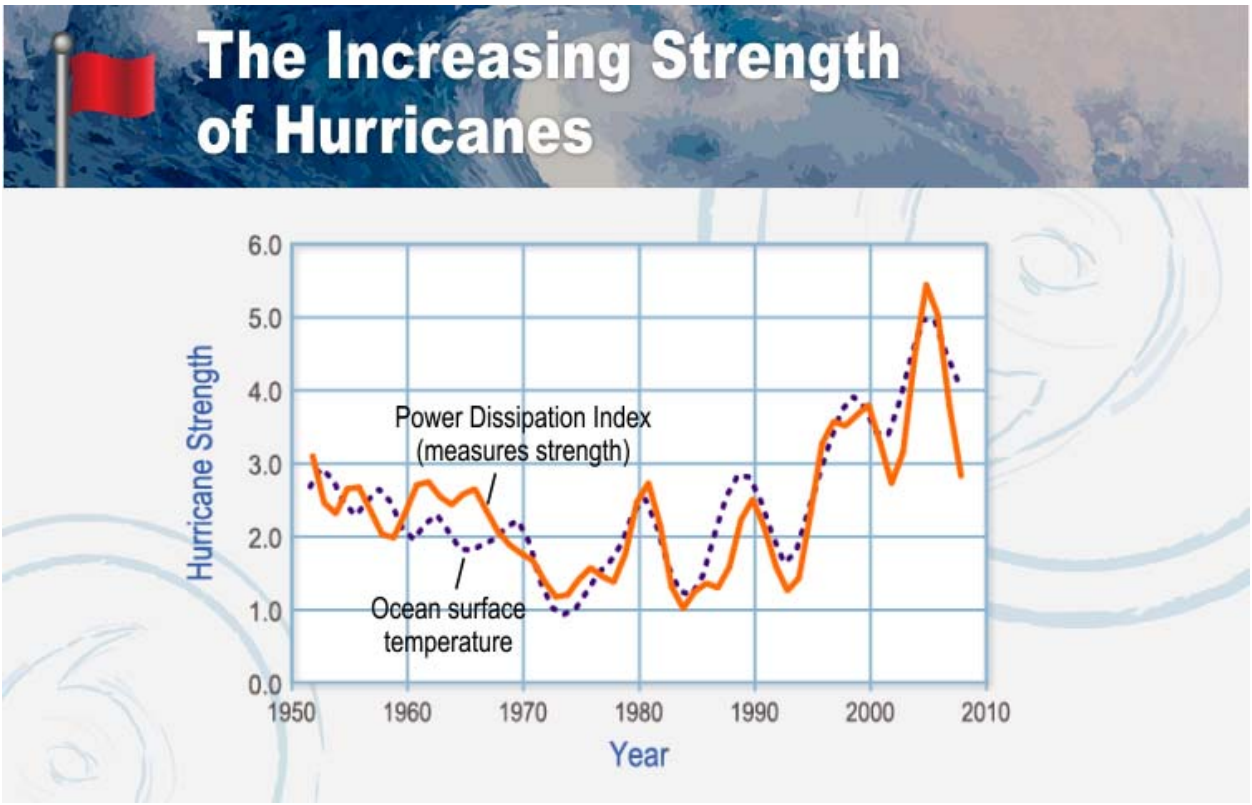
Narrator: Let's test what you've learned about climate change and hurricanes. Hurricanes need lots of warm, moist air to grow powerful. The average surface temperature of the world's oceans is predicted to increase. How do you think this change will affect the strength of hurricanes?

The text on the screen says: "Hurricanes need lots of warm, moist air to grow powerful. The average temperature of the world's oceans is getting warmer. How do you think this change will affect the strength of hurricanes?" You have three choices:

A. There will be no change.
B. Hurricane intensity will increase.
C. Hurricane intensity will decrease.

Answer: The correct answer is B. Hurricanes need access to lots of warm, moist air to gather strength. An increase in water temperature will make it much easier for hurricanes to grow very strong and dangerous.

Part 6. The Increasing Strength of Hurricanes.

