Making a Climograph: A GLOBE Data Exploration

Purpose

Students learn how to construct and interpret climographs and understand how climate differs from weather.

Overview

Students calculate and graph maximum and minimum temperature averages and monthly precipitation totals for each month of a year, then compare their graph to a 30-year climograph for the same approximate area. Students gain an understanding of why at least 30 years of weather data are necessary to describe the climate of a region.

Student Outcomes

Students will be able to:

- Calculate weather averages and totals in order to construct a one-year climate graph summarizing monthly maximum and minimum temperature averages and precipitation totals.
- Understand the value and purpose of 30-year climographs to determine a location's climate.

Science Concepts

- *Earth Systems Science*
- *Weather and Climate*
- *Weather can be described with quantitative measurements*

Science Practices

- *Analyzing and interpreting data*

Time

Two class periods (100 minutes)

Level

Middle school (grades 6-8)

Materials and Tools

- *Reading: Weather and Climate*
- *Student Activity Sheet A*
- *Student Activity Sheet B*
- *Student Activity Sheet C*
- Long Beach Data (pages 8-19)
- Colored pencils
- 12 calculators
- Rulers

Preparation

- Print the reading and *Student Activity Sheets A, B,* and *C* for each student.
- Print the Long Beach Data (pages 8-19) single-sided and assign one page to each student pair or group.

Prerequisites

- Familiarity with basic mathematics such as calculating means and sums
- Familiarity with building basic graphs, charts, and tables
- Familiarity with metric measurement units (temperature and distance)

Background

Weather refers to the day-to-day atmospheric conditions in an area over a short period of time from seconds to weeks. Climate is the weather of a place averaged over a longer period of time (typically over 30 years). Climate refers to statistical averages of temperature, precipitation, and other aspects of the atmosphere.

Climographs (also called climatographs) are a graphic way of describing how temperature and precipitation vary through the year at a

location. Climatologists require 30 years of temperature and precipitation data to adequately capture a location's climate.

A graph of one year of temperature and precipitation data can be helpful for understanding the weather that took place in a given year; however, it can fail to capture climate patterns for a location, especially when there have been unusual weather events during that year. In this activity, students explore the distinction between one year's weather data and the average of 30 years of weather data, learning that long-term measurements are important for describing the "normal" climate patterns of a place.

Comparing their climograph of one year of data with the 30-year climograph, students will see how averaging data over many years can dampen the impact of unusual events, such as usually dry months or heat waves. They should also notice that missing data makes the precipitation graph less accurate since it is a total for each month rather than an average.

About the data: The temperature and precipitation data that students use in this activity were collected in 2004 by students at Long Beach High School's NIKE Environmental Center in Long Beach, New York (US), as part of the GLOBE Program.

What To Do and How To Do It

Step 1. Introduce the similarities and differences between weather and climate.

- Begin the lesson by asking students the difference between weather and climate. Note their answers on a Venn diagram on the board. Add that both climate and weather are often described with information about temperature and precipitation. Share the following examples:
  - Climate is what we expect. Weather is what we get.
  - Weather determines what clothes you wear. Climate determines the types of clothes that are in your closet.
- Hand out the *Reading: Weather and Climate*. Discuss it as a class after students have completed the reading, adding to the Venn diagram on the board as needed. Tell students that in this activity they will learn how to make a climograph for one-year, then compare it to a 30-year climograph for the same location.

Step 2. Students match graphs with locations.

- Hand out *Student Activity Sheet A* to each student and one month of the Long Beach Data and a calculator to each pair of students. Ask students to read the introduction to Long Beach on the activity sheet.
- Have student pairs work together to fin the total precipitation, and average high and low temperature for their assigned month of the Long Beach Data. For younger students, demonstrate how to add temperatures and divide by the number of measurements using a calculator before students begin.
- Have student pairs share the average high and low temperature and the precipitation total for their month so that all students can complete the data table on *Student Activity Sheet A*.

Step 3. Students create a one-year climograph.

