Section 2.6

Ball Bounce

Developed by Doug Smeltz T3 Conference – Adapted by Kelley Harding

Materials:

1. Group of 4 students (a ball dropper, someone to catch the ball, someone to measure the height, and a recorder)
2. Basket Ball (or any large ball with a nice bounce)
3. A Flat Surface carpeted or non-carpeted next to a wall.
4. A yardstick.
5. A roll of masking tape.
6. A ruler

Directions:

1. Place a long piece of masking tape from the floor, up the wall about 6 feet.
2. Starting from the floor, use the yardstick to mark off inch tick marks. Write the number value every 5 inches. Continue until you reach 70 inches.
3. Select a ball dropper, catcher, measurer, and recorder.
4. The ball dropper will hold the ball up so that the bottom of the ball lines up with the 20 inch mark on the wall (For the wall not to effect the bounce hold the ball about 2 in. away from the wall)
5. The measurer will check to make sure the dropper is correct.
6. The dropper then releases the ball, it will bounce one time, and the catcher will catch the ball at the top of the bounce.
7. The measurer will look under the ball and measure the height of the bounce by reading the measure on the masking tape.
8. The measurer will then share the information with the recorder who will record the bounce in the data table.
9. The group will repeat this two more times at the same height of 20 in.
10. Once the group has recorded 3 recordings at the same height, the group will go up by increments of 10 in. (20 in, 30 in, 40 in, ...) until reaching the 70 in. mark on the masking tape.
11. When the recorder has completed writing down all measurements. That student will share the information with the rest of the group to copy.
12. The group will then complete the rest of the charts, graphs, and questions.

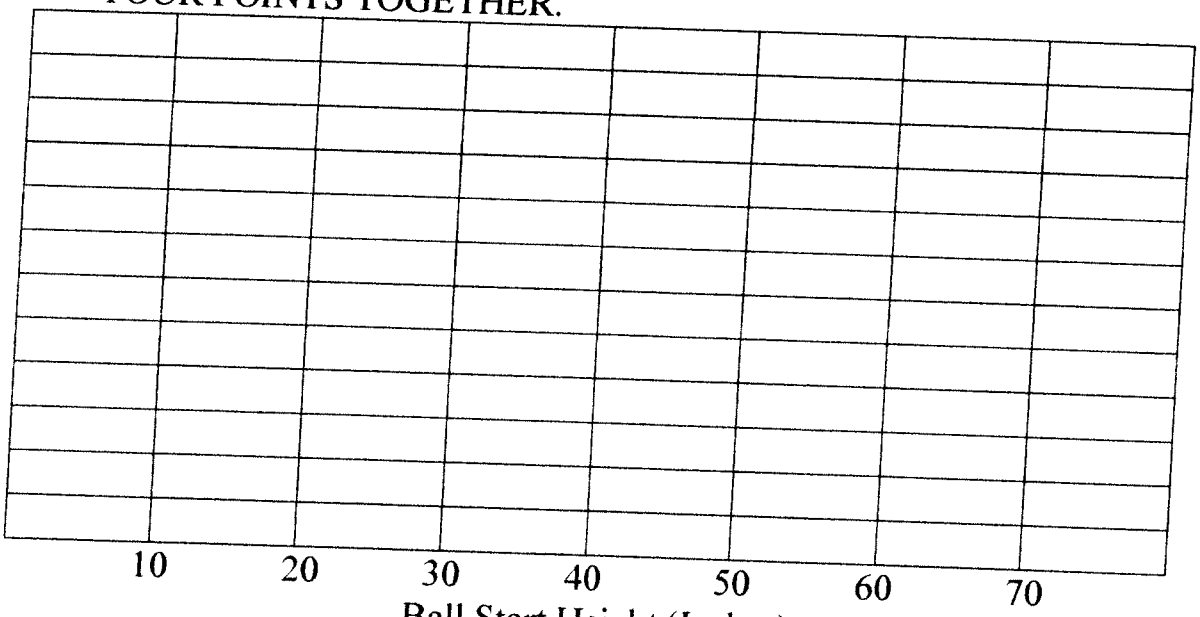
Start Height	Bounce 1	Bounce 2	Bounce 3	Average
20 in.				
30 in.				
40 in.				
50 in.				
60 in.				
70 in.				

1. Fill the above chart with your three bounce attempts in the appropriate columns.
2. Once the recorder fills the chart with data, the group will then copy the data and calculate an average bounce height.
3. Adding the 3 bounce heights and dividing the sum by 3 can find the average.
4. Record the average in the column provided in the table.
5. Please fill in the blank for the coordinates with your average bounce height for each drop height

(Ball Start Height, Average Bounce Height)

(20, ____), (30, ____), (40, ____), (50, ____), (60, ____), (70, ____)

6. Graph your coordinates on the graph below DO NOT CONNECT YOUR POINTS TOGETHER.



6. Using a ruler and a pencil. Draw ONE single line that best shows the trend of the data. This is called a "Best Fit Line" it may go through some of your data points or it may not. It is just showing the direction that the data could go if you would continue collecting ball bounce data for 80 in., 90 in…
7. After drawing your "Best Fit Line" pick two points that are the closest to the line or lie on the line. Fill these two coordinates in the blank:

(_____ , _____) and (_____ , _____)
Are the two points that best describe the trend of the data

8. Using the two points that you selected above, calculate the slope. Remember, slope is Change in y over Change in x.

The slope of the "Best Fit Line" is _____.

9. Now that you have some points and the slope of your "Best Fit Line" you can now calculate the equation for the "Best Fit Line" using y=mx+b. You can use either coordinate above in #7 for x and y and use the slope that you calculated in #8.

The equation for the best fit line is y = _____

10. After you have found the equation for the line, you can now calculate the bounce of the same ball you used in your experiment from any height you want. But remember you used inches in your experiment so you must enter inches into your equation to solve for the following: A ball dropped from:
    a. 100 in. would bounce _____ in.

    b. 10 ft. would bounce _____ft. & _____in.

    c. The roof of a house (20 ft.) would bounce _____ft. & _____in.

    d. The LaVeque Tower in downtown Columbus is 169.2 m. (39.37 inches in one meter)

    would bounce _____ft. & _____in.

11. The Sears Tower in Chicago is one of the tallest buildings in the world. If you would drop your ball from the top of the roof, which is 1486 ft. above the ground. How high would your ball bounce according to your equation?

My ball would bounce _____ft. and _____in.