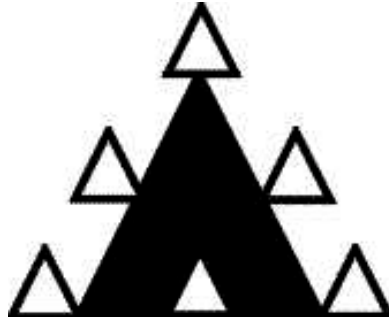


THE MAGICAL TRIANGLES!

Math skills: Addition
You will need: Paper and pencil
Difficulty level: 2

Introduction: There is only one way to fit the numbers in this triangle so that all the sides are equal.

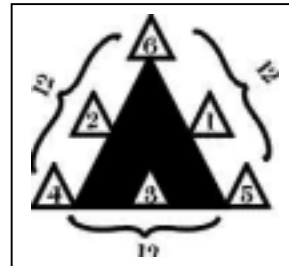


What to do:

- ◆ Show your class this triangle and ask them to try to fit the numbers 1,2,3,4,5,6 into the small triangles so that the sum of each side of the triangle will be exactly 12.
- ◆ Ask them to try again with a different set of numbers: 4,5,6,7,8,9. The sum will now be 21.
- ◆ And what about 2,4,6,8,10,12 (sum of 24)? Ask them to find a pattern and create their own magical triangle!

How it works:

Place the highest three numbers in the corner spots. Then place the lowest number between the two highest; the next lowest between the next two highest and the third lowest in the remaining place. The sum of the sides will always be the same!



Why it works:

The chosen numbers form a series A, A+1, A+2, A+3, A+4, A+5. The three highest numbers, A+5, A+4, and A+3 are assigned to each corner of the triangle. The three lowest numbers are assigned to the sides of the triangles with the lowest number between the two highest; the next lowest between the next highest and the remaining numbers on the remaining side. The sum of the sides are then given by:

$$\begin{aligned}
 A+3+A+1+A+5 &= 3A+9 \\
 A+5+A+A+4 &= 3A+9 \\
 A+4+A+2+A &= 3A+9 \text{ (which are all equal).}
 \end{aligned}$$

Note: This also works if you reverse the procedure and put the smallest number in each corner and place the largest numbers between the two smaller, etc. The numbers do not have to be consecutive, but simply have the same interval between them; hence, the series A, A+X, A+2X, A+3X, A+4X, A+5X will also work. Also the procedure will work if the highest 3 numbers are separated by any interval from the three lowest numbers; for example the series A, A+X, A+2X, B, B+X, B+2X will work.