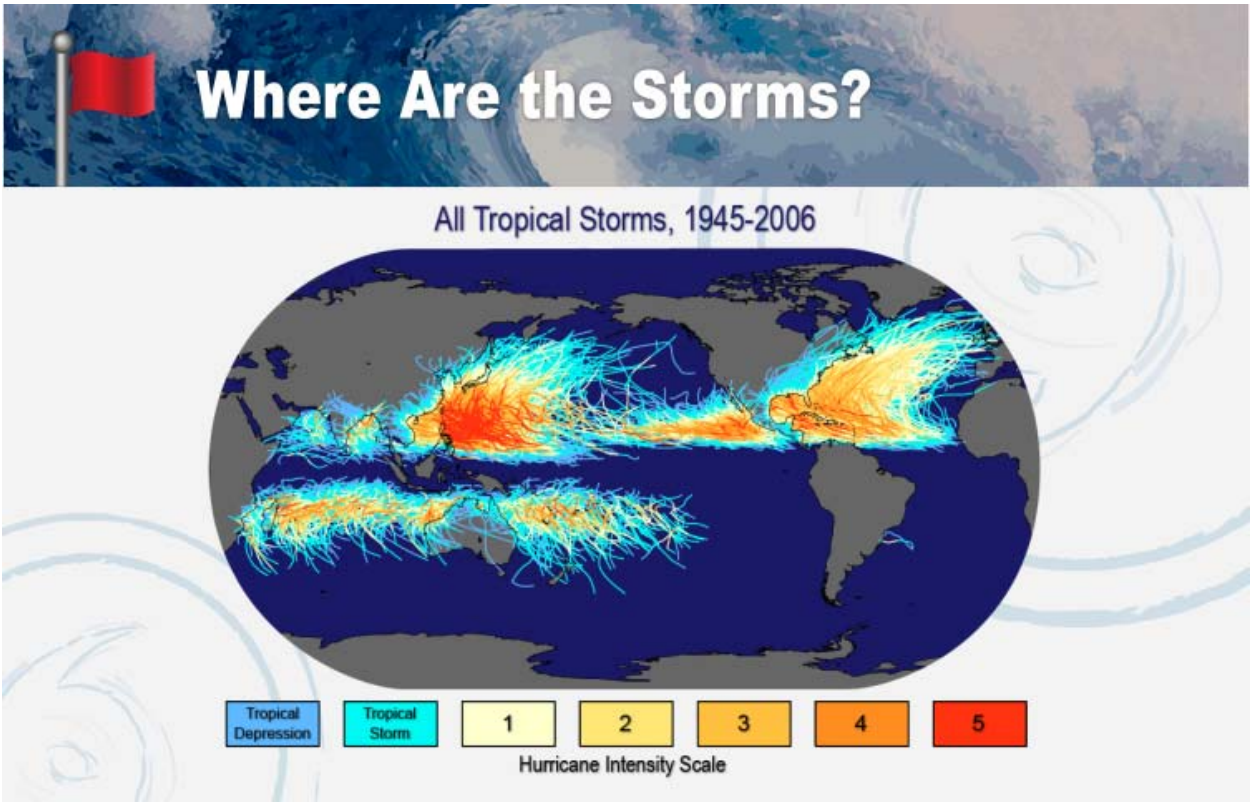


Narrator: This graph shows the relationship between water temperature and hurricane strength in the North Atlantic Ocean. The dotted purple line shows the average temperature of the ocean surface. The orange line shows total hurricane power each year, which is based on the number of hurricanes and their wind speed.

A couple of things stand out in this graph. First, do you see that when the average temperature of the ocean surface gets warmer, hurricanes become stronger?

Now take a look at the general trend. Ocean surface temperature and hurricane power both go up and down from one year to the next, but do you see how, overall, both have been rising over the last 30 years or so?

Part 7. Where Are the Storms?



Narrator: Tropical storms occur in many parts of the world, in addition to the Caribbean. As ocean temperatures continue to rise, tropical cyclones, typhoons, and hurricanes will become more powerful.

This map shows the path of every recorded tropical storm from 1945 through 2006. The colors represent the strength of each storm. "Category 5" storms are the strongest and can have wind speeds of 155 miles per hour! Sustained winds at this speed will snap or uproot nearly every tree, blow out most windows, collapse many buildings, and destroy all mobile homes.

Most tropical cyclones are located in specific areas, like off the coast of China and Japan; around Australia, India, and the Philippines; and in the North Atlantic. Many of these areas have highly populated coastlines… and will have to prepare for more powerful storms in the future!

Part 8. Preparing for Stronger Tropical Storms.

Narrator: There's a lot that people can do now to prepare for stronger tropical storms in the future. For example, coastal communities can make sure that their citizens are prepared for hurricanes, know how to evacuate an area, and have safe places to go if they cannot leave.

People can also construct new buildings that can withstand hurricanes, and make their existing homes and businesses safer, such as by installing wind-resistant roofing and putting up wood or metal shutters. They can also limit development in hurricane zones.

It's also very important to protect our coastal environment, which is the first line of defense in a tropical storm. Natural features like sand dunes, marshes, and wetlands act like speedbumps by absorbing some of a storm's energy and reducing the flooding to populated areas further inland.

Part 9. Test Your Knowledge!

Narrator: Ready to test your knowledge again? Here's a list of actions people could take in the future. Which of these actions do you think will help us prepare for stronger hurricanes? And which ones might put us in greater danger?

The text on the screen asks: "Which of the actions below might help us prepare for stronger hurricanes and which actions might put us in greater danger?"

Action #1: Build houses closer to the beach. Does this make us safer or put us in danger?

Answer: It puts us in more danger. Hurricanes cause storm surges that can damage beachfront houses.

Action #2: Protect coral reefs and barrier islands. Does this make us safer or put us in danger?

Answer: It makes us safer. By forcing water to slow down before it reaches the mainland, coral reefs and barrier islands reduce the damage done by hurricanes.

Action #3: Set up evacuation plans and emergency shelters. Does this make us safer or put us in danger?

Answer: It makes us safer. Sometimes the only way to guarantee safety is to have people leave the area altogether or gather in a safe place.

Action #4: Pave over salt marshes to have easier access to the beach. Does this make us safer or put us in danger?

Answer: It puts us in more danger. Salt marshes cause waves to lose power before hitting land because water has to slow down as it travels through a marsh.

Part 10. What Have You Learned?

Narrator: Phew! The storm is over—and so is your trip to the Caribbean and the Gulf of Mexico. What have you learned?

Onscreen text: Tropical storms can harm people, property, and the environment.

Narrator: Hurricanes and cyclones are tropical storms that can have devastating effects on people, property, and the environment.

Onscreen text: Hurricanes and other tropical storms need warm, moist air to grow powerful.

Narrator: Hurricanes and other tropical storms form over the ocean, and they need warm, moist air to grow powerful.

Onscreen text: Climate change will cause tropical storms to become even stronger.

Narrator: Tropical storms happen naturally, but as the world's oceans get warmer, tropical storms will become stronger.

Onscreen text: Preparing now for stronger tropical storms can help reduce their damage.

Narrator: People can take many steps to prepare for stronger tropical storms in the future, such as setting up evacuation routes and shelters, building stronger houses, and protecting barrier islands and wetlands.

Part 11. Congratulations!

Narrator: Congratulations! You've earned a passport stamp by learning about how climate change affects tropical storms.

Onscreen code: 363940