

## Possibility Spaces

Those cube shaped things are dice (plural) and one of them is called a die. Its a bit like mouse and mice. Many people (and Maths assignments) ignore this nicety and call a die a dice.

In games like Monopoly, you have to roll two dice and add the scores. This has the effect of making scores like 6, 7, and 8 more common than scores like 2 or 12.

When you roll two dice, each one of them has 6 possible outcomes. If the first die falls on (say) 4, then the second die could still land on any if its faces, so possible scores could include 5, 6, 7, 8, 9 and 10. Each of the other five numbers on the first die also leads to six possible scores, so there are 36 equally likely outcomes.

A possibility space diagram is a way of organising these possible outcomes...

		1st die					
		1	2	3	4	5	6
2 <sup>nd</sup> die	1						
	2						
	3						
	4						
	5						
	6						

Fill in the rest of this table with the total scores

Once you have your possibility space drawn, you can use it to answer questions.

- 1) What is the probability of scoring 7?
- 2) What is the probability of scoring *less than* 5?
- 3) What is the probability that your score is a prime number?
- 4) What is the probability that your score is a square number?
- 5) In another (rather odd) game, you toss a coin and roll a die. If the coin lands heads up, you double the score on the die. If the coin lands tails up, you get the score on the die.
  - a) Draw a possibility space diagram for this game (hint:  $6 \times 2$  possible outcomes)
  - b) Use the diagram to find the probability of a score greater than 9
  - c) Use the diagram to find the probability of a score that is an even number