**TODAY'S FORECAST:** *Afternoon thunderstorms and lightning - see inside for more details.*

# Weather Report

**FREE** | ***Promoting Hazardous Weather Awareness in Florida since 1999*** | February 2008

# Florida and lightning: a combination to take seriously

**BY BRIAN LaMARRE**
*Weather Report Staff Writer*

Lightning has been a fascination of mankind for centuries. This awe-inspiring force begins from mere friction and static electricity, as cloud particles collide with one another. However, lightning remains among the top weather-related killers across the United States, striking the ground about 25-million times each year and causing more injury and death than tornadoes.

The 2008 Florida Hazardous Weather Awareness Week is a perfect time to note that our state, out of all 50 states, is the lightning capital of the country. As lightning occurs frequently across the state, the area stretching across central Florida from Tampa to Titusville receives more lightning strikes than any other location in the state.

Why Florida? The answer lies in our geography. The Florida peninsula is bounded by the Atlantic Ocean to the east and the Gulf of Mexico to the west. As a result, daytime heating often generates a sea breeze boundary that moves inland from each of our coasts during the day. When these boundaries collide, thunderstorms are the result.

STEPHEN J. CODDINGTON | St. PetersburgTimes

**Bolts of lightning fill the sky above palm trees in Inverness.**

## Lightning and thunder: a match made in heaven

Even though lightning seems to focus on Florida, on average, there are roughly 2,000 thunderstorms impacting the planet at any given moment!

A typical lightning bolt is only one inch wide; however, it can reach two to ten miles in distance. When lightning strikes, it will heat the air rapidly to 50,000 degrees Fahrenheit. The air then expands, resulting in the explosive sound we know as thunder.

Can you have thunder without lightning? The simple answer is no. Always remember, it's the lightning strike that generates the all-too-familiar sound of thunder, like a chain reaction. However, many people believe you can see lightning and never hear thunder. Can this be true? To answer this question, we first need to discuss how fast thunder travels in order to reach your ear.

## Speed of sound and light

Thunder travels at the speed of sound, which is roughly one mile every five seconds. The next time you see lightning, count the number of

**See LIGHTNING, 6**

## A MESSAGE FROM GOV. CHARLIE CRIST

**Gov. Crist**

Each day, more than 17-million people call the Sunshine State their home. Florida is a great place to live, work and play. But with this beautiful place comes a personal responsibility for each of us to be prepared for the hazards that affect our state.

In Florida, natural events such as thunderstorms and lightning are common. The key to your family's safety is being aware of hazardous weather conditions and knowing how to prepare for them.

I have recently proclaimed Feb. 2-9, 2008, as an extended Florida *Hazardous Weather Awareness Week*, this year adding one day to note the anniversary of last year's Groundhog Day tornadoes and the efforts of survivors and their communities to be prepared for 2008. I urge you to read the *Weather Report* and share this valuable information with your family. This Florida Hazardous Weather Awareness guide will help us all make better decisions about personal safety year-round.

Sincerely,
*Charlie Crist*
Gov. Charlie Crist

## A MESSAGE FROM THE DIRECTOR OF THE FLORIDA DIVISION OF EMERGENCY MANAGEMENT

The Florida Division of Emergency Management works with local governments to respond to all types of disasters. Many of these disasters are due to natural weather events, such as hurricanes, tornadoes and floods. After the deadly tornadoes and wildfires last year, too many times we heard from survivors who said, "I only had minutes to act, I wished I had been better prepared, planned ahead and followed the local warnings."

For 2008, the state of Florida remains committed to promote a culture of preparedness across our great state. You have a vital role and can do your part by taking the time to learn about the different hazards we face. Now is the perfect time to get a plan, restock emergency supplies, purchase a NOAA Alert Radio, and be ready to act when threatening weather approaches your community.

Please read and share this informative guidebook with your family, friends and co-workers. This is life-saving culture that all Floridians can benefit from.

Sincerely,
*Craig Fugate*
Director Craig Fugate

**www.FloridaDisaster.org/kids**

FNIEC Florida Newspaper In Education Coordinators, Inc.

St. Petersburg Times Newspaper in Education

STATE EMERGENCY FLORIDA SERT RESPONSE TEAM

# Now is the time to prepare for all of Florida's weather!

**BY BOB HOWARD**
*Weather Report Staff Writer*

Floridians live each day in a delicate balance. Population growth and ever changing weather patterns constantly impact our fragile ecosystem. We can be thankful that our state has been spared from hurricanes the past two years; however, we also have been spared the abundant rainfall Florida receives from tropical systems. As a result, drier conditions now exist throughout the state.

Last spring, wildfires spread through the pine forests and wetlands of Florida, causing one of the worst outbreaks of wildfires in Florida since 1998. One of the largest fires ever recorded in the continental United States moved into Florida from Georgia (you can read more about that on Page 18). Because of the lessons we have learned over the years, our Florida Division of Forestry, state and local firefighters and other disaster responders saved more homes and lives in the face of these dangerous fires.

History has taught us that the La Niña weather pattern currently in place produces little rain during the winter and spring months, so there is even more need to be prepared for the possibility of fires. Making sure that your home is FIREWISE is important for protecting your family. FIREWISE is a national program that promotes responsibility for planning a safe community that can protect itself against a wildfire threat. Your family can be FIREWISE by keeping trees, vines and grasses from becoming overgrown, making sure trees and landscaping are free of dead branches and leaves, and making sure that signs and house numbers are easily visible for firefighters to see. These are just a few examples of being FIREWISE. You can learn more by going to www.firewise.org. Make sure you get your parents' permission first!

In addition to wildfires, many other hazards, including hurricanes and severe weather, can impact Florida. Making sure your home has a working NOAA Alert Radio is a good idea, so your family can be alerted to dangerous weather approaching your community. The radio can be an important part of your family's disaster plan. The past hurricane seasons have taught us how important it is to be prepared before severe weather arrives. While hurricanes usually give us the luxury of advance notice, other events such as tornadoes can occur with little to no warning. NOAA Alert Radios have been proven to help save lives in the event of a sudden onset of severe weather or other local emergencies.

The 2008 *Weather Report* newspaper is a fun, interactive guide that you can use at home or at school with your local newspaper as a resource. This guide offers safety actions for Florida weather events and includes a variety of activities you can practice in class or at home with friends. Since you and your family are not always together, it is important that you know your family's disaster plan. This includes having a complete disaster-supply kit that is ready to use as needed.

As Floridians, it is important that we all do our part by learning about the hazards we may face. Everyone should get a plan that can be used 365 days a year. To get a plan, go to FloridaDisaster.org and with your family and class:

- Discuss the different severe weather events that can occur.
- Find "safe areas" in your home and at school.
- Choose evacuation routes and a pre-determined place to meet.
- Stock up on emergency supplies you may need.
- Take Red Cross first aid, CPR and disaster preparedness classes.
- Make sure your NOAA Alert Radio is always on.
- Check your newspaper's online news site, radio and TV reports during severe weather events.
- Be ready to act when called upon by local officials.

*Bob Howard is the operations officer at the Florida Division of Emergency Management.*


Weather Report

**Florida Hazardous Weather Awareness Guide 2008**

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This publication is a project of the Florida Division of Emergency Management in cooperation with the National Weather Service Florida Offices.

A downloadable teacher guide is available at www.FNIEC.org.

# Florida Hazardous Weather Awareness Week: 8 days in '08 Feb. 2-9

This year, the Florida Division of Emergency Management is designating eight days to focus on the importance of being aware of Florida's weather hazards, beginning Feb. 2, to coincide with the anniversary of the Groundhog Day tornadoes that struck the state in 2007. The topics assigned to each weekday are:

- Monday, Feb. 4
  Lightning
- Tuesday, Feb. 5
  Marine hazards and rip currents
- Wednesday, Feb. 6
  Tornadoes and thunderstorms
  (Statewide tornado drill)
- Thursday, Feb. 7
  Hurricanes and flooding
- Friday, Feb. 8
  Temperature extremes and wildfires

# Practice makes perfect: statewide tornado drill Feb. 6

If a tornado were to strike tomorrow, would you be prepared? Would you know what actions to take? In Florida, tornadoes strike all too often. Planning and practice are keys to tornado safety. Whether at home, school or business, everyone should have a plan in place for severe weather. The tornado drill gives Floridians a chance to test their plans and determine whether or not they are prepared. This is especially true in schools.

A very important part of Florida Hazardous Weather Awareness Week is the statewide tornado drill, Wednesday, Feb. 6. On the morning of the drill, all participants should consider themselves under a Tornado Watch. A watch means you should monitor the weather and be prepared to go a safe place in the event of a warning. At approximately 10:10 a.m., the National Weather Service will issue a practice tornado warning. The warning will be broadcast on NOAA Alert Radio as a weekly test message.

By 10:30 a.m., an "all-clear" message will be issued. Public and commercial broadcasters are encouraged to participate by broadcasting these messages immediately. For the Florida Panhandle counties within the Central time zone, all drill activities will be repeated one hour earlier (9:10 a.m. Central Standard Time).

In real life, you must listen for the watch and warning messages and determine the threat to your area. Then you should decide which protective actions to take. Important: When in doubt, take immediate protective action!

Plans may vary depending on the number of adults present, how vulnerable your location is, communications and a host of other factors. All Floridians should use the tornado drill to develop and practice their plans. Being prepared saves lives!

If actual severe weather threatens Florida on Feb. 6, the drill will be postponed until Friday, Feb. 8.

## For more information, visit these Web sites:

Florida Division of Emergency Management
**www.FloridaDisaster.org**

National Weather Service
**www.weather.gov**

American Red Cross
**www.redcross.org**

Florida Department of Education
**www.fldoe.org**

Just Read, Florida!
**www.justreadflorida.com**

Florida Newspaper In Education Coordinators
**www.fniec.org**

National Hurricane Center
**www.nhc.noaa.gov**

JetStream Online School for Weather
**www.srh.noaa.gov/jetstream/index.htm**

Storm Prediction Center
**www.spc.noaa.gov**

Hurricane Hunter Web site for teachers and students
**www.aoc.noaa.gov/Teachers_and_students.html**

National Wildland/Urban Interface Fire Program
**www.firewise.org**

Federal Alliance for Safe Homes
**www.flash.org**

# Statewide Tornado Drill timeline

School districts, private schools, preschools and daycare centers are urged to participate in the drill.

***Weeks before the drill***

**Prepare**

- Inform staff, students, parents.
- Review and refine a tornado plan.

***Feb. 6: The day of the drill***

**After 8:00 a.m.**
**Consider a tornado watch to be in effect**

- Announce watch to staff, students.
- Designate authority (coordinator).
- Evacuate tornado vulnerable areas.

**10:10 a.m.**
**Tornado warning**

- Receive message.
- Coordinator determines threat.

**10:20 a.m.**

- Upon determination of immediate threat, give "take shelter" or "duck and cover" command (depending on space available at location).

**10:30 a.m.**
**Termination of Watch and Warning**

- Give instructions to return to normal activities. (You will not receive notification. Terminate the drill as you see fit.)

***After the Drill***

**Wrap up**

- Following the drill, assess and revise plan as needed.

The tornado warning will be broadcast on NOAA Alert Radio and will be encoded as a weekly test for this drill.

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# TORNADOES

# Know the answers to stay safe in a tornado

**BY JON RIZZO**
*Weather Report Staff Writer*

One of nature's most powerful forces is a tornado. Check out this Q&A to be smart when tornadoes twist your way.

A tornado moves through downtown Miami after touching down on the southwest edge of the city.

Miami Herald

### What is a tornado?

A tornado is a violent column of rotating air that comes down from a thunderstorm to reach the ground. Tornadoes usually last only a few minutes, but they can cause much damage as they travel along the ground. Some tornadoes can travel for many dozens of miles; other tornadoes may appear to skip above the ground for a few moments.

Most tornadoes in Florida occur in June, July and August. However, the strongest tornadoes in Florida usually occur in February, March and April.

### Where do tornadoes come from?

Tornadoes develop within very strong thunderstorms called supercell thunderstorms. Supercell thunderstorms depend on air moving upward in a spiral. This rotating, rising air allows thunderstorms to last for several hours. They also may travel for 50 miles or more. Some supercell thunderstorms may produce several tornadoes.

Some weaker tornadoes have formed from regular thunderstorms. These tornadoes can occur when cold air rushing out from underneath one thunderstorm collides with cold air rushing out from another thunderstorm. As these winds merge from different directions, rotation takes place, and that rotation sometimes produces a tornado.

Tornadoes also can occur near the edge of tropical cyclones. They occur in squalls called rainbands. These tornadoes often occur more than 100 miles from the center of the tropical cyclone. Such tornadoes can strike with little warning.

### How do we know the strength of tornadoes?

National Weather Service meteorologists use the Enhanced Fujita Scale, or EF Scale, to rate the strength of tornadoes. The EF Scale replaced the older Fujita Scale in 2007. Professor Theodore Fujita created the original scale in 1971. It helped meteorologists estimate the strength of the winds inside tornadoes. The scale is used when meteorologists investigate the damage caused by tornadoes.

The new EF Scale includes work both by meteorologists and wind engineers. Meteorologists first look at the tornado damage. Next, they compare the damage for a single type of home, business or other structure to the EF Scale. Finally, they estimate the wind speed that would have been needed to cause the damage. The EF Scale shows some major damage can occur in only 100-miles per hour (mph) winds.

