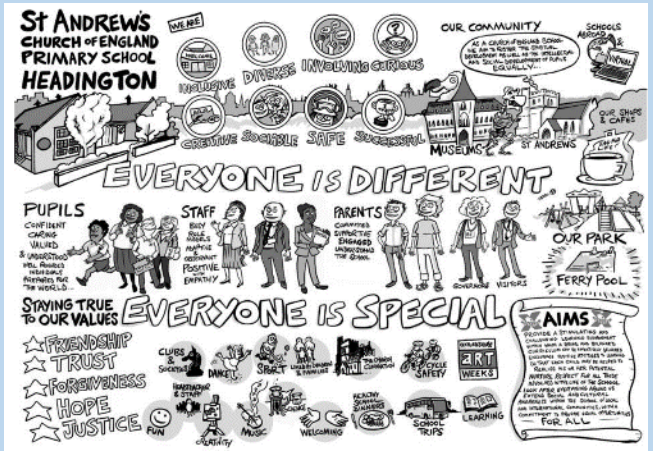
St Andrew's Church of England Primary School

Maths
Manipulatives Models and Calculation Policies



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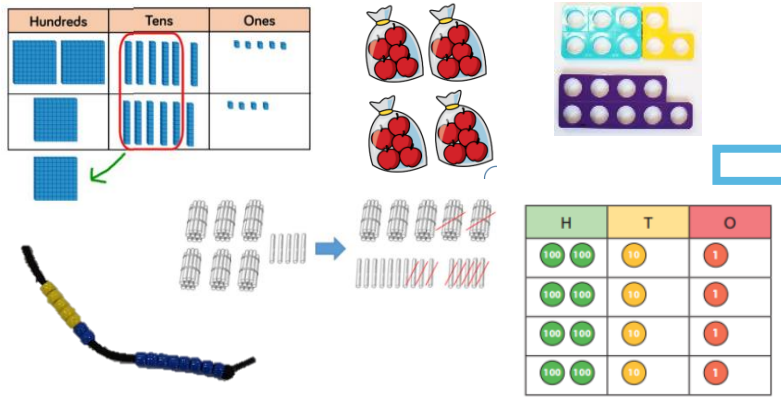
Maths at St Andrew's

Long term planning using the National Curriculum objectives, is approached through the **White Rose** scheme of learning. The calculation policy enables consistency in models and methods, creating a coherent and well-sequenced plan. Approaching maths through teaching and learning the **Concrete** to **Pictorial** to **Abstract** methods enables all pupils to build and secure basic numeracy skills and develop mastery. The methods taught and used by pupils aid in developing their fluency, reasoning and problem-solving skills.

Doodle Maths is used across the school, to encourage an online personalised daily opportunity to rehearse and practise Mathematical skills.

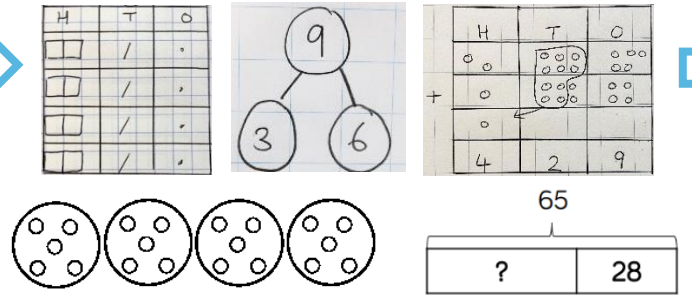
Concrete

Using objects (including manipulatives)



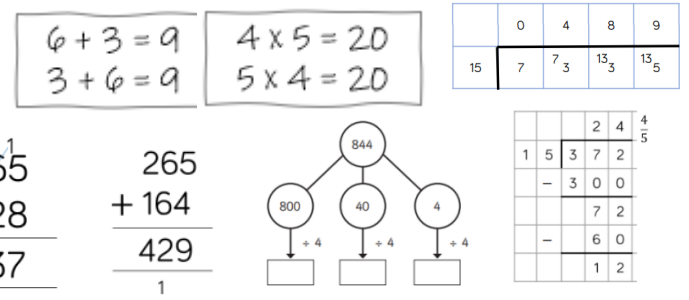
Pictorial

Pictures representing the concrete methods. Also includes bar models, number lines and hundred squares



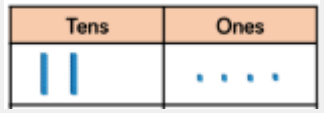
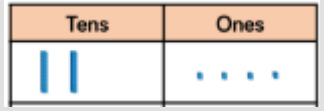
Abstract

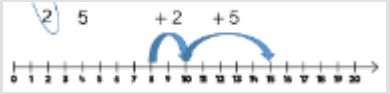
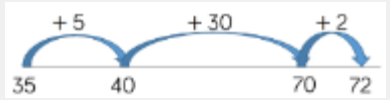
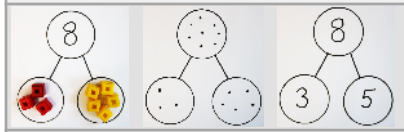
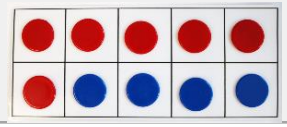
Formal written methods such as column addition or long division, or number sentences.



