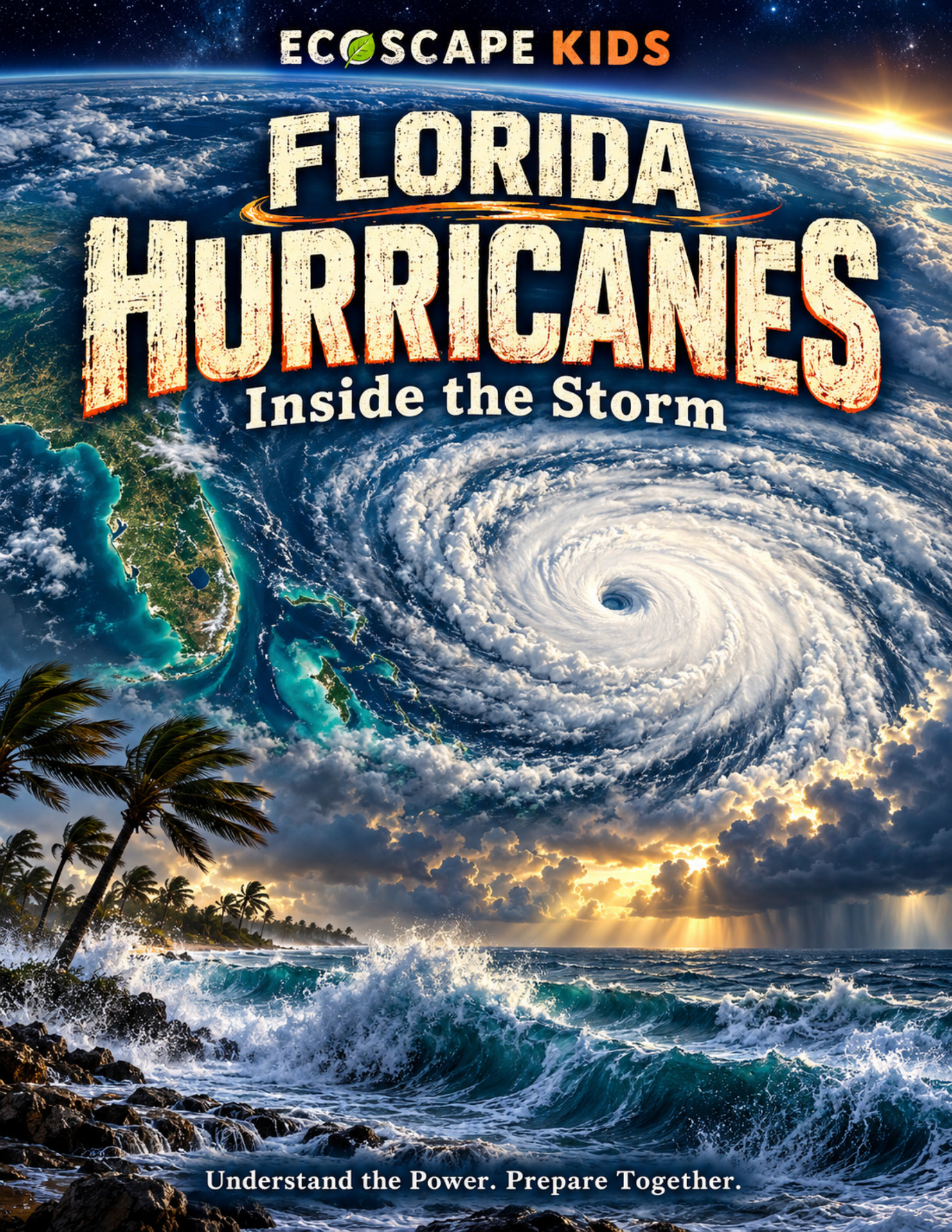
ECOSCAPE KIDS

FLORIDA HURRICANES

Inside the Storm



Understand the Power. Prepare Together.

Understand the Power. Prepare Together.

A Florida hurricane learning book for ages 8–12.

A STORM HAS MANY STORIES

Follow warm ocean water into a growing storm. Learn how scientists track hurricanes, why the forecast changes, and how wind and water affect Florida.

LEARN WITH A TRUSTED ADULT

Preparation is a family responsibility. Adults make safety decisions, arrange shelter, manage medicine, and handle tools and electrical equipment. Kids deserve clear explanations and support.

USE THIS BOOK BEFORE A STORM

This is a learning resource, not a live forecast. During an emergency, follow current National Weather Service alerts and local emergency management instructions. Call 911 for immediate danger.

FIND YOUR WAY

The next page lists every topic. An alphabetical index and a glossary appear at the back. PDF bookmarks and linked index entries jump to the right page.

