

NBA Jumpers

Materials: TI 73 Calculators, a CBL2, a light probe, A Laser pointer



Jump questions:

- How high do NBA players jump? See if you can find out by researching on the internet.
- How high do students jump? Boys? Girls?
- Are jump heights related to how tall you are?

Let's find out some answers to our questions. We'll use a light sensor and a CBL2 to measure how long you are in the air during a jump. We will measure "hang time" as a way to see how high you jump.

Directions:

- Connect the light sensor to the CBL which is connected to the calculator.
 - Position the laser and light sensor about three feet apart so the laser is shining into the sensor.
 - Stand between the laser and the sensor and block the laser light.
 - Jump into the air as high as you can—straight up and back down, blocking the light again. The time the beam is unblocked is detected by the CBL. This "hang time" will be computed as a jump height.
 - You can jump more than once, but only your last attempt will be kept as part of the data set.
 - Follow the directions on the JUMP program on the calculator.
 - Share the data with the entire class using the DWDCHER program. Connect 2 calculators with the link cable and run the DWDCHER. Follow directions on the screen.
- 1) Now that you have the data in your calculator, let's organize it—sort it from smallest to largest.
 - Press 2nd [STAT], OPS, 1.
 - Choose the list you want to sort (2nd [STAT]—pick list). Then enter.
 - Look at your sorted list.
 -
 - 2) Find the minimum _____ and maximum _____ jump heights.

What is the range of data? _____

What is the middle jump height? _____ We call the middle number the *median*.

3) How should we look at this data? What kind of graphs do we want?

- Press 2nd [PLOT]. Turn one plot on.
- Select a histogram. Go to 2nd [Stat] to tell the calculator what list you want.
- (Make certain y = is cleared.)
- Prepare the window for the data.
- Sketch the histogram below. Label the axes.
- Change the plot to a box plot. Sketch and label below (to the right of the histogram).
- Press Trace and use the left and right arrow keys to find the statistics values.
Median _____ Minimum _____ Maximum _____

Quartile 1 _____ Quartile 3 _____



6) Compare the histogram and the box plot. How do they show the same data differently? Which one shows the information better? Or is there a better?

7) What does the box part of the box plot tell you? Explain the quartiles.

8) If the box is wide, what is true about the jumps in the class?

If the box is narrow what is true about the class jumps?

9) If the median is right of center, what do we know about the jumps in our class?

If the median is left of center, what do we know about the jumps in our class?

10) What do the lines (the whiskers) at either end of the box show?

11) A box plot is sometimes distorted by very high or low values (jumps). Does your box plot show any outliers? How do you know when you have an outlier?

12) How would your box plot change if one of the jumpers had a sprained ankle and could only jump $\frac{1}{2}$ inch off the ground?

How would your box plot change if Michael Jackson was one of the jumpers?

13) Devise a plan to figure out whether or not jump heights are related height. Collect and organize the data, prepare graphs. Explain your conclusion