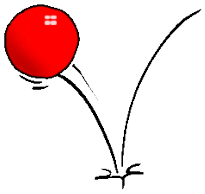


Douglas Anderson Algebra I - Ball Bouncing Lab

Group Members: _____

Question: How does the height from which you drop a ball affect the height that it will bounce?

Hypothesis: I think if a ball is dropped from a greater height, then, _____

_____

_____

Materials Needed: Bouncing Ball, Tape Measure (CM.), Tape to secure Tape Measure, Calculator, This packet, and pencil for recording.

Experiment Procedure:

1) Assign roles to your group members. You will need to have:
   - Recorder - Organizes the group and records all responses during the experiment phase.
   - Ball-Dropper - Holds the bottom of the ball steady and drops it from the given heights.
   - Spotter(s) - Makes sure the ball doesn't get lost or bounces away. Is responsible for measuring the bounce height at the bottom of the ball.

2) Find a drop station for your group on the poles around the DA Amphitheatre. All group members should stay in your area, and not comingle with other groups.

3) The Ball-Dropper will drop the ball so that the bottom of ball is even with the 20 cm. marking on the tape measure. The Spotters should closely watch to estimate the height of the bottom of the ball on the first bounce. Repeat this procedure at 20 cm. two more times. (A total of 3 bounces at each of the heights.) The Recorder should record all three bounces on the chart which follows.

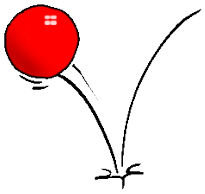
4) Repeat step-3, but change the drop height to 40 cm., 60 cm., 80 cm., 100 cm., 120 cm., and 140 cm. You should have a total of 21 drops and bounces recorded.

5) Once you are finished with your bounces, and are waiting for other groups to finish, you may begin calculating the average bounce for each drop height.

6) Gather all materials (leave the tape measures taped to the poles) and return to the classroom to finish our work.

Data Collection:

Drop Height	Bounce Trial #1	Bounce Trial #2	Bounce Trial #3	Average Bounce
20 cm.				
40 cm.				
60 cm.				
80 cm.				
100 cm.				
120 cm.				
140 cm.				



Douglas Anderson Algebra I - Ball Bouncing Lab

Part 2: (Each group member will complete this page.) **Name**_____

Displaying the Data:

1) In this experiment, what variable was the independent variable?_____

2) In this experiment, what variable was the dependent variable?_____

3) Which variable should go on the x-axis? _____ y-axis _____

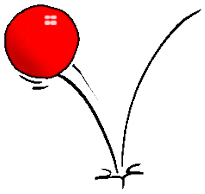
4) Summarize your group's bounce data in the chart to the right:

Drop Height	Average Bounce
0 cm.	(What would you expect?)
20 cm.	
40 cm.	
60 cm.	
80 cm.	
100 cm.	
120 cm.	
140 cm.	

5) Consider the following requirements for each graph we do from now on in this class:

1) Include a title. (Be specific and capitalize.)
2) Label each axis with appropriate variables.
3) Scale each axis to fit your data. Be sure your scale is in equal/even intervals. (For this activity, scale the data to go up to 200 cm. in both directions.)
4) Be sure your scale or label includes units.

6) Using the expectations above, create a graph to represent your average bounce height data. Once your graph is set up, plot each of the data points on the graph.



Douglas Anderson Algebra I - Ball Bouncing Lab

Part 3: (Each group member will complete this page.) **Name**_____

Interpreting the Data:

7) Would you describe your data as linear or non-linear, and why? _____

_____

8) Your data may, or may not, have been linear. In order to model the information, however, we are going to create a "*Line Of Best Fit*" that goes as near to the center of all of the data points as possible. We will use this line to answer the remaining questions.

9) Should our *Line of Best Fit* go through the origin? Why or why not? Justify your answer in terms of what the origin represents in the context of this problem. (What does it mean in terms of balls bouncing?) _____

_____

10) Using a ruler or straight-edge, draw an appropriate *Line of Best Fit* through the center of your data points.

11) How would your *Line of Best Fit* look different if your ball was "more bouncy"? _____

_____

12) How would your *Line of Best Fit* look different if your ball was "less bouncy"? _____

_____

13) In mathematics, to INTERPOLATE means to determine a value in the middle of some data by estimating or calculating it from surrounding known values. Based on your *Line of Best Fit*, how can you interpolate to predict the height that your ball would have bounced if you had dropped it from 70 cm? _____

_____

_____

What is your bounce prediction for a drop from 70 cm? _____

14) In mathematics, to EXTRAPOLATE means to extend a set of data or information beyond the known values, using the assumption that the trends that you observe will continue. Based on your *Line of Best Fit*, how can you extrapolate to predict the height that your ball would have bounced if you had dropped it from 200 cm_____

_____

_____

What is your bounce prediction for a drop from 200 cm? _____

CHALLENGE QUESTION:

What is the SLOPE of your *Line of Best Fit*? _____

What is the equation of your *Line of Best Fit*? ($y=mx+b$ format)_____