# Are You Better Than Average?™

<u>History of the Game</u>: 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)

<u>About Dice</u>: 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)x(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.

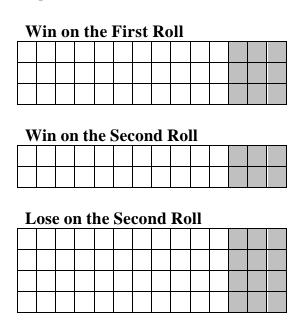
### Playing the Game:

- 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!

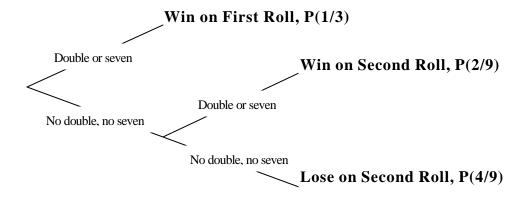
For extra copies of the rules and score sheet, visit airsafe.com/analyze/average.htm.

# Are You Better Than Average? ™: Game Sheet

This game sheet can be used for the standard 99-turn game. This is an easy graphical way to illustrate how close the expected result conforms to actual results. In most cases, after 99 turns, actual results should be close to the following distribution: 33 wins on the first roll, 22 wins on the second roll, and 44 losses after two rolls. Fill the white squares first, the gray squares are for outcomes in excess of the expected number,



# Are You Better Than Average: Possible Outcomes



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

## Thank You for Using AirSafe.com

Thanks for being part of the AirSafe.com audience. Feel free to use these additional resources.

**Web site** – <u>www.airsafe.com</u> - The site features extensive information about airline safety and security, as well as other information of interest to the airline community.

**Airport Security** – <u>tsa.airsafe.org</u> – Before your next flight, visit AirSafe.com to review common airport security policies to find out what's allowed and what's not allowed on the aircraft.

**Podcast** – <u>podcast.airsafe.org</u> - The Conversation at AirSafe.com podcast highlights current airline safety and security issues of high interest. Available on iTunes and other major podcast providers.

**Videos** – <u>video.airsafe.org</u> - Featuring the videos from the Conversation at AirSafe.com podcast, this will take you directly to the AirSafe.com channel on YouTube, where you can review or comment on the most popular videos from the site.

Newsletter – <u>airsafenews.com</u> - All the latest AirSafe.com news, including notices of new podcasts and other items of interest

**Crash Videos** – <u>planecrashes.blogspot.com</u> - This is AirSafe.com's collection selected crash videos from around the world, including crashes from airlines, military units, and private aircraft.

**Celebrity Plane Crashes** – <u>celebrity.airsafe.org</u> - This is AirSafe.com's collection selected crash videos from around the world, including crashes from airlines, military units, and private aircraft.

**Fear of Flying Resources** – <u>fear.airsafe.org</u> - Basic background information about fear of flying and suggestions about how a passenger can deal with the fear.

### **Free Downloads**

Feel free to download the following resources from Todd Curtis and AirSafe.com:

**Parenting and the Internet** – Published in 2007, this is a practical how-to manual on managing online children. Document includes additional resources for parents. http://www.airsafe.com/downloads/pati.pdf

**AirSafe.com Podcasting Manual** – This step-by-step guide gives any organization, from a middle school to corporations, the foundation to create an audio or video podcast, put that podcast on iTunes, YouTube and elsewhere, and to do so without spending much money.

http://www.airsafe.com/classes/airsafe-podcasting-manual-draft.pdf

### **Feedback**

Send your comments and questions by phone at 206-300-8727, using the feedback form at <u>feedback.airsafe.org</u>, or by email at tcurtis@airsafe.com

Dr. Todd Curtis AirSafe.com