



4th - 8th Grade

**4-H PROJECT**

**LESSON**

**PLANS:**

4-H Helps

YOUTH

into the

**21<sup>st</sup>** Century

Series **1**

"Hurricane Hazards"

**LSU**  
AgCenter  
Research & Extension

# Dear Project Helper,

This lesson is part of an effort by the 4-H Youth Development Division of the LSU AgCenter to provide teaching activities that are fun as well as educational. We are pleased you have agreed to work with youth as they learn and grow. You will help them learn scientific concepts that they will use for many years.

These lessons address Louisiana Content Standards science benchmarks; therefore, what you do with this activity should help strengthen students for LEAP testing. We appreciate your being part of this effort.



# Learning Activity: "Hurricane Hazards"

## Key Concepts:

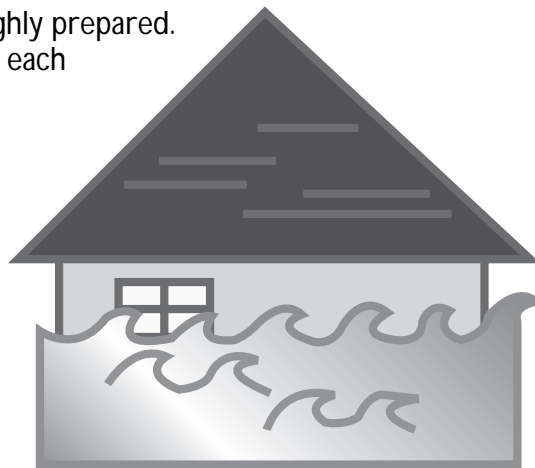
1. Speed of wind determines its ability to cause harm.
2. Certain visible signs can give clues to the speed and strength of wind and its potential to cause harm and destruction.

## How will members apply this information?

1. Teach hurricane safety and awareness to others.
2. Explore alternative safety measures using history of hurricane damage and impact.
3. Monitor winds during hurricane season to determine when dangerous winds are present.

## Getting Ready:

1. Gather all supplies needed.
2. Read lesson and be thoroughly prepared.
3. Make copies of handout for each participant.



## What You Need for the Lesson:

1. Hurricane tracking chart
2. Three-speed electric fan
3. Three separate colors of paper (20 to 30 sheets of each color)
4. Yardstick
5. Copy of handout for each student

Track:  
 Science

Life Skill:  
 Teamwork, Communication,  
 Decision Making, Problem  
 Solving, Visualizing Information,  
 Completing a project/task  
 and Critical Thinking

Character Focus:  
 Citizenship and Responsibility

Project Skill:  
 Awareness of history,  
 terminology, effects, tracking  
 and preparation  
 procedures for hurricane  
 watches, warnings  
 and evacuations.

Louisiana Content  
 Standards  
 Benchmarks:

S1-EB-3, S1-EB-4, S1-EB-6,  
 S1-M-A1, S1-M-A2, S1-M-A3,  
 S1-M-A4, S1-M-A5, S1-M-A6,  
 S1-M-A6, S1-M-A7, N-7-M,  
 N-2-E, N-8-E, M-1-E, M-3-E,  
 M-5-E, D-1-E