- Instruct students to create an annual graph of temperature and precipitation data for Long Beach, NY, for the year 2004 using the information in their table on *Student Activity Sheet A*, colored pencils, and the instruction and template provided on *Student Activity Sheet B*.

Step 4. Compare the one-year climograph with the 30-year climograph.

- Remind students that a climograph usually includes 30 years of data. Ask students whether they think the 30-year climograph will or will not look much like the one-year climate graph that they constructed. Have students write a hypothesis to describe their answer.
- Hand out *Student Activity Sheet C*. Ask students to compare the climograph that

they made with 2004 data on *Activity Sheet B* with the climograph that uses 30 years of data on *Student Activity Sheet C*. Have students answer the questions on *Student Activity Sheet C* individually in preparation for a class discussion.

Step 5. Class discussion

- Discuss as a class whether one year of weather data can accurately convey the climate of a specifi location. Have students summarize what they learned.
- Ask students how missing data and extreme weather events affect a one year climograph.

Assessment

The graph on *Student Activity Sheet B* will indicate whether students understand the format of a climograph. The answers on *Student Activity Sheet C* will indicate whether students understand the reason for averaging many years of weather data to understand climate of a location.

Extensions: Delve Deeper into GLOBE Data

Have students follow this activity with the *Weather Tourists* activity from this series of GLOBE Data Explorations.

Have students collect min/max air temperature and precipitation data using the GLOBE Atmosphere Protocols and compare a year of their data to a 30-year climograph for your location.

Have students create a climate graph with monthly temperature averages and precipitation totals for their city/town or another location of interest. Students can use their own GLOBE temperature and precipitation data for their school in a given year, data from another GLOBE school, or long-term data from locations specified via the GLOBE website. Additional sites with 30-year climographs for comparison purposes with annual climate graphs can be found at the web site for the US Drought Mitigation Center.

Credits

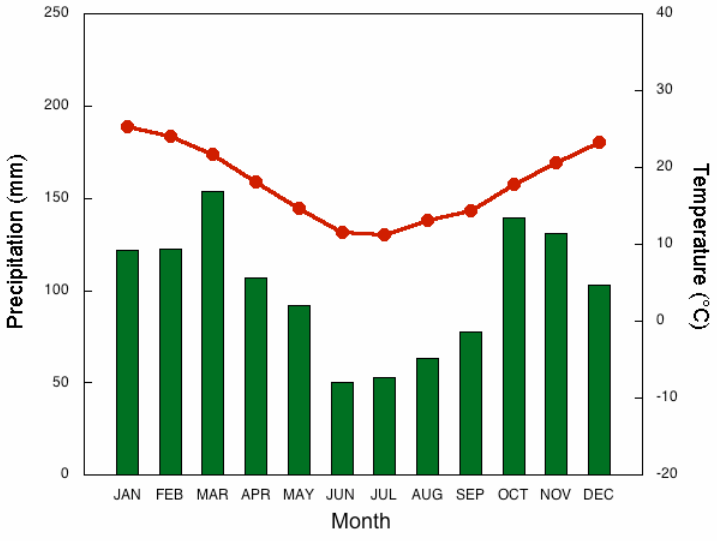
This activity is part of *GLOBE Data Explorations*, a collection of activities developed by the UCAR Center for Science Education (scied.ucar.edu), a GLOBE Partner. Activities were reviewed by science educators and staff at GIO and field tested by teachers.

Weather refers to the variations in atmospheric conditions in an area over a short period of time from seconds to weeks. For example, if it is forecast to be sunny and warm tomorrow, that's weather. Some days are hotter, colder, wetter, or windier. Weather is variable. It changes day-to-day and even hour-to-hour.

