

'Broadening Horizons'

# Calculation Policy

Policy Date:	March 2022	Version: 1.1		
Policy Review Date:	March 2025	Headteacher Debra Bailey	Signed	Insert Date 29/03/2022
			D.300	
Ratified by Gove	erning Body:			
Sue Welford (Cha	air of Governors)	Insert Signature	Insert Date	
		fu Masfer	29/03/2022	

## Early Years

#### One-to-one correspondence:

Children first learn to count using one to one correspondence.

Children will be encouraged to say a number each time they touch an object.



#### Recognising numerals:



Children learn to recognise numerals to 20.

They are beginning to match the numeral with the correct corresponding quantity.

#### Using physical resources:



Children begin by practically taking away one or adding one more. They will also be able to use drawings to support them.

#### Numicon:



Children will be able to use Numicon to count, as well ordering them from smallest to biggest to create their own number line. Children should be able to see which Numicon shape is one more or one less.

## Early Years

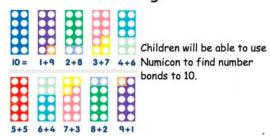
#### Number bonds using Tens frame:

Children will be able to use a tens frame to find number bonds to 10.



The tens frame shows 6 + 4 = 10

#### Number bonds using Numicon:

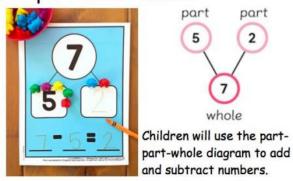


#### Number lines:

0 1 2 3 4 5 6 7 8 9 10

Children will be able to use a number line to count, as well as using it to take away or add one. This will be for numbers up to 20.

#### Part-part-whole model:



#### Part-part-whole model:



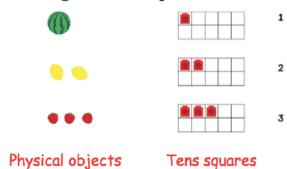
Alongside the part-partwhole diagram, children will use Numicon and practical resources to add and subtract numbers.

Children will be confident to say and write calculations using the + and - signs.

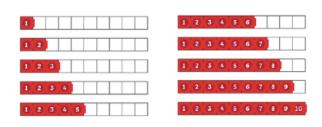
## Place Value-Counting



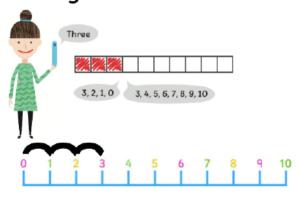
#### Counting with objects:



#### Counting with objects:



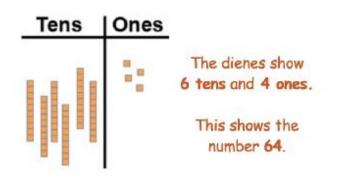
#### Counting with number lines:

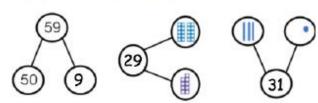


Using multilink cubes

### Place Value

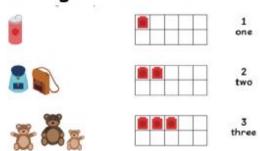
Dienes to represent numbers: Number bond method:



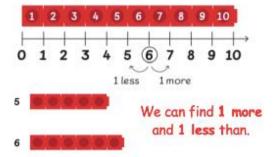


Separating the numbers apart like this is called **partitioning**.

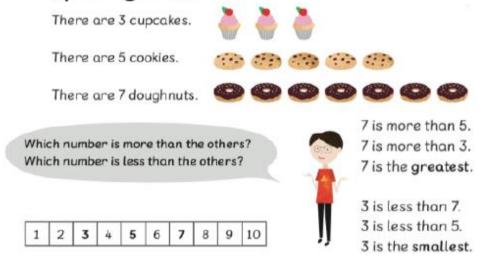
#### Writing numbers to 10:



#### Ordering numbers:

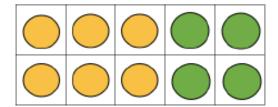


#### Comparing numbers:

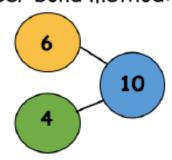


## Addition

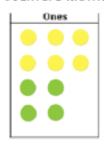
#### Tens frame:



#### Number bond method:



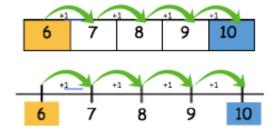
#### Counters method:



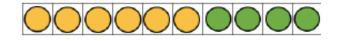
Base 10 method:

Ones	
	+
_	_

#### Number line method:



#### Tens strip:



Count on from the biggest number:

$$6 + 4 = 10$$

#### Number bond method:



#### Picture method:



#### Abstract calculations:

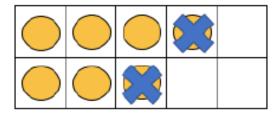
Commutative	Inverse
2 + 5 = 7	7 - 5 = 2
5 + 2 = 7	7 - 2 = 5

#### Bar model:

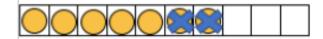
7	
2	5

## Subtraction

#### Tens frame:



#### Tens strip:



Count back from the biggest number:

$$7 - 2 = 5$$

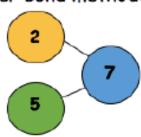
#### Number bond method:



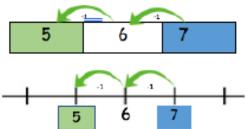
#### Picture method:



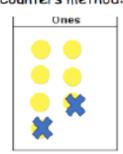
#### Number bond method:



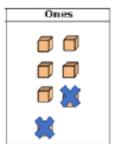
#### Number line method:



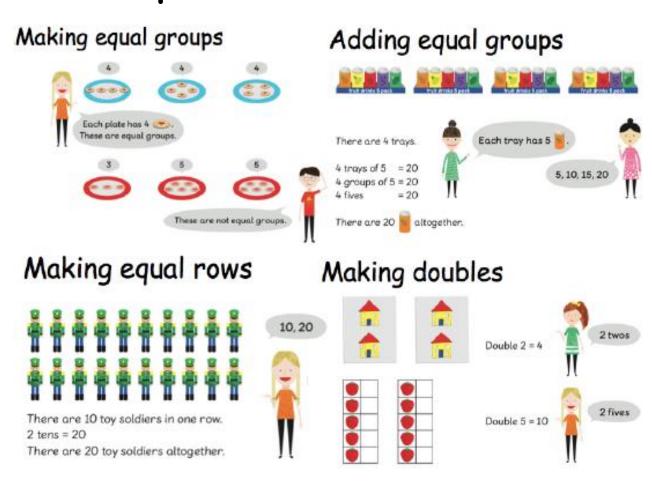
#### Counters method:



#### Base 10 method:



## Multiplication and Division



#### Grouping equally

There are 8 cans.



There are 4 boxes of 2 cans.

#### Sharing equally

There are 6 cookies and 3 children, Each child takes one cookie.



Each child gets 2 cookies.

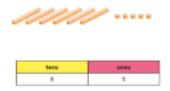
## Year 2 Place Value

#### Counting in tens to 100:





## We can represent two-digit numbers in these ways:

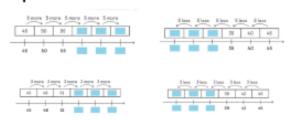




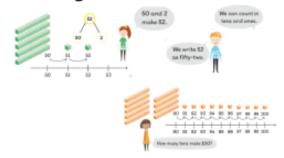
#### Comparing numbers:



## We can find the missing numbers in patterns:



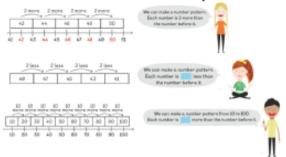
#### Counting in tens and ones:



## We can make numbers using different number bonds:



#### We can extend number patterns:

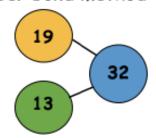


# Year 2 Addition

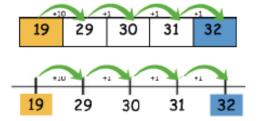
#### Counters method:



#### Number bond method:



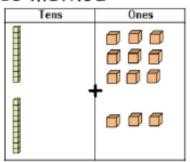
#### Number line method:



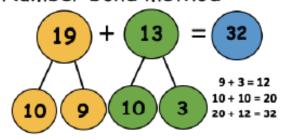
#### Column addition:

### 19 ### 13 ### 12 ##

#### Base 10 method:



#### Number bond method:



#### Bar model:

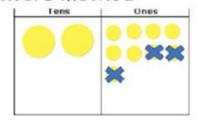
32		
19	13	

#### Abstract calculations:

Commutative	Inverse
19 + 13 = 32	32 - 13 = 19
13 + 19 = 32	32 - 19 = 13

## Subtraction

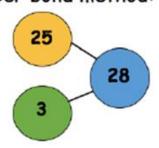
#### Counters method:



#### Bar model:



#### Number bond method:



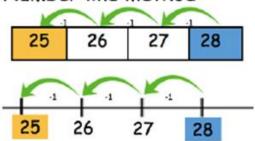
#### Column subtraction:



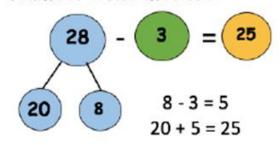
#### Base 10 method:

Tens	Ones

#### Number line method:



#### Number bond method:



#### Abstract calculations:

Inverse
28 - 3 = 25
28 <b>- 25 =</b> 3

## Multiplication

Repeated addition:

Number line method:





Groups of:

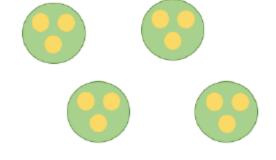
Multiplication:

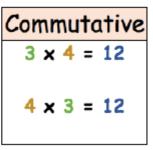




Grouping Method:

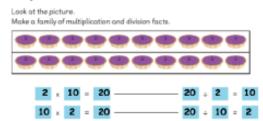
Abstract calculations:





## Year 2 Division

## Make a family of multiplication and division facts:



#### Solving Problems

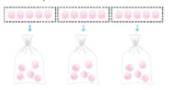
Ruby has 15 marshmallows. She packs 5 marshmallows into each bag. How many bags does Ruby need?



#### Solving Problems:

Ruby has 15 marshmallows. She packs 5 marshmallows into each bag. How many bags does Ruby need?

#### Method 2 Draw a picture.



#### Solving Problems:

Ruby has 15 marshmallows. She packs 5 marshmallows into each bag How many bags does Ruby need?

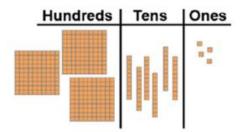
Method 3 Use a division equation.



Ruby needs 3 bags.

## Place Value

#### Base ten or dienes blocks:



#### Value of digits:

427 = 4 hundreds + 2 tens + 7 ones 427 = 400 + 20 + 7

The digit 4 stands for 4 <u>hundreds</u> or 400. The digit 2 stands for 2 tens or 20. The digit 7 stands for 7 ones or 7.

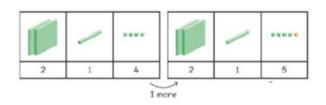
We write 427 as four hundred and twenty-seven.

#### partitioning.

#### Number lines:



#### Finding 1 more or less than:



#### Number bond method:

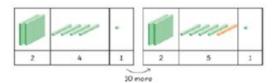


#### Place value cards:



Separating the numbers apart like this is called

#### Finding 10 more or less than:



#### Finding 100 more or less:

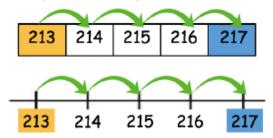
	m	*****
7	4	5
	100 more	
	m	*****
8	4	5

## Addition

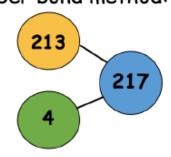
#### Counters method:

Hundreds	Tens	Ones

#### Number line method:



#### Number bond method:



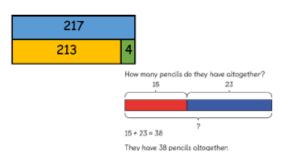
#### Abstract calculations:

Commutative	Inverse
213 + 4 = 217	217 - 4 = 213
4 + 213 = 217	217 - 213 = 4

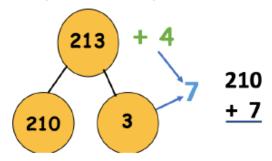
#### Base 10 method:

Hundreds	Tens	Ones	
		+	

#### Bar model:



#### Number bond method:

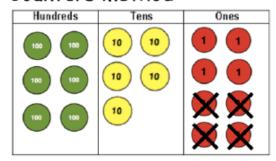


#### Column addition:

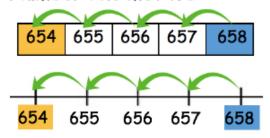
Without renaming:	With renaming:
	1 1
2 1 3	2 1 3
+ 4	+ 4 9 7
2 1 7	7 1 0

## Subtraction

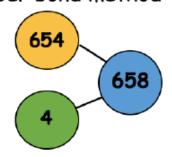
#### Counters method:



#### Number line method:



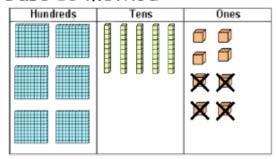
#### Number bond method:



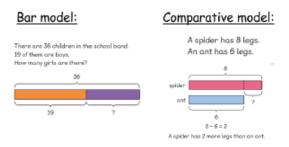
#### Abstract calculations:

Commutative	Inverse	
658 - 4 = 654	654 + 4 = 658	
658 - 654 = 4	4 + 654 = 658	

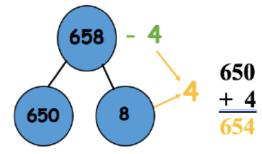
#### Base 10 method:



#### Bar models:



#### Number bond method:



With renaming:

#### Column subtraction:

Without renaming:

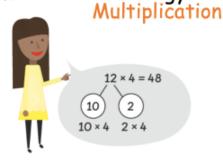
658	6 <sup>4</sup> , 8
- 4	- 3 4 9
6 5 4	3 0 9

## Multiplication

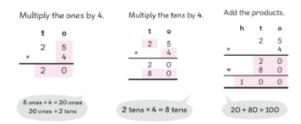
#### Arrays:

•		
3 times tables	4 times tables	8 times tables
000		
3 x 5 = 15	4 x 5 = 20	8 x 5 = 40 (doubling the 4 times tables)

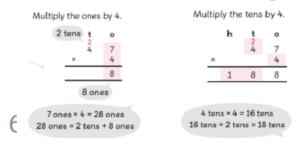
Number bond strategy:



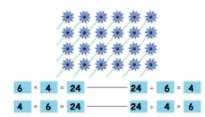
## Bridged column method: With renaming



## Short multiplication: With renaming



## Make a family of multiplication and division facts:



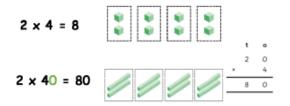
#### Bridged column method:

Without renaming



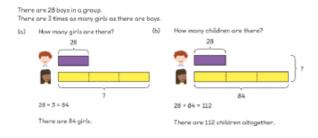
#### Short multiplication:

Without renaming



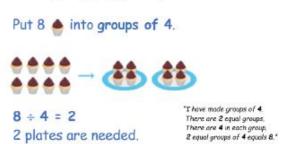
#### Solving word problems:

Bar model

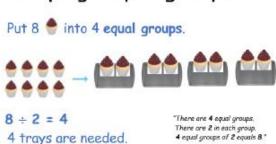


## Division

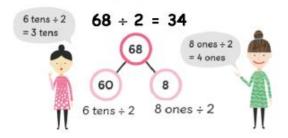
#### Grouping: 'groups of'



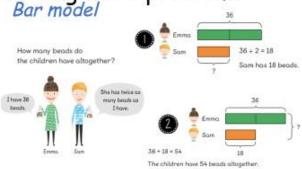
#### Grouping: 'equal groups'



