

Multiple Methods of Multiplication

Notes for the volunteer

The activity is using different algorithms to multiply two numbers.

Materials: Napier's bones. Make these by printing out the printable version of Napier's bones, cutting them out, and gluing them onto 3/4" wide craft sticks.

Printouts of the Egyptian multiplication table.

Scrap paper and pencils.

Activities: Pose a multiplication problem to children coming to your display (or encourage them to make up one of their own) and let them choose one of the methods. You can, if you choose, use the problems given below as examples. You should try these problems yourself to get familiar with these alternate algorithms. Choose smaller numbers for younger children (3rd or 4th grade) and larger numbers for older children. I would consider the problems below to be large numbers.

Egyptian example problems:

$$88 \times 188 = 16544$$

88	188
1	188
2	376
4	752
8	1504
16	3008
32	6016
64	12032
128	24064
	16544

$$57 \times 396 = 22572$$

57	396
1	396
2	792
4	1584
8	3168
16	6336
32	12672
64	25344
128	50688
	22572

$$231 \times 312 = 72072$$

231	312
1	312
2	624
4	1248
8	2496
16	4992
32	9984
64	19968
128	39936
	72072

Vertically and Crosswise example problems:

35x97 :

3x9	27	hundreds
5x9+3x7	66	tens
5x7	35	ones

	3395	

Why this works: 3 x 9 is short for 3 tens times 9 tens, which is 27 hundreds. The first "vertical" part gives the number of hundreds. Then the "crosswise" step is tens times ones: 5 ones x 9 tens + 3 tens x 7 ones, giving 66 tens. The final "vertical" step is ones times ones.

89x54:

8x5	40
9x5+8x4	77
9x4	36

	4806

296x578

2x5	10	hundred thousands
2x7+9x5	59	thousands
9x7+2x8+5x6	109	hundreds
9x8+6x7	114	tens
6x8	48	ones

	171088	

Three digit multiplication is a bit more complicated. Hundreds x hundreds are the only way to get hundred thousands. Thousands are hundreds times tens (and of course tens times hundreds). There are two ways to get hundreds: tens times tens and hundreds times ones (vertically and crosswise). Tens are tens times ones. Ones are ones times ones. I would recommend offering only two digit multiplication problems unless someone is looking for an extra challenge.