*Delivery Mode:*

*Project club or  
 project group meeting*

*Time Allotted:*

*30-45 minutes*

*Number of  
 Participants:*

*groups 10 to 30*

# 4th-8th Grade "Hurricane Hazards"

What You Say:	What You Show or Do:	What Participants Do:
<p>If you have experienced a hurricane, would you please share the experience with the group? What causes the most damage during hurricanes? (Possible answers: the wind, water, falling or flying objects, etc.)</p>	<p>Allow time for discussion and replies.</p>	<p>Discuss and respond.</p>
<p>(Experience) On this table is a fan in front of a stack of paper. What do you think will happen when I turn the fan on at low speed? (Possible answers: Papers will blow around; papers will blow off the table, etc.)</p>	<p>Allow for discussion and reply.</p>	<p>Discuss and reply.</p>
<p>We will divide into groups of three (or four or five, depending on size of group and space available). Each group will estimate, in feet and inches, the distance the pages will travel and the number of pages that will travel at low speed, at medium speed and then at fast speed of the fans. For each fan, one member from the team will estimate the distance the papers will travel, one member will estimate the number of pages that will travel and one member will measure and report the actual distance and page count that occurs for each fan speed.</p>	<p>Place stack of paper (blue) in front of fan that you will turn to low speed for 5 seconds. Place stack of paper (green) in front of fan that you will turn to medium speed for 5 seconds. Place stack of paper (white) in front of fan that you will turn to high speed for 5 seconds. Assist participants in forming groups. Allow time for estimations. Turn fans on for 5 seconds and allow students to measure distance papers traveled and count the number of pages that traveled.</p>	<p>Form groups, make predictions, measure outcome of distance and number of papers and report.</p>
<p>(Share) What happened when fan speed increased? (Possible answers: The distance the papers traveled increased, the number of pieces of paper traveling increased.)</p>	<p>Allow time for discussion and replies.</p>	<p>Discuss and respond.</p>

## 4th-8th Grade "Hurricane Hazards"

What You Say:	What You Show or Do:	What Participants Do:
<p>What speed of the fan caused the papers to travel the farthest? (Answer: the highest speed)</p> <p>What speed of the fan caused the largest number of papers to travel? (Answer: the highest speed)</p> <p>What does this experiment suggest about wind speed and velocity? (Answer: the higher the speed and velocity, the farther objects can be carried.)</p> <p>As wind speed increases, what happens to the probability of damage to property? (Answer: More damage is likely to occur if objects are in the path of the wind.)</p>	<p>Allow time for discussion and replies.</p>	<p>Discuss and reply.</p>
<p>As a hurricane is forming, we have what is called a tropical depression and then a tropical storm over the warm tropical oceans such as the Gulf of Mexico. As the tropical storm develops into a hurricane, the hurricane will develop sustained winds in excess of 64 knots (74 miles per hour). These storms are capable of producing dangerous winds, torrential rains and flooding, all of which may result in tremendous property damage and loss of life in coastal populations. One memorable storm in Louisiana was Hurricane Andrew, which was responsible for at least 50 deaths and more than \$30 billion in property damage. How fast does the wind have to blow for the storm to reach the hurricane category? (Answer: 74 miles per hour)</p> <p>The official dates of the hurricane season are June 1 through November 30.</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and reply.</p>

## 4th-8th Grade "Hurricane Hazards"

What You Say:	What You Show or Do:	What Participants Do:
<p>Will some of you now share your hurricane experiences?</p>		
<p>(Generalize)            What are the differences between a hurricane, a cyclone and a typhoon?            (Answers: Cyclones usually occur over the Indian Ocean, typhoons are over the western Pacific Ocean and hurricanes are over the Atlantic Ocean.)            Will we likely experience a typhoon or a cyclone in the United States? Why, or why not?            (Answer: No. They do not usually occur near us.)</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and reply.</p>
<p>(Process)            Sometimes during the hurricane season, our weather forecaster may announce, "We are under a hurricane watch" or "We are under a hurricane warning." What do you think each statement actually tells us about the possibility of our experiencing a hurricane?            What should we do when we hear these statements?            (Possible answers: A watch is to let us know when a hurricane may threaten our area. We should listen carefully to weather reports and check our emergency supplies. A warning is to let us know that a hurricane is expected to strike our area within 24 hours or less. We should begin to take further steps to secure our safety and that of our pets and our homes. If there is possibility of a direct hit, we should seek proper shelter or remove ourselves from the area if at possible.)</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and reply.</p>

