Barbie® Doll Bungee Jumping

Procedure:

1. Secure the doll's ankles together with one rubber band. This will serve as a point of attachment for the bungee cord. Tie back the doll's hair with a rubber band if it is not already in a ponytail.
2. Construct a bungee cord composed of 2 rubber bands and attach it to the band on the doll's ankles. The doll should fall freely from a standing position, plunging headfirst.
3. Drop the doll several times to perfect the technique of taking readings and recording data.
4. Create a data table to record the trials, the number of rubber bands in the bungee cord, and the drop distance. Remember that you will need to record an average maximum drop for each.
5. Drop your doll seven times using 2 rubber bands, and record the data.
6. Add a rubber band to your attached bungee cord. Drop your doll three times using the new cord and record the data.
7. Repeat Step 6 until you have used a total of 6 rubber bands. (You may have to devise a way to take measurements greater than 1 m).
8. Calculate the average distance for each rubber band count and record these values in your data table.
9. Construct a graph of the average drop distances versus the number of rubber bands.
10. Either manually draw the line of best fit *or* perform a linear regression on your graphing calculator/computer if you know how to do this. Determine the slope and y-intercept. Write the line equation in the $y = mx + b$ format.
11. Use your equation to predict the numbers of rubber bands needed to provide a safe yet thrilling jump from the height that your teacher specifies.
12. Create and attach the bungee cord predicted in step 11. Proceed to the drop zone and test your prediction. Record your results.

Lab Report:

Purpose: In your own words, using 1 or 2 sentences, describe the purpose of this lab.
Hypothesis: What is your hypothesis?
Data, Tables, and Graphs: All data, calculations and graph from the procedure is to be turned in with the lab report.
Post-lab Questions:

1. Based on your graph, how many rubber bands did you calculate needed to be used to have Barbie come as close to the floor as possible?
2. Based on your results, were you correct in your estimation of rubber bands? What percentage were you off by?
3. Barbie's friend wants to bungee jump and have some fun too, using the same equipment. Barbie warns her friend that this is not a safe plan. Her friend replies, "But we weigh the same!". What variable had her friend neglected? Justify Barbie's concern with data.

Concluding Paragraph
Answer the following prompt with complete sentences! Remember to support any claim with data/evidence!

What are some of the sources of error that occurred in this lab that could have affected the results? (More than one item and explain)