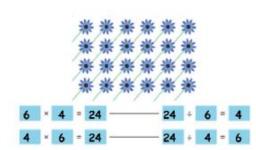
#### Number bond strategy: Division



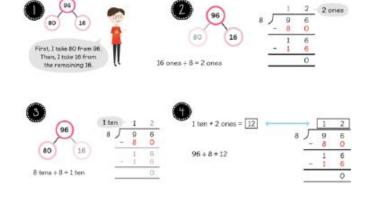
### Solving word problems:



## Make a family of multiplication and division facts:

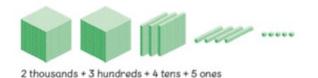


#### Number bond and long division:

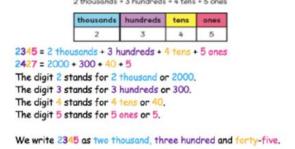


## Place Value

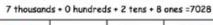
#### Base ten or dienes blocks: Thousands/Hundreds/Tens/Ones

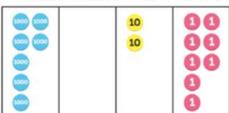


#### Value of digits:



#### Place value counters:

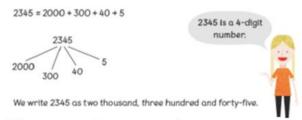




#### Number patterns:



#### Partitioning:



#### Place value cards:



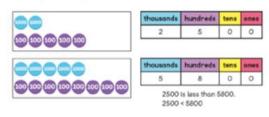
Separating the numbers like this is called **partitioning**.

#### Comparing numbers:



352 is more than 241 352 is greater than 241 352 > 241

#### Comparing numbers:



2500 is less than 5800 2500 < 5800

## Addition

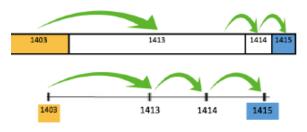
#### Base 10 method:

Thousands	Hundreds	Tens	Ones
		+	+

#### Counters method:

Thousands	Hundreds	Tens	Ones
1000	9 9	+	• • • • • • • • • • • • • • • • • • •

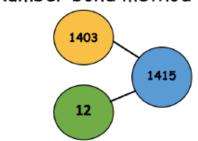
#### Number line method:



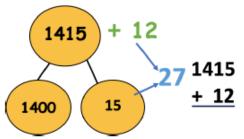
#### Abstract calculations:

Commutative	Inverse	
1415 + 12 = 1427	1427 - 12 = 1415	
12 + 1415 = 1427	1427 - 1415 = 12	

#### Number bond method:



#### Number bond method:



#### Bar model:

1415	
1403	12

#### Column addition:

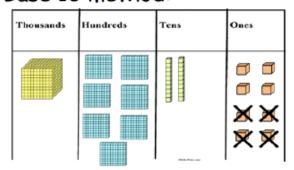


## Subtraction

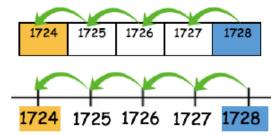
#### Counters method:

Thousands	Hundreds	Tens	Ones
1000	000	19 19	0 0 0 0 % % % %

#### Base 10 method:



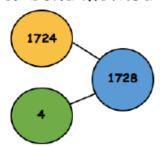
#### Number line method:



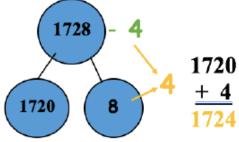
#### Abstract calculations:

Commutative	Inverse
1728 - 4 = 1724	1724 + 4 = 1728
1728 - 1724 = 4	4 + 1724 = 1728

#### Number bond method:



#### Number bond method:



#### Bar model:

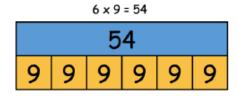
1728	
1724	4

#### Column subtraction:

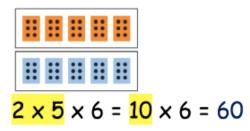


## Multiplication

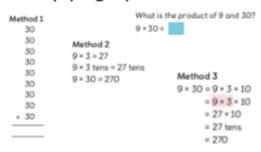
#### Bar model:



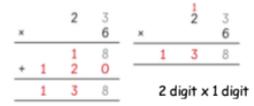
#### Multiply 3 numbers:



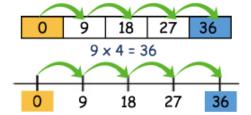
#### Multiplying by 10:



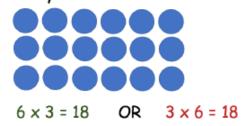
# Bridged and short multiplication:



#### Number line method:



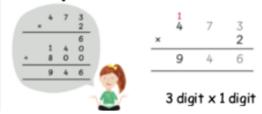
#### Array method:



#### Multiplying by 100:

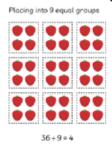


# Bridged and short multiplication:

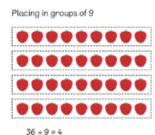


## Division

#### Division by grouping:

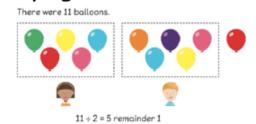


Each group has 4 strawberries.



There are 4 groups

#### Grouping with remainders:

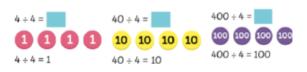


The quotient is 5 and the remainder is 1. Each friend got 5 balloons. There was 1 balloon left over.

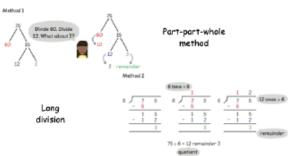
#### Divide using multiplication:

$$24 \div 3 = 8$$
  
 $3 \times 8 = 24$ 

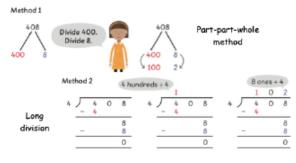
#### Dividing by 1, 10 and 100:



