

Illustrative Mathematics

7.SP.3,4 – College Athletes

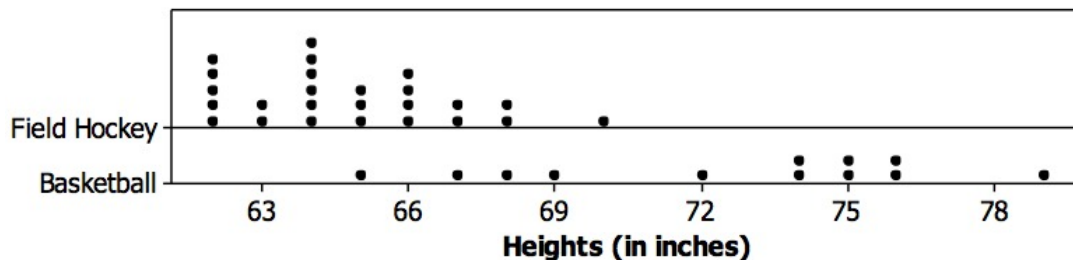
Alignment 1: 7.SP.B.3, 7.SP.B.4

Not yet tagged

Below are the heights of the players on the University of Maryland women's basketball team for the 2012-2013 season and the heights of the players on the women's field hockey team for the 2012 season. (Accessed at <http://www.umterps.com/sports/w-fieldh/mtt/md-w-fieldh-mtt.html> , <http://www.umterps.com/sports/w-baskbl/mtt/md-w-baskbl-mtt.html> on 1/13/13) Note: it is typical for a women's field hockey team to have more players than a women's basketball team would.

Field Hockey Player Heights (inches)
66
64
66
63
67
62
62
64
64
64
65
66
65
64
63
62
62
68
68
66
70
67
65
62
64

Basketball Player Heights (inches)
75
65
76
75
76
72
67
69
74
68
74
79



- a. Based on visual inspection of the dotplots, which group appears to have the larger average height? Which group appears to have the greater variability in the heights?

- b. Compute the mean and mean absolute deviation (MAD) for each group. Do these values support your answers in part (a)?
- c. How many of the 12 basketball players are shorter than the tallest field hockey player?
- d. Imagine that an athlete from one of the two teams told you she needs to go to practice. You estimate that she is about 65 inches tall. If you had to pick, would you think that she was a field hockey player or that she was a basketball player? Explain your reasoning.
- e. The women on the Maryland field hockey team are not a random sample of all female college field hockey players. Similarly, the women on the Maryland basketball team are not a random sample of all female college basketball players. However, for purposes of this task, suppose that these two groups can be regarded as random samples of all female college field hockey players and all female college basketball players, respectively. If these were random samples, would you think that female college basketball players are typically taller than female college field hockey players? Explain your decision using answers to the previous questions and/or additional analysis.

Commentary

In this task, students are able to conjecture about the differences in the two groups from a strictly visual perspective and then support their comparisons with appropriate measures of center and variability. This will reinforce that much can be gleaned simply from visual comparison of appropriate graphs, particularly those of similar scale. Students are also encouraged to consider how certain measurements and observation values from one group compare in the context of the other group. As a possible extension, students can investigate if these distributions are in fact similar to the distributions of heights of women's field hockey and women's basketball players.

Task 1341 is similar to this task and looks at weights of two groups of offensive linemen. In that task, the difference in MAD's is also about 2. However, the variability for the two groups was judged to be similar because in the context of that task, a difference of 2 pounds is small relative to the weight values, which ranged from 250 to 340 pounds. In this task, a difference of 2 inches is judged as meaningful relative to the height values in the data sets.

Solution: Solution

- The center of the basketball distribution is much higher on the number line than the center of the field hockey distribution, so at first glance, it appears that the basketball group has the higher average. Similarly, the values for the basketball distribution appear to have a greater range and are less concentrated than the field hockey distribution, so it appears that the basketball group has greater variability in its observations.
- Field Hockey: mean = 64.76, MAD = 1.75; Basketball: mean = 72.5, MAD = 3.58. These values do support the conjectures from Part (a).
- The tallest field hockey player is 70 inches. Four of the basketball players are less than 70 inches (65, 67, 68, and 69).
- At 65 inches, she is more likely to be a field hockey player. Using the summary measures, 65 inches is approximately the mean for the field hockey players, so she would be a field hockey player of average height. A height of 65 inches is more unusual for the basketball team as that value is just over 2 MAD's below the mean. Using the raw data and a probability argument, 3 of the 25 field hockey players are 65 inches (12%) and only one out of the 12 basketball players is 65 inches (8.3%).
- Yes, it appears that women's college basketball players are typically taller than women's college field hockey players. In addition to any arguments/statements made earlier regarding the dotplots and summary measures, one could also mention that $\frac{2}{3}$ of the basket players are taller than the tallest field hockey player (and similar comparative arguments).



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