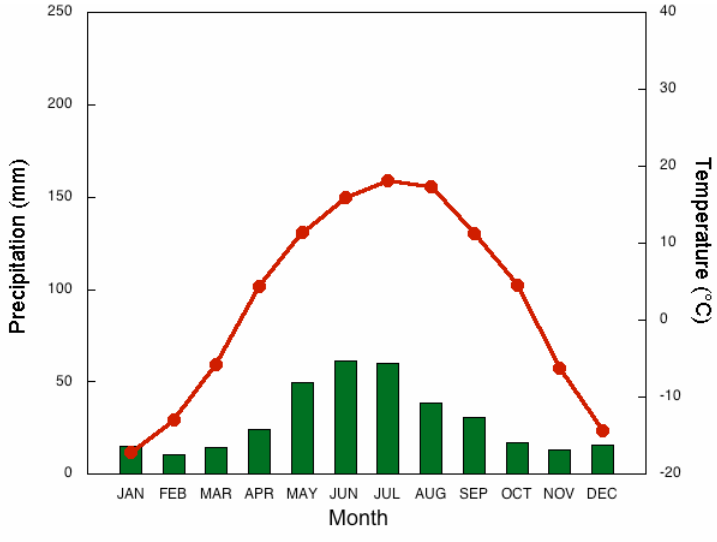
Climate is the weather of a place averaged over a longer period of time. Climate is the probability of certain weather on any given time of the year. For example, if it is usually sunny and warm during August in San Diego, California, that's climate. Climate describes what is usual. To understand the climate of a location, scientists average 30 years of daily weather measurements. Thirty years, with 365 days in each year – that's 10,950 measurements of daily high temperature, 10,950 measurements of daily low temperature, and 10,950 measurements of precipitation like rain or snow – all to figure out what's typical for a place.

Climographs (also called climatographs) are graphs of average temperature and precipitation that describe the climate of a place. A climograph shows two different types of information on the same graph. Take a look at the sample climographs below. Notice that on the x-axis (horizontal) are the months of the year. This is not for a particular year but, rather, an average. Notice that there are two y-axis scales. On the left side is precipitation (in millimeters) and on the right side is temperature (°Celcius). The bar graph shows the amount of precipitation each month. The line graph show the average temperature each month. Some climographs include line graphs for both average high and low temperature.

Buenos Aries, Argentina



Saskatoon, Canada



Climographs courtesy of the National Drought Mitigation Center (U.S.)
http://drought.unl.edu/DroughtBasics/WhatisClimatology

Make a Climograph
Student Activity Sheet A

Name _____

Date _____

Long Beach, New York, is an oceanfront community located on an island along Long Island's south shore on the East Coast of the United States. Long Beach is located only 40 km from the center of New York City, so it's convenient beach to visit for people who live in the city.

Your assignment is to explore atmospheric data to learn what sort of weather to expect during a visit to Long Beach, New York, at different times of the year. The atmospheric data was collected by students at Long Beach High School's NIKE Environmental Center in 2004 as part of the GLOBE Program. It's just one year of data, but it can tell you a lot about what the weather is like at different times of year.

You will calculate annual precipitation totals and mean monthly maximum and minimum temperatures. Then you will make a one-year climograph for Long Beach.

Monthly Precipitation Totals: Add a month's precipitation in millimeters (mm). Record the number in the appropriate row (month) in the table below.

Monthly Maximum Temperatures: Add the daily maximum temperatures for each day of a month, and divide the sum by the number of measurements made that month. Record the number in the table below.

Monthly Minimum Temperatures: Add the daily minimum temperatures for each day of a month, and divide the sum by the number of measurements made that month. Record the number in the table below.

Month	Monthly Precipitation Totals	Monthly Maximum Temperatures	Monthly Minimum Temperatures
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Name _____

