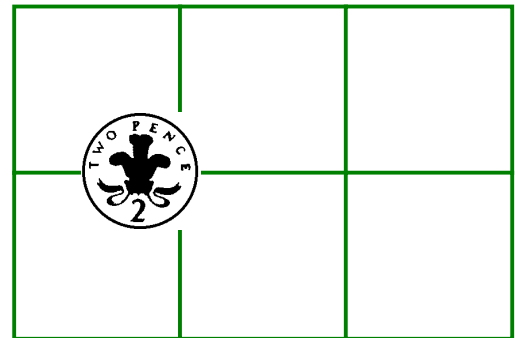
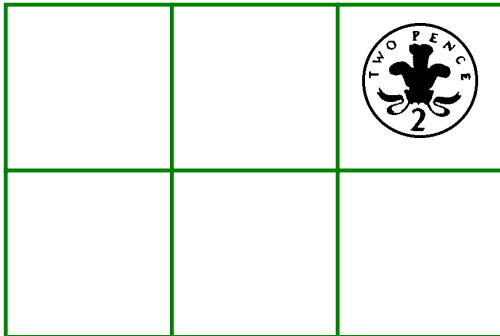




INVESTIGATION



Roll a Penny



MathSphere

Roll a Penny

Here is a game to make:

Design a Roll-a-Penny game.

You will need:

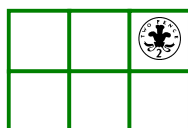
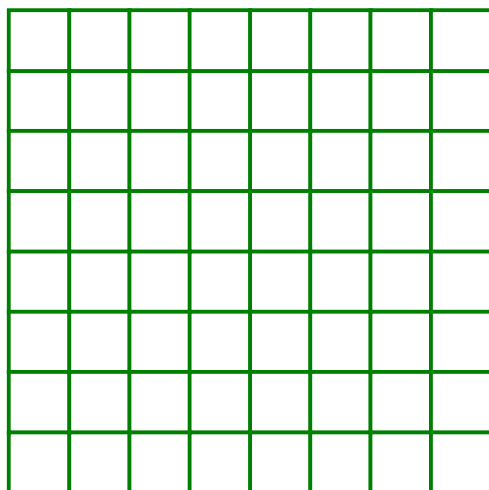
1. At least one 2p coin.
2. A piece of card to make the board.
3. Pencils and a ruler.

What to do:

Measure the diameter of the coin.

Draw squares on the board one and a half times as big as the diameter of the coin.

Now roll the coin 100 times and count how many times it lands on the board without overlapping a line. Ignore any times when the coin rolls off the board!



**Good
(Count)**

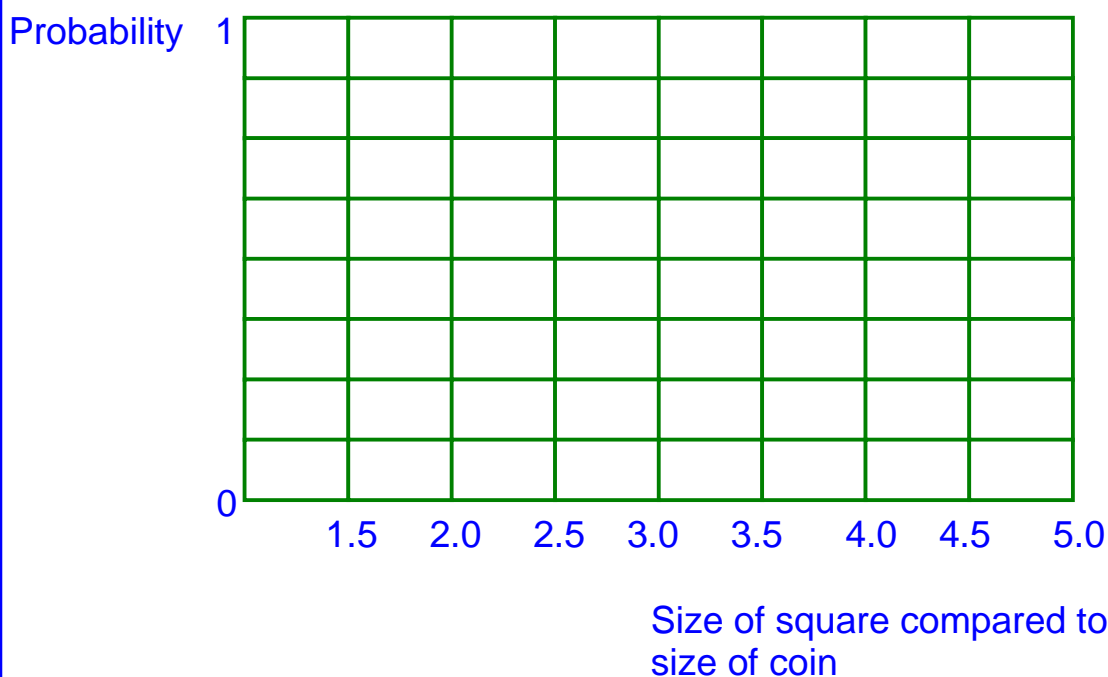


**Bad
(Don't Count)**

Can you now say what the probability is of rolling the 2p piece and the coin landing **between** the lines without touching them?

Things to try:

1. Repeat the experiment with lines that are twice the size of the coin. Then two and half times, three times etc. How does this affect the probability?
2. Draw a graph of the probability of landing between the lines for different sizes of square:



3. Keep the size of the square the same and change the size of the coin. How does this affect the probability?
4. Repeat with a 1p coin. Are the probabilities the same as with the 2p coin? Can you explain your answer?

Answer Guide

Some probabilities are easy to calculate (the probability of throwing a 5 on a normal dice, for example), but some are much harder to calculate. This investigation shows that it is still possible to find probabilities by experimenting instead of thinking about the theory of an experiment.

Obviously, as the size of the squares increases, the probability of landing between the lines increases, although it will never quite reach 1. This would only happen in the limiting case of an infinite sized board with no lines!

The drawing of the graph should show the change in probabilities nicely. If you want to cover a lot of different sized squares, share the task between the class/family - some testing one and a half times the diameter, some twice the diameter etc.