Regional Science Consortium Buoys and Weather

Teacher Guide

Student Worksheet Answer Key

Figures 1-3:

1. What three variables are being examined in Figures 1, 2, & 3?

Air temperature, wind speed, and wave height.

2. A. What was the highest average air temperature observed in the summer of 2019?

79°F

B. On what date was this average air temperature observed?

July 19, 2019

3. What was the wind speed on August 27th, 2019?

19 mph

4. A. On what day was the highest wave observed in the summer of 2019?

May 12, 2019

B. What was the wave height on this day in feet? (1 meter = 3.28 feet)

0.82 m x 3.28 = 2.69 ft

5. Do any of the variables appear to be related? Why or why not?

The graphs of wind speed and wave height look very similar. The highest wind speed of the summer occurred on the same day as the greatest wave height. The air temperature graph looks totally different from these.

Figures 4-8:

6. What is the independent variable in Figure 4? What is the dependent variable?

The independent variable is average air temperature because it is located on the x-axis of the graph. The dependent variable is average wave height because it is located on the y-axis. This would be wave height is dependent on the average air temperature.

7. A. R² measures the strength of the relationship between your trendline and the dependent variable. A higher R² value indicates a stronger relationship. Compare Figures 4 & 5. Which variable has the stronger relationship with wave height? Explain your reasoning.

Figure 5 has a stronger relationship with average wave height because it has an R^2 value = 0.9138 which is higher than the R^2 value of Figure 4 which is 0.1908. This indicates that it is more likely that wave height is dependent on wind speed than it is on average air temperature.

B. How does this compare to your answer from Question 5? This supports my answer from question 5.

8. Compare and discuss the information contained in Figures 5-8.

These figures each depict the relationship between wave height and wind speed for the months of May, June, July and August for 2019. Each figure depicts a different month. It appears that the relationship between wave height and wind speed is strongest in the month of May because that month had the highest R² value (R² =0.9138). This relationship was weakest in the month of August which had an R² = 0.6655. This could indicate that the relationship varies throughout the year, or that the strong relationship in May is a coincidence. Perhaps a different variable has a stronger relationship with wave height than wind speed does in August.