Date _____

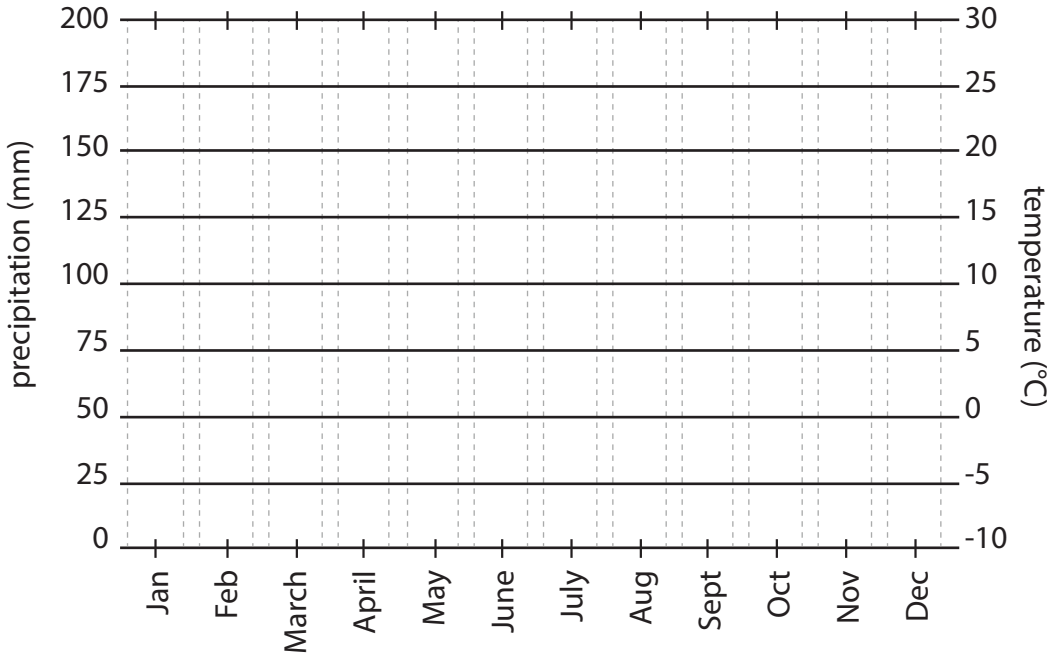
Part D: Make a one-year climograph.
You'll need: three colored pencils (one light color and two darker colors), a ruler, and the graph template below.

1. Make a bar graph below with the monthly precipitation totals that you recorded on *Student Activity Sheet A* on the graph below. Make each bar the width of the dotted lines and color it in with a light colored pencil. Color the precipitation square in the key with the color you used for the bar graph.

2. Choose a darker colored pencil and make a dot on the graph to represent the average maximum temperature for each month as you recorded on *Student Activity Sheet A*. Use your ruler to make sure each dot is in line with the name of the month. Connect the dots. Color in the key for average high temperature with the colored pencil.

3. With a different shade of colored pencil, make a dot for the average minimum temperature for each month using the values from *Student Activity Sheet A*. Connect the dots. Color in the key for average low temperature with the colored pencil.

Long Beach, New York (U.S.) Climograph
(Made with 2004 GLOBE data)



