



## Time Needed

One class period

## Materials

(for each student or group of students)

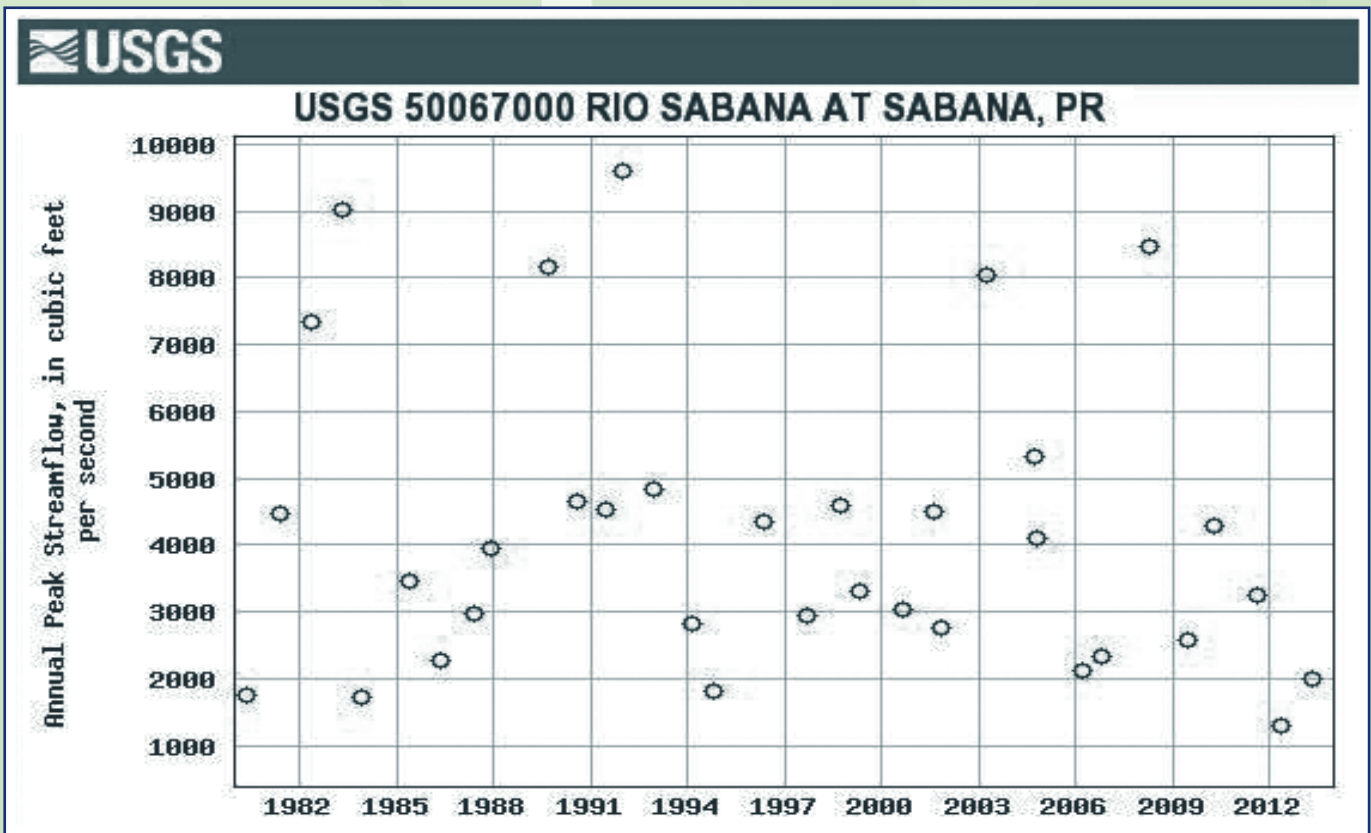
- Pencil
- Graph paper
- “Caribbean Cruise” article in this *Natural Inquirer* edition

The question you will answer in this FACTivity is: What can you learn from data about gage height and streamflow for a stream for an extended period of time?

## Methods

In the article you just read, the scientists examined a variety of different types of data from the Bisley Experimental Watersheds

in the Luquillo Experimental Forest. The table of data provided in the following table is from the Rio Sabana in Luquillo Experimental Forest and El Yunque National Forest. The data have been collected for 33 years. The gage height is the height of the water above zero on the water gage. A water gage is an instrument used to find the depth or quantity of water or to indicate its surface height. Streamflow is the water released from a stream. Streamflow is measured in cubic feet per second. Examine the data in table 1. On the graph paper provided (on page 123), create a graph for either the gage height data or the streamflow data (**figure 19**).