## 4th-8th Grade "Hurricane Hazards"

What You Say:	What You Show or Do:	What Participants Do:
<p>(Apply)</p> <p>In each group, please list five preparation strategies when a hurricane watch is issued. List five preparation strategies when a hurricane warning is issued. Examples of preparation strategies for a hurricane watch are: Stay informed of any potential danger. Check flashlights, portable radio and TV sets and your supply of batteries for that equipment. Make sure vehicles are filled with fuel. Stock a good supply of non-perishable food that does not require cooking. Check materials you may need such as masking tape, boards, nails and rope or wire. Make plans for providing light in your home. Remember, if you have to evacuate, your pets will not be allowed in most shelters. Make plans early to take care of pets. Preparation strategies for a hurricane warning are: 1. Stay informed of any potential danger. 2. If you are not in an evacuation area, and your home is sturdy and in no danger of flooding, stay at home. 3. Prepare for high winds by securing loose objects on and around your home. 4. Tape or board windows and draw drapes and blinds to protect against water and glass. 5. Check your survival supplies. Stock canned food that does not require cooking, flashlights, spare batteries, water for drinking and operating toilets, and tools for quick repairs. 6. Secure valuables and personal papers against water damage.</p>	<p>Allow time for discussion and responses.</p>	<p>Each group should develop a list of five preparation items for a hurricane watch and warning. One member from each should report on the list of five selected items for a hurricane watch and another member should report items for a hurricane warning.</p>

# 4th-8th Grade "Hurricane Hazards"

What You Say:	What You Show or Do:	What Participants Do:
<p>What are five steps you can take once an evacuation order has been issued?</p> <p>(Possible answers: Leave early, in daylight if possible. Shut off water and electricity where they enter the house. Take small valuables and papers, but travel light. Take blankets or sleeping bags, flashlights, special foods and medications as required, infant needs and lightweight chairs. Leave food and water for pets. Lock up house. Drive carefully to designated shelter; use recommended route. Register every person arriving at shelter. Be prepared to help shelter workers, if asked.</p>	<p>Allow time for discussion and responses.</p>	<p>Discuss and respond</p>
<p>As <b>citizens</b> of our communities, we have the <b>responsibility</b> of sharing what we know with other members of our community. Read about hurricanes to learn how to increase your chances for survival when they happen. Share what you know with family, neighbors, younger children and others in your community.</p>		

# Ways to Help Members

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## Learn More:

1. Give hurricane tracking charts to all students. Instruct them to plot three points on tracking chart. Latitude 26.5 North, Longitude 93.5 West; Latitude 29.0 North, Longitude 82.0 West; Latitude 30.9 North, Longitude 88.0 West.
2. Complete resource list with handouts. They consist of the Saffir-Simpson Scale and categories of hurricanes, why and how hurricanes are named, and definitions of terms used to describe hurricanes and their force.
3. Have students research past major hurricanes of the 20<sup>th</sup> century. Some examples of hurricanes that made landfall in the 20<sup>th</sup> century: Hurricane Camille, Hurricane Hugo, Hurricane Andrew, Hurricane Betsy and Hurricane Audrey. Discover where they made landfall, what their impact was and what geographic factors may have affected their impact.
4. Have students research hurricane preparedness in their community.



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### Resources:

American Red Cross/  
 Masters of Disaster™,  
 Hurricanes, Lesson Plan 2/  
 Hurricanes Hazards and  
 Wind. Masters of Disaster™ is a trademark of the American Red Cross.

**Web sites:** <http://www.yatcom.com/newor/weather/hurricane.html>  
<http://www.weather.com>  
<http://noaa.gov>

For additional information about the *Masters of Disaster* curriculum, visit the American Red Cross Web site at [redcross.org/disaster/masters](http://redcross.org/disaster/masters).

### Acknowledgments:

*Masters of Disaster/3-5*, ©2000 by the American National Red Cross. *Masters of Disaster* is an alliance between the American Red Cross and the Allstate® foundation supporting disaster safety education for students and families.

Evaluating 4-H Curriculum through the Design Process: Pilot Testing and Collecting Data for the 4-H National Jury Review Process, ©1999 by Purdue University, The Ohio State University. *Louisiana Content Standards*, published by Louisiana State Department of Education.

# Handout #1

## Hurricanes



ESS-E-A4 investigating, observing, measuring and describing changes in daily weather patterns and phenomena

### PREPARING FOR A HURRICANE

#### Program Objective:

To make youth aware of the history, terminology, effects, tracking procedures and preparation procedures of hurricanes.