ABOUT THE ILLUSTRATIONS

These are educational illustrations, not photographs or exact measurements. The cone example is fictional. The selected historical timeline ends in 2024. Source links were reviewed in October 2026.

Created by Ecoscape Kids

Ecoscape Outdoor Services, LLC • Tampa, Florida

Inside This Book

Explore the science. Read the forecast. Prepare with your family.

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ECOSCAPE KIDS

FLORIDA HURRICANES

WHAT IS A HURRICANE?

A giant rotating storm powered by warm ocean water.

A hurricane is an organized system of thunderstorms with winds circling a low-pressure center. To earn the name hurricane, its strongest sustained winds must reach at least 74 miles per hour.

MORE THAN WIND

Hurricanes also bring heavy rain, coastal storm surge, and dangerous waves. Flooding can reach far inland.

ONE STORM. THREE CLASSIFICATIONS.

TROPICAL DEPRESSION
38 mph or less

TROPICAL STORM
39–73 mph

HURRICANE
74 mph or more

These speeds describe sustained winds, not brief gusts.

LOW PRESSURE: An area with lower air pressure than its surroundings.

Sources 1, 2 (pp. 33–34) • Illustrations are conceptual.

How Hurricanes Form

Warm water starts the engine. The right conditions keep it running.



1 THE OCEAN SUPPLIES ENERGY

Warm ocean water adds heat and moisture to the air. Hurricanes usually need water around 80°F (27°C) or warmer, with warmth extending below the surface.

2 THUNDERSTORMS GROW

Warm, moist air rises. As water vapor condenses into cloud droplets, it releases heat. This helps fuel more rising air and thunderstorms.

3 A SPINNING SYSTEM ORGANIZES

Air flows toward a low-pressure center. Earth's rotation helps turn the flow. Far enough from the equator, thunderstorms can organize around a spinning center.

4 THE CONDITIONS MUST COOPERATE

Moist air and low wind shear help the storm stay organized. Wind shear means winds change speed or direction with height.

NOT EVERY STORM BECOMES A HURRICANE

Most tropical disturbances never grow into hurricanes. Warm water alone is not enough.

Sources 1 (pp. 33–34) • Illustrations are conceptual.

INSIDE THE STORM

A quieter center. A fierce ring of thunderstorms. Rainbands stretching outward.

THE EYE

Air sinks near the center of a well-developed hurricane. Winds are often lighter here, and the sky sometimes clears. Not every hurricane has a clear, visible eye.

THE EYEWALL

Towering thunderstorms surround the eye. This ring usually holds the strongest sustained winds and intense rain.

THE RAINBANDS

Curved groups of thunderstorms spiral around the center. Heavy showers and strong gusts arrive in bursts, often far from the eye.

A CHANGING STORM

Hurricanes change shape as they strengthen, weaken, or interact with nearby weather. Their parts are not perfectly neat circles.

The eye is not the all-clear

If the center passes overhead, dangerous winds return from the other direction. Stay sheltered until officials say it is safe.

Sources 3, 4 (pp. 33–34) • Illustrations are conceptual.

STRONGER OR WEAKER?

A hurricane changes as its surroundings change.

FUEL BELOW

Warm water supplies heat and moisture. Deep warm water helps a storm keep drawing energy even as waves stir the ocean.

AIR ABOVE

Moist air and low wind shear help thunderstorms remain organized. Strong wind shear tilts and disrupts the storm. Dry air also interferes with thunderstorm growth.

LAND CHANGES THE BALANCE

Over land, a hurricane loses its steady ocean supply of heat and moisture. It usually weakens, but damaging wind and flooding often continue.

RAPID INTENSIFICATION

Forecasters use this term when maximum sustained winds increase by at least 35 mph in 24 hours. A storm can become much stronger quickly.

Prepare before the last forecast

Changes in strength are hard to predict exactly. Families need time to act safely.

Sources 1, 4 (pp. 33–34) • Illustrations are conceptual.

What the Categories Mean

The Saffir-Simpson Hurricane Wind Scale measures sustained wind speed.

1	CATEGORY 1	74–95 mph
2	CATEGORY 2	96–110 mph
3	CATEGORY 3	111–129 mph
4	CATEGORY 4	130–156 mph
5	CATEGORY 5	157 mph or more

MAJOR HURRICANES

Categories 3, 4, and 5 are called major hurricanes. Every category brings dangerous winds.

ONE NUMBER IS NOT THE WHOLE STORY

The category does not measure storm surge, rainfall, flooding, tornadoes, or the size of the storm. A tropical storm or Category 1 hurricane can still cause deadly flooding.

WIND SCALE ONLY

Always check separate surge, rain, and flood forecasts.

Sources 5 (pp. 33–34) • Illustrations are conceptual.

EYES IN THE SKY. SENSORS AT SEA.

