

Objective

To develop a probability distribution for 10 randomly tossed tacks landing upright. To express the central tendency as a mode, median and mean.

Lesson Notes

3. Write these definitions on your blackboard:

Mode: The **most frequent** outcome. It appears more often than any other number.

Median: The **central number**. It has an equal number of outcomes above and below it.

Mean: The **average** outcome. Add all the numbers and divide by the total.

Answers

2-3. The distribution in this example conforms quite well to the classic bell-shaped curve. For samplings with only 100 trials, expect your class to generate a wide variety of less probable "lumpy haystack" variations.

Mode: 4 is the most frequent outcome.

Median: 4 is the central number.

Mean: $0 \times 1 = 0$

$1 \times 6 = 6$

$2 \times 9 = 18$

$3 \times 17 = 51$

$4 \times 25 = 100$

$5 \times 20 = 100$

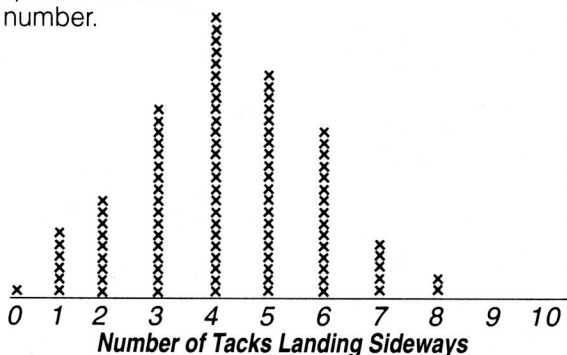
$6 \times 15 = 90$

$7 \times 5 = 35$

$8 \times 2 = 16$

Total = 416

Mean = $416/100 = 4.16$



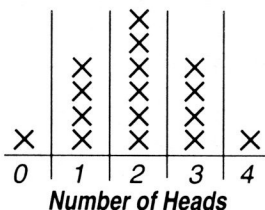
Extension

Pool the results of all your students into a single class histogram. For example, you might let 1 square on a piece of graph paper represent 10 class outcomes. This much larger sampling will likely conform more closely to the classic bell-shape.

Evaluation

Q: Shake 4 pennies in your cup and count the number that land heads up. Graph 16 outcomes on lined paper.

A: Here is the most likely distribution. (However, it is much more likely that each student will generate one of a multitude of less probable distributions.)



Materials

☐ A cup. If noise is a problem, substitute styrofoam for plastic or paper. Don't use glass.

☐ Ten tacks. Use the same brand for uniformity.

☐ Notebook paper.