

## Golf Ball Lab - Chapter 2

In this lab, you will explore the relationship between the height of a golf ball before dropping it and its height after one bounce.

### *Materials*

You will need at least three people (2 groups can work together to get the data) and the following items:

1. a tape measure
2. a golf ball

### *Recording the Data*

The same person should drop the golf ball each time. A second person should measure the height of the golf ball (from the bottom of the ball) before the first person drops it. The ball should be dropped from an initial height of 12 inches. A spotter should estimate the bounce height of the golf ball. Repeat this process three times for the drop height of 12 inches, then compute the average of the three bounce heights. Next, find the average bounce heights of the golf ball for initial heights of 24 inches, 36 inches, 48 inches, 60 inches, and 72 inches.

## Analyzing the Data

1. Display your golf ball data in a table like the following:

Drop Height (inches)	Bounce Height (inches)
12	
24	
36	
48	
60	
72	

2. Let  $B$  be the bounce height (in inches) after it was dropped from an initial height of  $H$  inches. Use a graphing calculator to draw a scattergram of the golf ball data. Draw a sketch of the scattergram on graph paper.
3. Find an equation of a linear model to describe the situation. Write your equation with the function name  $f$ . Round constants in your equation to two decimal places.
4. Find the  $B$ -intercept of your model. What does it mean in this situation? If you can find a linear model with a more reasonable  $B$ -intercept that still fits the data well, do so.
5. Use a graphing calculator to draw a graph of your model and the scattergram in the same viewing window. Also, graph the model on your scattergram by hand. How well does  $f$  model the data?
6. Use your model to estimate the bounce height for a drop height of 80 inches.
7. On a golf course, a golf ball is hit to a maximum height of 50 feet. What does your model estimate the bounce height to be after one bounce? Do you think this estimate is accurate? If not, will it be an underestimate or an overestimate? Explain.
8. Find the slope of your model. What does the slope mean in this situation? Explain.
9. Estimate the bounce height after three bounces for a drop height of 90 inches.