Forecasters combine observations from many places.

SATELLITES

Satellites watch clouds over huge areas of ocean. Different instruments help scientists study cloud temperatures, moisture, and storm structure, day and night.

RADAR

Weather radar reveals rain and helps meteorologists estimate wind motion inside storms. Coastal radar becomes especially useful as a storm approaches land.

OCEAN INSTRUMENTS

Buoys, underwater gliders, and other ocean instruments measure conditions at sea. Water below the surface matters because it stores heat that can fuel a storm.

PUTTING IT TOGETHER

No single instrument tells the entire story. Forecasters compare measurements, check their quality, and feed observations into computer models.

Observation versus forecast
An observation describes what is happening. A forecast estimates what happens next.

Sources 6 (pp. 33–34) • Illustrations are conceptual.

FLYING INTO A HURRICANE

Hurricane hunters bring the storm into sharper focus.



A FLYING LABORATORY

Specially equipped NOAA and Air Force aircraft collect weather measurements. Some fly through hurricanes. Others sample the atmosphere around and above the storm.



A SMALL PROBE. IMPORTANT DATA.

A dropsonde falls beneath a small parachute. As it descends, it measures wind, air pressure, temperature, and humidity, then radios the readings to the aircraft.

WHY FLY THERE?

Ocean storms often develop far from land-based weather stations. Aircraft observations help locate the center and measure the storm's strength and structure.

SCIENCE TAKES A TEAM

Pilots, engineers, technicians, and scientists plan and carry out these missions. The measurements help improve forecasts and hurricane research.

Measurements improve decisions

Fresh information helps forecasters update the warnings families and communities depend on.

Sources 7 (pp. 33–34) • Illustrations are conceptual.

WHERE WILL IT GO?

A projection is a forecast, not a promise.

THE ATMOSPHERE STEERS THE STORM

Large areas of high and low pressure influence the winds around a hurricane. Those winds help steer it across the ocean and sometimes toward land.

COMPUTER MODELS

Models use observations and mathematical rules to estimate how the atmosphere will change. Different models sometimes predict different paths or strengths.

WHY FORECASTS CHANGE

New measurements reveal details earlier forecasts missed. Small differences grow over time, so predictions farther into the future usually have more uncertainty.

ABOUT SPAGHETTI PLOTS

A bundle of model tracks shows possible solutions. The lines are not all equally reliable. Counting lines over a town is not a good way to judge danger.



Use the official forecast

The National Hurricane Center combines evidence and expert judgment. Families should follow official updates and local instructions.

Sources 8, 10 (pp. 33–34) • Illustrations are conceptual.

Understand the Forecast Cone

The cone describes uncertainty about the storm’s CENTER.



FICTIONAL EXAMPLE • NOT A FORECAST OR A HAZARD BOUNDARY

WHAT THE CONE SHOWS

The cone surrounds a range of possible future positions of the center. Its width comes from recent years of official track forecast errors.

A USEFUL LIMIT

The cone is designed around roughly two-thirds of historical track errors. The center sometimes travels outside it.

WHAT THE CONE DOES NOT SHOW

It does not show the size of the storm or the full area of dangerous weather. Wind, surge, rain, and tornadoes reach beyond the cone.

READ MORE THAN THE TRACK

Use local alerts and separate wind, surge, and rainfall forecasts. A location outside the cone is not automatically safe.

Sources 9, 10 (pp. 33–34) • Illustrations are conceptual.

READ THE WHOLE FORECAST

Location, strength, timing, and hazards tell different parts of the story.

CHECK THE TIME

A forecast has an issue time. Older screenshots might show a path that has already changed. Look for the newest official update.

READ THE KEY MESSAGES

The National Hurricane Center highlights the main threats. Local National Weather Service offices explain expected effects in your community.

WATCH THE ARRIVAL TIME

Preparations and evacuation need to finish before dangerous weather arrives. Tropical-storm-force winds often begin before the center reaches land.

KEEP MORE THAN ONE ALERT SOURCE

Wireless emergency alerts, local officials, and a battery-powered NOAA Weather Radio help families stay informed. Power or internet service might fail.

Landfall has a specific meaning

Landfall happens when the center crosses the coastline. Dangerous conditions often arrive earlier and continue afterward.



Sources 4, 8, 10 (pp. 33–34) • Illustrations are conceptual.

WHEN THE OCEAN COMES ASHORE

Storm surge is rising seawater pushed toward land.

WIND MOVES WATER

A hurricane's winds push ocean water toward the coast. Water builds up and spreads across normally dry ground.

SURGE AND TIDE

Storm tide combines storm surge with the regular astronomical tide. Breaking waves add another destructive force on top of the raised water.

