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Title: Making a Seismograph

Purpose: How does the magnitude of vibrations affect the amplitude of a seismograph?

Hypothesis: If I increase the magnitude of vibrations, then the amplitude of the seismograph will increase.

Independent Variable: magnitude of vibrations

Dependent Variable: amplitude of a seismograph

Control: There was not a control group in this experiment.

Constants: same pen and string, same table, same type of paper, same clamp, same people in group

Materials: 1 clamp, 1 metal bar, 6" piece of string, 2 rubber bands, 1 table, 1 pencil, 2 people

Procedure: I laced a piece of paper directly beneath the pen and the clamp stand. One person slowly moved the paper past the pen, as the other hit the end of the table. The first trial represented a medium magnitude movement. The second trial was the soft movement, and the third was the hardest, or the most forceful magnitude. While looking at each individual seismograph, the greatest magnitude was observed and identified. Measuring the distance from the top and bottom of the spike represented the amplitude. The data from each seismograph was recorded in the table on the following page.

Observations and Data:

Magnitude	Amplitude	Observations
Medium (#1)	>1.3 cm.	a little jagged, the dots are the darkest of all the trials, the pen a little wild
Softest (#2)	>.5 cm.	the smoothest line, more dots and dots are closer together, the pen was not out of control
Hardest (#3)	2 cm.	the most jagged, doesn't really have a certain path, the least amount of dots, pen way out of control

Conclusion: **This lab investigated** how the magnitude of vibrations affects the amplitude of a seismograph. **In order to study the problem we** created three magnitudes of movement and measured the amplitude of each with a seismograph. **My results showed** the trial with the greatest amplitude was trial three because the table was being hit with the most force, making the table and the pen move more than the other three trials. The trial with the least amplitude was trial two because the table was hit with the least amount of pressure. **While observing the experiment, I noticed that** the more vibrations or higher magnitude resulted in higher amplitude on the seismograph. The harder the table was being hit, the higher the amplitude rose. **The data supports my hypothesis, which states that** an increase in the magnitude of vibrations will increase the amplitude of the seismograph.

**I believe the results are accurate because** while the experiment was in progress, the frame moved at the same rate as the table. It was proven in trials one through three that the increased magnitude of table movement caused the greatest amplitude differences on the seismograph. It is clear, therefore, that the movement of the frame also corresponds to the amplitude of the seismograph. The more the frame moved, the greater the amplitude on the seismograph. **In order to further investigate this problem, next time I would** try the experiment on a different surface and would add additional movements of varying forces for further readings on the seismograph.