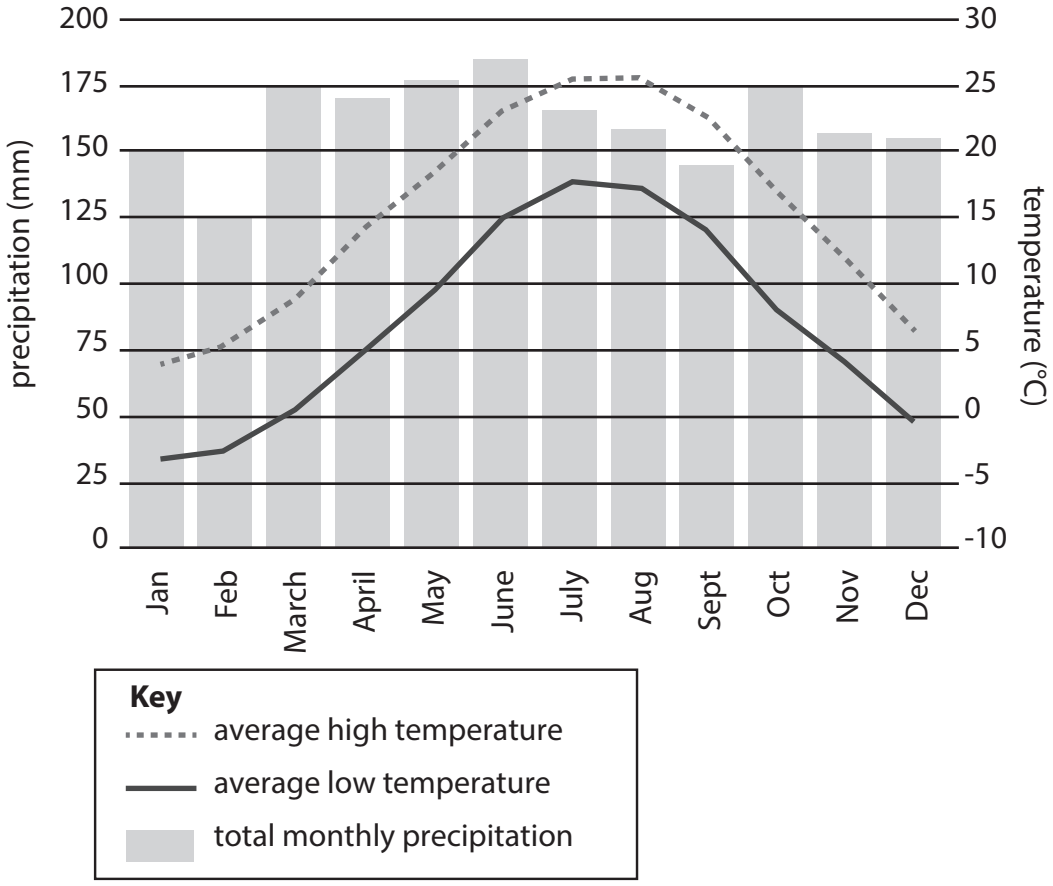
4. Compare your one-year climate graph to others in your class to ensure that that they look similar. Identify the reason for any differences between graphs.

Make a Climograph
Student Activity Sheet C

Name _____

Date _____

Long Beach, New York (U.S.) Climograph
(Made with NOAA data from 1981-2010)



This is a climograph for Long Beach, NY, made with 30 years of weather data. Compare it to the graph you made using 2004 data.

1. How are the graphs similar?

2. How are the graphs different?

3. Make a hypothesis about the biggest difference that you see.

4. Can a one-year climate graph convey the climate of a location?

January 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 January	6.7	2.8	0
2 January	7.8	2.2	0
3 January	8.3	5.6	0.25
4 January	10.0	7.8	0.25
5 January	9.4	1.7	6.86
6 January	4.4	0.6	3.56
7 January	2.8	-8.3	0
8 January	-2.8	-6.1	0
9 January	-1.7	-10.6	0
10 January	-10.0	-17.2	0
11 January	-7.2	-13.9	0
12 January	0.6	-7.8	0
13 January	5.0	1.1	0.25
14 January	5.6	-12.8	0
15 January	-8.3	-13.3	0
16 January	no data	no data	no data
17 January	-1.7	-8.3	0
18 January	1.1	-1.7	4.83
19 January	1.1	-6.1	2.54
20 January	-3.9	-7.8	0
21 January	-3.3	-8.9	0
22 January	1.7	-5.6	0
23 January	2.2	-10.6	0
24 January	-7.8	-10.0	0
25 January	-6.1	-13.9	0
26 January	-7.2	-10.6	0
27 January	-6.1	-8.9	0
28 January	-2.8	-7.8	0
29 January	-2.2	-6.7	0
30 January	-3.3	-10.0	0
31 January	no data	no data	no data

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

February 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 February	-2.2	-7.2	0
2 February	2.2	-5.6	0
3 February	6.7	-4.4	0
4 February	5.0	-1.1	20.32
5 February	5.6	-4.4	0
6 February	1.7	-2.8	9.4
7 February	5.6	1.1	22.61
8 February	4.4	-7.2	0
9 February	2.8	-4.4	0
10 February	6.1	1.7	0.51
11 February	7.8	0.6	0
12 February	2.8	-2.8	0
13 February	3.3	-0.6	0
14 February	5.0	0.6	0
15 February	5.0	-5.6	0
16 February	-1.7	-2.8	0
17 February	-0.6	-1.1	0
18 February	1.1	1.7	0
19 February	no data	no data	no data
20 February	no data	no data	no data
21 February	6.1	-1.1	0
22 February	10.0	1.7	0
23 February	5.0	-1.7	0
24 February	7.8	0.6	0
25 February	1.7	-5.0	0
26 February	6.1	-2.2	0
27 February	6.7	-2.8	0
28 February	8.3	-1.1	0
29 February	12.2	2.8	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

