

# Multiplication and Division

## Year 4

### The Distributive Property of Multiplication

#### Vocabulary:

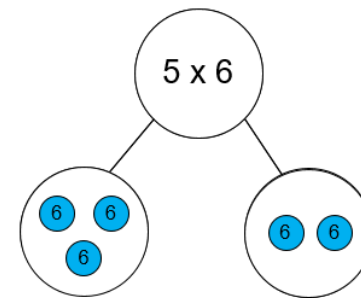
Multiplication    Distributive Law    Adjacent    Multiples    Factors    Partitioning  
Equations    Expressions    Arrays    Part-whole model    Difference

$0 \times 6 = 0$	} +6	$6 \times 0 = 0$	} +6
$1 \times 6 = 6$		$6 \times 1 = 6$	
$2 \times 6 = 12$		$6 \times 2 = 12$	
$3 \times 6 = 18$		$6 \times 3 = 18$	
$4 \times 6 = 24$		$6 \times 4 = 24$	
$5 \times 6 = 30$	} +6	$6 \times 5 = 30$	} +6
$6 \times 6 = 36$		$6 \times 6 = 36$	
$7 \times 6 = 42$		$6 \times 7 = 42$	
$8 \times 6 = 48$		$6 \times 8 = 48$	
$9 \times 6 = 54$		$6 \times 9 = 54$	
$10 \times 6 = 60$		$6 \times 10 = 60$	
$11 \times 6 = 66$		$6 \times 11 = 66$	
$12 \times 6 = 72$		$6 \times 12 = 72$	

x	1	2	3	4	5	6
1	●	●	●	●	●	●
2	●	●	●	●	●	●
3	●	●	●	●	●	●
4	●	●	●	●	●	●
5	●	●	●	●	●	●

$$4 \times 6 + 6$$

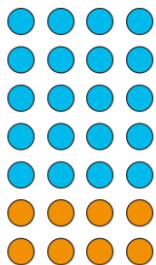
Five sixes is one more six than four sixes.



$$3 \times 6 + 2 \times 6 = 5 \times 6$$

5 is equal to 3 plus 2, so 5 sixes is equal to 3 sixes plus 2 sixes.

Adjacent multiples of \_\_\_ have a difference of \_\_\_.



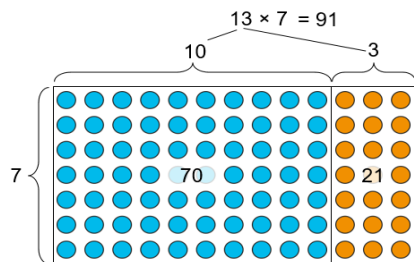
$$7 = 5 + 2$$

$$7 \times 4 = 5 \times 4 + 2 \times 4$$

$$= 20 + 8$$

$$= 28$$

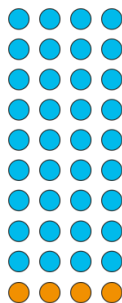
We can partition one of the factors to make calculations easier.



$$13 \times 7 = 10 \times 7 + 3 \times 7$$

$$= 70 + 21$$

$$= 91$$



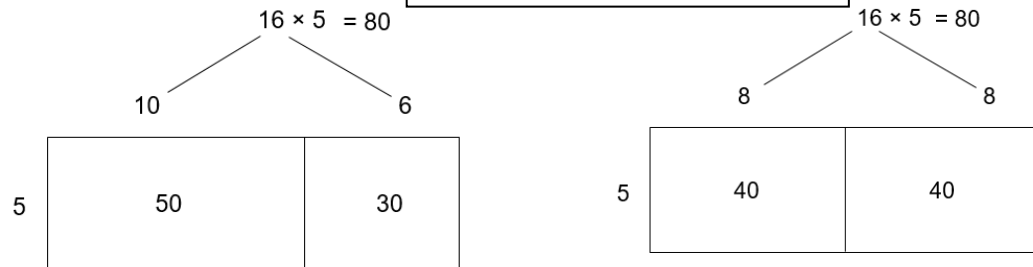
$$9 = 10 - 1$$

$$9 \times 4 = 10 \times 4 - 1 \times 4$$

$$= 40 - 4$$

$$= 36$$

We can partition the factors in different ways to make calculations easier.



$$16 \times 5 = 10 \times 5 + 6 \times 5$$

$$= 50 + 30$$

$$= 80$$

$$16 \times 5 = 8 \times 5 + 8 \times 5$$

$$= 40 + 40$$

$$= 80$$

# Multiplication and Division

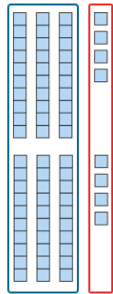
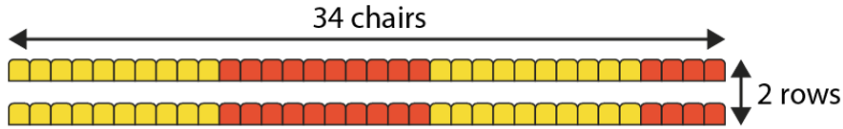
Year 5

