

LAB

1

Laboratory
Activity

The Rain Shadow Effect

Interstate Highway 80 runs from San Francisco on the Pacific Ocean eastward across the Sierra Nevada mountain range and into Nevada, as shown by the map in Figure 2 at the back of this activity. The Sierra Nevada range extends north and south about 640 kilometers through eastern California.

When warm, moist air from the Pacific Ocean moves in over the western coast of the United States, it moves eastward and rises as it moves over mountain ranges. This rising causes the water vapor in the air to cool and condense to form clouds. These clouds serve as a source of precipitation in the form of rain or snow. The majority of this precipitation will fall on only one side of the mountain range. The opposite, dryer side of the mountain range is said to be in the "rain shadow" of the mountains. In this activity, you will analyze weather data to determine the effect of mountain ranges on precipitation patterns.

Strategy

You will plot elevation and precipitation data for various locations along Interstate Highway 80 on a graph.

You will infer the effect of a mountain range on the amount of precipitation received in different locations.

Materials

colored pencils

Procedure

1. Study Table 1 in the Data and Observations section and the map at the end of this activity. Table 1 lists data from eleven cities or towns along Interstate Highway 80. They are referred to as reporting stations because they are places where the National Oceanographic and Atmospheric Administration (NOAA) collects data on weather conditions, including precipitation.
2. Use the data in the table to plot a graph of the elevation of each reporting station along the highway. The grid for your graph is provided in Figure 1 in the Data and Observations section. Mark the elevation of each station above its location with a dot. Then connect the dots with a line. The resulting graph will give you a rough idea of the shape of the land as you travel along Highway 80.
3. Refer back to Table 1 and use the ranges in Table 2 to mark off regions of average precipitation on the x -axis. (Note: There may be more than one station contained within a particular region, or range of precipitation, and changes from one region, or range of precipitation, to another may occur in the areas between stations.) Using your marks as a guide, shade the area between your graph line and the x -axis with the appropriate color from Table 2 for each region, or range of precipitation. Note: The resulting graph will look something like a rainbow under your graph line. Notice that each color represents a different range of precipitation.

Laboratory Activity 1 (continued)

Data and Observations

Table 1

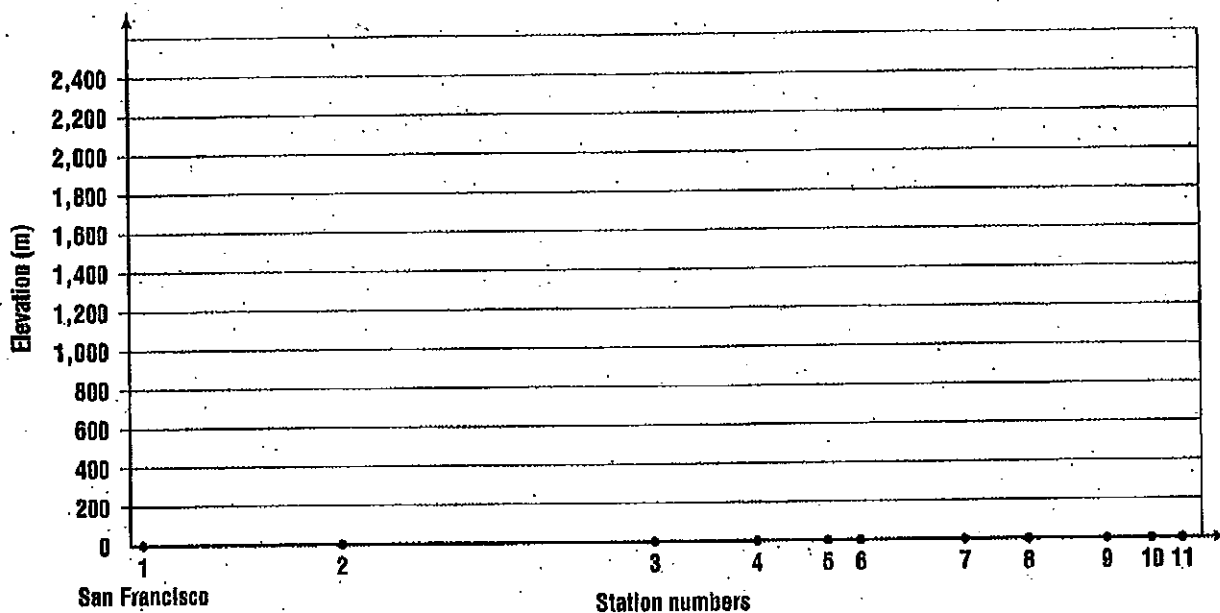
Reporting station	Elevation	Average annual precipitation (cm)
1 San Francisco, CA	5	61
2 Vacaville, CA	34	64
3 Auburn, CA	394	88
4 Colfax, CA	732	123
5 Baxter, CA	1129	142
6 Blue Canyon, CA	1449	174
7 Soda Springs, CA	2099	163
8 Truckee, CA	1799	83
9 Verdi, NV	1488	41
10 Reno, NV	1344	19
11 Sparks, NV	1328	21

Table 2

Amount of precipitation	Color
0 to 25 cm	Red
26 to 75 cm	Orange
76 to 125 cm	Blue
Over 126 cm	Green

Laboratory Activity 1 (continued)

Figure 1



Questions and Conclusions

1. Which side of the Sierra Nevada Mountains receives the greatest amount of precipitation? Why?

2. Why is there more rain or snow at Baxter than at Auburn?

3. Which stations receive the greatest amounts of precipitation? Why?

4. The elevation of Reno, Nevada, is higher than the elevation of Baxter, California. Why does Reno receive less precipitation than Baxter does?