EVERY COASTLINE IS DIFFERENT

The shape of the coast, water depth, storm size, speed, and track affect the surge. A wind category alone does not tell you how high the water will rise.

WATER FINDS A ROUTE

Surge travels through bays, rivers, canals, and low ground. A home does not need an ocean view to face danger.

Leave when officials direct

Evacuation is the main protection from storm surge. Do not wait to see water approaching.



Sources 11 (pp. 33–34) • Illustrations are conceptual.

RAIN FAR FROM THE COAST

A weaker storm still carries a powerful flood threat.

TOO MUCH RAIN, TOO QUICKLY

Flash floods develop when heavy rain arrives faster than the ground and drainage systems can absorb or carry it away.

RIVERS RISE LATER

Water draining from a large area flows into rivers. Flooding sometimes continues or worsens after skies begin to clear.

A SLOW STORM LINGERS

Storm speed, size, and the land beneath it affect rainfall. The wind category does not measure how much rain a place will receive.

HIDDEN HAZARDS

Floodwater hides holes, sharp debris, sewage, chemicals, and electrical hazards. Moving water is stronger than it looks.



Stay out of floodwater

Never walk, swim, or play in it. Drivers should turn around at flooded roads. Tell an adult and choose a safe route.

Sources 11 (pp. 33–34) • Illustrations are conceptual.

WIND, DEBRIS, AND TORNADOES

A storm creates danger both near and far from its center.

THE WIND PUSHES HARD

Strong winds damage roofs and trees. Loose outdoor objects become flying debris. Even covered windows are places to stay away from.

GUSTS VERSUS SUSTAINED WINDS

A gust is a brief burst. Sustained wind is averaged over a longer period. Hurricane categories use maximum sustained winds, not the strongest gust.

TORNADOES IN RAINBANDS

Some hurricane thunderstorms produce tornadoes. They often occur in outer rainbands, away from the eye.

TWO ALERTS AT ONCE

A hurricane warning does not replace a tornado warning. Families need to keep receiving local alerts while sheltering.



Shelter from wind

Use a sturdy building and an interior room away from glass, on the lowest level safe from flooding. Follow local emergency instructions.

Sources 11 (pp. 33–34) • Illustrations are conceptual.

DANGER BEYOND THE SHORE

A distant hurricane still changes the ocean at your beach.

WAVES TRAVEL OUTWARD

A hurricane sends swells far across the ocean. Dangerous surf sometimes reaches beaches where the weather still looks pleasant.

RIP CURRENTS

These concentrated channels of water move away from shore. They pull swimmers farther out, rather than pulling them underwater.

NOT A STORM-WATCHING SPOT

Piers, jetties, dunes, and seawalls become dangerous places during high surf. Waves can reach farther than expected.

LISTEN TO LOCAL WARNINGS

Beach flags, lifeguards, and official beach forecasts help families recognize unsafe conditions. Stay out when conditions are hazardous.

If caught in a rip current

Float and signal for help. Do not fight straight against the current. If able, swim parallel to shore to escape, then angle back. Get a lifeguard or call 911 if someone needs rescue. Never enter the water to rescue someone.

Sources 11, 12 (pp. 33–34) • Illustrations are conceptual.

ECOSCAPE KIDS

FLORIDA HURRICANES

WATCH OR WARNING?

Similar words. Different meanings. Both deserve attention.

HURRICANE WATCH: POSSIBLE

Hurricane conditions are possible in the area. Watches are generally issued 48 hours before tropical-storm-force winds are expected to begin.

HURRICANE WARNING: EXPECTED

Hurricane conditions are expected in the area. Warnings are generally issued 36 hours before tropical-storm-force winds are expected to begin.



WHY START THE CLOCK EARLY?

Outdoor preparations and evacuation become dangerous before hurricane-force winds arrive. Families need time to act ahead of the weather.

OTHER ALERTS MATTER TOO

Storm surge, flooding, tornadoes, and tropical-storm winds have their own alerts. An evacuation order comes from local officials.

Never wait for the worst wind

Follow local evacuation instructions when issued. A watch or warning is not a countdown that guarantees extra time.

Sources 13 (pp. 33–34) • Illustrations are conceptual.

ECOSCAPE KIDS
FLORIDA HURRICANES

KNOW YOUR ZONE. KNOW YOUR ROUTE.

Evacuation moves people away from places facing serious danger.

ZONES ARE ABOUT LOCATION

Florida counties use evacuation zones to identify areas at risk, especially from storm surge. An evacuation zone is not the same as a flood-insurance zone.

THE HOME MATTERS TOO

Mobile homes and other unsafe buildings need special plans for wind. A home outside a surge zone is not automatically a safe shelter.

CHOOSE A SAFE DESTINATION

Adults should plan where to go, how to get there, and a backup route. Follow your county's directions rather than guessing how far to drive.

