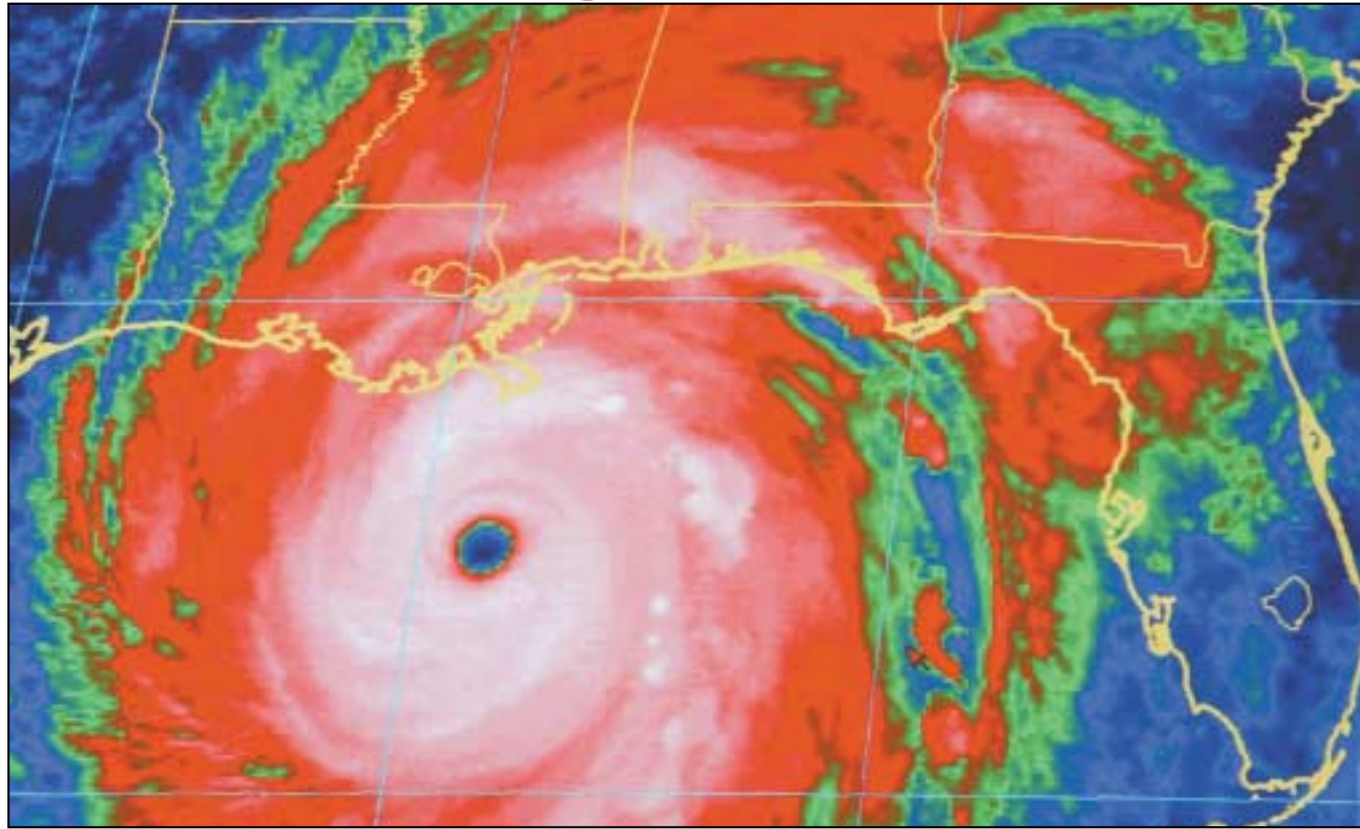


Predicting hurricanes



A National Oceanic and Atmospheric Administration infrared satellite image shows the outer bands of Hurricane Katrina, well ashore on the northern Gulf coast and the centre of the storm about 165 miles, south-southeast of New Orleans at 8:15 p.m. before the hurricane struck.

