

Maths Circle Explorations: Session 1

October 2021

3. Get hold of a toothpick. Alternatively, you can use a matchstick, or any object of a similar shape and size. Measure the length l of the toothpick. Create a ruled paper in which the parallel lines are a distance $2l$ apart. Throw the toothpick on the paper randomly (i.e., without "taking aim"). If it lands so that it intersects a line on the paper, write "1", otherwise, write "0". If the toothpick does not land completely on the paper, then the result is declared invalid. Repeat this 100 times, and then add all the numbers you have written. Compare notes with others. Do they have the same number? Similar numbers?

Can you find an "explanation" for your experimental results based purely on mathematical reasoning? What would you expect if you repeated the experiment 1 million times? What would change if you modified the spacing between lines on the paper?