March 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 March	14.4	6.1	0
2 March	11.1	4.4	0.51
3 March	13.9	5.0	0
4 March	13.9	5.0	3.05
5 March	7.8	3.9	0
6 March	8.9	4.4	6.6
7 March	13.3	3.9	0.25
8 March	11.1	-1.1	1.52
9 March	5.6	-1.1	1.52
10 March	no data	no data	no data
11 March	7.2	0.6	0
12 March	12.2	3.3	0
13 March	4.4	-1.7	0
14 March	5.0	-2.8	0
15 March	11.1	1.7	0.25
16 March	12.8	-1.7	0
17 March	-0.6	-2.8	0.51
18 March	5.6	-2.2	0.76
19 March	3.9	-1.1	5.59
20 March	5.0	-1.1	0
21 March	8.9	2.8	1.78
22 March	8.3	-3.9	0
23 March	2.8	-4.4	0
24 March	7.2	2.2	0
25 March	8.3	4.4	1.52
26 March	10.0	5.6	0.25
27 March	14.4	6.1	2.79
28 March	20.6	7.8	0
29 March	10.0	1.1	0
30 March	5.6	1.1	0
31 March	7.2	3.3	27.43

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

April 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 April	8.3	4.4	9.4
2 April	10.0	5.0	0
3 April	7.2	3.3	3.56
4 April	no data	no data	no data
5 April	8.9	-1.7	0.25
6 April	6.7	-1.1	0
7 April	11.1	6.1	0
8 April	16.1	4.4	0
9 April	16.1	4.4	
10 April	15.6	6.1	0
11 April	13.9	6.1	0.76
12 April	10.6	5.0	0.76
13 April	10.0	4.4	28.19
14 April	12.2	6.1	25.91
15 April	12.8	3.9	7.87
16 April	12.8	4.4	0
17 April	17.2	5.6	0
18 April	20.0	7.8	0
19 April	18.3	6.1	0
20 April	21.7	10.0	0
21 April	21.1	7.8	0
22 April	15.6	7.8	0.25
23 April	no data	no data	no data
24 April	16.7	6.1	7.37
25 April	19.4	7.2	0
26 April	no data	no data	no data
27 April	no data	no data	no data
28 April	16.7	3.3	2.29
29 April	13.9	8.3	0
30 April	13.9	9.4	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

May 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 May	14.4	10.0	0
2 May	15.0	11.1	0
3 May	13.3	10.6	2.54
4 May	12.2	5.6	4.57
5 May	15.0	8.3	0
6 May	17.2	8.9	0.25
7 May	17.2	10.0	1.27
8 May	26.1	9.4	0
9 May	14.4	8.9	0.25
10 May	16.7	10.6	0
11 May	20.0	11.1	14.22
12 May	21.7	14.4	0
13 May	23.9	15.0	0.51
14 May	22.2	10.6	0.51
15 May	18.9	12.2	0
16 May	23.3	15.6	6.35
17 May	23.3	12.2	0
18 May	18.3	12.2	2.03
19 May	20.0	15.6	6.6
20 May	19.4	12.2	12.19
21 May	17.8	13.3	3.3
22 May	19.4	14.4	0.25
23 May	20.6	11.7	0
24 May	21.7	13.9	5.33
25 May	17.8	12.8	0.25
26 May	15.0	10.6	1.52
27 May	21.7	11.1	7.87
28 May	20.6	12.8	14.99
29 May	23.3	11.7	5.59
30 May	20.0	11.7	0
31 May	19.4	13.3	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

