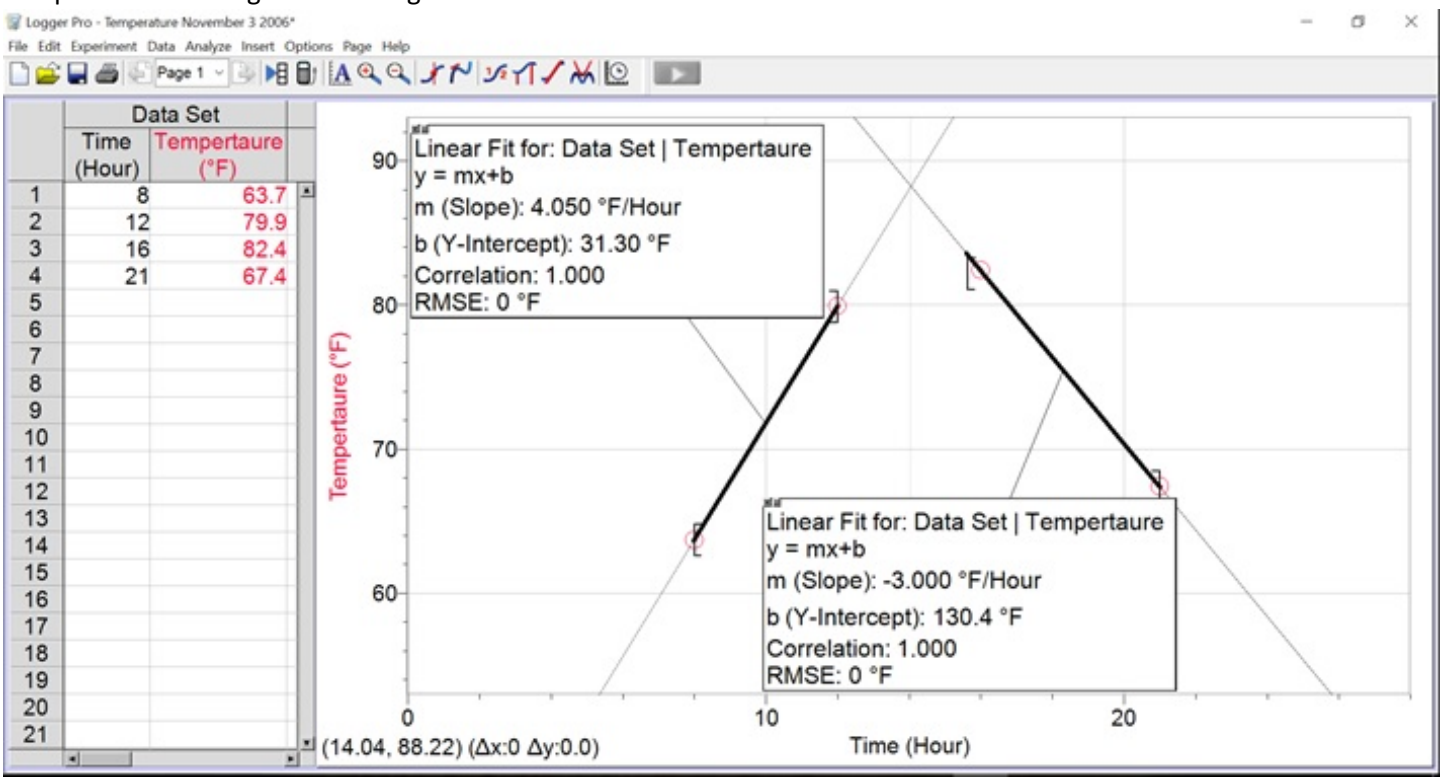
Analyzing Venice High School weather data for use in the classroom

Sample Data from log file 112006lgcsv60.csv



Day	Month	Year	Hour	Minute	Temperature
3	11	2006	0	0	69.3
3	11	2006	1	0	68.1
3	11	2006	2	0	68.1
3	11	2006	3	0	67.1
3	11	2006	4	0	66.4
3	11	2006	5	0	66.4
3	11	2006	6	0	64.5
3	11	2006	7	0	64
3	11	2006	8	0	63.7
3	11	2006	9	0	68.8
3	11	2006	10	0	73.5
3	11	2006	11	0	76.3
3	11	2006	12	0	79.9
3	11	2006	13	0	81.4
3	11	2006	14	0	82.6
3	11	2006	15	0	82.4
3	11	2006	16	0	82.4
3	11	2006	17	0	79.4
3	11	2006	18	0	74.9
3	11	2006	19	0	71.6
3	11	2006	20	0	68.9
3	11	2006	21	0	67.4
3	11	2006	22	0	66.1
3	11	2006	23	0	65

1. Find appropriate data from logfiles.
    a. Visit Venice High School Weather Site
    b. http://sarasotacountyschools.net/schools/venicehigh/
    c. Navigate to website menu → Weather
    d. Scroll down to Historical Data
    e. Select Log Files
    f. Download 112006lgcsv60.csv
2. The goal is to find the intercept point of two lines. The idea is that the temperature goes up in the morning and down in the evening. Objective: To calculate the time of day when the temperature is at a maximum using temperature data points from the morning and evening by applying the point slope formula.
3. Data Points:
    a. Morning: 63.7°F at 8 am & 79.9°F at 12 pm - Evening: 82.4°F at 16 hours (4 pm) & 67.4°F at 21h (9 pm)
    b. Find slope using $m = \frac{y_2 - y_1}{x_2 - x_1}$
        i. Morning: (79.9 – 63.7) / (12 – 8) = 16.2 / 4 = + 4.05 °F/hour
        ii. Evening: (67.4 – 82.4) / (21-16) = -15 / 5 = -3.00 °F/hour
        iii. Notice that it warms up quicker than it cool, probably because the earth (trees, soil, etc…) are retaining heat.
    c. Put into y = mx + b form by using the point slope formula: $y - y_1 = m (x - x_1)$
        i. Morning
            1. y – 63.7 = 4.05 (x – 8)
            2. y = 4.05 x + 31.3
        ii. Evening
            1. y – 67.4 = -3.00 (x – 21)
            2. y = -3.00 x + 130.4
    d. Find intercept time
        i. Equation i2 and ii2 are both equal to y so we can set them equal to each other
        ii. i2 = ii2
        iii. 4.05 x + 31.3 = -3.00 x + 130.4
        iv. 7.05 x = 99.1
        v. x = 14.06 hours (~2 pm)
4. Analysis
    a. The intercept of the two lines occurs at 2 pm.
    b. If we look at the data table we can see the maximum temperature for that day is actually at 14 hours. 😊
    c. We can calculate the maximum theoretical temperature at 14 hours.
        i. y = mx + b
        ii. y = 4.05 x + 31.3
        iii. y = 4.05 (14) + 31.3
        iv. y = 88°F
    d. The actual maximum temperature is only 82.6°F
    e. This can lead into a discussion about how the temperature does not just suddenly change.
5. Going Further
    a. Other data can be analyzed
        i. Monthly temperatures
        ii. Yearly temperatures
        iii. UV, Solar Intensity, Humidity, Barometric Pressure
    b. Where to view sample data
        i. VHS Site
            1. Under the top section there is a link: View our older Weather Display Live Flash Format
            2. Going to the Graph button you can experiment with other data
            3. Other data can be found under Historical Data → Daily Weather Report
        ii. Weather Underground
            1. There is an icon/sticker under the Sun and Moon Information that will take you to Weather Underground (WU) www.wunderground.com
            2. You can also find the VHS Weather Station by searching the WU website.
            3. Various graphs can be created there.