

THE WAVE!

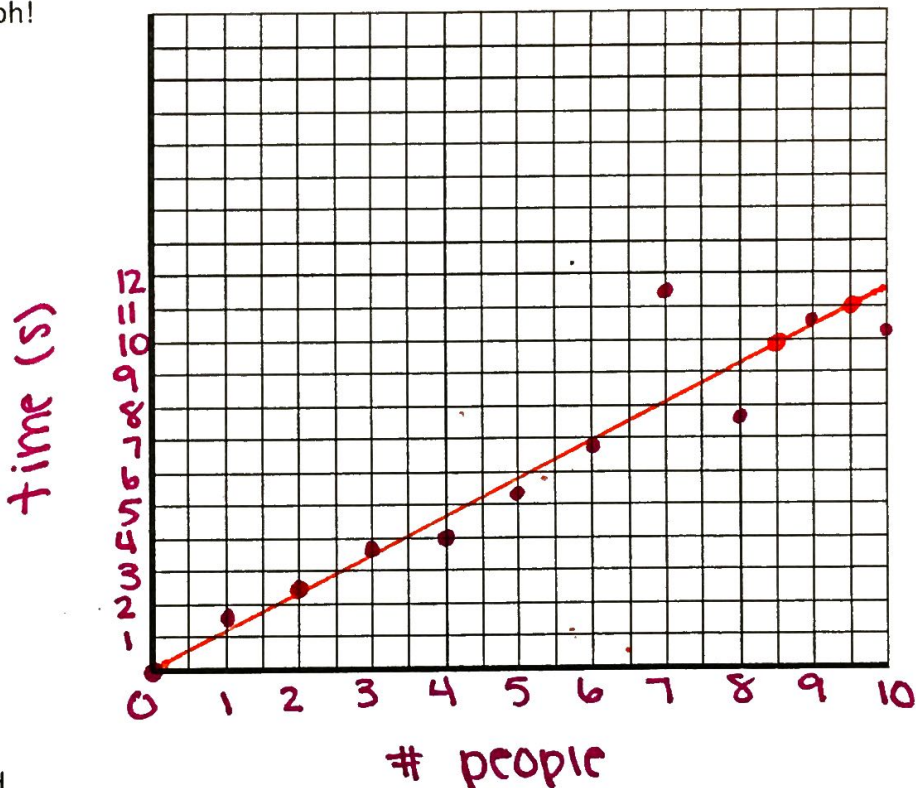
I. Experiment

Students, it's time to show your support of our FVHS Bengals by doing the WAVE! One student will start the wave, and they will be timed how long it takes to raise their arms and sit back down. Then one more student will be added, and the two students together will be timed. More and more students will be added until we have the wave going around our classroom!

II. Data Collection

Make sure you label your table and graph!

# people (x)	time (s) (y)
0	0
1	1.69
2	2.43
3	3.56
4	4
5	5.36
6	6.85
7	11.5
8	7.64
9	10.59
10	10.10



III. Graph and Trend Line

- Plot your data on the graph provided.
- Describe the correlation of this data in words.
- Draw a trend line on your graph, and choose two points to find the slope. Show your work!

$$\begin{array}{l} (2, 2.5) \\ (8.5, 10) \end{array} \quad \frac{10 - 2.5}{8.5 - 2} = \frac{7.5}{6.5}$$

- Write an equation of this line in slope-intercept form. $y = 1.15x$

IV. Linear Regression

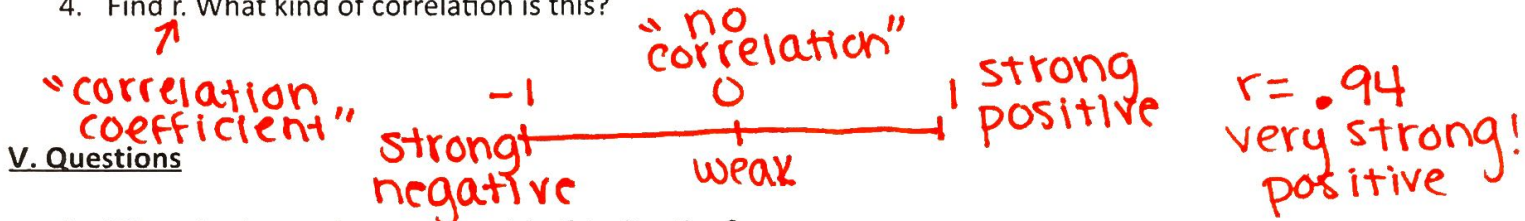
- Enter your data from your table into Stat Edit in your graphing calculator.
- Use your graphing calculator to find the equation of the line of best fit: $y = 1.10x + .32$

$$\begin{array}{l} y = ax + b \\ a = 1.10 \\ b = .32 \end{array}$$

3. What differences do you notice between your trend line that you drew by hand and your line of best fit that came from your calculator?

$$y = 1.1x + .32$$

4. Find r . What kind of correlation is this?



V. Questions

1. What do the x-values represent in this situation? _____
 2. What do the y-values represent in this situation? _____
 3. What does the slope (m) represent in this situation? _____

4. What does the y-intercept (b) represent in this situation? _____

5. How long would it take 40 students to make a wave? Show your work. 44.32 sec.

$$y = 1.1(40) + .32$$

$$y = 44.32$$

6. How many students are needed for 2 minute wave? Show your work. 109 students

$$120 = 1.1x + .32$$

$$- .32 \quad - .32$$

$$119.68$$

$$\frac{119.68}{1.1} = \frac{1.1x}{1.1}$$

$$x = 108.8$$

7. Was your answer to Question 6 a whole number? Does a non-whole number make sense for this answer? Explain.

8. a. How long did it actually take 3 students to complete the wave?

$$3.56 \text{ seconds}$$

- b. Using your line of best fit, how long should it take for 3 students to complete the wave? Show work!

$$3.62 \text{ seconds}$$

$$y = 1.1(3) + .32$$

$$y = 3.62$$

- c. Why are these two values different?

9. If you compare your data with the prediction for how long it would take 5 students to complete the wave that comes from your equation of the line of best fit, how close are the two times? What might cause the difference in the two numbers?