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Hit Ten!

A dice game involving moving 10 squares to the finishing square gives an opportunity to consider empirical probability, says Colin Foster.

In many everyday scenarios, we cannot calculate a theoretical probability of something happening. Even some simple-sounding games involving dice are complicated to analyse and the easiest way to estimate the probability of a win is often to run a simulation on a computer. In this lesson, available in full at tinyurl/hitten, students are asked to estimate the probability of winning a game in which they throw an ordinary dice and move a counter that many spaces forwards. To win, they must "hit 10" by landing on the tenth square from the start. This game is too complicated for students to work out the probability of winning theoretically, so they must estimate it by playing the game several times and seeing how often they win. This enables them to calculate how much money they might be willing to pay to play the game, if the prize for winning is £1.

WHY TEACH THIS?

+ Probability is often poorly understood by students; it can be a difficult topic, and is not always particularly intuitive
+ Introducing a real-life situation is a great way to help learners put the rules and methods involved into context
+ Students will enjoy the simple (but highly competitive!) game that is the starting point for this investigation
+ Opportunities to extend more able pupils, develop understanding of place value and practise mental calculation and estimation are available

ABOUT THE AUTHOR
Colin Foster is an Assistant Professor in mathematics education in the School of Education at the University of Nottingham. He has written many books and articles for mathematics teachers (see www.foster77.co.uk).

SNEAK PEEK

THE GAME

In a game called "Hit Ten!" you win if your counter lands on the square that says "TEN". You have to land **exactly** on that square – if you overshoot it, you lose!

1. Place a counter on "START".
2. Throw an ordinary dice.
3. Move to the right that many spaces.

3. Repeat until you either hit "TEN" or go off the end.
What is the probability of winning this game?

START	1	2	3	4	5	6	7	8	9	TEN