LEAVE EARLY WHEN DIRECTED

Roads, bridges, and shelter options change as a storm approaches. Do not wait until the wind or water makes travel dangerous.

Find the real map

Ask an adult to check FloridaDisaster.org/KnowYourZone and your county emergency management website before hurricane season.



Sources 14 (pp. 33–34) • Illustrations are conceptual.

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YOUR FAMILY HURRICANE PLAN

Good preparation starts while the weather is calm.

STAY CONNECTED

Adults choose an out-of-area contact and safe meeting places. Keep important phone numbers on paper as well as in phones.

PLAN FOR DIFFERENT PLACES

A storm might threaten while family members are at work or school. Know how your school shares updates and how trusted adults arrange pickup.

CHOOSE SHELTER OPTIONS

Plan where to stay if your home is unsafe or evacuation is ordered. Adults should confirm transportation, shelter requirements, and backup choices.

EVERYONE HAS A ROLE

Kids stay with trusted adults and know where essential supplies belong. Adults make evacuation decisions and manage tools, vehicles, medicines, and electrical equipment.



A plan reduces surprises

Review it before the season. Keep it simple enough for every family member to understand.

Sources 15, 18 (pp. 33–34) • Illustrations are conceptual.

ECOSCAPE KIDS

FLORIDA HURRICANES

PACK FOR DAYS WITHOUT SERVICES

Florida recommends at least seven days of supplies.

WATER COMES FIRST

Store at least one gallon per person per day for drinking and sanitation. More is needed for some people, hot weather, and pets. Four people need at least 28 gallons for seven days.

FOOD AND EVERYDAY NEEDS

Pack shelf-stable food, a manual can opener, hygiene supplies, and items needed by babies or family members with special diets.



LIGHT AND INFORMATION

Include flashlights, spare batteries, a battery-powered or hand-crank radio, and charged power banks. Choose flashlights rather than candles.

ADULTS HANDLE THE ESSENTIALS

They organize medicines, a first-aid kit, copies of important documents, cash, and any equipment the family relies on.

Pack for your household

A shelter or evacuation bag is easier to carry than the full home supply. Adults should check local shelter guidance and refresh supplies regularly.

Sources 16, 17 (pp. 33–34) • Illustrations are conceptual.

PREPARE THE HOME EARLY

Small objects outside become dangerous in strong wind.

BEFORE A STORM THREATENS

Adults arrange repairs, inspect shutters, and ask qualified professionals about roof, door, and tree concerns. Waiting until strong winds arrive is too late.

SECURE THE YARD

Adults bring loose furniture, toys, tools, and planters inside or secure them properly. Never work outdoors during dangerous weather.

PROTECT OPENINGS

Use approved storm shutters or properly installed protective panels. Tape on windows does not provide hurricane protection.

KEEP KIDS AWAY FROM HAZARDS

Ladders, saws, heavy panels, roofs, and electrical work belong to trained or capable adults. Children should not climb trees or help remove branches.

Property never comes first

Leave the home when local officials direct. Stronger windows do not make a surge evacuation zone safe.



Sources 18 (pp. 33–34) • Illustrations are conceptual.

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FLORIDA HURRICANES

PLAN FOR EVERY FAMILY MEMBER

Pets, medical needs, and accessibility belong in the plan.

PETS NEED A DESTINATION

Adults should confirm which shelters or other destinations accept pets. Pack food, water, medicine, identification, records, carriers, and leashes.

SERVICE ANIMALS

Service animals have different access rules from pets. Adults should check arrangements and bring essential supplies for the animal.

MEDICAL AND ACCESS NEEDS

Plan for mobility, communication, refrigerated medicine, and equipment that needs electricity. Arrange backup help before a storm threatens.

ASK THE COUNTY EARLY

People needing extra assistance should contact local emergency management about registration, transport, and special-needs shelter options. Registration does not guarantee shelter eligibility.

Never leave pets behind

Include them in evacuation plans. Adults should confirm current shelter rules rather than assuming every shelter accepts animals.

Sources 15, 19, 20 (pp. 33–34) • Illustrations are conceptual.

WHILE THE STORM ROARS

Stay with trusted adults and keep listening for official instructions.

CHOOSE THE SAFER SPACE

In a sturdy building, shelter in a small interior room away from windows, on the lowest level safe from flooding. Follow evacuation orders before the storm.

KEEP THE ESSENTIALS CLOSE

A flashlight, radio, drinking water, and needed medicine belong nearby, Keep listening for local alerts, including tornado warnings.

STAY AWAY FROM GLASS

Closed shutters do not make windows safe viewing spots. Do not open windows to balance pressure or step outside to watch the weather.

IF WATER RISES

Tell an adult immediately, Follow emergency instructions and move to a higher safe level if flooding threatens. Never enter floodwater or become trapped in a closed attic.



