

Are You Better Than Average?™

History of the Game: Once upon a time, there once was a procrastinating dad who promised to make up a game for the school's math night. The night before math night, he thought "What can I come up with real, real quick?" Spying a pair of dice, he doodled a bit, trying to come up with a way to quickly demonstrate the basics of probability. The game does this in a fun way that both kids and adults enjoyed. The children of Lake Woebegone, who are all above average, inspired the game's title.

Purpose of the Game:

To demonstrate three basic principles of applied mathematics: averages, probability, and modeling.

Materials:

One pair of dice, throwing tray or other flat surface, score sheet (optional)

About Dice: A single die has six sides numbered one through six. With a pair of dice, there are thirty-six possible combinations. Twelve combinations result in either a double or in two numbers that add up to seven, therefore there is a 12 in 36 chance, or one in three probability of rolling a double or a seven.

The Model: On average, it takes three tries to get either a seven or a double, therefore if one gets a seven or a double on the first or the second throw, one is better than average. It can be shown that the probability of getting a double or seven on the first throw is $1/3$, the probability of getting it on the second throw is $[(2/3) \times (1/3)] = 2/9$, and the probability of getting it after two throws is $1 - [(1/3) + (2/9)] = 4/9$.

This model can be demonstrated by playing the game 99 times – there should be about 33 ($1/3 \times 99$) who get a double or a seven on the first try, 22 on the second try, and 44 who do not do so after the first two tries. One can keep track of the results by using a score sheet of the results of the first and second throws.

Playing the Game:

- Have someone throw a pair of dice into the throwing tray.
- If the person gets a double or a seven on the first throw, add an "X" in the "Wins on First Roll" table of the score sheet and go to the next player. If the person does not get a double or a seven, throw again.
- If the person gets a double or a seven on the second throw, add an "X" in the "Wins on Second Roll" table of the score sheet. If the person does not get a double or a seven, add an "X" to the "Loses on Second Roll" table. In either case, move to the next player.
- After 99 turns (a person can play more than once), count up the number in each table and see how close it comes to the prediction of the model.
- Remember to keep the atmosphere light and playful!

For extra copies of the rules and score sheet, visit airsafe.com/analyze/average.htm.

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Dr. Todd Curtis
AirSafe.com