Shedding Light on the Weather

Student Activity

Name _____

Class _____

Introduction

There are many factors that contribute to our weather. You will be looking at hourly data for Time, Temperature, and Relative Humidity over 24-hours from different locations in the U.S. As a result, you will:

- Make Temperature vs Time, Relative Humidity vs Time, Relative Humidity vs Temperature graphs.

- Describe the relationship between Time and Humidity, Time and Temperature, and Humidity and Temperature.

- Summarize the 24-hour data using mean, median, mode, and range.

You'll Need

Any of these TI compatible technologies:

TI-84 Plus*
TI-84 Plus Silver Edition*
🌀TI-84 Plus C Silver Edition
🌀TI-84 Plus CE

Entering the Data

1. To enter the data set that your teacher indicates, press [stat] and [enter]. Press [▲] to highlight the header of the leftmost list. Insert an empty list by pressing [2nd][ins] to insert a new column and [2nd][alpha] to type in the name of the new list. Do this to name three lists: HR, TEMP, and RELHU where you will enter the Time (0 through 23) to represent midnight to 11 PM, the Temperature and the Relative Humidity data.

2. The data should resemble the lists shown on the right.

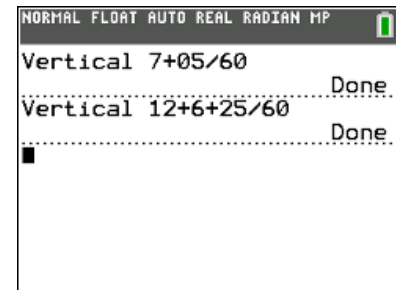3. To graph the Temperature and Relative Humidity data, press [2nd][stat plot] and set up Plot1 as a scatterplot with HR as the independent variable and TEMP as the dependent variable. Plot2 as a scatterplot with HR for the independent variable and RELHU. To help in your analysis, chose a different mark for each plot. Clear out any functions in the [y=] editor. Now press [zoom] [ZoomStat] to graph the data.
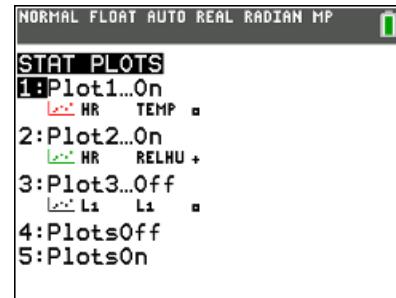
4. To help see the times of the sunrise and sunset, draw vertical lines on the graph by pressing [2nd][draw] and entering the sunrise and sunset times. An example of drawing a line at 7:05 am and 6:25 pm is shown. Go back to the graph by pressing [graph].

Looking at the Results

1. Make a sketch of the time plots of temperature and relative humidity with sunrise and sunset identified on one set of axes.
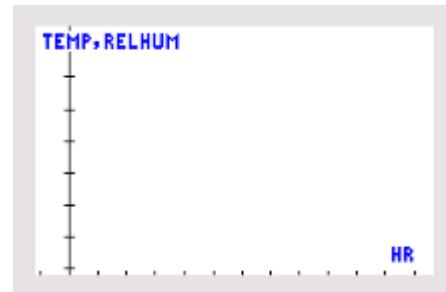
2. From the above graph, describe how Temperature and Relative Humidity are related.

3. Describe how Relative Humidity varies during the 24-hr period.

4. Describe how the Temperature varies during the 24-hr period.

5. Graph Temperature as the independent variable and Relative Humidity as the dependent variable to verify your response to Question 1. Sketch the graph. In your own words, describe the relationship between Temperature and Relative Humidity.
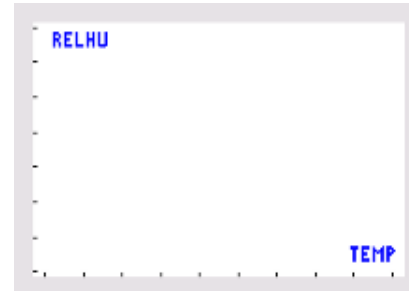
6. Look at the mean, median, mode, and range of the Temperature and Relative Humidity.

Press [stat][▶] to see the CALC menu and select 1-Var Stats.

Temperature: _____ _____ _____ _____

　　　　　　　 Mean 　　　 Median 　　 Mode 　　　 Range

Rel. Humidity: _____ _____ _____ _____

　　　　　　　 Mean 　　　 Median 　　 Mode 　　　 Range

Use these statistics to compare with other locations in the U.S.

Going Further

1. Find the line of best fit for the Relative Humidity-Temperature graph. Record the equation.

2. Collect data in other areas of the U.S. or other times of the year to answer questions you may have. For example, is the relationship between temperature and relative humidity affected by the proximity with bodies of water or other geographic features?

Data

April 16 data are from National Weather Service (www.weather.gov) the Hourly Weather Forecast.

The Fallon, NV and Aberdeen, ID data are from AgriMet Historical Dayfile Data Access
http://www.usbr.gov/pn/agrimet/webagdayread.html