Calm does not mean finished

The eye sometimes brings a brief lull. Stay sheltered until officials announce it is safe.

Sources 21 (pp. 33–34) • Illustrations are conceptual.

AFTER THE WIND STOPS

Blue sky does not remove the hazards.

WAIT FOR PERMISSION

If evacuated, return only when local officials say it is safe. Damaged roads and buildings remain dangerous after the weather improves.

Let adults check first

Do not enter a damaged building or approach a leaning tree. Follow local advice about drinking water and food safety.



KEEP AWAY FROM WIRES

A fallen power line might still carry electricity. Do not touch it or anything touching it, including water, fences, or branches. Tell an adult and stay far away.

FLOODWATER IS NOT A PLAYGROUND

Water hides sharp debris, contamination, and electrical danger. Stay out even if it looks shallow or calm.

CLEANUP IS ADULT WORK

Unstable trees, broken glass, sharp metal, mold, and heavy equipment create risks. Children should not take part in disaster cleanup.

Sources 22, 23, 24 (pp. 33–34) • Illustrations are conceptual.

ECOSCAPE KIDS
FLORIDA HURRICANES

WHEN THE POWER GOES OUT

Safe choices matter long after the storm passes.

A HIDDEN GAS

Fuel-burning equipment produces carbon monoxide. This poisonous gas has no color or smell. A working battery-backup carbon monoxide alarm helps warn a household.

GENERATORS ARE ADULT EQUIPMENT

Use portable generators outdoors, at least 20 feet from windows, doors, and vents, with exhaust directed away from buildings. Never use one in a home, garage, porch, or carport.

CHOOSE SAFER LIGHT

Use flashlights or battery lanterns. Candles add fire risk. Never use a grill or camp stove indoors.

FOOD, WATER, AND HEAT

Adults should follow official advice about spoiled food, boil-water notices, medicine storage, and staying cool. Never taste food to decide if it is safe.



Report symptoms immediately

If anyone feels dizzy, weak, nauseated, or confused near fuel-burning equipment, get everyone to fresh air and call 911.

Sources 22, 23 (pp. 33–34) • Illustrations are conceptual.

A COMMUNITY RECOVERS

People with different skills help a place become safer again.

TEAMS AT WORK

Emergency crews rescue people and assess damage. Utility workers repair systems. Health workers, shelter staff, and volunteers support families.

RECOVERY TAKES TIME

Some streets reopen quickly. Other neighborhoods need months or longer. Homes, schools, parks, and natural habitats recover at different speeds.

FEELINGS MATTER

After a storm, kids sometimes feel worried, angry, sad, or tired. Talking with a trusted adult and returning to familiar routines helps. Ask for extra support if worries interfere with daily life.

HELP FROM A SAFE PLACE

Adults choose safe ways for families to support others. Children should stay away from debris and disaster cleanup sites.



You are not responsible for fixing everything

A child's job is to stay safe, speak up about needs, and let trusted adults help.

Sources 24, 25 (pp. 33–34) • Illustrations are conceptual.

A SEASON. A NAME. A REMINDER.

Florida prepares every year, even when the outlook sounds quiet.

ATLANTIC HURRICANE SEASON

The official season runs June 1 through November 30. Tropical storms and hurricanes sometimes form outside those dates.

WHY GIVE STORMS NAMES?

Names make it easier to communicate about different storms. In the Atlantic, a tropical cyclone receives a name when it becomes a tropical storm.

NAMES RETURN, WITH EXCEPTIONS

The World Meteorological Organization manages the lists. Many names repeat on a six-year cycle. Names of especially deadly or costly storms are retired.

AN OUTLOOK IS NOT YOUR FORECAST

A seasonal outlook estimates activity across a large region. It does not predict whether your neighborhood will be hit. One storm is enough to make preparation important.



Learn from the past

The next five pages highlight selected storms that affected Florida. They are not a complete list of every Florida hurricane.

Sources 26, 27 (pp. 33–34) • Illustrations are conceptual.

BEFORE SATELLITES

1921–1935

Selected storms • Categories describe the landfall stated in each entry.

1921 — **Tampa Bay / Tarpon Springs Hurricane**

Category 3 near Tarpon Springs. Destructive storm surge flooded parts of the Tampa Bay coast.

1926 — **Great Miami Hurricane**

Category 4 at its South Florida landfall. It struck the Miami area, bringing destructive wind and water before modern satellites and radar existed.

1928 — **Okeechobee Hurricane**

Category 4 at its Florida landfall near West Palm Beach. Wind drove Lake Okeechobee water over vulnerable lakeside communities, causing catastrophic flooding.