On Feb. 2, 2007, three tornadoes moved through Central Florida during the early morning hours. Two of the tornadoes were rated EF-3. Those tornadoes heavily damaged hundred of homes and killed 21 people.

### What is a waterspout?

A waterspout is a tornado over water. Some waterspouts occur from supercell thunderstorms.

Most waterspouts, however, occur from cloud lines. These are lines of tall, puffy cumulus clouds that occur along the shore or over the Florida Keys. Dr. Joseph Golden studied waterspouts in Florida for more than 35 years. He estimated that more than 300 waterspouts occur each year along the Florida coast. Most of these are weak. A few waterspouts do move ashore. Waterspouts that reach the shore can cause the same damage as a tornado.

### When do tornado warnings occur?

The National Weather Service uses tools and volunteers to watch for severe weather. Skywarn Severe Weather Spotters are volunteers who report tornadoes to the National Weather Service. Doppler radar is used to look for thunderstorms, which may cause a tornado.

The National Weather Service will issue a tornado warning when a tornado is either seen by a severe weather spotter or indicated by Doppler radar. You and your family need to take cover right away whenever a tornado warning is issued for your area. Never try to outrun a tornado in a car. Seek shelter in a small room on the lowest floor of your home. Leave mobile homes and find a stronger building or house. Stay away from windows and doors. Use pillows to cover your head.

NOAA Alert Radio is the best way to stay informed about tornadoes. These are special radios that receive weather information. The NOAA Alert Radio will turn on and alert you of dangerous weather. It is very important to make sure the radio is always plugged in. Make sure it has a strong battery in case the power goes out.

## HOW DOES THE ENHANCED FUJITA SCALE WORK?

The Enhanced Fujita Scale (EF Scale) uses actual damage to estimate a tornado's wind speed. Tornadoes are classified according to the damage they cause, on the Fujita Scale. This scale was named after its creator, Dr. Theodore Fujita. The EF Scale is to be used with caution. Tornado wind speeds are still largely unknown, and the wind speeds on the EF Scale never have been scientifically tested and proven. Winds of different speeds may cause the same damage depending on how well-built a structure is, wind direction, wind duration, battering by flying debris and various other factors.

**EF 0 GALE TORNADO: 65-85 MILES PER HOUR (MPH)**
Some damage to chimneys. Tree branches broken off. Shallow-rooted trees uprooted.

**EF 1 MODERATE TORNADO: 86-110 MPH**
Roof surfaces peeled off. Mobile homes overturned. Moving autos pushed off roads.

**EF 2 SIGNIFICANT TORNADO: 111-135 MPH**
Considerable damage. Roofs torn off frame houses. Large trees snapped or uprooted. Light-object projectiles generated.

**EF 3 SEVERE TORNADO: 136-165 MPH**
Severe damage. Roofs and some walls torn off well-constructed homes. Most trees in forests uprooted. Heavy cars lifted off ground.

**EF 4 DEVASTATING TORNADO: 166-200 MPH**
Well-constructed houses leveled. Structures blown off weak foundations. Cars thrown and large projectiles generated.

**EF 5 INCREDIBLE TORNADO: 200+ MPH**
Strong frame houses lifted off foundations and disintegrated. Automobile-sized projectiles fly through the air in excess of 100 mph. Trees debarked.

## MASTERS OF DISASTER

A disaster safety curriculum related to all weather experiences is available from the Red Cross for use by teachers of grades K-2, 3-5 and 6-8. Teachers, refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit. If your school does not have the kit, check out www.redcross.org/disaster/masters.

*Jon Rizzo is the warning coordination meteorologist at the National Weather Service office, Key West.*

## TORNADO SAFETY ACTIONS

### *Homes*

- When a tornado watch is issued, be prepared to take action.
- When a tornado warning is issued or a tornado is imminent, go to the innermost room on the lowest level away from windows. Interior closets, halls and bathrooms are good places to go.
- If you do not have time to get to the lowest level, get under a bed. If you are at school, get under your desk.
- Consider constructing a tornado-safe room in or adjacent to your home.

### *Open Country*

- Seek a nearby shelter, if time permits.
- If not, lie flat in the nearest depression, ditch or culvert. Cover your head with your arms.

### *Vehicles*

- Abandon your vehicle and seek refuge in a building or, as a last resort, a ditch.
- Do not try to outrun a tornado.

### *Offices, Hotels and Condos*

- When action is required, take shelter in an interior hallway on the lowest floor, or in a closet or small room.
- As a last resort, get under heavy furniture, away from windows.

### *Manufactured and Mobile Homes*

- Have a plan of where to go during a tornado threat–a nearby pre-identified safe structure within walking distance.
- Abandon mobile homes and go to a firmly built shelter.

## Using the news

### Tracking tornadoes

Use the Internet, the *Weather Report* and your local newspaper to research tornadoes. Explore the following questions: What are tornadoes? How do they form? When do they form? How can you be safe when a tornado is approaching? What is a NOAA Alert Radio? What do storm chasers do? How many tornadoes hit your county last year? Compile all of your information for an oral presentation to your class.

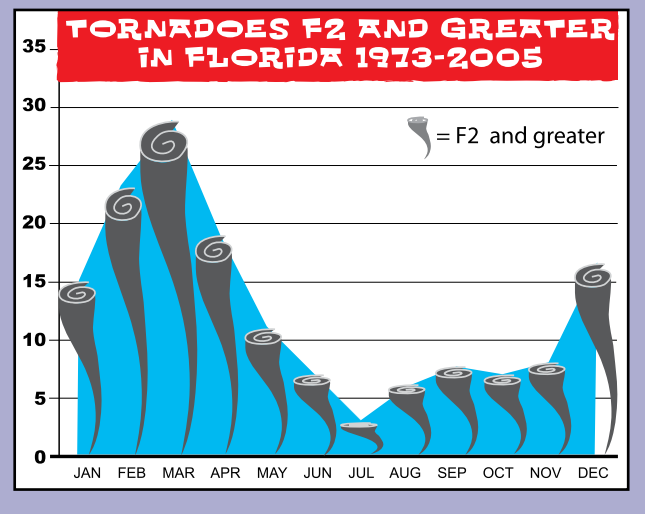
Sunshine State Standards: LA.A.1.3; LA.A.2.3; LA.B.2.3; LA.C.1.3; LA.C.2.3; LA.C.3.3; SC.B.1.3; SC.D.1.3

RED HUBER | Orlando Sentinel

**A truck and car rest in the middle of two homes that were destroyed in Kissimmee after a tornado touched down.**

## WHAT'S THE NO. 1 WIND SAFETY RULE?

The No. 1 wind safety rule is to get as many walls between you and the outside world as possible so the debris in the wind cannot reach you. It is not the wind that kills and injures people; it is the debris in the wind. For example, you can drive on the highway at 70 mph and stick your hand out the window and not be harmed. However, you would suffer serious injury if your hand hit a brick or branch while the car is speeding down the road. If you can keep the debris in the wind from reaching your location, you will survive the wind event–whether it is a tornado, hurricane or thunderstorm downburst wind.



# Lightning: continued from 1

SCOTT KEELER | St. Petersburg Times

**A lightning bolt cracks behind the Don CeSar Beach Resort, as a thunderstorm moves west over the mouth of Tampa Bay.**

seconds it takes for the thunder to reach you. If it takes 10 seconds, then the lightning strike is two miles away. If it takes less than one second, then you were almost struck by lightning and should seek shelter immediately!

Because lightning travels at the speed of light, which is roughly 930,000 miles every five seconds, it is very possible to see lightning off in the distance and never hear the sound of thunder it produces. The sound wave of thunder will weaken as it travels, especially as it comes into contact with obstacles, such as trees, buildings and terrain.

### Beware: electricity at work

Statistically speaking, there is a one in 3,000 chance of being struck by lightning over the course of a lifetime. In other words, if you know 10 people, then someone in your group has a one in 300 chance of being struck. Any lightning strike can be deadly!

As the No. 1 thunderstorm threat in Florida, lightning results in an average of 10 fatalities and 40 injuries each year. Many of the survivors suffer severe, lifelong injuries and related disabilities. In terms of electricity, a single lightning bolt can contain as much as 30,000 amps and can generate 1-million volts or more! However, people struck by lightning carry no electrical charge. Therefore, emergency medical services can be performed safely to help resuscitate an individual struck by lightning.

In line with the statistics, unfortunately, 10 people in Florida died from lightning strikes in 2007. The deaths occurred in the following locations: Miramar, while the victim repaired a roof; Miami, while the victim did landscape work; Lynn Haven, while the victim did yard work; Jacksonville, while the victim was under a tree; Miami, while the victim walked door to door selling books; Deerfield Beach, while the victim scuba dived; Treasure Island, while the victim headed for shelter; Boca Raton, while the victim played soccer; Parkland, while the victim did yard work; and Fort Myers, while the victim fished.

### Staying safe

When lightning is occurring, the most dangerous place to be is an open area, such as a sports field. Nearly half of all lightning deaths occur in open areas. Many people are struck when they go under a tree to keep dry during a storm. Outdoor water activities such as swimming, boating and fishing are very dangerous during lightning. Seek shelter in a substantial building such as a home, and do not be tempted to watch lightning from open windows or doors. A lightning strike to the ground or water can travel horizontally more than 30 feet in all directions. Therefore, when thunderstorms are approaching, avoid outdoor activities as if your life depends on it –because it does!

Covered picnic shelters, tents and convertibles (even with the roof up) offer absolutely no protection from lightning. An automobile with a metal roof does provide safe shelter. However, contrary to popular belief, the rubber tires do not provide this protection for you. If lightning strikes an automobile, the electricity flows around the metal shell of a hardtop vehicle and is redirected to the ground, so the occupants inside are protected.

### The 30-30 Rule

Your National Weather Service promotes the 30-30 Rule in seeking safe shelter. The 30-30 Rule states: When you see lightning, count the time until you hear thunder. If this time is 30 seconds or less, go immediately to a safer place. As the storm passes, wait 30 minutes or more after hearing the last clap of thunder before leaving your shelter.

This rule works best when a thunderstorm is approaching an area. However important this rule may be, it will not protect against a strike from the first lightning you see! Therefore, be alert to changes in sky conditions. If a cloud begins to build high into the sky, a thunderstorm may be forming. It is best to seek shelter before you hear thunder in this case.

Unfortunately, many people go outside too quickly after they feel a storm has passed and are struck by lightning.

Lightning has been known to strike more than 10 miles away from a thunderstorm. Many deaths from lightning occur ahead of the storm because people wait until the last minute before seeking shelter. A recommended course of action is to be aware of the weather forecast and the conditions around you by clicking on your area of interest from the National Weather Service Web site at www.weather.gov.

The National Weather Service, in partnership with the Florida Division of Emergency Management, wishes everyone a safe and healthy season.

### LIGHTNING SAFETY ACTIONS

- Avoid open high ground and isolated large trees.
- Avoid water–swimming pools, lakes and rivers, beaches and boats.
- Seek shelter inside a building or an automobile but not a convertible or golf cart.
- Stay away from doors, windows and metal objects such as pipes and faucets.
- Stay off corded telephones and away from electrical devices.

### LIGHTNING FACTS

- Lightning heats the air up to 50,000 degrees Fahrenheit. This rapid heating of the air produces the shock wave that results in thunder.
- A ground stroke can produce somewhere between 100- million and 1- billion volts of electricity.
- The length of an average cloud-to-ground lightning channel can range from two to 10 miles.
- You can tell how far away lightning is by counting the seconds between seeing the lightning flash and hearing thunder. For every five seconds you count, lightning is one mile away.

### LIGHTNING SAFETY WEEK: JUNE 22-28, 2008

www.lightningsafety.noaa.gov

### THE 30-30 RULE

Use the 30-30 Rule to determine the threat of lightning in your area.

**30 SECONDS:**

Count the seconds between seeing lightning and hearing thunder. If this time is less than 30 seconds, lightning is still a potential threat. Seek shelter immediately.

**30 MINUTES:**

After hearing the last thunder, wait 30 minutes before leaving shelter. Many lightning deaths occur after the storm passes. Stay in a safe area until you are sure the threat has passed.

