THE POWERS OF THE MULTIPLIACTION TABLE

Today, at school the times table is a device students use to learn multiplication through rote rehearsal and rapid-fire memory drills. Although some view mastery of the times table as an achievement in itself, it gives students a sturdy foundation to lay mathematical brick. Let's take a dip in deeper waters and explore some amazing patterns that reveal the powers hidden in the multiplication table.

TRIANGLES AND SQUARES:

In a sea of integers, the red numbers on the main (Northwest to Southeast) diagonal of the multiplication table are clearly *square numbers* – the counting numbers raised to the power of 2.

	1	2	3	4	5	6	7	8	9	10	11
1	1	2	3	4	5	6	7	8	9	10	11
2	2	4	6	8	10	12	14	16	18	20	22
3	3	6	9	12	15	18	21	24	27	30	33
4	4	8	12	16	20	24	28	32	36	40	44
5	5	10	15	20	25	30	35	40	45	50	55
6	6	12	18	24	30	36	42	48	54	60	66
7	7	14	21	28	35	42	49	56	63	70	77
8	8	16	24	32	40	48	56	64	72	80	88
9	9	18	27	36	45	54	63	72	81	90	99
10	10	20	30	40	50	60	70	80	90	100	110
11	11	22	33	44	55	66	77	88	99	110	121

The multiplication table also gives us *triangular* numbers (numbers that can be represented by a pattern of dots arranged into an equilateral triangle). Summing up the numbers in each square lattice starting in row 1 and column 1, gives us the triangular numbers squared.

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$= 1 = (1)^2$

1	2
2	4

$= 9 = (1+2)^2$

1	2	3
2	4	6
3	6	9

$= 36 = (1+2+3)^2$

1	2	3	4
2	4	6	8
3	6	9	12
4	8	12	16

$= 100 = (1+2+3+4)^2$

Summing up the numbers in the square lattices starting in row 1 and column 1 give us the triangular numbers squared.