

MAST ACADEMY OUTREACH

ELEMENTARY SCHOOL PROGRAM

Adventures Aboard

WOW

(Weather on Wheels)

On-Site Packet



MAST Academy

Maritime and Science Technology High School

Miami-Dade County Public Schools

Miami, Florida

**MAST ACADEMY OUTREACH
WEATHER ON WHEELS
ELEMENTARY ON-SITE HIGHLIGHTS PACKET**

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Key to Symbols:



The “umbrella” symbol appears beside all directions, which are always enclosed within a cloud.
READ ALL DIRECTIONS CAREFULLY.



The “thinking” symbol appears beside all critical thinking questions. Teamwork will be required to answer these questions.

WEATHER STATION 1

EVERY PICTURE TELLS A STORY

You will document your experience aboard Weather on Wheels by using the digital camera to take two photos of any of the Weather Stations.



Look around and find one of the weather stations you want to photograph.

Write a story about each photograph. Use complete sentences in your story. Think about who or what is in your picture. If a person is in your photograph, what is he or she doing? If a computer is in your photograph, what is on the screen? If a piece of equipment or an instrument is in your photograph, what is it used for?

FIRST PHOTOGRAPH

This is a photograph of _____

SECOND PHOTOGRAPH

This is a photograph of _____

When finished, turn to page 2, the “Wind” Station.

WEATHER STATION 2

WIND

Wind is air in motion. It is caused by the unequal heating of the earth's land and water surfaces, which causes differences of pressure in the atmosphere.



Follow the directions on the table for using the wind speed indicator to record the wind speed in miles per hour.

1. **Wind Speed (MPH)** _____

A **hurricane** is a powerful tropical cyclone (rotating storm) with winds over 74 miles per hour.



Using the hurricane plotting chart on the table, follow the track of Hurricane Katrina in 2005. Record in the chart below Katrina's coordinates in latitude and longitude for each of the dates shown (a key to latitude and longitude is above the map).

DATE (11:00 PM)	LATITUDE	LONGITUDE
Aug. 23, 2005		
Aug. 24		
Aug. 25		
Aug. 26		
Aug. 27		
Aug. 28		
Aug. 29		

Hurricanes are classified according to both the intensity of the winds, and the damage produced by the storm. The method used to measure the intensity and damage caused by a hurricane is called the Saffir-Simpson Scale, which is shown below. This system categorizes storm intensity on a scale of one to five.

Use the Saffir-Simpson scale to answer the questions below.

CATEGORY	CENTRAL PRESSURE		WINDS (MPH)	SURGE	DAMAGE
	Millibars	Inches			
5	<920	<27.17	>155	>18'	Catastrophic
4	944-920	27.88-27.17	131-155	13'-18'	Extreme
3	964-945	28.47-27.91	111-130	9'-12'	Extensive
2	979-965	28.91-28.50	96-110	6'-8'	Moderate
1	≥980	≥28.94	74-95	4'-5'	Minimal

- What category hurricane has winds of 111-130 MPH? _____
- What category has a central pressure of <920 millibars? _____
- Hurricane Hugo in 1989 was a Category 4 hurricane. What type of damage did it cause?

- Hurricane Andrew in 1992, Hurricane Camille in 1969 and the Florida Keys Hurricane of 1935 are the only Category 5 hurricanes to strike the United States. What was the storm surge? _____

When finished, turn to page 3, the "Relative Humidity" Station.

WEATHER STATION 3 RELATIVE HUMIDITY

The amount of water vapor in the air is called humidity. Relative humidity is the amount of water vapor in the air at a certain temperature; warmer air can hold more water vapor than cold air. If the relative humidity is 50%, then the air is holding half the amount of water vapor it is capable of holding. If the relative humidity is 100%, then the air contains all the water vapor it can possibly hold. You will measure relative humidity using a **hygrometer** and a **sling psychrometer** (Sigh-krom-a-ter).



Look at the **hygrometer** on the table, then answer question 1.