### MASTERS OF DISASTER

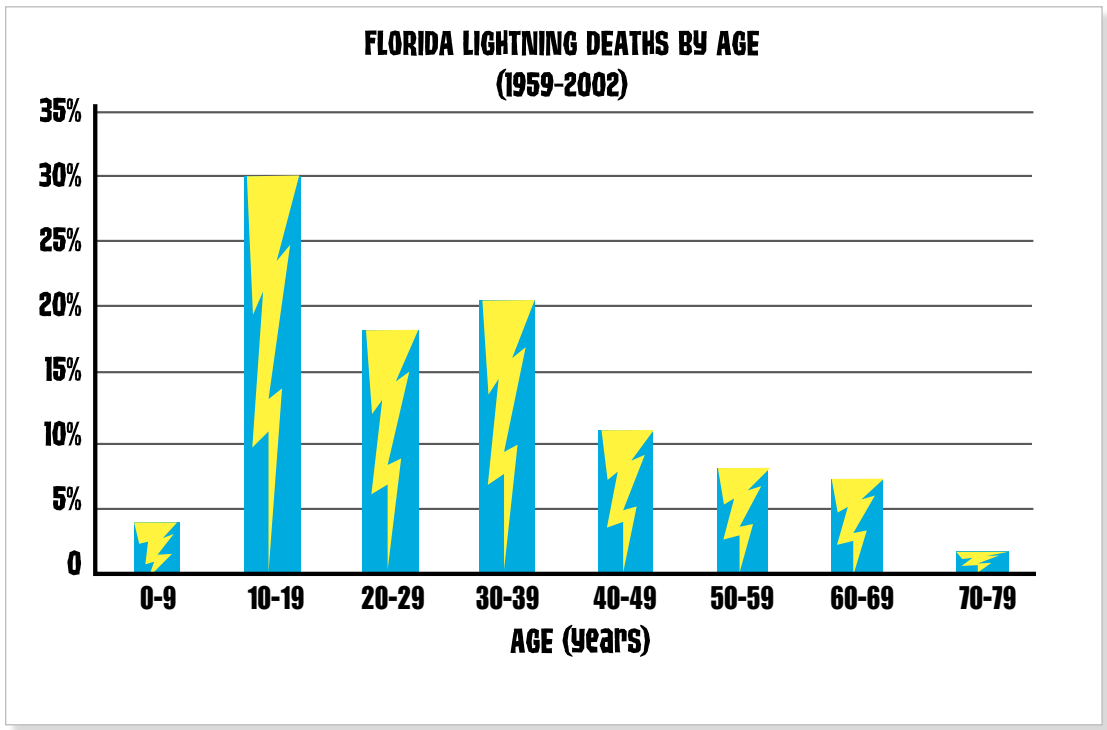
A disaster safety curriculum for use by teachers of grades K-2, 3-5 and 6-8

***Teachers***: Refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit. www.redcross.org/disaster/masters

*Brian LaMarre is meteorologist-in-charge, National Weather Service, Tampa Bay Area.*

DOUGLAS R. CLIFFORD | St. Petersburg Times

**A bolt of lightning flashes in the distance beyond the Rheba Sutton White Chapel at the corner of Georgia Avenue and 12th Street in downtown Palm Harbor.**




## Using the news

### Shocking energy

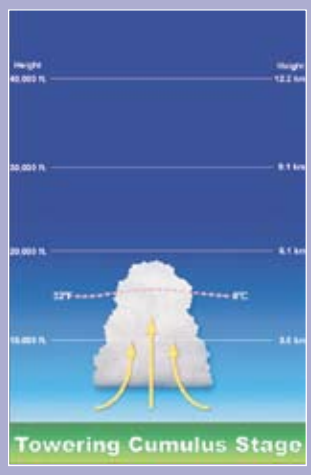
In 1751, Benjamin Franklin experimented with electricity in a thunderstorm, using a kite, a key and a Leyden jar (a device for storing static electricity). Static electricity is a fixed electric charge that is built up on a material. A common example of static electricity is the slight electrical shock that we can get when we touch a doorknob during dry weather. The static electricity is formed when we gather extra electrons, (negatively charged particles, which we rub off carpeting) and they are discharged onto the doorknob. Try this: Rub a wool (not acrylic) cap on your hair (on a dry day). This removes some of the electrons from your hair, giving each hair a slight positive electrical charge. Like charges repulse one another, so each hair resists the other hairs. The result is your hair will stand straight up on your head. Did you know that static electricity and lightning are both forms of energy? There are many different forms of energy. Look in the newspaper for pictures and words that are forms of energy. Cut out the words and pictures you find and create an energy collage to share with your class. Write an essay explaining the importance of energy to your life.

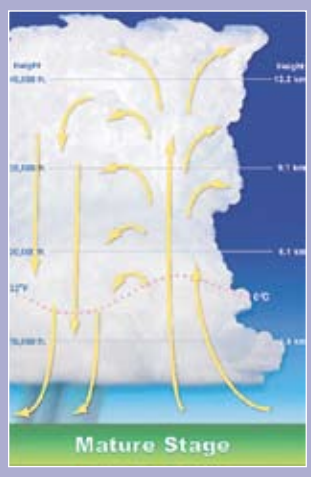
Sunshine State Standards: SC.B.1.3; SC.D.1.3; LA.A.1.3; LA.B.1.3; LA.B.2.3; LA.C.1.3; LA.C.3.3

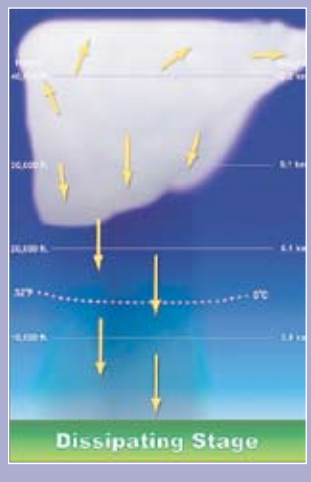
SCOTT KEELER | St. Petersburg Times

**An offshore thunderstorm produces a cloud-to-water lightning bolt.**

# THUNDERSTORMS



JIM STEM | St. Petersburg Times

**Traffic heads north on Interstate 275 as an intense thunderstorm approaches downtown Tampa.**

# Thunderstorm: a huge engine that floats in the sky

**BY AL SANDRIK**
*Weather Report Staff Writer*

Thunderstorms occur frequently across Florida. In fact, the Florida peninsula has the greatest number of thunderstorms in the United States. One of the reasons Florida has so many thunderstorms is that many of the ingredients needed to create thunderstorms can be found here almost every day.

A thunderstorm is basically a huge engine that floats in the sky. Like a car engine, a thunderstorm needs fuel, a place to convert the fuel into power and an exhaust system. When everything is working correctly, a thunderstorm can have strong winds, hail, lightning, heavy rainfall and even tornadoes.

## The perfect ingredients

So, let's look at the ingredients needed to form a thunderstorm in more detail.

## Fuel

Like the car engine, a thunderstorm needs fuel. That fuel is known as water vapor. Water vapor is invisible water floating in the air, and while we cannot see the water vapor, we can certainly feel it when the air gets very humid and sticky. Since Florida is surrounded by water, not to mention the many inland lakes, rivers, marshes and swamps, there are plenty of sources of water vapor to feed thunderstorms.

## Lift

The next ingredient needed is a way to get the air to rise into the sky, or what meteorologists call lift. Sources of lift can be an approaching frontal system, a storm moving by in the upper atmosphere, or – as on most summer afternoons – the sun heating the ground. Each night, the ground over the inland portions of the state cools off because the sun is not heating it, but when the sun comes up the air near the ground becomes hotter and hotter.

Eventually, the air begins to rise, and as it does it cools. The rising, cooling air cannot hold as much water vapor as the warmer air near the surface, so water droplets begin to form and move around in the air. When water vapor becomes a water droplet,

it releases energy to the storm, much like the pistons in a car's engine provide energy to the car. Energy also is released at the top of the cloud, where water droplets form into ice crystals. We can see when this starts to happen because puffy clouds begin to form, and these clouds are called cumulus clouds.

### Moisture

As the air over the inland areas rises, some air must come in to replace it, and it does so from the Gulf of Mexico and the Atlantic Ocean. The winds move inland from the water, and that brings even more moisture into the growing thunderstorm. Soon there are so many water vapor droplets in the cloud that they collide and join together, growing larger and larger and becoming raindrops.

### Downdraft

Until the raindrops form, there is only rising air, or updrafts, in the cloud, but when the raindrops become heavy enough, gravity begins to pull them down toward the ground. When this happens, the downward-moving air is called a downdraft. A cloud which has both updrafts and downdrafts will soon begin to produce rainfall, lightning and thunder. Once this occurs, it is called a thunderstorm, and the cloud is called a cumulonimbus cloud. If the updrafts and downdrafts in the storm are really strong, the storm may produce large hail, strong winds that can damage trees and houses, and tornadoes.

### Exhaust

There is one thing we have left out so far. Remember, a thunderstorm is like an engine, and an engine has to have an exhaust system to take away the used-up fuel. At the very top of the storm, where the ice crystals are, strong winds blow across the thunderstorm, taking the ice crystals away. You can see when this happens as the top of the cloud becomes very flat, and there are wispy clouds, or cirrus clouds, moving away from the top of the storm, causing it to look like an anvil.

## HOW LONG DO THUNDERSTORMS LAST?

It's not easy to say how long a thunderstorm will last. Thunderstorms come in different forms, which will determine how long they might survive. Sometimes a storm has only one thunderstorm cloud and will last for 20 to 30 minutes. Meteorologists call these types of storms single cell thunderstorms because each cloud is known as a cell.

Sometimes thunderstorms have a family of clouds, or cells, associated with them and the thunderstorm may go on for a very long time, but each thunderstorm cloud, or cell, only lasts 20 to 30 minutes.

So how does the thunderstorm go on for so long? Well, whenever a thunderstorm cell dies, inside the storm another develops, keeping the parent thunderstorm alive. These families of thunderstorms are called multicell thunderstorms. Finally, sometimes a thunderstorm cell can become huge and cover an area as large as some of our biggest counties, such as Marion County or Palm Beach County. When this happens, they are called supercell thunderstorms, and all supercell thunderstorms rotate. Supercell thunderstorms are very dangerous because they often can produce tornadoes. Meteorologists track these types of thunderstorms very closely!

## TRACKING THUNDERSTORMS

Meteorologists use many tools to forecast and keep close watch on thunderstorms. Weather balloons and weather instruments detect the moisture and unstable air needed for thunderstorms to form. Doppler radar is used to see inside thunderstorms. It can see heavy rains, hail and strong winds. Your local National Weather Service office has meteorologists and technicians working every hour of the day and every day of the year. They issue warnings when thunderstorms may become severe. Warnings give people time to move to places of safety.

## THUNDERSTORM SAFETY ACTIONS

- Monitor NOAA Alert Radio. Listen for severe thunderstorm watches and warnings.
- When severe thunderstorms threaten, go to a small interior room on the lowest floor of your home, school or business. Avoid windows.
- Before a severe thunderstorm, move vehicles into garages or carports to help prevent damage, time permitting.

## THUNDERSTORM FACTS

- Severe thunderstorms can produce hail the size of a penny (3/4 inch) or larger.
- Penny-sized hail or larger can cause significant damage to the exterior surface of your vehicle, and break windows and damage roofs of homes and businesses.
- Penny-sized hail or larger can cause significant bodily injuries, such as broken bones and even blindness.
- Severe thunderstorms produce straight wind, called downbursts, of 58 miles per hour (mph) or greater. Downbursts have been measured in excess of 100 mph.
- Downbursts can cause significant damage even to well-constructed homes, topple or snap large trees, blow down road and commercial signs, and remove roofs from structures.
- Downbursts can cause damage similar to that of a strong tornado, and cause loss of life or significant bodily injury from wind-blown debris and toppled structures.

## Tropical recipe

Florida's tropical atmosphere and sea breezes provide the perfect recipe for the making of thunderstorms! Three ingredients are needed – moisture, an unstable atmosphere and lift. Thunderstorms are part of life in Florida. They are nature's way of providing badly needed rainfall. Research the hydrologic cycle on the Internet. Write a well-developed paragraph, based on your research, discussing the importance of thunderstorms to Florida's hydrologic cycle. Create a poster representing the hydrologic cycle and showing the importance of thunderstorms to the hydrologic cycle. Next, use your local newspaper to track thunderstorms throughout the month. Keep a chart of your results.

Sunshine State Standards: SC.D.1.3; SC.G.1.3; SS.B.1.3; LA.A.1.3; LA.B.1.3; LA.C.2.3; LA.B.2.3; LA.A.2.3

MELISSA LYTTLE | St. Petersburg Times

**Thunderstorms in the Tampa Bay area cause flights to be canceled and planes to be delayed at Tampa International Airport.**

## MASTERS OF DISASTER

A disaster safety curriculum related to all weather experiences is available from the Red Cross for use by teachers of grades K-2, 3-5 and 6-8. Teachers, refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit.

If your school does not have the kit, check out www.redcross.org/disaster/masters.

*Al Sandrik is the warning coordination with the National Weather Service office in Jacksonville.*

FRED VICTORIN | St. Petersburg Times (1995)

**Residents examine the wreckage of a boat after Hurricane Opal tore through the Panhandle.**

# In the path of hurricanes

*Florida's special geography makes it prime territory for storm tracking*

**BY ROBERT MOLLEDA**
*Weather Report Staff Writer*

Tropical storms and hurricanes are a part of life in the Sunshine State. Ever since records have been kept, there have been plenty of stories about destructive winds originating in the tropics and sweeping across our state.

Why is Florida in the path of so many hurricanes? It's because of our unique geographical location. Florida lies in the subtropical zone, which extends roughly the length of the peninsula. As a result, storms developing in the tropical waters of the Atlantic Ocean or Caribbean Sea often are steered toward the state by the Bermuda or Subtropical High, a large area of high pressure that sits over the Atlantic during the summer months. We also are surrounded by very warm waters, which breed and support hurricanes: the Atlantic Ocean to the east, the Gulf of Mexico to the west and the Caribbean Sea well to the south.

How often does Florida get hit by tropical storms and hurricanes? Tropical storms threaten the state almost every year, and most years experience a direct strike from a tropical storm. Hurricanes, on the other hand, are not as frequent, but they're still rather common.

On average, hurricanes seriously threaten South Florida once every four years. Northeast Florida gets threatened by hurricanes once every 11 years, on average. This, of course, doesn't mean that hurricanes will affect us only every four years or so. Hurricanes can strike any year and, therefore, we need to be prepared each and every hurricane season.