June 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 June	18.3	11.1	7.62
2 June	20.6	13.3	0.25
3 June	22.8	16.1	1.27
4 June	22.2	13.3	0
5 June	18.9	14.4	0
6 June	16.7	11.7	4.06
7 June	19.4	13.3	0.25
8 June	23.9	16.1	0
9 June	25.0	17.2	0
10 June	27.8	22.2	0
11 June	25.6	13.9	4.06
12 June	21.7	13.3	0
13 June	20.6	15.6	0
14 June	21.1	16.1	0
15 June	25.6	17.8	0
16 June	28.3	18.9	0
17 June	27.2	18.9	0
18 June	no data	no data	no data
19 June	no data	no data	no data
20 June	no data	no data	no data
21 June	no data	no data	no data
22 June	no data	no data	no data
23 June	no data	no data	no data
24 June	24.4	17.8	0
25 June	no data	no data	no data
26 June	no data	no data	no data
27 June	25.0	16.1	1.02
28 June	25.0	16.7	0
29 June	26.7	16.1	1.52
30 June	23.9	17.8	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

July 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 July	24.4	18.3	0
2 July	23.9	19.4	0
3 July	26.1	17.8	0
4 July	25.0	18.9	0
5 July	25.0	20.0	10.92
6 July	26.1	20.0	0.51
7 July	no data	no data	no data
8 July	no data	no data	no data
9 July	27.2	20.6	0
10 July	26.7	18.3	0
11 July	27.2	20.0	0
12 July	25.6	20.0	0.51
13 July	21.1	16.7	29.21
14 July	22.8	17.8	0
15 July	23.9	18.3	8.89
16 July	25.6	18.3	0
17 July	26.1	19.4	0
18 July	25.6	20.0	0
19 July	23.9	20.0	1.52
20 July	25.0	20.0	0
21 July	29.4	20.6	0
22 July	27.2	21.7	0
23 July	26.7	22.2	0
24 July	23.9	19.4	3.05
25 July	21.7	18.3	0
26 July	25.0	17.2	0
27 July	23.3	18.3	0
28 July	22.8	18.9	23.37
29 July	27.2	19.4	0.25
30 July	26.7	20.6	0
31 July	26.1	21.7	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

August 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 August	26.1	21.7	10.16
2 August	26.7	21.7	0
3 August	26.7	22.2	0
4 August	29.4	21.7	0.25
5 August	31.1	17.8	0.25
6 August	23.3	15.6	0
7 August	22.2	14.4	0
8 August	22.2	15.0	0
9 August	25.6	18.3	0
10 August	25.0	19.4	0
11 August	25.0	21.1	0
12 August	24.4	20.6	7.87
13 August	25.0	21.7	0.76
14 August	23.9	20.0	3.56
15 August	22.8	18.9	20.83
16 August	23.9	18.3	15.75
17 August	23.9	16.7	1.52
18 August	23.9	20.0	0
19 August	25.6	21.7	0
20 August	25.6	22.2	0
21 August	26.7	22.2	0
22 August	24.4	14.4	20.07
23 August	23.9	17.2	0
24 August	23.9	20.0	0
25 August	24.4	16.7	0
26 August	22.8	16.1	0
27 August	25.0	20.6	0
28 August	26.1	21.1	0
29 August	26.1	21.1	0
30 August	26.7	22.2	0
31 August	no data	no data	no data

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

September 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 September	27.8	17.2	0
2 September	27.8	17.8	0
3 September	24.4	17.8	0
4 September	25.0	20.0	0
5 September	26.1	17.8	0
6 September	21.1	13.9	0
7 September	25.0	18.3	0
8 September	25.6	21.1	50.04
9 September	23.9	18.9	10.41
10 September	25.0	18.3	0
11 September	26.7	16.7	0
12 September	22.2	15.0	0
13 September	27.8	17.8	0
14 September	26.7	18.9	0
15 September	20.6	16.1	0
16 September	26.1	18.3	1.78
17 September	25.0	20.0	0
18 September	23.9	16.7	1.52
19 September	19.4	10.6	0
20 September	18.9	10.6	0
21 September	no data	no data	no data
22 September	27.2	15.6	0
23 September	27.2	18.3	0
24 September	27.2	16.7	0
25 September	21.7	16.7	0
26 September	25.6	18.3	0
27 September	26.1	16.7	0
28 September	no data	no data	no data
29 September	no data	no data	no data
30 September	19.4	13.3	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

