2011 National Science Olympiad Finals
Compute This! (Division B)

Background

Hurricanes are massive severe storms, which form over warm waters in both the Atlantic and Pacific Oceans, and pose a significant risk when they strike land. Hurricanes begin as Tropical Depressions and then strengthen to become Tropical Storms, Hurricanes, and sometimes Major Hurricanes. The Saffir-Simpson Hurricane Wind Scale is a common rating scale to classify Hurricanes from Category 1 to Category 5, based upon sustained wind speeds. Major Hurricanes are a special group of Hurricanes that reach Category 3 or above in strength. Hurricane records are kept separately for the Atlantic Basin (Atlantic Ocean, Caribbean Sea, and Gulf of Mexico) and for the Eastern Pacific (out to a longitude of 140° W).

Graphical Problem

Using your PC web browser and historical data from the www.noaa.gov domain, please identify the total number of Hurricanes that occurred in the Eastern Pacific during each of the five years from 2006-2010. In addition, for each year, identify the number of these hurricanes that also reached "Major Hurricane" status, as defined by the Saffir-Simpson Hurricane Wind Scale.

In MS Excel, please create a data table with three columns, five rows, and a title above each column. The first column should contain the Year, with 2006 at the top and 2010 at the bottom. The second column should contain the Total Number of Hurricanes that occurred in the Eastern Pacific during that year. The third column should contain the Number of Major Hurricanes in the Eastern Pacific that year, which will be a subset of the second column.

Next, please add a 2-D Clustered Column chart and place it neatly below your data table. The x-axis should contain the year, in chronological order, from left to right. Two columns should appear above each year -- one column for the Total Number of Hurricanes that occurred in the Eastern Pacific that year, and second column for the Number of Major Hurricanes. Your chart should contain only one y-axis on the left hand side.

The x-axis (horizontal axis) of your chart must be titled "Year". The y-axis (vertical axis) must be titled "Number of Hurricanes". Please include a chart title above your chart, a legend above your chart to identify the two different columns, and data labels above each column. Spelling must be accurate in your data table and your chart to receive credit. Please follow the above instructions exactly.

Short Answer Questions

In MS Word, please provide the answer and associated URL for each of the following questions. Official www.noaa.gov web sites must be referenced. Please note that several questions require multiple answers. Complete sentences are not necessary, but spelling must be accurate to receive credit. You may list multiple URLs if necessary.

1. Name the most costly mainland United States tropical storm (not adjusted for inflation) that occurred between the years of 1900 and 2006. In which year did this storm occur?

2. During Hurricane Katrina in August 2005, what was the highest peak wind gust in miles per hour measured at the NASA Michoud Assembly Facility? If sustained winds at this speed occurred, what would the corresponding categorization be according to the scale first developed by Herb Saffir and Bob Simpson?

3. Between 1944 and 2009, name the hurricane that maintained sustained wind speeds greater than 155mph for the greatest number of days? Between 1961 and 2010, name the only tropical cyclone recorded to have traveled more than 7000 miles?

4. Identify the only named storm to pass over the Gulf of California in the year 2004. Which other 2004 hurricane was directly responsible for deaths in 8 different countries (hint: it passed within 20 nautical miles of Cuba)?

5. In 2005, Hurricane Katrina first made landfall near which major US city? In which US state was Katrina located when it was downgraded to a tropical depression?

General Instructions

1. Please place your Team Number and School Name at the top of your Excel and Word files.
2. Please name your files (Team XX)(School Name). Save your files as directed by your Event Supervisor.
3. Your Excel file should include both a spreadsheet data table and a 2-D Clustered Column chart as described above. Your Word file needs to include only the answers and URLs for each of the five questions.
4. Reference materials and calculators are not permitted. You may use blank scrap paper to organize your work.
5. This is a two-person event. Absolutely no external communication with others (e-mail, chat, forums, etc.).
6. Please raise your hand if you have a technical problem or question on the event.
7. When you are done, please save your files as directed, and return your exam sheet to your proctor. **DO NOT LOGOFF**.

GOOD LUCK!

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SCHOOL NAME _____ **TEAM NUMBER** _____

STUDENT SIGNATURES 1. _____

2. _____

(Do Not Write Below This Line)
(Event Supervisor Use Only)

PLACE _____

Completeness & Accuracy of Quantitative Data Collected (20 Points Max) _____

Total Number of Hurricanes	_____ (10 Points – 5x2)
Number of Major Hurricanes	_____ (10 Points – 5x2)

Completeness, Accuracy, and Format of Graphical Data (30 Points Max) _____

Years in Chronological Order (L to R)	_____ (5 Points)
X-Axis Labeled "Year"	_____ (5 Points)
Y-Axis Labeled "Number of Hurricanes"	_____ (5 Points)
Title Above Chart	_____ (5 Points)
Legend Accurate and Above Chart	_____ (5 Points)
Data Labels Above Each Column	_____ (5 Points)

Answers and URL's for Short Answer Questions (50 Points Max) _____

1 Name of Tropical Storm, Year	_____ (10 Points – 5x2) w/ URL
2. Peak Wind Gust Speed, Category	_____ (10 Points – 5x2) w/ URL
3. Name of Hurricane, Name of Tropical Cyclone	_____ (10 Points – 5x2) w/ URL
4. Name of Storm, Name of Hurricane	_____ (10 Points – 5x2) w/ URL
5. Name of City, Name of State	_____ (10 Points – 5x2) w/ URL

TOTAL SCORE _____

TIE BREAKER: [ ] Short Answer Questions [ ] Quantitative Data Collected [ ] Overall Graphical Quality