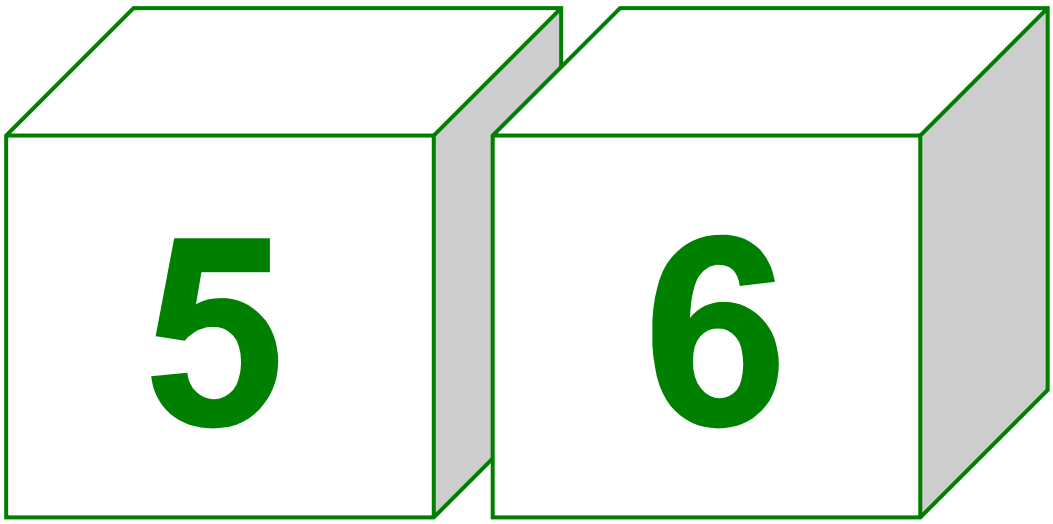
INVESTIGATION

Two Dice



MathSphere

Two Dice

First: One dice!!! Throw one six sided die thirty six times.
How many of each number would you expect to get?
How many did you get?

If two six sided dice are thrown together and the scores added up, what is the smallest total that can be obtained?
What is the largest?

Here is a game to play:

Throw two six sided dice 36 times and add up the scores on the two dice each time.

Count how many of each total you obtained.

Draw a block graph of your results.

Things to try:

1. Repeat the experiment for a lot more throws and draw a graph of your results.

2. Write down all the possibilities of numbers on the two dice that could come up, like this:

(1,1) (1,2) (1,3) (1,4) etc and find the total for each one.
2 3 4 5

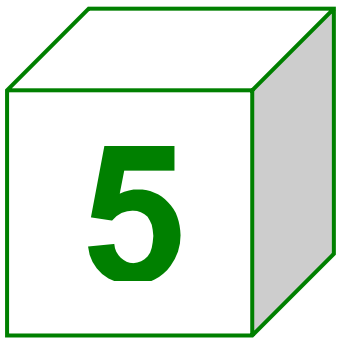
See how many add up to 2, how many add up to 3 etc.

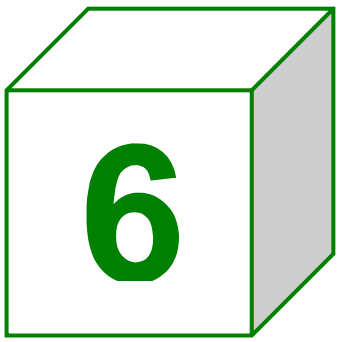
Draw a graph of these possibilities. Compare it with the graph you obtained when you threw the dice. What do you notice?

3. Using your answers to question 2., can you calculate the probability of obtaining each score when you throw the dice. Eg. What is the probability of obtaining a total of 2?

4. Try the experiment with three dice and see what happens.

5. Try the experiment with dice with a different number of faces such as tetrahedra or octahedra.





Answer Guide

When throwing two normal dice, it is a simple matter to predict the probability of obtaining each score.

Here are the number of combinations that make each total:

2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	5	4	3	2	1

(If you are in doubt about the number of possibilities because (2,3) seems to be the same as (3,2), you will soon see they are different if you think of the two dice as being of different colours. (2,3) means 2 on the red dice and 3 on the blue dice. (3,2) means 3 on the red dice and 2 on the blue dice).

There are 36 combinations altogether, so the probability of obtaining, say, a total of 8 is $^{5}/_{8}$.

This idea can be extended to any number of dice or dice with different numbers on them.

Eg. Throwing two octahedral dice with numbers 1 to 8 will give the totals 2 to 16 and the probabilities may be easily calculated in the same way.

The graphs obtained through throwing will follow the same general shape as the graph of the theoretical possibilities, but will not normally fit exactly. The more times you throw the dice, the better the graph of the throws will fit the theoretical graph.