#### Divide with remainders:

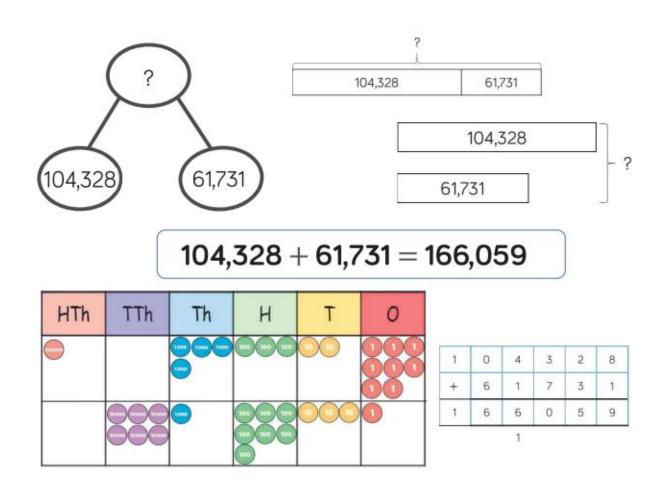


#### Divide without remainders:



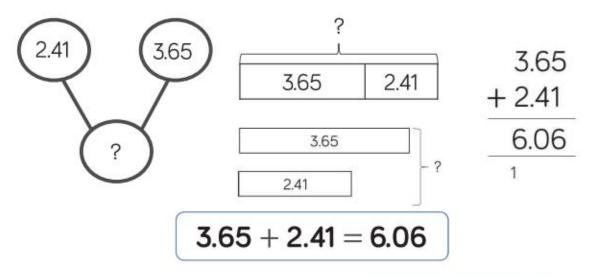
# Year 5 and 6 Addition

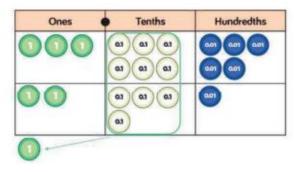
Add numbers with more than 4 digits

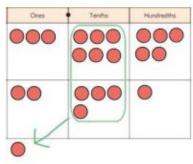


# Year 5 and 6 Addition

Add with up to 3 decimal places

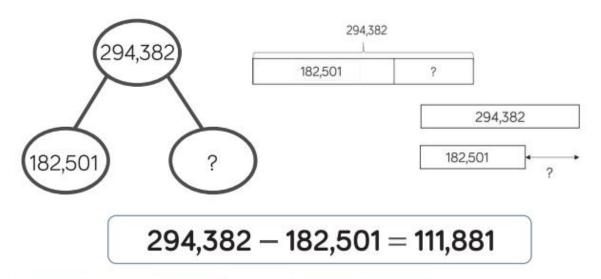


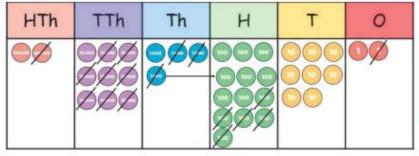




# Year 5 and 6 Subtraction

Subtract numbers with more than 4 digits

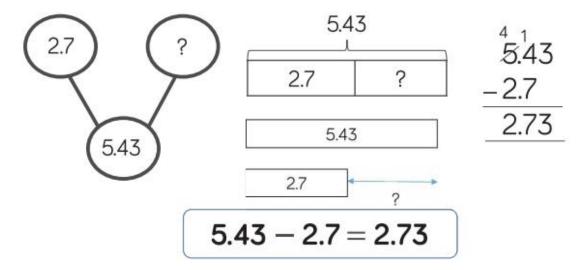


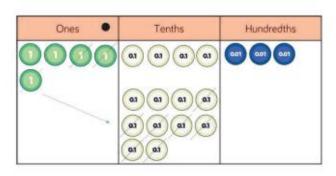


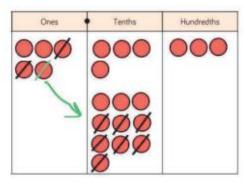
	2	9	3/	13	8	2
-	1	8	2	5	0	1
	1	1	1	8	8	1

# Year 5 and 6 Subtraction

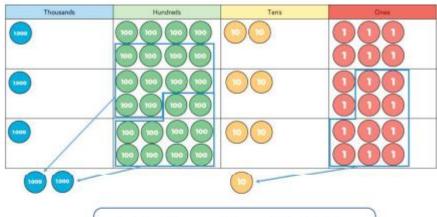
Subtract with up to 3 decimal places







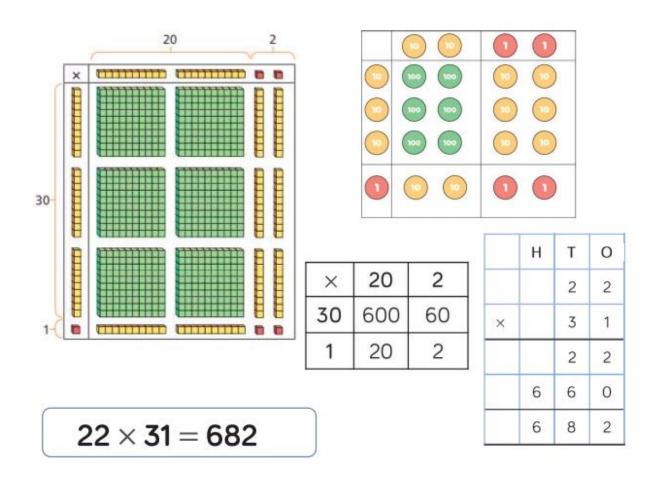
Multiply 4-digit numbers by 1-digit numbers



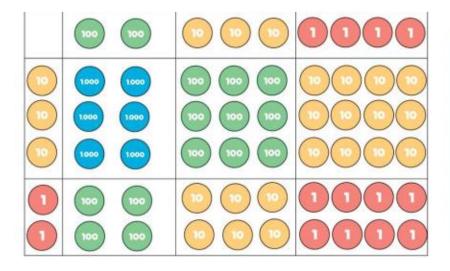
$$1,826 \times 3 = 5,478$$

	Th	Н	Т	0
	1	8	2	6
×				3
	5	4	7	8
	2		1	

Multiply 2-digit numbers by 2-digit numbers



Multiply 3-digit numbers by 2-digit numbers



Th	Н	Т	0
	2	3	4
×		3	2
	4	6	8
17	1 2	2	0
7	4	8	8

Section Committee of the Committee of th		Name of the last o			wani azan wasan
234	X	32	_	7	122

