Name: _____

Barbie Bungee

Introduction:

In this activity, you will simulate a bungee jump using a Barbie doll and rubber bands. Before you conduct the experiment, formulate a hypothesis:

> I believe that _____ is the maximum number of rubber bands that will allow Barbie to safely jump from a height of 510 cm.

Now, conduct the experiment to test your hypothesis.

Group Roles:

You will be working in groups of five people. Each of you must take on one of the following roles:

A. Group Leader: Responsible for ensuring that the group is on task and on schedule.
B. Materials Manager: Responsible for getting all required materials for the experiment and returning them once the experiment is complete. Rubber band police.
C. Bungee Technician: Responsible for dropping Barbie from the bungee platform.
D. Surveyor: Responsible for accurately measuring each of Barbie's jumps.
E. Data Recorder: Responsible for recording Barbie's jumps onto the data table.

Procedure:

Complete each step below. As you complete each step, put a check mark in the box to the left.

- Tape the measuring tape to the wall at a height of 6 feet (upside down so that the 0 measure is at the 6 foot mark).
- With a rubber band, create a double-loop to wrap around Barbie's feet. A double-loop is made by securing one rubber band to another using a slip knot.
- Wrap the open end of the double-loop tightly around Barbie's ankles (you may wish to secure it with tape). You should now have one rubber band around her feet (the harness) and another rubber band attached to that one (Band 1).
- With Barbie's feet at the start of the measuring tape, measure Barbie's height when there are no rubber bands attached to her feet. Record this information in to the data table of Question 1.
- Have one group member hold the open end of the rubber band attached to the harness at the start of the measuring tape. Have the Bungee Technician hold the Barbie at the same height. Drop the Barbie and measure the lowest distance the doll reaches on this jump. Record this measurement on the table. Repeat the same jump two more times. Record these measurements onto the table and then calculate an average in the final column. This step will ensure a more accurate measurement. Accuracy is important – Barbie's life could depend on it.

- Repeatedly attach an additional rubber band for each new jump, measure the jump distance, and record the results in the data table until you have reached a maximum of 5 rubber bands.

1. Complete the data table below.

Number of Rubber Bands (x)	Jump 1 Distance in Centimeters	Jump 2 Distance in Centimeters	Jump 3 Distance in Centimeters	Average Jump Distance in Centimeters (y)
0				
1				
2				
3				
4				
5				

2. Make a scatterplot of your data on a graph. Indicate the scale on each axis.
3. Draw a line of best fit on the graph.
4. What is the relationship between the number of rubber bands and the jump distance?

5. What is the equation for your line of best fit?

6. What is the slope of your equation, and what does it represent in this context?

7. What is the y-intercept of your equation, and what does it represent in this context?

8. Based on your data, what would you predict is the maximum number of rubber bands so that Barbie could safely jump a height of 510 cm?

Now let's go test your prediction by sending Barbie down the stairwell!!!

Results: _____

9. Were your predictions reliable? Why or why not? Justify your answer and be sure to consider your methods of collecting, recording, and plotting data.

10. How do your predictions from question 8 compare to the hypothesis you made before doing the experiment? What prior knowledge did you have (or not have) that helped (hindered) your ability to make a good hypothesis?