Hurricanes are the most powerful of all storms and cause many deaths every year. Many of these deaths can be avoided if plenty of warning is given. Hurricanes cannot be stopped but they can be tracked as they move across the ocean.

Information about the weather can be collected in many ways for example using

satellites and aircraft. Weather satellites in space gather information day and night about temperature and cloud patterns. This information is recorded and sent back to earth. If any tropical storms are detected they can then be carefully watched.



Weather aircraft can be sent up into storms to gather information. Some of these aircraft have instruments that can measure temperature, pressure and wind speed beneath the wings. Other aircraft carry instruments in the 'nose' which makes the nose very long. This type of plane can measure wind strength, speed and direction.

There are weather scientists, called meteorologists, on board and they study

the findings and try to predict what will happen to the storm.

If there is a possibility of a hurricane striking within 24 to 36 hours, a warning called a 'watch' is sent out.

Modern technology helps to predict how hurricanes will behave and warnings can be made early on. As a result many more lives are saved nowadays than long ago.



Websites

- www.fema.gov/kids/hurr.htm
Lots of information about hurricanes that is easy to read.
- www.weatherwizkids.com/hurricane1.htm
Lots of photos and animation including pictures of how hurricanes occur and the destruction they cause.
- www.miamisci.org/hurricane
Lots of animated pictures and information. Includes real life story of family who survived a hurricane.

eureka

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Hurricane



Fire and rescue personnel launch a boat amid floodwaters from Hurricane Katrina, as they head out to rescue a family.

Before you came back to school a tragedy occurred in America. Hurricane Katrina hit the Gulf Coast of the US (see map above). It destroyed an area around the size of the UK with winds of up to 160kph. It was the 3rd most destructive hurricane in American history and so far has resulted in the deaths of hundreds of people and thousands more have been made homeless. The city of New Orleans, which is largely surrounded by water, has been devastated by the hurricane. Almost 80% of the city is below sea level and it is protected by 563km of levees. These are special walls that were

built to prevent water flooding into the city. However when the levees gave way in three places, the city became flooded rather like a tap filling up a bowl. After a few days the water became very dirty and dangerous for people and everybody was evacuated from the city so the water could be pumped out.

In this issue of Eureka we will explain what causes hurricanes and what causes some of the damage that usually follows.

The word hurricane has many origins. One source could be from a Native American word 'hurucane' meaning 'evil spirit of the

wind'. A hurricane is a huge swirling storm of violent wind and rain that can last for several hours. Hurricanes form over the oceans in the tropics where the water is warm (over 26°C, so they won't form near Ireland). They grow and become stronger as they move and they also speed up. Their winds circle around a calm area called the eye and get faster and stronger as time goes on. Huge thunderclouds build up. The whole system can measure up to 800 km across (that is more than the distance from the north to the south of Ireland).

Much of the damage caused by a hurricane

is due to water. As well as heavy rain a hurricane produces huge waves in the ocean called a storm surge. These waves can be up to 15m high. As the hurricane comes near land, the storm surge builds up and can wash away dunes, walls or other barriers. When the hurricane moves over land fierce winds and heavy rain pound the area for several hours. However as it continues to move over land, a hurricane rapidly loses its power.

Welcome back to Eureka!

A close up view of a hurricane

Hurricanes start off as small storms over warm seas in the tropics. The winds may not be very strong at this stage. They swirl around a calm area in the centre called the eye. Have you ever watched water going down a plughole? It spins around because the Earth is spinning.

A hurricane is a bit like this except warm moist air is spinning upwards. As the storm moves over the ocean it gets energy from the warm air and speeds up and gets stronger. A hurricane picks up billions of tonnes of water vapour from the sea and this forms huge clouds.



The Saffir-Simpson hurricane scale

Last year you read in Eureka how earthquakes are measured by the Richter scale. Hurricanes are measured on

the Saffir-Simpson hurricane scale. The stronger a hurricane is, the more dangerous and damaging it can be.



