Addition: Partial Sums

Many times it is easier to break apart addends. Often it makes sense to break them apart by their place value. Consider 248 + 345

248 = 200 + 40 + 8

345 = 300 + 40 + 5

500 + 80 + 13 = 593

Sometimes we might use partial sums in different ways to make an easier problem. Consider 484 + 276

484 = 400 + 84

276 = 260 + 16

660 + 100 = 760

Addition: Adjusting

We can adjust addends to make them easier to work with. We can adjust by giving a value from one addend to another.

Consider 326 + 274. We can take 1 from 326 and give it to 274.

$$\begin{array}{rcr} 326 & + & 274 \\ -1 & & +1 \\ \hline 325 & + & 275 = 600 \end{array}$$

More Friendly Problem → 325 + 275 = 600

Consider 173 + 389. We can take 27 from 389 and give it to 173 to make 200.

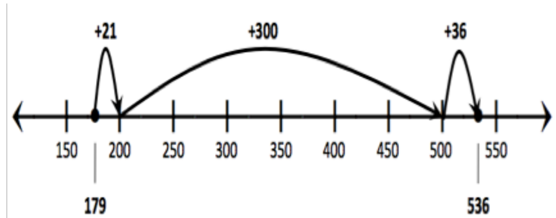
$$\begin{array}{rcr} 173 & + & 389 \\ +27 & & -27 \\ \hline 200 & + & 362 = 562 \end{array}$$

More Friendly Problem → 200 + 362 = 562

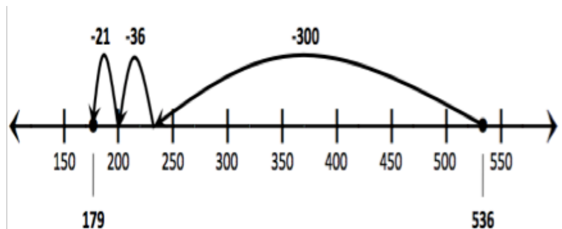
Subtraction: Count Up or Count Back

When subtracting, we can count back to find the difference of two numbers. In many situations, it is easier to count up.

Consider 536 – 179



We can count up from one number to the other. The difference is 300 + 21 + 36 or 357. (above)



We can count back from one number to the other. The difference is -300 (land at 236), -36 (land at 200), – 21 (end at 179).

Subtraction: Adjusting

We can use "friendlier numbers" to solve problems. 4,000 – 563 can be challenging to regroup. But the difference between these numbers is the same as the difference between 3,999 – 562. Now, we don't need to regroup.

(Original problem)	**4,000**	-	**563 =**
(Compensation)	- 1		- 1
	3,999	-	562 = 3,437

What Is Multiplication?

Multiplication has different representations based on the context. Regardless of the representation, the product of any 2 factors remains the same. Representations for 3rd grade include:

These examples are for 6 x 4.

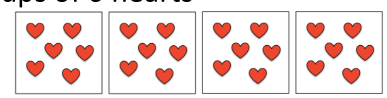
Repeated Addition:

6 + 6 + 6 + 6

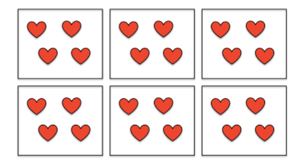
4 + 4 + 4 + 4 + 4 + 4

Equal Groups / Sets:

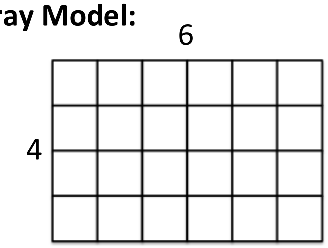
4 groups of 6 hearts



6 groups of 4 hearts



Area/Array Model:



6 x 4 = 24 square units -or-

4 x 6 = 24 square units

The Commutative Property

This property allows us to reverse the order of factors. It is useful in many situations.

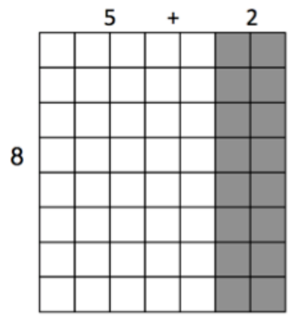
Examples above show that 6 x 4 is equal to 4 x 6 regardless of the representation.

Multiplication: Area/Array Model

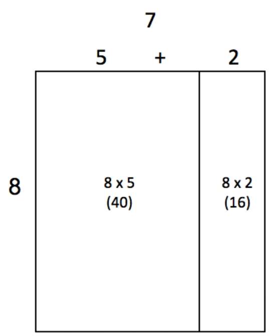
The area/array model for multiplication and the distributive property are used to solve multiplication problems.

Model for 8 x 7:

8 x 7 =
(8 x 5) + (8 x 2) =
40 + 16 =
56



This is the same model without inner squares. It is considered an "open model."



Students move from area/array models to working with partial products and the distributive property.

8 x 7
(8 x 5) + (8 x 2)
40 + 16
56

Multiplication: Multiples of 10

3 x 1 = 3
3 x 1 ten = 3 tens
3 x 10 = 30

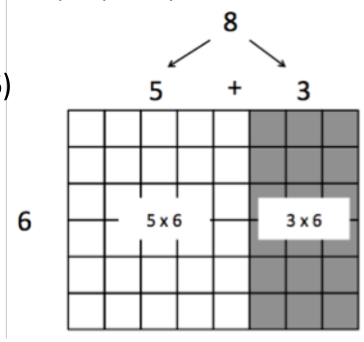
3 x 4 = 12
3 x 4 tens = 12 tens
3 x 40 = 120

The Distributive Property

This property allows us to break apart factors. It can make computation more efficient. It will be used later in algebra.

In 8 x 6, we can break the 8 into (5 + 3). 8 x 6 becomes (5 x 6) + (3 x 6).

8 x 6
(5 x 6) + (3 x 6)
30 + 18
48



Division: Think Multiplication

Multiplication and division are related. When working with division, it sometimes makes sense to "think multiplication." 12 ÷ 4 could be thought of as "4 times what equals 12."

How many groups of 4 are in 12 hearts?
What is 12 ÷ 4?

What times 4 equals 12?
3 x 4 = 12 so there are 3 groups of 4 hearts.

Strategies to Develop Computational Fluency

Grade 3

This brochure highlights some of the strategies used by students to develop computational fluency.

Adapted from Howard County Public School System