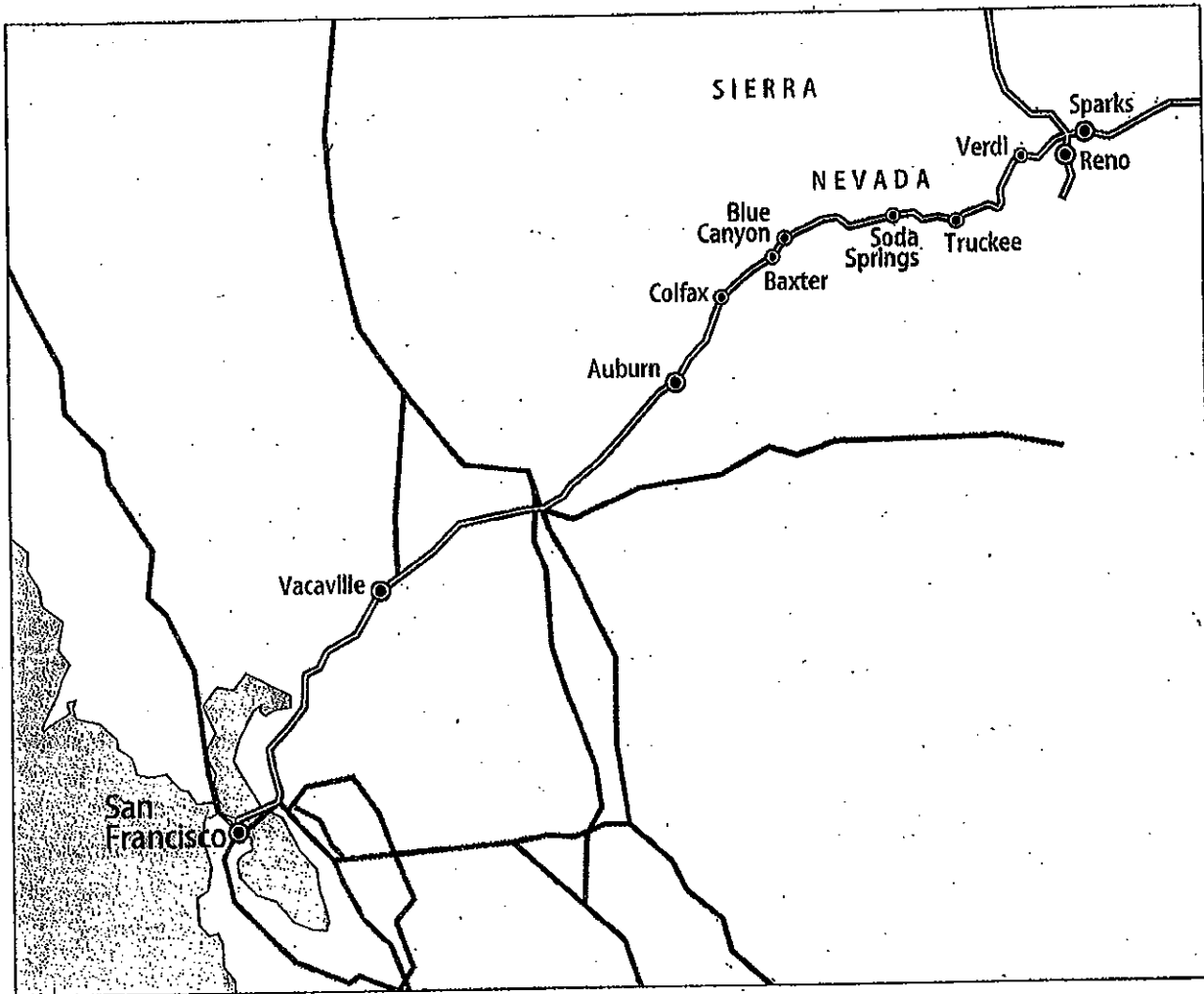
5. On which side of the Sierra Nevada Mountains would you expect to find environments that support a greater diversity and number of organisms? Why?

Laboratory Activity 1 (continued)

Strategy Check

- _____ Can you plot elevation and precipitation data of locations along Interstate Highway 80 on a graph?
- _____ Can you infer the effect of a mountain range on the amount of precipitation received in different locations?

Figure 2



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