 We have a winner!

Aim

To mathematically explore and create a sideshow alley game that uses a Galton Board. The aim of the activity is identify any misconceptions regarding experiments of this type and to lead students to develop an understanding of the shape of the Normal Distribution.

Explanation

Investigating a Galton Board (or Quincunx) where a ball has equal opportunity to fall left or right of pegs positioned in a triangular array, demonstrates a normal distribution of results. This can be utilised to create games of probability and chance.

Tasks

Students are to explore the [Galton board](https://www.mathsisfun.com/data/quincunx.html) and how it works:

They should consider the results when the ‘size’ or number of rows is 7, comparing to the normal distribution after 100 drops. They could then add the class totals and have a group discussion regarding the statistics.

Students are to use the Galton Board to create a game with the following parameters:

* Cost to play is $2.
* You propose that there are 4 possible prize categories – small prize worth 50 cents, medium prize worth $1, large prize of $10 value and a monster prize worth $25.
* Students are to decide how the game is played and how the prizes are determined.
* Discuss the expectations of the game after 100 plays and potential profit in relations to the variables selected and the Normal Distribution data.
* Using the link, students are to simulate the game with their criteria and determine their expected financial gain/loss.