1935 — **Labor Day Hurricane**

Category 5 in the middle Florida Keys. Its extremely low central pressure made it the most intense recorded U.S. landfall by pressure.

HISTORY LESSON

Coastal surge and water pushed from a lake are different flooding mechanisms. Both show why wind speed alone does not explain a disaster.

Sources 28, 29, 31, 35 (pp. 33–34) • Illustrations are conceptual.

A STATEWIDE HISTORY

1947–1995

Selected storms • Categories describe the landfall stated in each entry.

1947 — **Fort Lauderdale-area hurricane**

Category 4 near Pompano Beach.

1949 — **Palm Beach hurricane**

Category 4 near Palm Beach Shores.

1950 — **Easy**

Category 3 near Cedar Key. Its slow movement helped produce exceptional rainfall.

1960 — **Donna**

Category 4 through the Keys, then across the peninsula.

1965 — **Betsy**

Category 3 through the Florida Keys.

1975 — **Eloise**

Category 3 on the Florida Panhandle coast.

1992 — **Andrew**

Category 5 in southern Miami-Dade County. Its concentrated wind damage changed how Florida thought about building protection.

1995 — **Opal**

Category 3 near Pensacola Beach.

HISTORY LESSON

The Keys, peninsula, Big Bend, and Panhandle all face hurricane risk. No part of the state should rely on another region’s experience.

Sources 28, 29, 31 (pp. 33–34) • Illustrations are conceptual.

BACK-TO-BACK STORMS

2004–2005

Selected storms • Categories describe the landfall stated in each entry.

2004 — **Charley**

Category 4 near Cayo Costa. Severe wind damage continued across central Florida.

2004 — **Frances**

Category 2 near Hutchinson Island. Slow movement prolonged rain and wind.

2004 — **Ivan**

Category 3 landfall in Alabama, with devastating surge and wind in Florida’s western Panhandle.

2004 — **Jeanne**

Category 3 near Hutchinson Island, about three weeks after Frances.

2005 — **Dennis**

Category 3 near Navarre Beach in the Panhandle.

2005 — **Katrina**

Category 1 in southeast Florida before its later, more destructive northern Gulf landfall.

2005 — **Rita**

Passed south of the Keys, bringing wind and coastal flooding without a Florida landfall.

2005 — **Wilma**

Category 3 near Cape Romano before crossing South Florida.

HISTORY LESSON

Landfall elsewhere does not mean Florida escapes damage. Several storms in one season also strain recovery and supplies.

Sources 28, 30, 31 (pp. 33–34) • Illustrations are conceptual.

DIFFERENT STORMS. DIFFERENT RISKS.

2016–2020

Selected storms • Categories describe the landfall stated in each entry.

2016 • **Hermine**

Category 1 near St. Marks in the Big Bend region. Surge and flooding affected communities along the Gulf coast.

2017 • **Irma**

Category 4 at Cudjoe Key, then Category 3 near Marco Island. Its broad circulation affected a large part of Florida.

2018 • **Michael**

Category 5 near Mexico Beach and Tyndall Air Force Base. Extreme winds and storm surge devastated parts of the Panhandle.

2020 • **Sally**

Category 2 landfall in Alabama. Slow movement brought major rainfall and flooding to the western Florida Panhandle.

HISTORY LESSON

Storm size, forward speed, rainfall, and coastal geography change the pattern of damage. The category is only one clue.

Sources 29, 31, 36, 37, 38 (pp. 33–34) • Illustrations are conceptual.

RECENT LESSONS

2022–2024

Selected storms • Categories describe the landfall stated in each entry.

2022 — **Ian**

Category 4 at Cayo Costa. Catastrophic surge hit southwest Florida, while heavy rain caused major inland flooding.

2022 — **Nicole**

Category 1 near Vero Beach. Coastal flooding and erosion showed that lower-category storms still cause serious harm.

2023 — **Idalia**

Category 3 near Keaton Beach in the Big Bend.

2024 — **Debby**

Category 1 near Steinhatchee. Heavy rain was a major concern.

2024 — **Helene**

Category 4 in the Big Bend near Perry. Destructive surge reached far along Florida’s Gulf coast.

2024 — **Milton**

Category 3 near Siesta Key. Wind, flooding rain, surge, and tornadoes affected different areas.

HISTORY LESSON

Learn from past storms, but use the current forecast for the next one. This selected history ends in 2024, not with a prediction of what comes next.

Sources 29, 31, 32, 33, 34 (pp. 33–34) • Illustrations are conceptual.

Words of the Storm

A–L • Plain-language definitions

Air pressure
The force of air pressing on a surface.

Carbon monoxide
A poisonous gas from burning fuel. It has no color or smell.

Condensation
The change from water vapor into tiny liquid droplets.

Dropsonde
An instrument dropped from an aircraft to measure weather as it falls.