5. What is the relative humidity reading on the hygrometer? _____ %



Follow the directions on the table for using the two **sling psychrometers**. Two people in your team should perform the activity at the same time. Record both the wet and dry bulb temperatures in the table below.

Psychrometer	Dry Bulb Temperature	Wet Bulb Temperature
# 1		
# 2		



Use the **relative humidity table** to find the relative humidity for each sling psychrometer. Follow the directions to the left of the table. Record both relative humidities in the chart below.

Relative Humidity from Sling Psychrometer 1	
Relative Humidity from Sling Psychrometer 2	



Now find the average relative humidity, then answer questions 2 and 3.

Find the sum of the two numbers above (add them together).	
Divide this sum by 2. This is the average humidity.	

2. Is the reading from the hygrometer (circle one) **higher than** **lower than** **the same as** the average relative humidity you calculated using the sling psychrometers?

3. Which instrument do you think gives you the more accurate reading? _____

Why? _____



When finished, turn to page 4, the “Air Pressure” Station.

WEATHER STATION 4

AIR PRESSURE

Air (barometric) pressure is the force exerted by the weight of the air above us. This weight creates a force on you much like the weight or force on a diver at the bottom of the ocean. The **barometer** is an instrument that measures changes in air pressure.



*Read the directions on the poster for reading the **aneroid barometer**. Look at the aneroid barometer on the table, and answer question 1 below.*

1. What is the current barometric pressure in millibars (mb)? _____

Hurricanes are areas of very low pressure (below 1000mb.) Typically the lower the air pressure the more intense the hurricane and its winds.



Look at the graph called “Air Pressure During Hurricane Katrina” and answer the following questions.

2. On what day was the air pressure the highest? _____
3. What was the air pressure on that day? _____
4. Hurricane Katrina hit New Orleans on August 29th. Was Katrina more or less intense the day before it hit New Orleans? (circle one) More Less



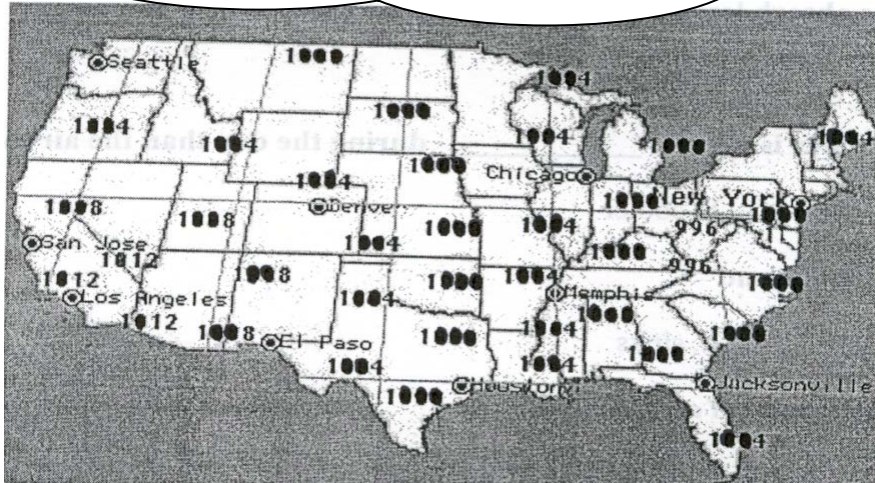
5. Explain your answer to #4. _____

6. If Katrina had hit New Orleans on August 28th, do you think it would have caused (circle one) more or less damage?



7. Explain your answer to #6. _____

The map on the table is a sample of an air pressure map. The thick black lines are called isobars. These lines connect locations of equal barometric pressure and form sets of curves that do not cross each other. On the map below, use the yellow highlighters provided to draw in the isobars by connecting numbers of equal pressure.



When finished, turn to page 5, the “*Clim*ate” Station.