The lack of hurricane strikes in Florida the last two years is not uncommon. We have gone two years in a row without hurricane strikes. Nevertheless, we need to always be ready in case we're not as lucky this upcoming hurricane season.

## It's not just a lot of wind

Hurricanes are known and feared for their ferocious winds that blow down trees and damage homes. The strongest hurricanes can have winds in excess of 155 miles per hour. Storms of such strength are classified as Category 5 hurricanes on the Saffir-Simpson hurricane scale. Hurricane Andrew, which struck South Florida in 1992, was the last Category 5 hurricane to make landfall in the United States, causing almost $30-billion in damage and killing a total of 40 people.

However, it is not just a hurricane's wind that can cause death and destruction. Flooding from torrential rains can produce a lot of damage. In fact, Florida's record for the most rainfall in a 24-hour period came from a hurricane. Hurricane Easy in 1950 dumped more than three feet of rain in Yankeetown along the northern Gulf Coast in Levy County.

Other recent storms, such as Hurricane Irene in 1999, Hurricanes Frances and Jeanne in 2004 and Hurricane Katrina in 2005, caused extensive flooding of many streets and neighborhoods across Florida. In some cases, streets and towns were flooded for days after the storm. (See story on flooding, Page 14.)

Storm surge is another water-related hazard that potentially can kill. Storm surge, which is the rise in ocean water level that accompanies a hurricane, is highest near the path of the center of the storm. In the strongest hurricanes, this storm surge can be as high as 15 to 20 feet above normal water levels. This amount of water easily can flood coastal communities with pounding waves. The combination of rising water and pounding waves is often deadly. Worldwide, approximately 90 percent of all deaths in hurricanes are drownings in either storm surge or rainfall flooding.

Another risk is tornadoes that often are embedded in the spiral bands of hurricanes. These tornadoes can develop suddenly and strike a community even though the center of the hurricane may be more than 100 miles away. Hurricane Ivan in September 2004 spawned a total of 18 tornadoes in Florida, most of them in the Panhandle.

## Detecting and forecasting hurricanes

The National Hurricane Center in Miami tracks tropical systems from their birth until they make landfall and dissipate, or move out over cold waters. Meteorologists use several data sources to observe and track developing tropical storms and hurricanes. When systems are developing very far from land, satellite imagery is used to locate the center and estimate the strength of the winds.

Other data sources, such as ocean buoys, ships and remote sensing instruments aboard satellites, also are used. When storms begin to threaten land areas, planes are flown into the center of the systems and release instruments known as dropsondes onto the ocean surface below in order to accurately determine the storm's location and strength. These planes are known as hurricane hunter planes, and are flown by United States Air Force Reserve and NOAA (National Oceanic and Atmospheric Administration) personnel. The planes fly at altitudes of 5,000 to 10,000 feet, often encountering a lot of turbulence as they enter the center of the storm. (If you're prone to getting motion sickness, don't ride on a hurricane hunter plane!)

Once meteorologists know a storm's location and strength, the next step is to predict its track and strength out to five days. To do this, meteorologists use very sophisticated aids known as computer models. There are several different computer models, which take in numerous amounts of data and produce their

own forecasts. One of the most important jobs of the hurricane forecaster is to determine which model is the best for a particular forecast. The official forecast is then issued by the National Hurricane Center, and National Weather Service offices all across Florida step in to provide locally specific information on the storm's potential effects in your neighborhood.

### Prepare to prevent panic

Your main protection against hurricanes is to be prepared and have a plan. A hurricane plan doesn't have to be anything extremely complicated, but should at least consist of the following two things.

First, determine whether you live in an evacuation zone. This information can be obtained from your local emergency management office. If you live in an evacuation zone, know when and where you will be going to pass the storm. Have a list of emergency telephone numbers handy.

Second, stock up on non-perishable supplies, batteries for electronic devices such as your NOAA Alert Radio, and have a disaster supply kit ready.

When a storm threatens your community, stay informed by monitoring the latest forecasts and warnings from the National Weather Service, as well as information and advice from your local emergency management officials. The best way to prevent a disaster from a hurricane is not to panic and wait until the last minute to get ready, but to be prepared and have a plan in place before the start of hurricane season. Have a safe hurricane season!

SCOTT KEELER | St. Petersburg Times (2004)

**Shredded plastic tangled in fence wire is a lingering sign of Hurricanes Charley, Frances and Jeanne, which passed through central Florida.**

## Using the news

### Being prepared

Robert Molleda reminds us that the lesson that we should learn from all these differences in hurricanes is that we need to prepare for every storm based on that storm's potential, and not on our memories of what happened in some other storm, even if it was the same strength. You and your family need a family disaster plan, especially if you need to evacuate your home. Create a plan for evacuation purposes. What important items will you take to an evacuation shelter or a relative's house? You need to plan carefully. Choose 15 items to take with you when you evacuate your home. Look for pictures of these items in the newspaper. Cut out the pictures and paste them on a piece of paper. Next to each item, briefly explain why you need to take it with you.

Sunshine State Standards: SS.B.1.3; SS.D.1.3; SC.H.3.3; LA.B.2.3

### WATCH AND WARNING: KNOW THE DIFFERENCE

A hurricane watch issued for your part of the coast indicates the possibility that you could experience hurricane conditions within 36 hours. This watch should trigger your family's disaster plan, and protective measures should be initiated.

A hurricane warning issued for your part of the coast indicates that sustained winds of at least 74 mph are expected within 24 hours. Once this warning has been issued, your family should be in the process of completing protective actions and deciding the safest location to be during the storm.

### HURRICANE TRACKING MAPS:

http://www.weather.gov/os/hurricane/images/atlchartshpmillclr.pdf

http://www.weather.gov/om/hurricane/images/atlnoaachart.pdf

### HURRICANE SAFETY ACTIONS

- Know if you live in an evacuation area.
- Know your home's vulnerability to storm surge, flooding and wind. Have a family plan.
- At the beginning of hurricane season (June), check your supplies, replace batteries and rotate your stock of food and water.
- If a storm threatens, listen to your local authorities and evacuate if ordered.

### SAFFIR-SIMPSON SCALE

**TROPICAL STORM:** Winds 39-73 mph

**CATEGORY 1 HURRICANE:** Winds 74-95 mph
No real damage to buildings. Damage to unanchored mobile homes.

**CATEGORY 2 HURRICANE:** Winds 96-110 mph
Some damage to building roofs, doors and windows. Considerable damage to mobile homes. Some trees blown down.

**CATEGORY 3 HURRICANE:** Winds 111-130 mph
Some structural damage to small homes. Large trees blown down. Mobile homes and poorly built signs destroyed.

**CATEGORY 4 HURRICANE:** Winds 131-155 mph
Wall failures in homes and complete roof structure failure on small homes. Total destruction of mobile homes. Trees, shrubs and signs all blown down.

**CATEGORY 5 HURRICANE:** Winds 156 mph +
Complete roof failure on homes and industrial buildings. Some complete building failures.

CHRIS ZUPPA | St. Petersburg Times (2004)

**A packing plant was destroyed, as well as the machinery inside, as a result of Hurricanes Charley, Frances and Jeanne.**

### MASTERS OF DISASTER

A disaster safety curriculum related to all weather experiences is available from the Red Cross for use by teachers of grades K-2, 3-5 and 6-8. Teachers, refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit. If your school does not have the kit, check out www.redcross.org/disaster/masters/

*Robert Molleda is a warning coordination meteorologist in the Miami Weather Forecast office.*

# Using your noggin - and the news

Stay on your toes when weather events crop up by trying these fun activities, many of which use your newspaper

## Electrifying experiment

Here is a way you can create and observe lightning safely. You will need Styrofoam plate, thumbtack, pencil with a new eraser, aluminum pie pan and a small piece of wool fabric.

1. Push the thumbtack through the center of the aluminum pie pan from the bottom.
2. Push the eraser end of the pencil into the thumbtack to create a handle for the pan.
3. Put the Styrofoam plate upside down on a table. Rub the underside of the plate with the wool for one minute. Rub hard and fast.
4. Pick up the pie pan using the pencil handle, and place it on top of the upside-down plate.
5. Touch the pie pan with your finger. If you don't feel anything when you touch the pan, try rubbing the pan again. Try turning out the lights before touching the pan.

## Building a tornado

### Materials

■ Glass jar with lid ■ Food coloring ■ Dishwashing soap

### Directions:

1. Add enough water to fill 3/4 of the glass jar.
2. Put in some food coloring and a teaspoon of dishwashing detergent.
3. Place the lid on the jar and shake it hard for 20 seconds.
4. Twist the jar hard.

### Results

The liquid should form a funnel that resembles a real tornado. The vortex's body will even lengthen and shorten, just like the real storm.

*Source: ThinkQuest*

## Disaster supply kit:
### Newspaper scavenger hunt

Disasters typically give little warning and can leave confusion and devastation in their wake. That is why it is important to be prepared. By having a disaster supply kit for your home and for use during an evacuation.

Below are some samples of items that should be in a disaster supply kit. Look for pictures or words in the newspaper of the following items for your disaster supply kit. Create a collage, diorama or poster with the items you find.

- Bottled water
- 10 cans of food (different types of food)
- If you have pets, cans of cat or dog food
- High-energy foods, such as peanut butter, crackers and trail mix
- An extra set of clothes, including shoes or boots
- Paper/plastic plates, cups and utensils
- Battery-operated radio
- Batteries
- Flashlight
- Non-electric can opener
- First aid Kit
- Fire extinguisher
- Duct tape
- Aluminum foil
- Paper and pencils
- Toilet paper
- Soap
- Household chlorine bleach
- Plastic trash bags

Now it is your turn to create your own disaster supply kit. Share the list with your family.

## Challenge your classmates

Much damage is done to homes and businesses each year by wild weather. Using the classified ads in your newspaper, compete with classmates to see who can identify the most businesses and services that might be of use to a community that has experienced any of the following disasters: tornadoes, hurricanes or floods. For example, you might select a disc jockey who could entertain the volunteer workers and residents of a tent city set up to house those who lost their homes as a result of a major hurricane. Think outside the box and be creative, and be prepared to explain your selections. Create a poster letting everyone know what services are available.

## About Newspaper In Education programs in Florida

Improving the literacy of Florida's students in all subjects is an important mission of Florida newspapers. That is why the Florida Newspaper In Education Coordinators Inc. (FNIEC) has partnered with the Florida Division of Emergency Management to bring you this special *Weather Report* publication. This award-winning organization of 27 Florida newspapers with Newspaper In Education programs is one of the strongest literacy providers in the state, promoting print and online editions of newspapers and accompanying curriculum materials for use in Florida's classrooms. For more information about Newspaper In Education in Florida, contact FNIEC executive director Karen Tower at ktower@flpress.com or 850-521-1157.

# Word fun

When you study meteorology and weather, you come up against some tough vocabulary words! Most vocabulary words are learned from context clues or good old-fashioned dictionary work. While you read the *Weather Report*, be sure to highlight or circle words you don't know. Try to figure out their meanings as they relate to weather by looking for clues in the sentences around these unknown words. Write down your best guess, and then look up the words in a dictionary. Search for the definition as it relates to weather. As a group activity, make a list of the words you and your classmates have identified and see which ones stumped the class. On this page is a list of words from the *Weather Report* that you may not know. Find these words in the word search. Look up these words in a dictionary, write down the definitions as they relate to weather and add them to your list.

**Next, find these words in the word search puzzle.**

| | | | |
|---|---|---|---|
| Atmosphere | Forecast | Parallel | Surge |
| Current | Hazardous | Projectiles | Torrential |
| Debris | Landslide | Radiation | Tranquil |
| Evaporate | Lightning | Saturate | Updraft |
| Fault | Meteorologist | Stable | Volcano |

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

# Make your own barometer

To measure air pressure, weather forecasters use barometers. When the air pressure is rising, good weather is on the way. When air pressure is falling, the weather will get stormier.

## Materials needed

- Empty coffee can
- Empty half-gallon jug or carton
- Index card
- Pencil and pen
- Plastic straw
- Plastic wrap
- Rubber band
- Tape

## Directions

**1.** Cover the top of the coffee can with plastic wrap.

**2.** Use a rubber band to secure the plastic in place. Make sure the plastic is pulled tight so that the can is airtight.

**3.** Tape the end of the straw to the middle of the plastic wrap so it lies horizontally across one side of the plastic wrap cover.

**4.** Place the empty half-gallon jug (or carton) next to the coffee can. Tape the index card to the jug so that the straw lines up approximately to the middle of the card. Use a pen to mark this point on the card, and label it with the date.

## Watch the pressure

**1.** Let the barometer settle for a few hours before beginning your observations. Place the barometer inside, away from a window, since it is sensitive to temperature as well as pressure.

**2.** Take the barometer outside to start your observations. You'll be tracking changes in the position of the straw, which will be affected by changes to the plastic wrap: High pressure will make the plastic wrap cave in, making the straw rise. Low pressure will make the plastic wrap puff up, so the straw will fall.

**3.** Check the location of the straw three times a day - in the morning, at lunch and at the end of the day. Using a pencil, mark the location of the straw on the index card with the date and time.