April 16, 2016 Temperature and Relative Humidity															August 1, 2015		
Chicago			Miami			Sioux Falls, SD			Fairbanks, AK			Fallon, NV					
Sunrise	6:07 am		Sunrise	6:56 am		Sunrise	6:41 am		Sunrise	6:08 am		Sunrise	5:54 am				
Sunset	7:33 pm		Sunset	7:44 pm		Sunset	8:12 pm		Sunset	9:33 pm		Sunset	8:09 pm				
Time	T(°F)	H (%)	Time	T(°F)	H (%)	Time	T(°F)	H (%)	Time	T(°F)	H (%)	Time	T(°F)	H(%)			
12 am	51	74	12 am	71	70	12 am	62	72	12 am	30	90	12 am	82	23			
1 am	51	74	1 am	71	66	1 am	61	78	1 am	28	91	1 am	75	30			
2 am	50	77	2 am	71	66	2 am	60	78	2 am	27	92	2 am	72	36			
3 am	50	77	3 am	71	66	3 am	60	78	3 am	27	91	3 am	69	40			
4 am	50	80	4 am	71	66	4 am	59	80	4 am	26	89	4 am	65	46			
5 am	50	80	5 am	71	66	5 am	57	85	5 am	27	86	5 am	65	42			
6 am	48	83	6 am	72	79	6 am	55	85	6 am	27	70	6 am	69	37			
7 am	49	83	7 am	72	79	7 am	55	90	7 am	29	72	7 am	69	44			
8 am	51	78	8 am	73	73	8 am	56	85	8 am	32	65	8 am	74	37			
9 am	54	69	9 am	74	72	9 am	58	82	9 am	35	60	9 am	84	28			
10 am	56	63	10 am	75	70	10 am	61	75	10 am	38	54	10 am	86	23			
11 am	57	61	11 am	76	66	11 am	63	70	11 am	41	50	11 am	89	19			
12 pm	59	60	12 pm	76	66	12 pm	67	61	12 pm	44	41	12 pm	93	18			
1 pm	60	60	1 pm	76	64	1 pm	68	59	1 pm	47	39	1 pm	92	17			
2 pm	60	60	2 pm	76	64	2 pm	69	58	2 pm	79	38	2 pm	95	15			
3 pm	60	58	3 pm	77	61	3 pm	70	55	3 pm	50	67	3 pm	94	15			
4 pm	60	58	4 pm	77	61	4 pm	70	55	4 pm	51	35	4 pm	96	15			
5 pm	59	57	5 pm	77	60	5 pm	69	55	5 pm	50	39	5 pm	95	14			
6 pm	58	59	6 pm	76	61	6 pm	69	55	6 pm	48	41	6 pm	92	15			
7 pm	57	61	7 pm	75	63	7 pm	68	57	7 pm	45	48	7 pm	89	20			
8 pm	56	61	8 pm	73	66	8 pm	67	60	8 pm	41	58	8 pm	83	27			
9 pm	55	64	9 pm	71	71	9 pm	66	62	9 pm	38	65	9 pm	79	35			
10 pm	53	69	10 pm	71	70	10 pm	65	65	10 pm	35	75	10 pm	76	41			
11 pm	52	70	11 pm	70	71	11 pm	64	68	11 pm	32	82	11 pm	75	40			

April 16, 2016 Temperature and Relative Humidity														Jan 1, 2016		
Corpus Christi, TX			Reno, NV			Boise, ID			Lexington, VA			Aberdeen, ID		
Sunrise	7::03 am		Sunrise	6:19 am		Sunrise	6:59 am		Sunrise	6:40 am		Sunrise	8:02 am	
Sunset	7:55 pm		Sunset	7:38 pm		Sunset	8:30 pm		Sunset	7:55 pm		Sunset	5:06 pm	
Time	T(°F)	H (%)	Time	T(°F)	H (%)	Time	T(°F)	H (%)	Time	T(°F)	H (%)	Time	T(°F)	H (%)
6 am	74	94	6 am	48	51	6 am	46	62	6 am	41	85	12 am	-13	76
7 am	75	90	7 am	53	43	7 am	50	58	7 am	47	74	1 am	-16	74
8 am	76	85	8 am	58	32	8 am	54	47	8 am	55	58	2 am	-13	76
9 am	78	82	9 am	63	24	9 am	58	39	9 am	60	47	3 am	-13	76
10 am	79	79	10 am	66	20	10 am	62	30	10 am	64	41	4 am	-16	74
11 am	81	75	11 am	69	19	11 am	65	26	11 am	66	39	5 am	-17	74
12 pm	81	75	12 pm	70	16	12 pm	66	22	12 pm	69	35	6 am	-12	75
1 pm	81	76	1 pm	71	14	1 pm	69	21	1 pm	71	32	7 am	-12	77
2 pm	81	77	2 pm	72	12	2 pm	69	22	2 pm	72	31	8 am	-13	77
3 pm	81	78	3 pm	72	12	3 pm	69	24	3 pm	72	32	9 am	-11	77
4 pm	80	78	4 pm	70	13	4 pm	68	30	4 pm	69	34	10 am	-8	79
5 pm	79	80	5 pm	66	14	5 pm	65	35	5 pm	65	40	11 am	0	83
6 pm	78	82	6 pm	63	20	6 pm	61	41	6 pm	62	42	12 pm	5	85
7 pm	77	84	7 pm	60	25	7 pm	56	50	7 pm	60	45	1 pm	8	86
8 pm	76	88	8 pm	57	30	8 pm	53	559	8 pm	58	47	2 pm	10	76
9 pm	76	90	9 pm	55	38	9 pm	49	65	9 pm	55	50	3 pm	11	69
10 pm	75	91	10 pm	52	40	10 pm	45	71	10 pm	54	52	4 pm	9	71
11 pm	75	91	11 pm	50	42	11 pm	42	75	11 pm	52	55	5 pm	5	75
12 am	75	93	12 am	48	50	12 am	40	76	12 am	51	59	6 pm	1	80
1 am	74	94	1 am	47	52	1 am	39	75	1 am	50	62	7 pm	-3	78
2 am	74	94	2 am	45	56	2 am	39	72	2 am	48	66	8 pm	-4	79
3 am	74	95	3 am	45	58	3 am	40	69	3 am	47	70	9 pm	-6	79
4 am	74	94	4 am	48	51	4 am	46	62	4 am	41	85	10 pm	-5	79
5 am	75	90	5 am	53	43	5 am	50	58	5 am	47	74	11 pm	-5	79