# Tabletop Games Curriculum: Math

written by Byron Alexander Campbell | December 14, 2015

As most board games' choice of theme is inevitably historical, the mechanisms driving these games can't escape being mathematical. If the game features any form of scoring, I can guarantee it will strengthen basic math skills such as addition, subtraction, multiples and rounding. In other words, if you pick any non-Hasbro title, the odds are very good that you'll be doing some basic arithmetic in a historical setting. Some games, however, provide a deeper exploration of specific concepts, often in the realm of probability and statistics, and thus deserve special mention as "math games."

Let's start with the oeuvre of acclaimed game designer and doctor of mathematics Reiner Knizia. He's authored literally scores of games of diverse weights and styles, but his best are all about assessing risk versus potential reward, and are therefore pure exercises in probability, estimation and statistical analysis. *Ra* is a classic, and for good reason; here's an auction game with an Egyptian theme in which players bid to collect sets of tiles, each of which score differently. Every time you make (or pass) a bid, you'll need to determine the value of the tiles on offer based not only on what's out now, but also on what's likely to appear next and exactly when the current round might come to an end. The coup de grâce, though, is that your bids are made with a small inventory of numerical tiles of specific values; if you win an auction, you lose the bid tile and replace it with the winning bid from the *previous* auction, so that the value of the bid itself becomes a part of the lot under consideration. (*Ra* is part of an informal "auction trilogy" that also includes *Medici* and *Modern Art*.) Further proof of Knizia's fascination with numbers can be found in *Decathlon*, his free-to-download dice game that simulates 10 different Olympic events.

Card-drafting games like *7 Wonders* (its second appearance on this list) and Gamewright's *Sushi Go!*, in which players pass hands of cards around the table, picking one at a time to keep before passing the rest down the line, function similarly to *Ra* in that skilled players must often weigh multiple scoring methods and the probable contents of future hands into their immediate decisionmaking. In fact, you can see that same practical application of statistics in many traditional card games, notably *Hearts* and *Spades*. This genre, called trick-taking, has continued to be a popular format for card games, from those as simple as Rio Grande Games' *Coloretto*—players collect sets of same-colored cards, which increase exponentially in value as they grow in size, but every set except your three largest counts *negatively* toward your score—to those as complex as Mayfair's *6 nimmt!*, an anti-trick-taking game that consists of a deck of cards numbered from 1 to 104.

Finally, push-your-luck games like *Can't Stop* and *Incan Gold* from Eagle-Gryphon Games are object lessons in probability. *Incan Gold*, the last card game on this list, puts players in the role of a team of relic hunters in an Indiana Jones-style ancient ruin. You will explore the rooms one card at a time, gathering an increasingly large pile of treasure, but inevitable dangers such as snakes and giant spiders can send the whole expedition to their graves. When will you decide that enough is enough and go back to base camp, and when will you push on, despite the risk, in search of greater loot? *Can't Stop* from iconic designer Sid Sackson (*Acquire*) has players rolling four dice and splitting them into pairs of numbers. The stop-sign-shaped board is broken into lanes of different lengths, visually correlated to the probability of rolling those numbers on 2 six-sided dice. Advance up the columns labeled with the sums you've chosen, and roll again as many times as you want, but if neither pair matches a sum you've previously rolled this round, you lose all progress.

Rio Grande's *Stone Age* offers a different on probability. Players send their tribes of early hunter-gatherers to various resource sites; each caveman deployed allows the player to roll 1 die, and the sum of those rolls is then divided by the resource's rarity (from 2 to 6) and rounded down to determine how many resources you've successfully gathered. How many tribesmen is enough to guarantee 2 gold nuggets?

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I can't overstate my central thesis that all games, electronic or analog, have educational merit; however, here is a short list of tabletop games, by subject, that I feel are particularly suited to supplement a K-12 curriculum. I've chosen to focus on tabletop games for a few reasons, foremost among which being that it's an area that I currently find intellectually stimulating. Each content area will be released as a separate update.