Evacuation
Leaving an unsafe area for a safer destination.

Evacuation zone
An area officials use to organize evacuation decisions, especially for surge.

Eye
The relatively calm center found in many well-developed hurricanes.

Eyewall
The ring of strong thunderstorms surrounding the eye.

Flash flood
A rapid rise of water, often after very heavy rain.

Forecast
An estimate of future weather based on evidence and scientific methods.

Forecast cone
A graphic showing uncertainty in the future track of a storm’s center.

Gust
A brief burst of stronger wind.

Humidity
A measure of moisture in the air.

Hurricane
A tropical cyclone with sustained winds of at least 74 mph.

Landfall
When the center of a storm crosses a coastline.

Low pressure
An area with lower air pressure than its surroundings.

Words of the Storm

M–W • Plain-language definitions

Major hurricane

A Category 3, 4, or 5 hurricane.

Model

A mathematical representation used to estimate how weather will change.

Observation

A measurement or description of conditions now or in the past.

Rainband

A curved group of showers or thunderstorms around a tropical cyclone.

Rapid intensification

An increase of at least 35 mph in maximum sustained winds in 24 hours.

Rip current

A concentrated current flowing away from shore through the surf zone.

Storm surge

An unusual rise of seawater caused mainly by a storm’s winds.

Storm tide

The water level from storm surge combined with the regular tide.

Sustained wind

Wind speed averaged over time. NHC uses a one-minute average for hurricane intensity.

Track

The path taken, or forecast to be taken, by a storm’s center.

Tropical cyclone

An organized rotating storm that forms over tropical or subtropical water.

Tropical depression

A tropical cyclone with sustained winds of 38 mph or less.

Tropical storm

A tropical cyclone with sustained winds of 39–73 mph.

Warning

An alert indicating a hazardous event is expected, imminent, or occurring, depending on the hazard.

Watch

An alert indicating conditions are favorable for, or a hazard is possible, depending on the hazard.

Wind shear

A change in wind speed or direction with height or distance. Vertical shear affects hurricane organization.

Sources & Further Learning

Open a linked reference with a trusted adult.

01 **How hurricanes form**
NOAA Ocean Service • Used on 1, 2, 4

02 **Tropical cyclone classification**
NOAA JetStream • Used on 1

03 **Tropical cyclone structure**
NOAA JetStream • Used on 3

04 **Hurricane terms and definitions**
National Hurricane Center • Used on 3, 4, 10, 31, 32

05 **Saffir-Simpson Hurricane Wind Scale**
National Hurricane Center • Used on 5

06 **Hurricane observation instruments**
NOAA AOML • Used on 6

07 **NOAA Hurricane Hunters**
NOAA Aircraft Operations • Used on 7

08 **Hurricane forecasting**
NOAA • Used on 8, 10

09 **About the forecast cone**
National Hurricane Center • Used on 9

10 **Understand forecast information**
NOAA • Used on 8, 9, 10

11 **Hurricane hazards**
National Hurricane Center • Used on 11, 12, 13, 14

12 **Rip current questions and answers**
National Weather Service • Used on 14

13 **Hurricane watch and warning**
NOAA Ocean Service • Used on 15

14 **Know your zone, know your home**
Florida Emergency Management • Used on 16

15 **Plan and prepare**
Florida Emergency Management • Used on 17, 20

16 **Preparing for hurricane season**
Florida Emergency Management • Used on 18

17 **Disaster supply kit checklist**
Florida Emergency Management • Used on 18

18 **Preparing for hurricanes**
CDC • Used on 17, 19

19 **Make a pet plan**
Florida Emergency Management • Used on 20

Click a reference title to open the full source. References reviewed October 2026.

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Sources & Further Learning

Open a linked reference with a trusted adult.

20 **Special needs registry**
Florida Emergency Management • Used on 20

21 **Stay protected during storms**
NOAA • Used on 21

22 **After a hurricane**
National Weather Service • Used on 22, 23

23 **Safety after a hurricane**
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29 **Notable Florida hurricanes**
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30 **Four hurricanes in six weeks**
NOAA • Used on 28

31 **Tropical cyclone report archive**
National Hurricane Center • Used on 26, 27, 28, 29, 30

32 **Hurricane Helene report**
National Hurricane Center • Used on 30

33 **Hurricane Milton report**
National Hurricane Center • Used on 30

34 **Hurricane Ian report**
National Hurricane Center • Used on 30

35 **Tampa Bay / Tarpon Springs hurricane of 1921**
National Weather Service • Used on 26

36 **Hurricane Michael report**
National Hurricane Center • Used on 29

37 **Hurricane Hermine report**
National Hurricane Center • Used on 29

38 **Hurricane Sally, September 2020**
National Weather Service • Used on 29

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