**4.** At the end of each day, determine if the average pressure reading for the day was falling, steady or rising.

**5.** Keep track of your figures on a chart.

*Source: Scholastic Inc.*

# Public service announcement

If a tornado were to strike tomorrow, would you be prepared? Would you know what actions to take? Planning and practice are keys to tornado safety. Whether in homes, schools or businesses, everyone should have plans for severe weather. That is why students throughout the state of Florida will participate in a tornado drill on Wednesday, Feb. 6, 2008. The tornado drill gives students a chance to test their plans and determine whether or not they are prepared. Not everyone is aware of this statewide tornado drill. Your job is to create a public service campaign for your school about Florida Hazardous Weather Awareness Week and the tornado drill. Study some of the display ads in your local newspaper (in print or online) and then design a public service ad for this event. With a partner, create a print or online ad, poster, radio ad and television ad to share with your classmates.

# FLOODING

## Keep your head above water

*Knowing how to be safe in floods comes in handy in Florida*

**BY BOB GOREE**
*Weather Report Staff Writer*

We've all seen those photos in the newspaper: After heavy rain, someone in a canoe or kayak paddles down what is usually the middle of a street. It may look like fun, but it is dangerous.

Flooding can happen in Florida and any of the other 49 states. Even relatively dry states such as Nevada and Arizona have serious floods from time to time. In Florida, flooding occurs frequently, but often the floods are minor. Nonetheless, Floridians must be careful because even minor floods can take a life. Once in a while, Florida can experience major floods that can cause many deaths and loss of property. We must be prepared.

### Flood ingredients

What makes a flood happen? Rain, right? Yes, but let's break the subject down a bit. Flooding is caused by:

- the amount and rate of the rainfall (meteorology) and
- what happens to the rain after it hits the ground (hydrology).

Meteorologists try to predict accurately when, where and how much rain will fall. The total amount of rain and how fast it falls (the rainfall rate) affect how much water will run off. The more water that runs down into streams or lower areas, the worse the flooding can be.

The atmosphere above Florida is usually more moist than in most other states. Our state is nearly surrounded by the Atlantic Ocean and the Gulf of Mexico, and the state receives a lot of evaporated water from these seas. During summer, thunderstorms erupt over the state as the sun heats the ground. Our moist air rises and forms thunderstorms and heavy rainfall.

### Hurricanes and flooding

Tropical cyclones often cause our state's worst flooding. Because of Florida's location and the fact that much of the state is a peninsula, Florida can experience more hurricanes than any other state in the country. Most hurricanes move out of the warm waters of the Atlantic Ocean and Gulf of Mexico, bringing very heavy rainfall.

In fact, the Florida record for the most rainfall during a 24-hour period occurred during Hurricane Easy in September of 1950. During that storm, 38.7 inches of rain fell at Yankeetown, along the Gulf Coast in Levy County. This heavy rainfall caused extensive flooding near Yankeetown and south of Ocala.

More recently, Hurricane Irene flooded much of south Florida in 1999, and Hurricanes Frances and Jeanne flooded many areas in 2004. Hurricanes may flood neighborhoods and towns due to poor drainage and may flood streams and rivers as all of the rainwater flows into the stream.

Meteorologists at the National Hurricane Center, the Southeast River Forecast Center and local Florida weather offices all watch hurricanes very closely to try to forecast how much rainfall a hurricane may produce and how much flooding may occur. These meteorologists use satellite pictures, Doppler radar and computer models to try to warn people well in advance of the flooding, so they can save lives and property. (See story on hurricanes, Page 10.)

### Go with the flow – predicting water's movement

When rain hits the ground, it can behave many different ways. The study of the movement of water along and under the ground is called hydrology. Hydrologists look at all the aspects of water's behavior and make predictions, just as meteorologists predict the weather.

Why would one river or small creek flood when another does not, even with the same amount of rainfall? To answer this, hydrologists look at the size and shape of the stream's basin. The basin is the area that captures the rainfall and funnels it into the main stream. From there on, the water depth in the stream is determined by the size and shape of the stream's channel and shores. A flood results when water flows over the stream's banks into normally dry areas.

Imagine a wide riverbank. The river may spill over and flood a large area, but the flood will be fairly shallow. A steeper riverbank may result in some areas experiencing deeper flooding along the shores. Either way, people along rivers and streams need to be ready for such floods.

Another factor that hydrologists look at is the condition of the soil and earth beneath. Is it sandy? If so, the water can soak in rather than flow away into a stream. Is it already wet? If so, there is less room for new water and there will be more runoff. Are there sinkholes and lakes and underground caverns that can hold the new water? If so, there will be less runoff.

Most of Florida is fairly flat and has sandy soil, lakes, swamps and prairies. This means that there can be a lot of rain and expansive areas without major stream flooding. But sometimes significant flooding does happen.

CURTIS KRUEGER | St. Petersburg Times (2006)

**A sign set out in the Shore Acres neighborhood in St. Petersburg during Tropical Storm Alberto.**

### FLOODING–IT'S NOT JUST FOR RIVERS ANYMORE

We also see our share of urban flooding. As our state's population increases, buildings and pavement replace the natural land. This creates more water runoff and can increase flood problems.

Urban flooding – streets and ditches and other drainage systems – occurs because of the shear amount of runoff, which can be especially dangerous and costly in these developed areas where we live and drive.

Most deaths due to flooding in the United States are due to people driving their cars into flooded areas. It may only take 12 to 16 inches of water to cause a car to float.

Once a vehicle begins to float, the situation for the driver and passengers becomes dangerous and often deadly. So, remember the advice: Turn around. Don't drown!

### RIVER FORECASTS ONLINE

At the National Weather Service (NWS), hydrologists team up with meteorologists to produce the best river and flood forecasts and warnings possible. These NWS river forecasts are available on the Web in an enhanced format. The Web pages show maps with river forecast points, color coded for river levels. Specific point forecasts are linked and displayable in graphs. These hydrographs show past, current and forecast river stage levels along with flood potential information.

River flood forecasts are now available on the easy-to-use AHPS Web site at: www.weather.gov/ahps.

If you live along or near a river, you should pay attention to the forecast, especially in times of significant rains. It takes time to prepare for river flooding, so get a head start by being alert to the forecasts.

## RULE OF THUMB

To estimate the total rainfall in inches from a hurricane, divide 100 by the forward speed of the storm in miles per hour (mph): 10 mph forward speed = 10 inches of rain.

Your local weather forecast office will provide a more accurate rainfall forecast as the storm approaches.

## FLOODING SAFETY ACTIONS

- Never play in flooded areas where hidden sharp objects, electrocution and pollution are serious hazards.
- In highly flood-prone areas, keep materials on hand such as sandbags, plywood, plastic sheeting, plastic garbage bags, lumber and shovels.
- Be aware of streams, canals and areas known to flood, so you or your evacuation routes are not cut off.
- Stay away from downed power lines and never drive into moving water.
- Drive carefully when water covers the road. If the road surface is obscured, water may be deeper than it appears.
- Heed water contamination advisories. Do not use food that has come in contact with floodwaters.

## FLOODING FACTS

- As little as 12 inches of moving water can carry most cars off the road.
- Just 6 inches of fast-moving floodwater can sweep a person off his or her feet.
- Most flood-related deaths occur at night and are vehicular.
- Urban and small-stream flash floods often occur in less than one hour.
- Tropical cyclones pose significant risk well inland due to freshwater flooding.

## MASTERS OF DISASTER

A disaster safety curriculum related to all weather experiences is available from the Red Cross for use by teachers of grades K-2, 3-5 and 6-8. Teachers, refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit. If your school does not have the kit, check out www.redcross.org/disaster/masters.

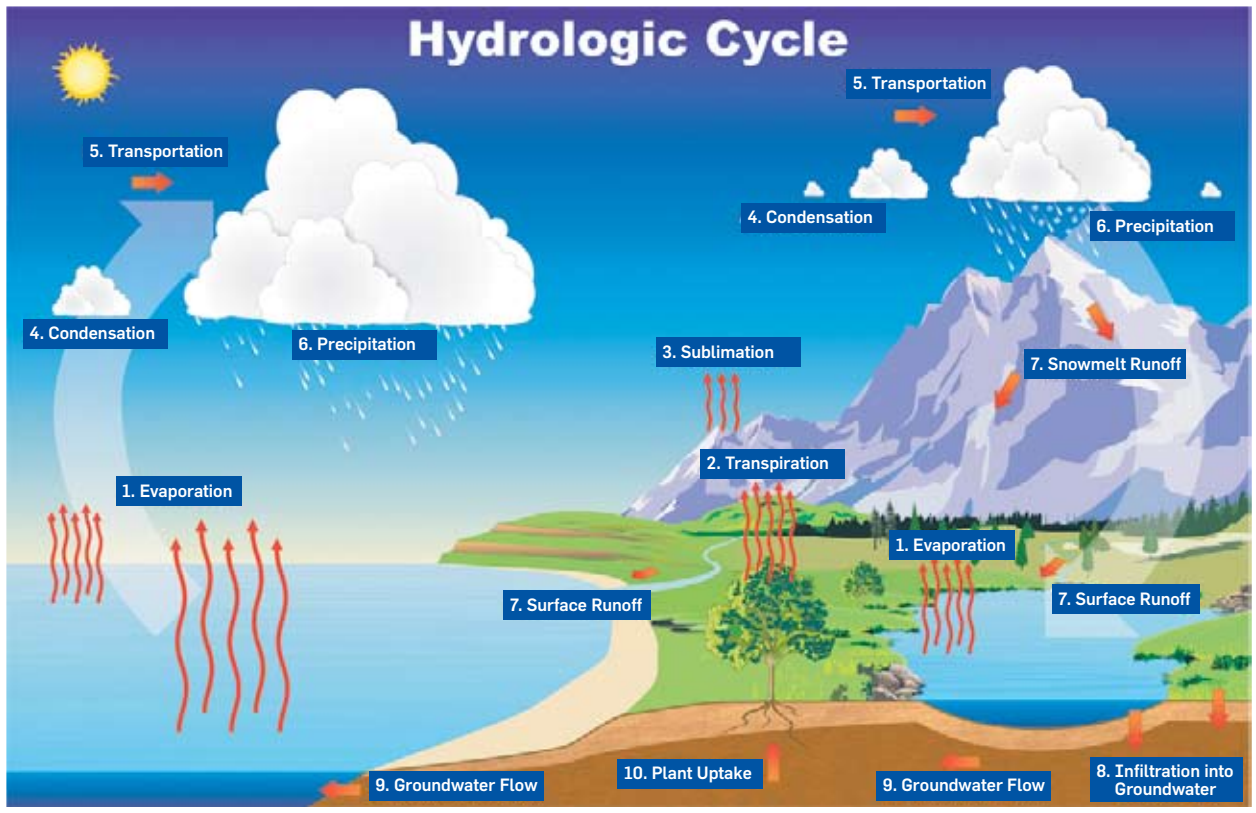
*Bob Goree is a warning coordination meteorologist in the Tallahassee Weather Forecast office.*

## Using the news

### Turn around. Don't drown!

Many people die from freshwater flooding because they try to drive through water that covers roads. Moving water only as deep as a car's hubcaps can be enough to move the car, possibly into a river or a stream. Remember, when you approach water covering a roadway, turn around... don't drown! Did you know that just 6 inches of fast-moving floodwater can knock you off your feet and 2 feet of water can sweep an SUV off a road? Each year, more deaths occur due to flooding than from any other thunderstorm-related hazard. The main reason is people underestimate the force and power of water. Many of the deaths occur in automobiles, as they are swept downstream. Of these drownings, many are preventable, but too many people continue to drive around the barriers that warn you the road is flooded. Floods can happen in most of the places where people live. Look in your local newspaper (don't forget the newspaper's Web site for archived stories) to find information about when and where the risks of flooding were high. Write a fully developed paragraph in response to the following questions. How did the weather create those conditions? How quickly did the water level rise? Did people prepare for the possibility in some way? Was there any property damage or loss of life? Who is responsible for monitoring and predicting these conditions in your area? Write a second paragraph explaining how people can avoid injuries due to flooding.

Sunshine State Standards: SS.B.1.3, SS.D.1.3, SC.H.3.3, LA.B.2.3




1. Evaporation is the change of state of water (a liquid) to water vapor (a gas). On average, about 47 inches (120 cm) is evaporated into the atmosphere from the ocean each year.

2. Transpiration is evaporation of liquid water from plants and trees into the atmosphere. About 90 percent of all water that enters the roots transpires into the atmosphere.

3. Sublimation is the process where ice and snow (a solid) changes into water vapor (a gas) without moving through the liquid phase.

4. Condensation is the process where water vapor (a gas) changes back into a water droplets (a liquid). This is when we begin to see clouds.

5. Transportation is the movement of solid, liquid and gaseous water through the atmosphere. Without this movement, the water evaporated over the ocean would not precipitate over land.

6. Precipitation is water that falls to the earth. Most precipitation falls as rain but includes snow, sleet, drizzle, and hail. Around 313,000 $mi^3$ (515,000 $km^3$) of water falls each year, mainly over the ocean.

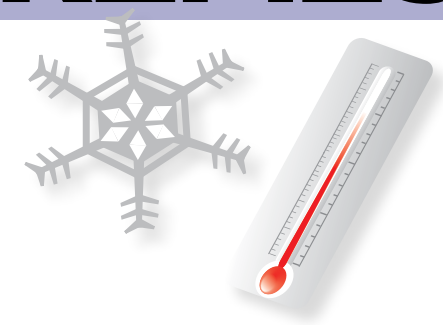
7. Runoff is the variety of ways of which water moves over the earth's surface. This comes from melting snow or rain.