## Multiply using a Formal Written Method (1)

### Vocabulary:

Ones Tens Hundreds Thousands Represents Partition Recombine  
 Multiply Unitising Partial Product Aligned Calculation Expanded layout  
 Compact layout Equation Regroup Algorithm

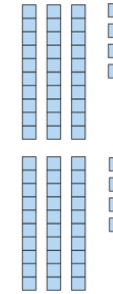
Factor x Factor = Product



$$34 = 30 + 4$$

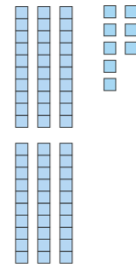
$$34 \times 2 = 30 \times 2 + 4 \times 2$$

Move between representations of dienes and expanded written multiplication.



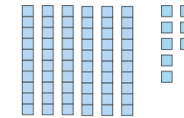
10s	1s
3	4
<hr/>	
	2

Use dienes to represent context as repeated addition and move to multiplication.



10s	1s
3	4
<hr/>	
	2
<hr/>	
	8

$2 \times 4 \text{ ones} = 8 \text{ ones}$



10s	1s
3	4
<hr/>	
	2
<hr/>	
	8
6	0

$2 \times 4 \text{ ones} = 8 \text{ ones}$

$2 \times 3 \text{ tens} = 6 \text{ tens}$

$321 \times 3 =$  963

100s	10s	1s
3	2	1
<hr/>		
		3
	6	0
		3
9	0	0
<hr/>		
9	6	3

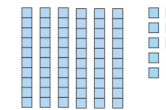
$3 \times 1 \text{ ones} = 3 \text{ ones}$   
 $3 \times 2 \text{ tens} = 6 \text{ tens}$   
 $3 \times 3 \text{ hundreds} = 9 \text{ hundreds}$

3	2	1
<hr/>		
		3
	6	0
		3
9	6	3

Represent 3 digit multiplication without exchanges using dienes, moving from expanded layout to compact layout.

10s	1s
3	4
<hr/>	
	2
<hr/>	
6	8

Move between representations of expanded layout and compact layout.



10s	1s
3	4
<hr/>	
	2
<hr/>	
	8
6	0
<hr/>	
6	8

$2 \times 4 \text{ ones} = 8 \text{ ones}$

$2 \times 3 \text{ tens} = 6 \text{ tens}$

# Multiplication and Division

Year 5

## Multiply using a Formal Written Method (2)

### Vocabulary:

Ones Tens Hundreds Thousands Represents Partition Recombine  
 Multiply Unitising Partial Product Aligned Calculation Expanded layout  
 Compact layout Equation Regroup Algorithm

Factor x Factor = Product

$367 \times 4 = \square$

1,000s	100s	10s	1s
	3	6	7
			4

Represent 3 digit by 1 digit multiplication with exchanges using place value counters, moving from expanded layout to compact layout.

$367 \times 4 = \square$

$4 \times 7 \text{ ones} = 28 \text{ ones}$   
 $= 2 \text{ tens} + 8 \text{ ones}$

1,000s	100s	10s	1s
	3	6	7
			4
		2	8

$367 \times 4 = \square$

$4 \times 6 \text{ tens} = 24 \text{ tens}$   
 $= 2 \text{ hundreds} + 4 \text{ tens}$

1,000s	100s	10s	1s
	3	6	7
			4
	2	4	0

$367 \times 4 = \square$

$4 \times 3 \text{ hundreds} = 12 \text{ hundreds}$   
 $= 1 \text{ thousand} + 2 \text{ hundreds}$

1,000s	100s	10s	1s
	3	6	7
			4
		2	8
	2	4	0
1	2	0	0

$4 \times 7 \text{ ones} = 28 \text{ ones}$   
 $= 2 \text{ tens} + 8 \text{ ones}$   
 $4 \times 6 \text{ tens} = 24 \text{ tens}$   
 $= 2 \text{ hundreds} + 4 \text{ tens}$   
 $4 \times 3 \text{ hundreds} = 12 \text{ hundreds}$   
 $= 1 \text{ thousand} + 2 \text{ hundreds}$

$367 \times 4 = \boxed{1,468}$

Move from expanded layout to compact layout.

$$\begin{array}{r}
 367 \\
 \times 4 \\
 \hline
 1468 \\
 \hline
 22
 \end{array}$$

If there are 10 or more ones, we must regroup ones into tens and ones.  
 If there are 10 or more tens, we must regroup into hundreds and tens.  
 If there are 10 or more hundreds, we must regroup into thousands and hundreds.