×	200	30	4
30	6,000	900	120
2	400	60	8

Multiply 4-digit numbers by 2-digit numbers

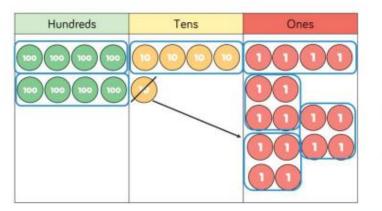
TTh	Th	Н	Т	0
	2	7	3	9
×			2	8
2	1 5	9	1 7	2
5 1	4	7 1_	8	0
7	6	6	9	2

1

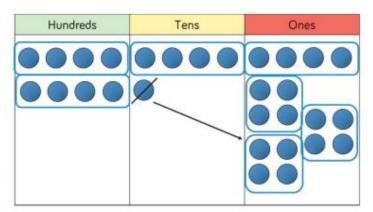
$$2,739 \times 28 = 76,692$$

## Division

Divide 3-digit numbers by 1-digit numbers (grouping)



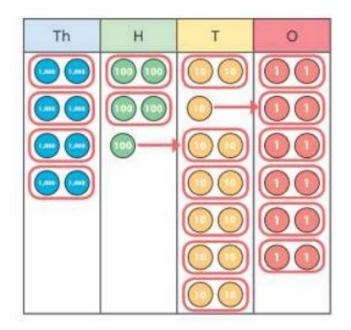
	2	1	4
4	8	5	16



 $856 \div 4 = 214$ 

# Year 5 and 6 Division

Divide 4-digit numbers by 1-digit numbers (grouping)



	4	2	6	6
2	8	5	13	12

$$8,532 \div 2 = 4,266$$

## Division

Divide multi-digit numbers by 2-digit numbers (short division)

	0	3	6
12	4	4 3	7 2

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

	0	4	8	9
15	7	7 3	13 <sub>3</sub>	13 <sub>5</sub>

15 30	45 60	75 9	0 105	120	135	150
-------	-------	------	-------	-----	-----	-----

## Division

Divide multi-digit numbers by 2-digit numbers (long division)

		0	3	6	$12 \times 1 = 12$ $12 \times 2 = 24$
1	2	4	3	2	
	-	3	6	0	$(\times 30)$ $12 \times 3 = 36$ $12 \times 4 = 48$ $12 \times 5 = 60$
			7	2	(×6) 12 × 6 = 72
	-		7	2	12 × 7 = 84 12 × 8 = 96
				0	$12 \times 7 = 108$
					$12 \times 10 = 120$

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

	0	4	8	9		4 45 45
15	7	3	3	5		$1 \times 15 = 15$
_	6	0	0	0	(×400	$2 \times 15 = 30$
Н	1	3	3	5		$3 \times 15 = 45$
-	1	2	0	0	(×80)	$4 \times 15 = 60$
	_	1	3	5	(,	$5 \times 15 = 75$
_		1	3	5	(×9)	$10 \times 15 = 150$
				0		

## Division

Divide multi-digit numbers by 2-digit numbers (long division)

$$372 \div 15 = 24 \text{ r} 12$$

			2	4	r	1	2
1	5	3	7	2			
	-	3	0	0			
			7	2			
	-		6	0			
			1	2			

$$1 \times 15 = 15$$
  
 $2 \times 15 = 30$   
 $3 \times 15 = 45$   
 $4 \times 15 = 60$   
 $5 \times 15 = 75$   
 $10 \times 15 = 150$ 

			2	4
1	5	3	7	2
	_	3	0	0
			7	2
	-		6	0
			1	2

$$372 \div 15 = 24 \frac{4}{5}$$