Saffir-Simpson Hurricane Category: 1
Wind speeds (Km per hour): 119-153
Signs: Broken trees and branches, signs broken or bent, boats torn away from their moorings.



Saffir-Simpson Hurricane Category: 2
Wind speeds (Km per hour): 154-177
Signs: Trees uprooted and knocked down. Some damage to doors, windows and roofs.



Saffir-Simpson Hurricane Category: 3
Wind speeds (Km per hour): 178-209
Signs: Damage to trees, doors, windows and roofs. Flooding in houses near coast. Smaller houses near coast destroyed. Power failure likely.



Saffir-Simpson Hurricane Category: 4
Wind speeds (Km per hour): 210-249
Signs: All signs knocked down. Severe damage to houses. Beaches destroyed. Flooding all around. Dangerous debris flying around in air.



Saffir-Simpson Hurricane Category: 5
Wind speeds (Km per hour): 250+
Signs: Many buildings completely destroyed. Houses turned over or blown away. Flooding widespread near coast.



Activity

Design & make a wind gauge

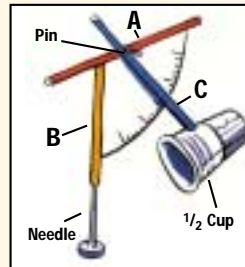
Scientists use an instrument called an ANEMOMETER to measure the strength of the wind. Try to make your own instrument to measure how fast the wind is blowing. It could look something like this.

MATERIALS

- Three plastic drinking straws or art straws.
- Polystyrene or plastic cup.
- Knitting needle or other stiff rod that the straw will fit over.
- Stiff card.
- Pins (marla or cork to cover tip).
- Sellotape and scissors.
- Stapler.

INSTRUCTIONS

1. Cut the card into a wedge shape like the one in the picture. Mark numbered lines on the card.
2. Staple or sellotape it to straw A.
3. Push needle/rod into straw B. Make sure that the straw can turn around easily on the rod.
4. Sellotape the card to straw B as shown in the picture.
5. Cut the cup in half and staple it to straw C.
6. Pin straw C to straw A so that it hangs free.
7. Stick the needle/rod in the ground and watch the wind moving the cup. What number does the straw reach?



SAFETY:
 Make sure to cover end of pin

Using your wind gauge keep a record of the wind for a week.

Naming Hurricanes

For hundreds of years hurricanes were given saints' names depending on which saint's feast day the hurricane happened. For example Hurricane San Felipe hit Puerto Rico on the 13th of September 1876. In the early 19th century an Australian meteorologist began giving names to tropical storms. It is said that he named his storms after politicians he didn't like! In 1979 the US started to use both female and male names for storms.

Six lists of names that contain one name for each letter of the alphabet are used. Each list is used again six years after it was last used. The only time a name is replaced on the list is if it caused tremendous damage. Do you think that Katrina will be replaced on the list?

Here is the six-year list of Hurricane Names for Atlantic storms (2002-2007). Is your name here?

2002	2003	2004	2005	2006	2007
Arthur	Anna	Alex	Arlene	Alberto	Andrea
Bertha	Bill	Bonnie	Bret	Beryl	Barry
Cristobal	Claudette	Charley	Cindy	Chris	Chantal
Dolly	Danny	Danielle	Dennis	Debby	Dean
Edouard	Erika	Earl	Emily	Ernesto	Erin
Fay	Fabian	Frances	Franklin	Florence	Felix
Gustav	Grace	Gaston	Gert	Gordon	Gabrielle
Hanna	Henri	Hermine	Harvey	Helene	Humberto
Isidore	Isabel	Ivan	Irene	Isaac	Ingrid
Josephine	Juan	Jeanne	Jose	Joyce	Jerry
Kyle	Kate	Karl	Katrina	Kirk	Karen
Lili	Larry	Lisa	Lee	Leslie	Lorenzo
Marco	Mindy	Matthew	Maria	Michael	Melissa
Nana	Nicholas	Nicole	Nate	Nadine	Noel
Omar	Odette	Otto	Ophelia	Oscar	Olga
Paloma	Peter	Paula	Phillippe	Patty	Pablo
Rene	Rose	Richard	Rita	Rafael	Rebekah
Sally	Sam	Shary	Stan	Sandy	Sebastien
Teddy	Teresa	Tomas	Tammy	Tony	Tanya
Vicky	Victor	Virginie	Vince	Valerie	Van
Wilfred	Wanda	Walter	Wilma	William	Wendy



