Rainfall & Water Level Graphs *Handout*

Students make and analyze graphs to discover relationships between rainfall and water level

PROCEDURE:

Part One

A. Preparation

1. Make a new folder in your student folder on the server and label it Lake Thonotosassa (or any lake). This is where you will save all your documents on your lake study.
2. Now go to: http://www.Hillsborough.WaterAtlas.org/

B. Collect Data

1. Open Atlas > Lake Thonotosassa (or any lake) from the "Lake Name" drop down menu, or type the lake name in the "Search" box.
2. When the lake General Information page comes up, go to the Photos Tab under the Lake/Watershed name. Save a picture to your folder. (Windows: Right Click, Mac: Control Click)
3. Go back to the General Information Page for your lake and open the Research Tab from the top menu. Open "Data Download". Click "Next" after each selection.
    a. Select your Water body.
    b. Select Hydrology.
    c. Select All Stations.
    d. Select Period of Record to download all data over the period in which data was recorded.
    e. Select Excel file > Download Data.
        Windows: Follow the directions in the Hydrology Data box.
        Mac: Control Click and select Download Link to Disk.
4. Navigate back to the General Information page for your lake. Minimize the website window.
5. Return to the "General Info" page for your lake. (Back arrow or navigate from "The Atlas" in the top menu) What is the historic water level (average) for your lake in feet above mean sea level? Historic Level: _____ft.

C. Make a Graph

1. Open the Hydrology Data Excel document you saved to your folder. Save a copy and title it Water Level Graph.
2. Change "level_ft." to "Lake Level (ft)" (Windows Right Click; Mac Click, then type.)
3. Insert a column after "Lake Level" and title the column "Historic Level (ft)."
4. Expand the website. Find the Historic Lake Level (the average for all of the recorded levels) for your lake. Notice that lake levels are in feet above mean sea level. Minimize the website.
5. Enter the value for Historic Lake Level and fill all cells in this column down to the last row containing data. (Highlight the Historic Lake Level and all of the cells below to the last row with data. In the menu, select Edit > Fill > Down).
6. Highlight the headers and data in three columns: "Sample Date," "Water Level," and "Historic Level."
7. Make a line graph showing the trend over time using the graphing tool. (Mac: go to Chart Wizard) Be sure and title your graph and axes. Save your graph in Excel format to your student folder.

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D. Compile and analyze in a Word document.

1. Open a new Word document. Write a title and save it in your student folder.
2. Go to File > Page Setup and change the margins to .75.
3. Insert the photo of your lake. Go to "Insert > picture > from file > your folder. Save.
4. Position the photo:
    a. Center the photo using the type tools. (Think of it as an object, or a very large word!)
    b. To move the picture up or down, click on the left edge of the picture. The curser will be on the lower left and will move the picture up or down.
    c. To move your curser below the photo, click on the right edge and the curser will be on the lower right, as if at the end of a word. Press Return.
5. Open the Excel graph in your folder. Highlight the graph and copy. Select the word document (click on the page) and paste the graph.
6. If necessary, resize the photo and/or the graph to leave space for your conclusion: Select the picture. Select a side or corner square. Click and drag. Keep the proportions the same for the picture. (Click and drag the corner squares.) Make the graph as wide as possible to better display the data. (Click and drag the side squares.)
7. Analyze the graph. Write one or more paragraphs on the following:
    a. What observations or conclusions can you make about the level of your lake compared with the Historic Average over this period of time?
    b. What relationships do you think there are between rainfall and lake level? What question can you ask? Form a hypothesis about rainfall and lake level. Record the question and hypothesis. Make a prediction.
8. Preview. Be sure your student information is on the document and the page orientation (landscape or portrait) is correct. Save your document and print it out.

Part Two

A. Print additional information.

Note: You will be using the website graphing tool. If the graph does not come up, press Control R (Windows) or Command R (Mac) to refresh the graph.

1. Print a two-year graph of water levels.
    a. Return to the General Information web page for your lake. (Use the search box, top right.)
    b. Click on Hydrology on the info bar.
    c. You are now on a page with water level information. Click on Two Year Graph.
    d. Scroll down and follow the print directions. Print. Note: This will print the graph and the credits page that gives credit to the website and shows your data is from scientific sources. To avoid multiple copies, print only page one.
2. Print a graph of rainfall in your watershed.
    a. Scroll down and click on Advanced Graphing. At each choice, click Next.
    Rock Lake > Hydrology > Rainfall > Graph All Stations > Period of Record > Graph Data.
    b. Print page one. This is a graph of current data, gathered by weather stations in each watershed beginning late summer 2003.

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B. Analyze the data. Can you find any relationships or trends between rainfall and lake level?

1. Locate the corresponding range of dates on the two graphs made with the Watershed Atlas graphing tool. Consider your Question and Hypothesis about rainfall and water level. What is your conclusion?
2. Compare the two water level graphs. Locate the range of dates on both graphs. What additional information do you see on the first graph?
3. Judging by the changes in lake level, what do you predict other records will show about the rainfall for this watershed for the period when the lake was below average?
4. How can you check your predictions? (Newspapers, etc. other records of rainfall.)

ADVANCED ACTIVITY: Most scientific data is in metric units so let's change our data to meters. On your Excel document (A) insert a column after level_ft. Title it level_m.

1 m =3.28 ft. Change your measurements to meters. Put your cursor in E2 and write a formula to change feet to meters. Copy down to the last row having data.

Graph this data. (Check with your teacher on writing a series for the x axis.)

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