October 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 October	21.1	13.3	0
2 October	20.6	17.2	0
3 October	19.4	12.2	0
4 October	21.1	12.2	0
5 October	20.0	10.6	0
6 October	16.1	7.8	0
7 October	20.6	11.1	0
8 October	21.1	13.9	0
9 October	21.1	16.1	0
10 October	20.0	15.0	0
11 October	no data	no data	no data
12 October	15.0	8.3	0
13 October	17.8	8.3	0
14 October	17.2	11.7	0.25
15 October	16.7	13.3	1.27
16 October	16.7	10.0	3.3
17 October	16.1	8.3	0
18 October	13.9	7.2	0
19 October	14.4	8.3	12.19
20 October	11.7	8.9	0.25
21 October	12.2	8.3	0
22 October	12.2	8.3	0
23 October	12.2	6.1	0
24 October	11.1	8.3	0
25 October	12.2	8.3	0
26 October	14.4	10.6	0
27 October	15.6	8.9	0
28 October	15.6	7.2	0
29 October	13.3	9.4	0
30 October	14.4	12.2	0.76
31 October	no data	no data	no data

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

November 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 November	22.2	11.7	0
2 November	15.6	7.2	0
3 November	15.0	10.6	0
4 November	14.4	3.3	0
5 November	12.2	7.8	19.3
6 November	12.2	6.7	0
7 November	15.6	8.3	0
8 November	16.1	6.7	0
9 November	10.0	1.7	0
10 November	5.6	-1.1	0
11 November	11.7	4.4	0
12 November	12.8	4.4	1.78
13 November	3.9	0.6	17.02
14 November	5.0	-1.7	0
15 November	10.0	2.8	0
16 November	13.9	4.4	0
17 November	no data	no data	no data
18 November	11.7	6.1	0
19 November	16.7	10.0	0
20 November	16.1	8.3	0
21 November	10.6	6.7	3.81
22 November	no data	no data	no data
23 November	no data	no data	no data
24 November	11.7	7.8	0.25
25 November	13.3	10.6	4.57
26 November	15.6	-1.1	2.29
27 November	9.4	3.9	0
28 November	12.2	8.9	34.04
29 November	12.8	3.9	0.25
30 November	no data	no data	no data

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	

December 2004

Location: Long Beach, New York (U.S.)

Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Precipitation (millimeters)
1 December	11.7	6.7	8.64
2 December	no data	no data	no data
3 December	7.2	2.2	0
4 December	7.2	-1.1	0
5 December	no data	no data	no data
6 December	11.7	0.6	0
7 December	7.2	2.8	13.72
8 December	13.3	7.2	8.64
9 December	14.4	4.4	0
10 December	8.3	5.6	9.14
11 December	9.4	6.7	6.35
12 December	10.6	3.9	1.78
13 December	7.2	5.0	0
14 December	6.7	0.6	0
15 December	no data	no data	no data
16 December	2.2	-3.3	0
17 December	no data	no data	no data
18 December	7.2	-3.3	0
19 December	7.8	1.1	0
20 December	6.7	-11.1	2.03
21 December	2.2	-11.1	0
22 December	8.9	-1.1	0
23 December	10.6	7.2	0
24 December	11.7	-1.7	11.94
25 December	0.6	-4.4	0
26 December	2.2	-4.4	0
27 December	-0.6	-6.7	0
28 December	-2.2	-8.9	0
29 December	2.8	-2.8	0
30 December	7.8	3.3	0
31 December	7.8	1.7	0

Count the number of days this month when data was collected.	Add all maximum temperatures.	Add all minimum temperatures.	Add all precipitation.
	Divide by the number of days (at left).	Divide by the number of days (at left).	