

CHEM 115 LAB & MA 153 WR 3: Bungee Barbie and Kamikaze Ken
Due Tuesday 9-29-09 (10 pts)

Problem: You have been hired to work for the Daredevil Adventure Company. This company offers rock climbing, sky diving, "extreme skiing", and cliff diving adventures to the public. To keep up with market demand, the company's board of directors decided to add bungee jumping to its offerings. The company has several sites planned for bungee jumping and each site is at a different height. Your first assignment involves working with a group of three other employees to simulate the testing of the drop height for a bungee cord that optimizes the thrill of splashing in a pool of water without actually hitting the floor. Using only one action figure (doll), your task is to determine for various heights above the floor the number of rubber bands that allows your action figure to come as close to the floor as possible (for maximum thrills) without causing any type of injury or fatality.

Step 1: Collecting the Data

If necessary, tape a weight to the doll's back so s/he is heavy enough to stretch the bungee cord (rubber band). You will need to do this if your dolls are lightweight or flimsy. Tie one rubber band to the doll's feet and drop it, head first, from various heights. Keep raising the jump height until the ol' coconut no longer hits the floor! Once you get close to this height, perform three trials and take an average. Continue adding rubber bands and complete the table.

Number of Rubber Bands	Maximum Height You Can Safely Jump			
	Trial 1	Trial 2	Trial 3	Average
1				
2				
3				
4				
5				
6				

Step 2: Modeling the Data

Using your average heights, enter the Number of Rubber Bands data in one list and the Maximum Height You Can Safely Jump data in another list. In the STAT PLOT Menu turn the plot on, select the scatterplot option, use the Number of Rubber Bands data in the Xlist, and use the Maximum Height You Can Safely Jump data in the Ylist. Adjust the window or select ZOOM 9: ZoomStat to graph the data. Find an equation that models the data.

Step 3: Using the Model and Analyzing Your Results

Each group will perform a live demonstration at a different height to test the accuracy of their prediction. A bowl of water will be on the floor directly below the launching board. You must find how many rubber bands are needed so your action figure will get the biggest thrill without getting a severe headache. Your group will fasten the required number of rubber bands to your doll, and the entire class will watch your action figure's jump. Your goal is to get a splash without a crash.

Requirements for (typed!) write up, due to John (one per person) by next Tuesday, Sept. 29, 2009

- Cover sheet indicating your name, then those in your group roles. After each name give the group roles of each: manager, scribe, clarifier, quality controller
- (1 pt) Specify the equation of your model, how you arrived at your equation
- (2 pts) Discuss any methods of solution and justifications of conclusions.
- (1 pt) Identify any assumptions that were made.
- (2 pts) Include graphs and tables. (I have shown you how to print calculator screens or you can use Excel.)
- (1 pts) Include possible sources of error
- (2 pts) Discuss the outcome of your launch and anything you would have done differently.
- (1 pt) After doing this assignment, what do you know now that you did not know before? What did you learn?