8. Infiltration is the movement of water into the ground from the surface.

9. Groundwater flow is the flow of water underground in aquifers. The water may return to the surface in springs or eventually seep into the oceans.

10. Plant uptake is water taken from the groundwater flow and soil moisture.

# TEMPERATURE EXTREMES



# In Florida, it can be hot, hot, hot, but also chilly.

**BY MELISSA GRIFFIN**
*Weather Report Staff Writer*

### It's not the heat; it's the humidity.

Though Florida is known as the Sunshine State, the southwestern part of the country is really the sunniest place in the continental United States. But if you've ever spent a summer in Florida, you know it also could qualify as the "Hot State." Each summer, numerous tourists come from all over the world to enjoy the warm weather and sunny beaches, but most are unaware of just how hot it can get in Florida. Surrounded by the Atlantic Ocean and the Gulf of Mexico, the state is always influenced by tropical moisture, especially in the summer. The humidity is a measure of how much water vapor is present in the air, and these percentages can be very high during the summer months.

In order for our bodies to keep cool, we sweat to get rid of excess body heat. As the sweat evaporates or runs off our bodies, it pulls the heat from our bodies and cools us. However, when high humidity values are combined with high temperatures, it makes our bodies think it's hotter than it actually is. This is called the heat index. The increased moisture in the air limits our bodies' ability to cool off by not allowing the sweat to evaporate. When the heat index reaches more than 105 degrees Fahrenheit, conditions become dangerous for the general population. A person can experience sunstroke, heat cramps, heat exhaustion and even a possible heatstroke if exposed to these conditions for a period of time.

The National Weather Service will issue heat advisories and warnings when the combination of heat and humidity causes the heat index to reach the extreme caution level.

In addition to the heat, people forget the dangers of ultraviolet (UV) radiation and often get sunburn. Sunburn can occur within 15 minutes of exposure, depending on the level of UV radiation and skin type. Even on cloudy days, the sun's UV radiation can do damage to skin. Over time, with prolonged exposure, this UV radiation can cause cancer and blindness.

### Play it safe: hot temperatures

- Make sure to wear lightweight and light-colored clothing. Lighter colors help reflect heat and sunlight; while the loose, lightweight clothing will help your body maintain its normal temperature.
- Slow down and limit your outdoor activities. Try to avoid doing or scheduling outdoor events during the heat of the day (usually 10 a.m. until 4 p.m.). Remain in air-conditioned places to reduce your exposure to the heat.
- Drink plenty of water or other non-alcoholic beverages. Your body needs water to keep cool. And drink water even if you don't feel thirsty; most people can dehydrate without realizing it.
- Check on the elderly, young children and animals during periods of prolonged heat.
- Apply sunscreen before exposure to the sun. Reapply sunscreen if you are taking part in activities that could wash off the product. Make sure to use a sunscreen with a sun protection factor of at least 15. Also, wear sunglasses and a hat or carry an umbrella to further protect yourself.

### Interesting heat facts

- The hottest temperature ever recorded in Florida was 109 degrees Fahrenheit on June 29, 1931, in Monticello.
- Miami has never recorded a high temperature of 100 degrees Fahrenheit.
- The hottest temperature recorded in the continental United States was 134 degrees Fahrenheit on July 10, 1913, in Greenland Ranch, located in California's Death Valley
- The hottest temperature recorded on Earth was 136 degrees Fahrenheit at Al' Aziziyah, Libya, on Sept.13, 1922.

### Baby, it's cold outside

Though many people head south to escape the cold temperatures in the winter, it isn't always warmer in Florida. During the past 150 years, there have been numerous severe cold outbreaks that have affected the state with below freezing temperatures and strong winds that produce bitterly cold wind chills. Increased wind speeds at cold temperatures accelerate the heat loss from exposed skin, and the wind chill is a measure of this effect. Basically, these conditions make a person or animal feel colder than the actual temperature. The National Weather Service will issue wind chill advisories/warnings, along with freeze advisories/warnings, when cold weather will threaten the area.

Associated Press

**The season's first accumulative snow counted for several accidents throughout the Milwaukee area.**

Temperature (°F)

| Relative Humidity (%) | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 | 100 | 102 | 104 | 106 | 108 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 80 | 81 | 83 | 85 | 88 | 91 | 94 | 97 | 101 | 105 | 109 | 114 | 119 | 124 | 130 | 136 |
| 45 | 80 | 82 | 84 | 87 | 89 | 93 | 96 | 100 | 104 | 109 | 114 | 119 | 124 | 130 | 137 | |
| 50 | 81 | 83 | 85 | 88 | 91 | 95 | 99 | 103 | 108 | 113 | 118 | 124 | 131 | 137 | | |
| 55 | 81 | 84 | 86 | 89 | 93 | 97 | 101 | 106 | 112 | 117 | 124 | 130 | 137 | | | |
| 60 | 82 | 84 | 88 | 91 | 95 | 100 | 105 | 110 | 116 | 123 | 129 | 137 | | | | |
| 65 | 82 | 85 | 89 | 93 | 98 | 103 | 108 | 114 | 121 | 128 | 136 | | | | | |
| 70 | 83 | 86 | 90 | 95 | 100 | 105 | 112 | 119 | 126 | 134 | | | | | | |
| 75 | 84 | 88 | 92 | 97 | 103 | 109 | 116 | 124 | 132 | | | | | | | |
| 80 | 84 | 89 | 94 | 100 | 106 | 113 | 121 | 129 | | | | | | | | |
| 85 | 85 | 90 | 96 | 102 | 110 | 117 | 126 | 135 | | | | | | | | |
| 90 | 86 | 91 | 98 | 105 | 113 | 122 | 131 | | | | | | | | | |
| 95 | 86 | 93 | 100 | 108 | 117 | 127 | | | | | | | | | | |
| 100 | 87 | 95 | 103 | 112 | 121 | 132 | | | | | | | | | | |

**Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity**

Caution · Extreme Caution · Danger · Extreme Danger

## Using the news

### Weather plotting

Weather temperatures are very important to people and animals. Look for the weather map in the newspaper or on the Internet to monitor the temperature in Florida for a two-week period. Chart the temperatures on a bar graph. Using the information about extreme temperatures, chart on a separate bar graph the prime times to avoid outdoor activities.

Sunshine State Standards: MA.D.2.3; LA.A.2.3; SC.G.1.3

### Play it safe: cold temperatures

- Stay indoors and use a safe heating source. Do not use fuel-burning devices indoors. They release carbon monoxide, which is a deadly gas. Also, make sure to use space heaters according to their instructions, and be attentive to open flames.
- Don't overexert yourself when outdoors. Your heart is already working overtime to keep you warm.
- If you must go outside, dress in layers and wear a hat and gloves. Try to stay dry and out of the wind.

### Interesting cold facts

- The coldest temperature recorded in Florida was minus 2 degrees Fahrenheit in Tallahassee on Feb.13, 1899. At the same time, snow up to 3 inches deep was reported by several cities in the Panhandle.
- Snow has been reported numerous times throughout the state. On Jan.19, 1977, snow fell on Miami and was seen in Homestead, which is 22 miles south of Miami. Unfortunately for snow lovers, it melted when it hit the ground!
- The deepest snowfall ever measured in Florida, 4 inches, occurred in Milton on March 6, 1954.
- The coldest temperature recorded in the lower 48 states was minus 70 degrees Fahrenheit at Roger's Pass, Mont., on Jan. 20, 1954.
- The coldest temperature recorded on Earth was minus 129 degrees Fahrenheit at Vostock II, Antarctica, on July 21, 1983.

### MASTERS OF DISASTER

A disaster safety curriculum related to all weather experiences is available from the Red Cross for use by teachers of grades K-2, 3-5 and 6-8. Teachers, refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit. If your school does not have the kit, check out www.redcross.org/disaster/masters.

*Melissa Griffin is the assistant state climatologist at FSU, Center for Ocean-Atmospheric Prediction Studies.*

## NWS Windchill Chart

Temperature (°F)

| Wind (mph) / Calm | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 | -45 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 36 | 31 | 25 | 19 | 13 | 7 | 1 | -5 | -11 | -16 | -22 | -28 | -34 | -40 | -46 | -52 | -57 | -63 |
| 10 | 34 | 27 | 21 | 15 | 9 | 3 | -4 | -10 | -16 | -22 | -28 | -35 | -41 | -47 | -53 | -59 | -66 | -72 |
| 15 | 32 | 25 | 19 | 13 | 6 | 0 | -7 | -13 | -19 | -26 | -32 | -39 | -45 | -51 | -58 | -64 | -71 | -77 |
| 20 | 30 | 24 | 17 | 11 | 4 | -2 | -9 | -15 | -22 | -29 | -35 | -42 | -48 | -55 | -61 | -68 | -74 | -81 |
| 25 | 29 | 23 | 16 | 9 | 3 | -4 | -11 | -17 | -24 | -31 | -37 | -44 | -51 | -58 | -64 | -71 | -78 | -84 |
| 30 | 28 | 22 | 15 | 8 | 1 | -5 | -12 | -19 | -26 | -33 | -39 | -46 | -53 | -60 | -67 | -73 | -80 | -87 |
| 35 | 28 | 21 | 14 | 7 | 0 | -7 | -14 | -21 | -27 | -34 | -41 | -48 | -55 | -62 | -69 | -76 | -82 | -89 |
| 40 | 27 | 20 | 13 | 6 | -1 | -8 | -15 | -22 | -29 | -36 | -43 | -50 | -57 | -64 | -71 | -78 | -84 | -91 |
| 45 | 26 | 19 | 12 | 5 | -2 | -9 | -16 | -23 | -30 | -37 | -44 | -51 | -58 | -65 | -72 | -79 | -86 | -93 |
| 50 | 26 | 19 | 12 | 4 | -3 | -10 | -17 | -24 | -31 | -38 | -45 | -52 | -60 | -67 | -74 | -81 | -88 | -95 |
| 55 | 25 | 18 | 11 | 4 | -3 | -11 | -18 | -25 | -32 | -39 | -46 | -54 | -61 | -68 | -75 | -82 | -89 | -97 |
| 60 | 25 | 17 | 10 | 3 | -4 | -11 | -19 | -26 | -33 | -40 | -48 | -55 | -62 | -69 | -76 | -84 | -91 | -98 |

Frostbite Times: 30 minutes · 10 minutes · 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

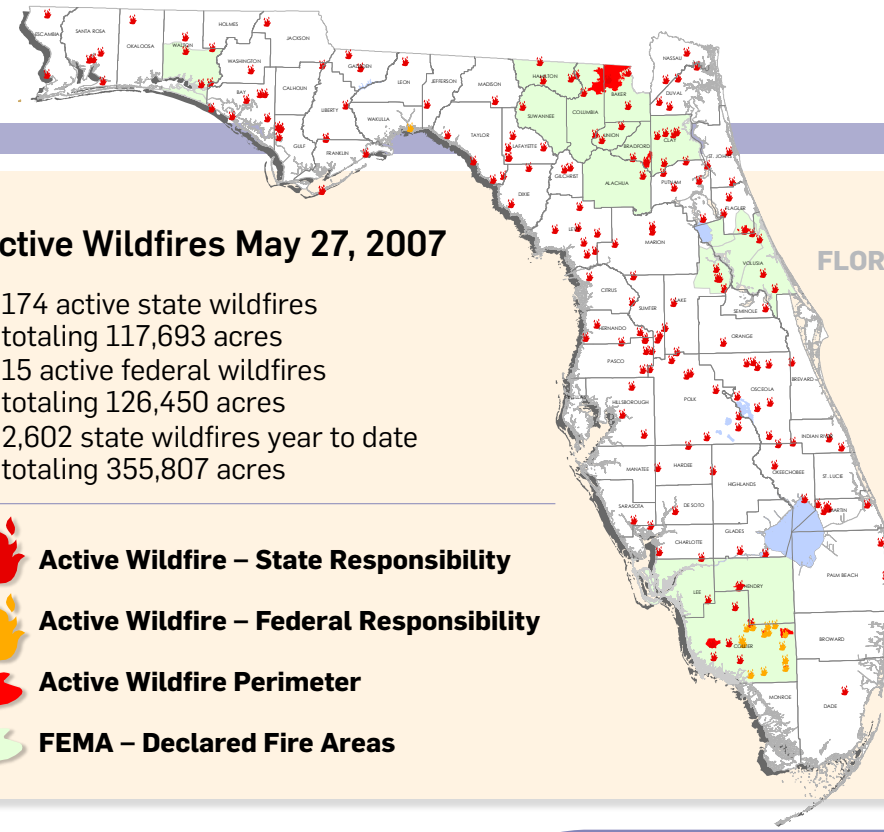
Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

# WILDFIRES

STEPHEN J. CODDINGTON | St. Petersburg Times (2007)

**Fire crews battle the western flank of the massive Bugaboo wildfire in Osceola National Forest.**




**Active Wildfires May 27, 2007**

- 174 active state wildfires totaling 117,693 acres
- 15 active federal wildfires totaling 126,450 acres
- 2,602 state wildfires year to date totaling 355,807 acres

**Active Wildfire – State Responsibility**

**Active Wildfire – Federal Responsibility**

**Active Wildfire Perimeter**

**FEMA – Declared Fire Areas**

## Wildfires flourish when hurricanes don't

**BY DR. DEBORAH HANLEY**

*Weather Report Staff Writer*

In 2007, wildfires across Florida burned more than 436,000 acres of state lands and 200,000 acres of federal property. With more than 4,200 wildfires across the state, 2007 was the most active wildfire season the state has seen since 2001. The biggest reason for the wildfire activity last year was the lack of hurricanes in 2006. Although tropical storms and hurricanes bring a lot of destruction and damage to the state, they also are the main source of rainfall for Florida during the summer and fall months of the year.