WEATHER STATION 5 CLIMATE

What is climate? How does one distinguish weather from climate? One simple way to think of it is that climate is what we expect; weather is what we get. To describe climate, researchers look at the average weather over a number of years in a particular region during a particular season. In this activity, you will use monthly **precipitation** data to compare the subtropical climate in Miami to a desert climate in Phoenix, Arizona.



1. Click on the book with the title “U.S. Climate Data.”
2. Click on the bar at the bottom right that says “List All Cities.”
3. Scroll down and click on **Miami, FL**. (Cities are listed alphabetically by state.)
4. Click on the bar that says “City Information.” There is a **yellow arrow** pointing to the month of January indicating that the information listed is for that month.
5. Record the precipitation (rain) in the box for January in the data table below.
6. Click on March and record the data. Repeat for May, July, September, and November.

Month	January	March	May	July	September	November
Precipitation (rain) in Miami (inches)						



7. Click on the small square above the word “Miami.”
8. Scroll up to Phoenix, AZ and click on this city. Click on “City Information.”
9. Find and record the precipitation (rain) for each month.

Month	January	March	May	July	September	November
Precipitation (rain) in Phoenix (inches)						



Using the precipitation data above, answer the following questions.



1. What is the wettest month for Miami? _____ For Phoenix? _____

2. What is the driest SEASON (spring, summer, fall, winter) in Miami? _____ In Phoenix? _____

3. How would you describe the climate in Miami? WET DRY

4. How would you describe the climate in Phoenix? WET DRY

5. Pretend that Miami has the same climate as Phoenix? Would it rain (circle one) more? or less?

6. If Miami had the same climate as Phoenix, how would we need to change how we use water? _____



Click on the “Home” button to return to the main screen

. When finished, turn to page 6, the “Weather Monitor” Station.

WEATHER STATION 6 WEATHER MONITOR



The **Weather Monitor** collects information about the weather from the Weather Station set up outside. Using the poster on the wall to help you find the information on the computer screen, fill in the data table below.

Time	Date	Moon Phase (Circle one) <div style="display: flex; justify-content: space-around; font-size: small;"> New Moon First Quarter Full Moon Last Quarter New Moon </div>			
Outside Temperature °C	Inside Temperature °C	Outside Humidity %	Inside Humidity %		
Dew Point °C		Heat Index °C			
Wind Chill °C		Wind Speed mph			
CURRENT Rainfall Day in	CURRENT Rain Rate in	Barometer mb			
Sunrise _____ AM	Sunset _____ PM	Forecast (Circle one) <div style="display: flex; justify-content: space-around; font-size: x-small;"> Mostly Clear Partly Cloudy Mostly Cloudy Rain Likely Snow Scattered Showers </div>			
					Wind Direction (draw an arrow)



At the top of the screen, click on the 5th icon from the left. (The icon with 2 small graphs.) If the graph is not showing the current time on the horizontal axis, then click on the arrow at the bottom right of the scroll bar to move the graph to the current time. One click moves the graph forward one hour.

1. What does the red line represent? _____
2. What does the blue line represent? _____

Read the following paragraph before answering questions 3 – 6.

Dew point is the temperature at which the atmosphere becomes 100% saturated (filled) with water. **If the outside temperature falls to the dew point temperature, water vapor in the air will condense, and dew will form on the windows or grass.** The dew evaporates once the outside temperature rises above the dew point.

3. On the graph shown on the computer screen, the outside temperature is higher than the dewpoint temperature. Under these conditions, would dew be able to form? _____ Yes _____ No



4. Why or why not? _____

5. If both the dew point and the outside temperature were the same, what would happen to the water vapor in the air? _____



6. If there was dew on the bus window early this morning but it is now gone, what happened to it? _____

At the top of the screen, click on the 3rd icon from the left to go back to the first screen.

When finished turn to page 1, the “Every Picture Tells a Story” Station.

The School Board of Miami-Dade County, Florida, adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Education Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits sex discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

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Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulate categorical preferences for employment.

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