Activity

Investigating water damage

How does floodwater affect different materials?

MATERIALS

- Plastic container or saucepan
- Materials to test e.g. wood, piece of newspaper, iron nail, plastic spoon, fabric, stainless steel spoon.
- Clothes pegs
- Water and jug
- Ruler

INSTRUCTIONS

1. Peg materials to the side of the container or saucepan as shown. This will stop them from falling over or floating away when you add water.
2. **Predict:** What do you think will happen to the materials if you leave them in water for a week?
3. Pour water into the tray, so that the bottom 2-3cm of each material is underwater.
4. Observe what happens and talk about changes you notice during the week. For each material, look at the part that is under water and the part that is above water.
5. At the end of the week, remove the materials carefully and let them dry.
6. Which materials have been most damaged by floodwater?



*** Time to reflect:** Use your results to think about the effects that floodwater might have on people's furniture and other belongings.



A home destroyed by Hurricane Katrina, September 9, 2005.



Activity

Why did the city flood?

New Orleans was protected from surrounding water by special walls called LEVEES. Much of the city was built below water level, but the levees were damaged during the hurricane. This investigation will help you to understand what happened next.

MATERIALS

- Plastic tray
- Marla/plasticine
- Water and jug
- Model buildings (e.g. plastic bricks)
- Sellotape

INSTRUCTIONS

1. Sellotape the model buildings in one corner of the tray.
2. Roll a thick sausage shape of marla and curve it to make a wall surrounding all the buildings. Press the marla firmly to make sure that it forms a tight seal where it touches the bottom and sides of the tray. This is your levee.
3. Carefully pour water into the rest of the tray, taking care not to fill above the height of the levee wall. Notice that the buildings are below water level, but they are safe on the other side of the levee.
4. Now investigate what happens to the water and buildings if you make a small break in the marla levee. Discuss what you noticed.

*** To find out:** How are workers in New Orleans trying to mend the levees and remove the water?



Facts about Hurricanes

- The deadliest hurricane that we know about happened in 1780. It left 22,000 dead in the Caribbean.
- Winds up to 320 km/h have been recorded in a hurricane. The fastest speed on our motorways is 120km/h so a hurricane could be nearly 3 times faster than that.
- Hurricanes spin anticlockwise north of the equator and clockwise south of the equator.
- There are usually around 10 hurricanes every year in the Gulf Coast. Some scientists think that number increases every 20 to 30 years.
- The hurricane season usually lasts from May to Sept.
- Hurricanes are also known as typhoons and cyclones. In Australia they are known as 'willy willies'!

word search

W A I I A X H U R R I C A N E E
 V Q J T X N C M F L O O D S C Z
 L L E X P S R G R U Y L P N Y G
 V A E V K O Y O N W F E O D C G
 C B B V T T T H Y B Y O J A L N
 C X N S E A K O V E H W V M O Q
 J M H A U E X A S P N G H A N P
 H B Y Q R E Q P Y O S O W G E M
 X G E Y K I M T W I N D L E G R
 V C R W Y O V Q Q W O O K J W A

1. Hurricane
2. Equator
3. Levee
4. Typhoon
5. Cyclone
6. Eye
7. Storm
8. Wind
9. Flood
10. Damage.



Smashed boats pile up at a marina on the north side of New Orleans, Louisiana.