In 2006, high pressure over the state protected it from any direct impacts of a major tropical system. However, tropical rainfall was prevented from reaching the state and bringing the beneficial moisture needed to keep the lakes and rivers full and the ground water at normal levels. The drought that began last summer continued through the winter, resulting in record low lake levels in Lake Okeechobee and severe water restrictions in south Florida during the spring.

By May 31, 2007, the state had 177 active wildfires burning at one time, with more than 127,000 acres on fire. The biggest fire was the Florida/Georgia Bugaboo Fire near Lake City. Smoke from that fire reached as far west as Tallahassee and as far south as Tampa and Orlando. Highways were closed for days due to heavy smoke near the fires. A large fire also burned across part of Lake Okeechobee because it was so dry. Drought conditions continue to be a concern across the state even in 2008 since 2007 was the second consecutive year with not many tropical systems across the state.

### What do El Niño and La Niña mean for wildfires?

Part of the reason for the drought conditions this past year was the development of La Niña in the Pacific Ocean. La Niña conditions occur when abnormally cold water forms across the central Pacific Ocean. These cold waters create a change in the atmospheric weather patterns that result in drier and warmer than normal winters across the Southeastern United States.

With the dry conditions the state has already experienced and continues to experience, the potential for another extremely active fire season in 2008 remains very high.

When the waters in the central Pacific Ocean are warmer than normal, it is referred to as an El Niño. El Niño conditions usually bring wetter than normal winters and reduce wildfire activity. In 2003, only 27,000 acres burned in 2,071 fires due to El Niño weather patterns keeping plenty of moisture in the soils and waterways. This was the lowest number of acres burned in Florida's wildfire records. Because of the influence of El Niño and La Niña on wildfire activity, it is possible to anticipate upcoming fire activity across the state based on forecasts of the next three to six months of weather and climate. As more research is done, more accurate forecasts can be made, and better planning and preparation can be made for upcoming wildfire seasons across Florida.

*Dr. Deborah Hanley is a meteorologist, Florida Division of Forestry, Florida Department of Agriculture and Consumer Sciences.*

## Using the news

### Just what the firefighter ordered?

An ecosystem is a living community of plants and animals that need each other to exist. Why would a wildfire or a prescribed burn be a positive thing for an ecosystem? Why would a wildfire be negative? Draw a line down a piece of paper. Label the left side of the paper "positives." Label the right side "negatives." Look for an article in the newspaper about a wildfire. Write a brief paragraph explaining if the fire had a positive or negative effect on the ecosystem.

Sunshine State Standards: LA.A.1.3; LA.A.2.3; LA.B.2.3; LA.C.2.3; LA.C.3.3; SS.B.2.3; SC.F.1.3; SC.G.1.3

### WILDFIRE SAFETY ACTIONS

- Create a defensible or safe space of at least 30 feet around your home that is lean, clean and green.
- To help emergency vehicles gain access, make sure driveways are at least 12 feet wide with at least 15 feet of overhead clearance and are easily identifiable.
- Keep gutters, eaves and yards clear of debris, sticks, pine needles and leaves.
- Trim all tree branches that hang over the house or are lower than 6 to 10 feet from the ground.
- Plant fire-resistant plants such as dogwood, sycamore, magnolia, oaks, red maple, wild azalea, sweetgum, black cherry and ferns instead of pines and palmettos.
- Use fire-resistant construction materials where possible and fireresistant barriers when attaching flammable materials, such as wood decks or fences, to the house.
- Follow local regulations for the burning or disposal of yard waste and other materials.
- Develop a personal disaster plan, including a plan for evacuating your home. Be sure to identify at least two routes out of your neighborhood or subdivision.

# Rain or shine, the key to smooth sailing is boating safety

**BY NICK PETRO**
*Weather Report Staff Writer*

It is no surprise that Florida ranks as the top boating state, with almost 1-million registered boats. The state's beautiful waterways, water sport opportunities and great weather add up to a lot of time spent on the water by residents and visitors alike.

However, before you venture out on the water, it is important for boaters, and particularly small boat operators, to check on the weather. What may seem like a tranquil and beautiful start to the day's weather quickly can turn violent with hazards such as severe thunderstorms, strong winds, rough seas, lightning and waterspouts.

Larger-scale weather systems, such as tropical cyclones, squall lines along cold fronts, gusty winds behind cold fronts and cool-season low pressure systems, also present dangers to small boaters.

## Preparation and awareness

Knowing what kind of weather to expect is one of the keys to staying safe during your boating adventure. Before leaving home, be sure to check the current marine conditions and the day's forecast by going online to weather.gov or listening to NOAA Alert Radio.

The National Weather Service issues coastal waters forecasts, which are updated four times per day and when conditions rapidly change. The coastal waters forecasts include a five-day forecast of wind direction, wind speed, wave height and precipitation. These forecasts should be your primary tools for planning a safe day on the water.

Once you are on the water, keep in mind that weather conditions can change rapidly. It is a good idea to periodically listen to NOAA Alert Radio on your VHF marine band radio. Also, remember to turn on the alert feature of your NOAA Alert Radio or VHF marine radio, if equipped. This feature will sound an alarm on your radio, anytime the National Weather Service issues a special marine warning. These warnings are issued to provide advance notice to mariners of short-duration (up to two hours) hazardous weather conditions, including sustained marine thunderstorm winds or associated gusts of 34 knots or greater, hail 3/4 inch or more in diameter or waterspouts.

You also can stay aware of short-term weather conditions and forecasts while on the water by using your Internet-capable cell phone or PDA. Simply point your HTTP-enabled device (PDA) to mobile.srh.weather.gov or your WAP-enabled device (Internet-capable cell phone) to www.srh.noaa.gov/wml. These sites will allow you to check the current marine conditions and updated forecasts and will allow you to view the latest radar and satellite images for your area.

TOM VARGA

**A large waterspout forms in the morning off Clearwater Beach.**

## SAFETY ACTIONS

**A safe and enjoyable Florida boating experience is up to you. Always plan ahead and remember these safe boating practices:**

- Check forecasts well ahead of time.
- File a float plan at your marina.
- Have an escape plan in mind. Thunderstorms and weather-related hazards form quickly. Never let these storms cut off your route back to land.
- If a thunderstorm threatens, be sure everyone aboard is wearing a life jacket as a small boat can be overturned quickly by gusty winds.
- If caught in a thunderstorm, go below deck if possible, and stay away from masts or ungrounded metal objects.
- Have a VHF marine band radio on board.
- Listen to NOAA Alert Radio for warning information.
- Know the limitations of your boat. If small craft advisories or gale warnings are issued, you should postpone travel.
- Always apply sunscreen before leaving the dock.

*Nick Petro is senior forecaster in the Weather Forecast office, Tampa Bay Area.*

A Miami Beach ocean lifeguard scans the water for trouble. Rip currents have claimed the lives of several south Florida swimmers.

DAVID ADAME | Associated Press

# Rip currents: Don't panic, don't fight, swim left or right

**BY DON SHEPHERD**
*Weather Report Staff Writer*

A rip current is a channelized flow of water moving away from the shore at beaches. Rip currents typically form along the beach at breaks in the offshore sandbar, but they also form near structures such as jetties and piers. Rip currents are part of the natural near-shore ocean circulation and are quite common, occurring at many beaches every day on both the Atlantic and gulf coasts of Florida. Some rip currents last from a few minutes to a few hours, while others may last for days. Weather or ocean conditions can cause rip currents to be stronger and more frequent on some days than on others.

## Why are rip currents dangerous?

Rip currents are dangerous because they can pull unprepared swimmers away from shore and into deeper offshore waters. They become especially dangerous when swimmers panic and struggle against the current while being pulled farther and farther away from the beach. Contrary to popular belief, rip currents do *not* pull a swimmer under the water.

Rip currents can move at speeds of up to eight feet per second, which is faster than an Olympic swimmer! At these speeds, the force of a rip current is too strong for even the strongest of swimmers, and attempts to swim directly back toward shore, especially for the panicked and tired swimmer, can be fatal. In fact, rip currents claim more lives in Florida each year than do hurricanes, tornadoes and lightning.

## Get a clue

When you take a trip to the beach, there are a few things you can do to protect yourself from the potential dangers of rip currents. First, when you arrive at the beach, ask the on-duty lifeguards about the current rip current danger. Also, note any flag warning system that may be present. Second, be able to recognize some of the signs that indicate that rip currents are present. A visible channel of churning, choppy water; a narrow channel where there is a difference in water color; a line of foam, seaweed or debris; or a break in the incoming wave pattern are all indicators of possible rip currents.

## What should you do?

If you find yourself caught in a rip current, doing two simple things will increase your chances of survival: Don't panic and don't fight the current! Since most rip currents are relatively narrow in width, to escape the outgoing current, you should swim in a direction parallel to the shoreline. Or more simply, if caught in a rip current and facing back toward the beach, swim either toward your left or right. Just remembering the simple phrase "Don't fight... Swim left or right" could save your life. When free of the current, swim at an angle back toward shore.

Before you leave for a trip to the beach, check the latest National Weather Service forecast for local beach conditions. Most Florida NWS offices issue a surf zone forecast each day, which includes the expected rip current risk. More rip current information can be found at the following Web site: www.ripcurrents.noaa.gov.

## RIP CURRENT SAFETY ACTIONS

- Learn how to swim!
- Do not overestimate your ability to swim in ocean waters and strong currents.
- If possible, always swim at beaches staffed by lifeguards or beach patrols, and heed their advice.
- If caught in a rip current, try to remain calm and signal for help in the direction of the beach patrol.
- If caught in a rip current, do not try to swim directly back to shore! Instead, turn and face sideways to the shore and wade or swim until you are out of the rip current. Then move back toward shore at an angle away from the rush of water.
- An alternate method of escape from a rip current, for those who are good floaters and swimmers, is to let the rush of water take you offshore until it slows, then swim back to the beach at an angle away from the rip current.
- Do not get caught in a rip current while trying to save someone else. Throw the person a flotation device and get help from the beach patrol.

## MASTERS OF DISASTER

A disaster safety curriculum related to all weather experiences is available from the Red Cross for use by teachers of grades K-2, 3-5 and 6-8. Teachers, refer to the lesson plans and activities in your school's Masters of Disaster curriculum kit. If your school does not have the kit, check out www.redcross.org/disaster/masters.

*Don Shepherd is a senior forecaster in the Mobile Weather Forecast office.*

## Using the news

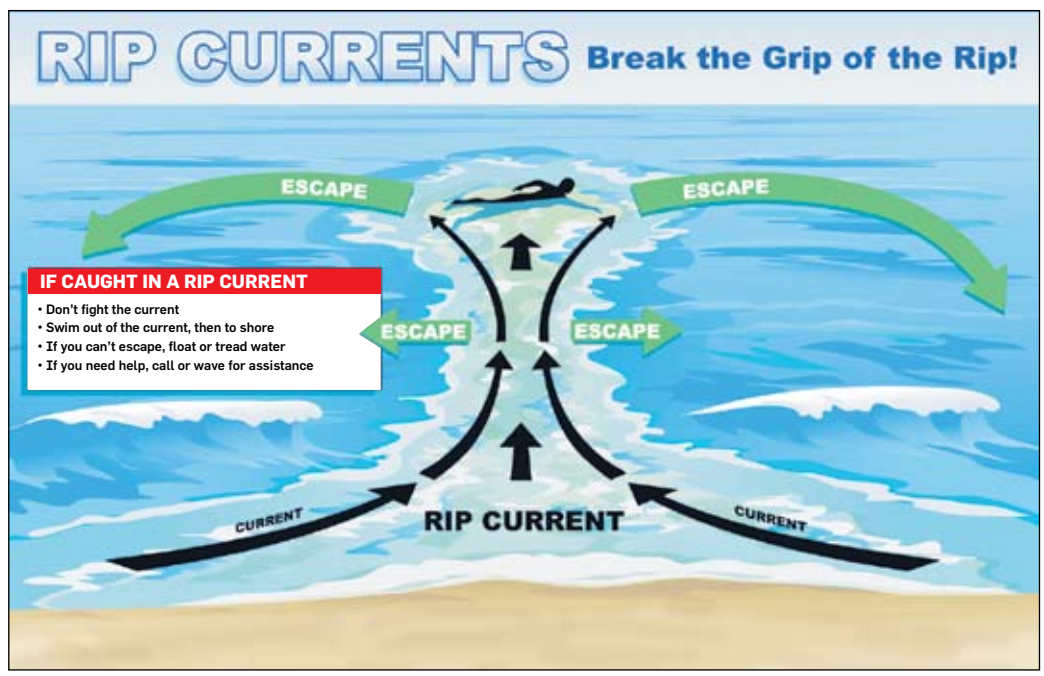
### Public service

Rip currents can be very dangerous. An average of 10 people die in Florida each year after getting caught in rip currents. It is important to educate people throughout the state about the dangers of rip currents. Your job is to create a rip current awareness campaign for your school. Look for advertisements in the newspaper. With a small group, write as many different advertising slogans as you can in your notebook. Discuss with your group members the different slogans from the newspaper and their effectiveness. Using these slogans as models, come up with a slogan for your awareness campaign. Using the advertisements you found as models, create your own public service announcement in the form of a poster promoting your slogan and campaign to help make people aware of rip currents. On the back of the poster, list the top 10 reasons for being aware of rip currents.

