

THE IMPORTANCE OF MATH FLUENCY

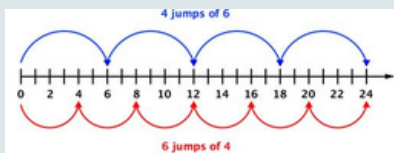
MULTIPLICATION

Numbers are Flexible

Numbers can be broken apart in many different ways. In 4×6 , you can break the six apart several ways to think differently about the problem. You could think of 6 as 3 and 3, so you multiply $4 \times 3 + 4 \times 3$. You could also think of 6 as 5 and 1, so you multiply $4 \times 5 + 4 \times 1$.

MULTIPLICATION REPRESENTATIONS 4 X 6 AND 6 X 4

number line jumps



repeated addition

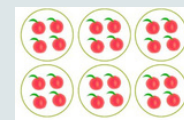
$$4 + 4 + 4 + 4 + 4 + 4 =$$

$$6 + 6 + 6 + 6 =$$

skip counting

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

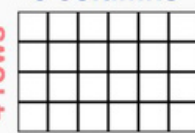


equal sized groups of



6 columns

4 rows



area model/arrays

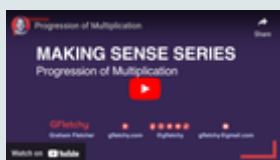
FLUENCY WITH MULTIPLICATION

There are patterns and relationships that exist in multiplication facts. By studying patterns and relationships, students build a foundation for fluency with multiplication and division.

	1	2	3	4	5	6	7	8	9	40
1	1	2	3	4	5	6	7	8	9	40
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
40	40	20	30	40	50	60	70	80	90	400

THE PROGRESSION OF MULTIPLICATION

This [video](#) illustrates the progression of multiplication from 2nd grade to the end of 5th grade.



RESOURCES

[Fluency Without Fear](#), Stanford University

[Math Flips](#), flashcards with visual models