**Figure 19.** A sample graph of the peak streamflow data from Rio Sabana. Graph courtesy of the U.S. Geological Survey.

Year	Date	Gage Height (feet)	Streamflow (cubic feet per second)
1980	May 22, 1980	12.55	1,760
1981	May 19, 1981	15.77	4,480
1982	May 10, 1982	18.17	7,340
1983	Apr. 21, 1983	19.35	9,010
1984	Dec. 02, 1983	12.50	1,730
1985	May 17, 1985	14.73	3,470
1986	May 13, 1986	13.27	2,260
1987	May 25, 1987	14.16	2,970
1988	Nov. 27, 1987	15.23	3,940
1989	Sep. 18, 1989	18.77	8,170
1990	Aug. 13, 1990	16.08	4,660
1991	Jun. 30, 1991	15.80	4,520
1992	Jan. 05, 1992	19.74	9,600
1993	Dec. 29, 1992	16.11	4,840
1994	Feb. 19, 1994	14.00	2,830
1995	Nov. 07, 1994	12.62	1,810
1996	May 13, 1996	15.64	4,350
1997	Sep. 26, 1997	14.15	2,960
1998	Sep. 21, 1998	15.86	4,580
1999	May 08, 1999	14.56	3,310
2000	Aug. 23, 2000	14.24	3,030
2001	Aug. 22, 2001	15.79	4,500
2002	Nov. 09, 2001	13.91	2,760
2003	Apr. 17, 2003	18.69	8,050
2004	Sep. 15, 2004	16.55	5,330
2005	Oct. 29, 2004	15.41	4,120
2006	Apr. 05, 2006	13.07	2,120
2007	Oct. 20, 2006	13.35	2,320
2008	Apr. 27, 2008	18.99	8,480
2009	Jun. 12, 2009	13.67	2,570
2010	Apr. 13, 2010	15.58	4,290
2011	Aug. 22, 2011	14.50	3,260
2012	May 10, 2012	11.82	1,300
2013	May 10, 2013	12.89	1,990

**Table 1.** Gage height and streamflow data from Rio Sabana in Puerto Rico. Data courtesy of U.S. Geological Survey.

After you have created the graph, compare the data over the 33-year time period.

- Circle any points that seem to be very high or very low.
- Name at least two things from the data that seem important. Why do you think the data from these two times may be important? What do you think the data from these times may indicate?
- How did creating a graph from the data help you to analyze and understand the data?
- Share and discuss your results with your classmates. Did they notice similar points in the data? How were your graphs and analysis of the graphs similar and different?

## Natural Inquirer Connections

You may want to reference these *Natural Inquirer* articles for additional information and FACTivities:

- “Leaf Me Alone” in the Tropical Forest edition of *Natural Inquirer*.
- “Don’t Litter the Stream” in the Hawai‘i-Pacific Islands edition of *Natural Inquirer*.
- “I’ll Huff and I’ll Puff and I’ll Blow Your Trees Down!” in the Tropical Forest edition of *Natural Inquirer*.
- “Swimming Upstream Without a Ladder” in the Tropical Forest edition of *Natural Inquirer*.

These articles, along with others, can be found at <http://www.naturalinquirer.org/all-issues.html>.

## What’s in a Word?

One of the many questions that people have asked from time to time is the spelling of the word “streamgagge” versus spelling it with a “u” as in “streamgauge.” Page 50 of the U.S. Geological Survey report, *A History of the Water Resources Branch, U.S. Geological Survey: Volume I, From Predecessor Surveys to June 30, 1919* (<http://on.doi.gov/USGSWaterHistory>) includes a reference giving credit to the change in spelling to F.H. Newell around 1892. The author wrote:

At about this time, F.H. Newell adopted the spelling “gagge” instead of “gauge.” As he informed the writer, “gagge” was the Saxon spelling before the “u” was inserted as a result of Norman influence on the language.

Ever since then, the U.S. Geological Survey has spelled the word without the “u.”

## Web Resources

International Institute of Tropical Forestry  
<http://www.fs.usda.gov/iitf/>

U.S. Geological Survey Water Data for Rio Sabana  
[http://waterdata.usgs.gov/nwis/inventory/?site\\_no=50067000&agency\\_cd=USGS](http://waterdata.usgs.gov/nwis/inventory/?site_no=50067000&agency_cd=USGS)

A Distance Learning Adventure: America’s Rainforests—Caribbean National Forest/Luquillo Experimental Forest  
[http://rainforests.pwnet.org/americas\\_rainforests/caribbean.php](http://rainforests.pwnet.org/americas_rainforests/caribbean.php)

El Yunque National Forest  
<http://www.fs.usda.gov/elyunque>

Luquillo Long-Term Ecological Research Program  
<http://luq.lternet.edu/>

Tabonuco Trees  
[http://www.na.fs.fed.us/pubs/silvics\\_manual/volume\\_2/dacryodes/excelsa.htm](http://www.na.fs.fed.us/pubs/silvics_manual/volume_2/dacryodes/excelsa.htm)

University of California Museum of Paleontology: Tropical Forests  
<http://www.ucmp.berkeley.edu/exhibits/biomes/forests.php#tropical>

History of Fort Valley Experimental Forest  
<http://www.foresthistory.org/ASPNET/Places/ResearchSites/FortValley.aspx>