#### Background Information:

Hurricanes are cyclones that develop over the warm tropical oceans and have sustained winds in excess of 64 knots (74 miles per hour). These storms are capable of producing dangerous winds, torrential rains and flooding, all of which may result in tremendous property damage and loss of life in coastal populations. One memorable storm was Hurricane Andrew, which was responsible for at least 50 deaths and more than \$30 billion in property damage.

The official hurricane season is June 1 through November 30, with most storms occurring in August, September and October. Storms known as hurricanes in the Atlantic Ocean are called typhoons in the western Pacific Ocean and cyclones over the Indian Ocean.

Records show that there are usually 10 tropical storms each year, with six of those developing into hurricanes. In recent years, the following have occurred:

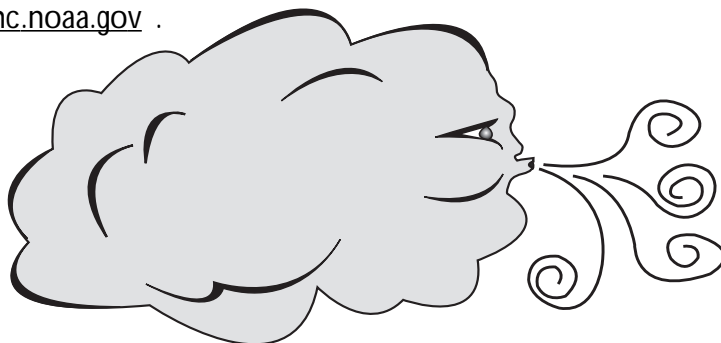
**1969 18 storms**

**1983 4 storms**

**1992 14 named storms; 8 developed into hurricanes**

**1998 14 named storms; 10 developed into hurricanes**

In addition, more hurricane information can be obtained from the National Hurricane Center's web site at [www.nhc.noaa.gov](http://www.nhc.noaa.gov) .





# Handout #1

## Hurricanes, cont.

### Naming of Hurricanes:

The National Hurricane Center near Miami keeps a constant watch on oceanic storm-breeding areas for tropical disturbances that may herald the formation of a hurricane. If a disturbance intensifies into a tropical storm - with rotary circulation and wind speeds above 39 miles per hour- the center will give the storm a name. A separate set of names is used each year, with the first name in the set beginning with the letter A. After the sets are all used, they are used again at a later year. The letters Q, U, X, Y, and Z are not included because of the scarcity of names beginning with those letters. The name list has an international flavor because hurricanes affect other nations and are tracked by the public and weather services of countries other than the United States. Names for these lists are selected from library sources and agreed upon at international meetings of the World Meteorological Organization by nations involved.

### Why are Hurricanes Named?

Experience shows that the use of short, distinctive given names in written as well as spoken communications is quicker, and less subject to error, than the older, more cumbersome latitude-longitude identification methods. These advantages are especially important in exchanging detailed storm information among hundreds of widely scattered stations, airports, coastal bases and the ships at sea.

The use of easily remembered names reduces confusion when two or more tropical storms occur at the same time. For example, one hurricane can be moving slowly westward in the Gulf of Mexico while, at exactly the same time, another hurricane can be moving rapidly northward along the Atlantic Coast. In the past, confusion and false rumors have arisen when storm advisories broadcast from one radio station were mistaken for warnings of an entirely different storm located hundreds of miles away.

**Advisory** - A method of disseminating hurricane and storm data to the public every 6 hours.

**Small Craft Advisories** - Small craft operators are advised not to venture into the open Gulf for winds of 20 knots or more.






**Special Advisory** - Warning given when there is a significant change in weather conditions or change in warnings.

**Intermediate Advisory** - A method of updating regular advisory information every 2 to 3 hours as necessary.

**Gale Warning** - Wind speed of 39 to 59 miles per hour expected.

The Saffir-Simpson Hurricane Scale categorizes the intensity of hurricanes. Based on a scale of 1 to 5, it estimates the potential property damage and flooding expected along the coast with a hurricane.