Sunshine State Standards: SS.C.2.2-4; SS.D.1.2-4; LA.A.2.2-4; LA.B.2.2-4; LA.C.2.2-4; LA.D.2.2-4; SC.C.2.2-4; SC.G.2.2-4; SC.H.1.2-4; SC.D.2.2-4

Chris Brewster, United States Lifesaving Association

**A break in the incoming wave pattern is one sign of a rip current.**




Dave Brenner, Michigan Sea Grant

**Rip currents are powerful currents of water moving away from shore. They can sweep even the strongest swimmer out to sea.**

# MITIGATION: Preparing to be prepared

## *There are many things to do ahead of time to help you be ready and safe when disaster strikes*

**BY ERIKA SALNA**
*Weather Report Staff Writer*

You live in Florida, so you already know you have to be prepared to face the threat of hurricanes. You hear the warnings every year, right?

But being prepared is more than stocking a supply of non-perishable foods. Because we are in an active hurricane cycle that may last another 15-20 years, it is important to mitigate the damages that might occur during this extended cycle. Mitigation is all about doing things ahead of time to protect our families, homes and businesses before a disaster hits. Mitigation is being proactive, rather than reactive. Mitigation means damage prevention.

You and your families can mitigate, too. You can look into the future and become hurricane problem-solvers by learning what to do ahead of time.

So, what is the difference between mitigation and preparation?

- Mitigation is having the correct shutters to protect windows from hurricane winds and flying debris.
- Preparation is putting up the shutters when a hurricane is threatening.
- Mitigation is planting Florida native storm-resistant trees and foliage around your house or business.
- Preparation is pruning them properly and clearing dead branches when a hurricane is threatening.
- Mitigation is deciding the best way to protect your windows; retrofitting a roof to make it stronger; and getting a new impact-and wind-rated, code-approved garage door.
- Preparation is putting the shutters in place on the tracks you had installed during the summer or bolting the steel brace against your new garage door.

### Did you know?

A report issued by the Multi-Hazard Mitigation Council of the National Institute of Building Sciences found that every $1 spent for mitigation saves $4 in damage and recovery costs.

### Culture of preparedness

Florida is the hurricane capital of the United States, so Florida residents need to live a lifestyle of preparedness, cultivating a culture of being prepared. This culture of preparedness has to become second nature and a way of life.

This includes the business community. Every business and corporation needs to have a plan that covers operations before, during and after a storm. A culture of corporate preparedness goes hand in hand with corporate responsibility. And, it's not just hurricanes. There are many natural or man-made disasters that can disrupt a business, so the plan needs to cover all hazards.

### Make a preparedness pledge:

"I will take personal responsibility and accountability to be prepared and have a plan."

### Before a hurricane:

- Protect your home with mitigation and retrofitting projects.
- Complete your personal hurricane plan and supply kit for your family and pets.
- Review your school district's hurricane plan.
- Make a special hurricane plan for any family member or relative with special needs; maintain an extra supply of prescription drugs and special medications.
- Find out if you are in a mandatory evacuation zone; plan your route if your family will evacuate.
- Place important documents in a waterproof container.
- Create an inventory of the inside and outside of your home.
- Designate a safe room in your house.
- Keep trees and bushes pruned.
- If your family owns a boat, determine how you will protect it.

## Using the news

### Student Activity

**1.** Ask your science teacher to allow school science projects to focus on local disaster planning and mitigation.

**2.** Write a letter to any of these agencies about disaster mitigation plans and projects for the state, your county or your city. You also can do a lot of research online.

a. Florida Division of Emergency Management

b. Local county division of Emergency Management

c. Local county and city commissions

**3.** Learn as much as you can about how wind flows around a building or a house during hurricanes and how the shape of the roof can affect how much damage occurs. Build a simple wind tunnel to test how the shape of a roof may help during a hurricane.

**4.** Learn about protective measures that reduce damage to a house or building. Visit www.mysafefloridahome.com to learn about free home inspections. Make a drawing or even build a scale model of your house or school showing various ways to protect it from the impact of a hurricane.

**5.** Divide your class into groups. Each group can research one of the following topics as it relates to hurricane protection:

- window construction and glass
- roofing design and materials
- shutter design and materials
- wall construction and materials
- garage door design and construction

**6.** After completing your research, do an oral presentation to your class on your findings. Use visual aids or drawings and pictures. Don't forget to include any ongoing research and new products you learn about.

**7.** Look through the Homes features sections or Real Estate classified sections of your local newspaper and cut out pictures of homes and floorplans of homes that you think would survive a Category 3 and above hurricane. Explain why you made your choices.

Sunshine State standards: SC.A.1.3; SC.B2.3; SC.H.1.3; SC.C.2.3; LA.A.2.3; LA.A.1.3; LA.B.1.3; LA.B.2.3; LA.C 3.3

## Student Activity

**1.** Checklists are a good way to make sure you have everything you need to be prepared. Divide your class into groups. Assign one of the following tasks to each group:

- Create a complete checklist for pets.
- Create a checklist of important papers.
- Create a checklist of items for small children or disabled persons, or elderly family members.
- Create a list of items that you must take with you or store safely in water proof bags or boxes, if you evacuate.
- Make a list of tasks to perform outside of your home.
- Make a list of tasks to perform inside of your home.

You can also do a lot of research online:

- Florida Division of Emergency Management
- Local county division of Emergency Management
- Local county chapter of the American Red Cross
- National Hurricane Center

You also can write to these organizations for brochures and information. Share your findings with your class. You may want to put all of the information you gathered into a notebook for reference when a hurricane is threatening.

**2.** As hurricane season approaches, look through the pages of your local newspaper for information about hurricane safety and preparedness. Cut out any articles you find, and paste them on separate sheets of paper. Keep them handy with the checklists that you have created.

Sunshine State Standards: LA.A.2.3; LA.A.1.3; LA.B.2.3; LA.B.1.3; LA.C.3.3

# You can't huff (or puff) to blow this house down

The entrance to the Disaster Survival House.

**BY ERIKA SALNA**
*Weather Report Staff Writer*

The Disaster Survival House, in Deerfield Beach, is a residential home built to withstand a major hurricane and operates an all-hazards learning and training center. It is the home base for Hurricane Warning!, which teaches hurricane and disaster mitigation, and safety and preparedness to children, families, individuals, seniors, students, businesses and trade personnel. StormZone is an outreach education program teaching students about emergency management and emergency support functions. Students participate in an actual disaster simulation and activation of an emergency operations center.

The Disaster Survival House features a hurricane laboratory, examples of window protection and wind tunnel demonstrations. Hurricane tracking, flooding, storm surge, lightning, generator safety, safe room and disaster preparedness planning also are covered in the educational tour. This includes an actual cockpit from a WP-3D Orion, the same type of aircraft that NOAA hurricane hunters fly into hurricanes.

The Hurricane Warning curriculum is a self-guided, Web-based virtual tour. This is presented through a network of computer kiosks with interactive touch screens that will engage visitors in a multi-media, exciting and educational experience. This is made possible by a Residential Construction Mitigation Program Grant awarded by the state of Florida and the Division of Emergency Management.

The house is open to the entire community for many types of classes, meetings and workshops for teachers, various organizations and professional groups and community emergency response teams. The Disaster Survival House, located at 1345 FAU Research Park Blvd. (near I-95 and SW 10th St.) in Deerfield Beach, is open to the public for tours, 8 a.m.- 4 p.m. on weekdays. For more information, call 954-426-6887, or visit www.hurricanewarning.org.

*Erika Salna is the project coordinator for the Disaster Survival House.*

Students gather in front of an image of Hurricane Floyd during a field trip to the Disaster Survival House.

The WP-3D Orion cockpit exhibit in the Disaster Survival House highlights the efforts of the hurricane hunters.

# WANTED:
## Weather observers in Florida

The Community Collaborative Rain, Hail and Snow Network, better known as CoCoRaHS, has recently expanded into Florida and is looking for citizen volunteer weather observers here in the Sunshine State.

CoCoRaHS, which began in 1998, is based at Colorado State University. CoCoRaHS is a non-profit, community-based network of volunteer citizen weather observers of all ages and backgrounds working together to measure and report precipitation (rain, hail and snow) levels. By using low-cost and self-provided measurement tools, training, education and an interactive Web site, CoCoRaHS aims to provide the highest-quality precipitation data for a variety of needs (the preservation of natural resources, education and research).

CoCoRaHS is already established in 25 states, with more states joining each month. This effort in Florida is especially important given the recent droughts and the past few years' tropical storms and hurricanes.

You can become a volunteer by going to www.cocorahs.org and clicking on the "Join CoCoRaHS" emblem on the upper right side. Once you're signed up, you can start reporting daily precipitation and seeing your information displayed on the state map. If you have any questions, contact Melissa Griffin or Dr. Pat Welsh for more information.

**CONTACT:**

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*Florida CoCoRaHS state co-coordinator*
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**Dr. Pat Welsh,**
*Florida CoCoRaHS state co-coordinator*
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# NOAA Alert Radio can be your family's best companion

**BY DENNIS DECKER**
*Weather Report Staff Writer*

It's 3 a.m., and it's raining hard. You lie in bed awake, even though the rest of your family is asleep. Lightning lights up your bedroom, and you hear the rumble of distant thunder. It happens to be late March, the height of Florida's dangerous tornado season. You have a new NOAA Alert Radio by your bed, and you know it is correctly programmed because you get the weekly test and all the warnings for your county.

"Waaaaaah, waaaaaah waaaaaah," the radio alarms. You turn it on and hear a tornado warning for your county, and it lists your town in the tornado threat area. You spring into action, waking your family and ushering them into the downstairs bathroom, the one with no windows.

Since your radio is battery-powered, you grab it and take it with you. In the bathroom, you can hear the rain getting harder and the thunder getting louder. You hear a severe weather statement over the radio telling you the tornado is four miles west of your town and moving east at 35 miles per hour.

A bad situation? Yes, but you are ready. Your chances of surviving uninjured are excellent. However, most people face a tornado without the lifesaving information that can be provided by a NOAA Alert Radio.

The alerts are broadcast from the local National Weather Service (NWS) office serving your area. The NWS meteorologists are watching the weather 24 hours a day, every day. Sophisticated Doppler radars and other technology help the meteorologists decide when to issue watches and warnings. When the decision is made and the message is broadcast, your weather radio can alert you to the danger.

NOAA Alert Radio was designated the sole government-operated radio system to provide warning information directly to the American people for both natural and other hazards. Now, there are more than 900 stations around the nation, including 31 in Florida.

It's not just a "weather" radio. It's an "alert" radio. NOAA's National Weather Service works very closely with Emergency Management agencies to provide you with other emergency messages, such as alerts for a wildfire or a chemical spill threatening your area. Emergency management agencies may produce evacuation messages for broadcast on NOAA Alert Radio.

Weather radios are manufactured by several companies and sold in many stores and on the Web. We recommend you buy a weather radio with the Public Alert™ designation. This means the radio can be programmed to receive only the alerts that are important to you. This is also known as SAME (specific area message encoding) technology. You should set the weather radio to ignore warnings for counties far away from your location. This way, you will get only the alerts that you need.

Many weather radios can be attached to personal computer strobe lights or other devices to make sure you are alerted.

Pay attention when your weather radio alerts you. Listen to the watch or warning message. Check out your newspaper's online news site, local TV or radio stations that serve your area. These constantly updated sources may be able to tell you much more about what is happening. Also, get the big picture on NWS Web sites. They can show you the latest warnings, overlaid on Doppler radar loop images.

During other times, when the weather is quiet, you may listen to the routine NOAA Alert Radio program. It gives you your current conditions, local forecasts, marine forecasts, tropical weather outlooks and other information.

We cannot warn you before your home is about to catch fire ... that's your smoke detector's job. For many other life-threatening events, get a NOAA Alert Radio. It just might make the difference. Oh, and don't forget the spare batteries.

*Dennis Decker is with the National Weather Service, Melbourne.*

## Using the news

### Tracking natural disasters

A NOAA Alert Radio can alert you to dangerous weather just as a smoke detector can warn you about dangerous smoke. The NOAA Alert Radio alerts are broadcast from the local National Weather Service (NWS) office serving your area. Your weather radio can alert you to potential dangers. Weather and natural disasters affect our daily lives, health and economy. For example, tsunami, hurricanes, typhoons and tornadoes can be very costly to an individual or the community at large. Many of these disasters occur only in certain parts of the world, but their occurrence can have an impact on the lives of those who have not experienced firsthand the drama and tragedy accompanying these events. Use the newspaper to keep track of natural disasters over a two- or three-week period. Keep a natural disaster journal. Identify the disaster and its location in your journal. Create a chart listing all of the natural disasters. Choose a disaster that did not happen in your area and make a list of some of the ways in which you or other people in your community would be affected by this particular kind of disaster. Write a brief essay outlining the disasters and how they affect communities. Share your information with your class.

Sunshine State Standards: LA.A.1.3; LA.A.2.3; LA.B.1.3; LA.B.2.3; LA.C.2.3; LA.C.3.3; SC.B.2.3; SC.D.1.3; SC.H.3.3