-  **Category 1 C**  
This is a hurricane with winds of 74 to 95 mph and a storm surge of 4 to 5 feet above normal. There usually is no real damage to building structures; however, damage is done primarily to unanchored mobile homes, shrubbery and trees. Also, some coastal road flooding and minor pier damage usually occurs.
-  **Category 2 C**  
This is a hurricane with winds of 96 to 110 mph and a storm surge of 6 to 8 feet above normal. There is usually some roofing material, door and window damage to buildings. Usually considerable damage to vegetation, mobile homes and piers occurs. Coastal and low-lying escape routes flood 2 to 4 hours before arrival of storm center, and small craft in unprotected waters usually have anchorage moorings break.
-  **Category 3 C**  
This is a hurricane with winds of 111 to 130 mph and a storm surge of 9 to 13 feet above normal. There is usually some structural damage to small residences and utility buildings with a certain amount of wall damage. Mobile homes are destroyed and flooding near the coast destroys smaller structures. Larger structures are damaged by floating debris. Terrain that is continuously lower than 5 feet above sea level may be flooded inland 8 miles or more.
-  **Category 4 C**  
This is a hurricane with winds of 131 to 155 mph and a storm surge of 13 to 18 feet above normal. Usually more extensive wall failures occur with some complete roof structure failure on small residences. Usually there is major erosion of beach areas and major damage to lower floors of structures near the shore. Terrain that is continuously lower than 10 feet above sea level may be flooded, requiring massive evacuation of residential areas inland as far as 6 miles.
-  **Category 5 C**  
This is a hurricane with winds higher than 155 mph and a storm surge of more than 18 feet above normal. There is usually complete roof structure failure on many residences and industrial buildings. Often there are complete building failures, with small utility buildings being blown over or blown away. Usually there is major damage to lower floors of all structures located less than 15 feet above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

**Louisiana has experienced many direct hits from hurricanes since 1899, and 11 have been major hurricanes, being either a category 3, 4 or 5.**



## Preparing for a Hurricane:

### When a HURRICANE WATCH is issued:

- Stay informed as to any potential danger.
- Check flashlights, portable radio and TV sets, and your supply of batteries for that equipment.
- Make sure vehicles are filled with fuel.
- Stock a good supply of non-perishable food that does not require cooking.
- Check materials you may need such as masking tape, boards, nails and rope or wire.
- Make plans for providing light in your home. Be careful; candles and open flame lanterns can cause fire.
- Remember, if you have to evacuate, your pets will not be allowed in shelters. Make plans early to take care of pets.



**Storm Warning** - Wind speed of 55 to 73 miles per hour expected.

**Hurricane Watch** - A hurricane may threaten your area.

**Hurricane Warning** - A hurricane expected to strike your area within 24 hours or less.

**Tropical Disturbance** - A moving area of thunderstorms in the tropics.

**Tropical Depression** - Area of low pressure, rotary circulation of clouds, winds to 38 mph.

**Tropical Storm** - Counterclockwise circulation of clouds and winds 39 to 73 miles per hour. The storm is assigned a name.

**Hurricane** - When a tropical storm reaches winds of 74 miles per hour or more, it is classified as a hurricane.

### When a HURRICANE WARNING is issued:

Stay informed as to any potential danger.

If you are not in an evacuation area, and your home is sturdy and in no danger of flooding, stay at home.

Prepare for high winds by securing loose objects on and around your home. Tape or board windows and draw drapes and blinds to protect against flying glass.

Check your survival supplies. Canned food that does not require cooking, flashlights, spare batteries, water for drinking and operating toilets, and tools for quick repairs may all be useful.

Secure valuables and personal papers against water damage.

If you are told to evacuate:

Leave early, in daylight if possible.

Shut off water and electricity where they enter the house.

Take small valuables and papers, but travel light.

Take blankets or sleeping bags, flashlights, special foods and medications as required, infant needs and lightweight chairs.

Leave food and water for pets.

Lock up house.

Drive carefully to nearest designated shelter; use recommended routes.

Register every person arriving with you at the shelter.

Be prepared to help shelter workers, if asked.

Visit our Web site: [www.lsuagcenter.com](http://www.lsuagcenter.com)

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