Manipulatives and Models

Click on the name of the manipulative/model to see examples and read how they may be useful.

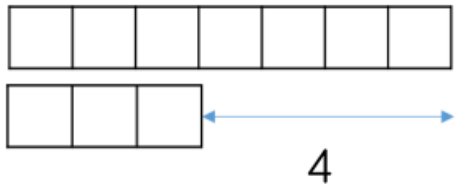
	Bar Models
	Bead String
	Unifix and Multilink Cubes
	Cuisenaire Rods
	Dienes/Base 10 (+/-)
	Dienes/Base 10 (x/÷)
	Number Shapes/Numicon

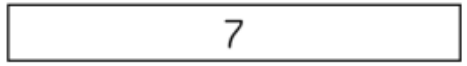
	Number Tracks
	Number Lines (Labelled)
	Number Lines (Blank)
	Part-Whole Models
	Place Value Counters (+/-)
	Place Value Counters (x/÷)
	Ten-Frame

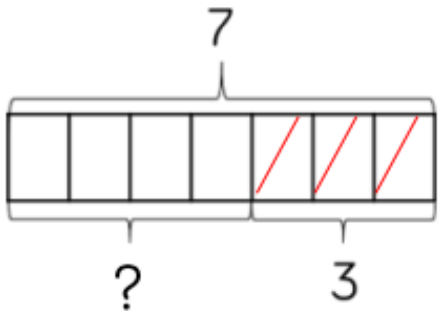
Some of the images are sourced from White Rose, the Maths scheme we follow.

Bar Models

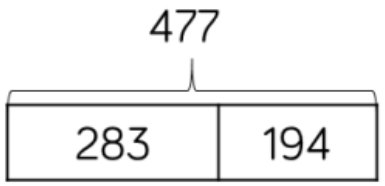
7 − 3 = 4







Examples

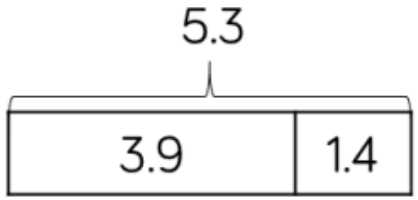


283 + 194 = 477
194 + 283 = 477
477 − 283 = 194
477 − 194 = 283

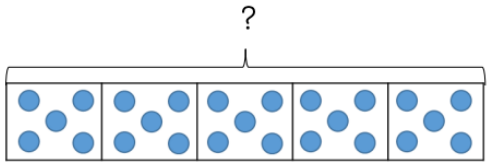
5 x 5 = 25

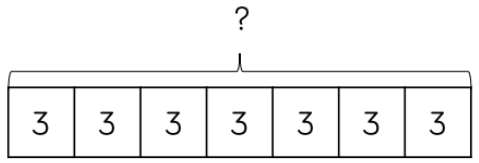
3 x 7 = 21
7 x 3 = 21

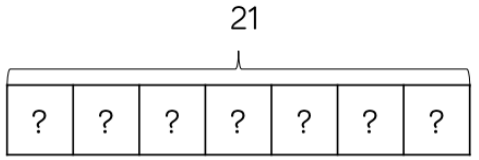
21 ÷ 7 = 3



3.9 + 1.4 = 5.3
1.4 + 3.9 = 5.3
5.3 − 3.9 = 1.4
5.3 − 1.4 = 3.9





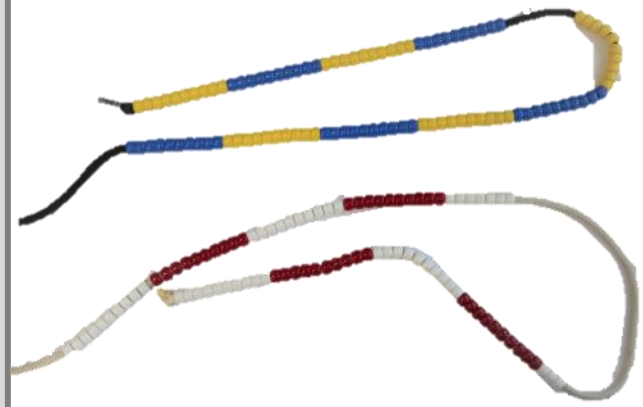


Useful for:

- counting on from the larger number
- comparing quantities
- representing difference in subtraction
- representing repeated addition for multiplication
- dividing into equal groups
- visualising word problems

Bead String

Examples



10, 20, 30, 40

10 + 3 = 13
13 – 3 = 10

3 + 10 = 13
13 – 10 = 3

4 x 5 = 20
20 ÷ 4 = 5

5 x 4 = 20
20 ÷ 5 = 4

Useful for:

- skip counting in 10s
- unitising
- adding and subtracting numbers within 100
- multiplying and dividing by grouping the beads and skip counting

Unifix and Multilink Cubes

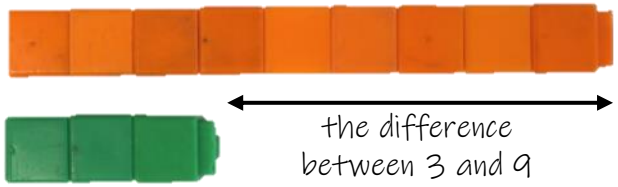
Examples

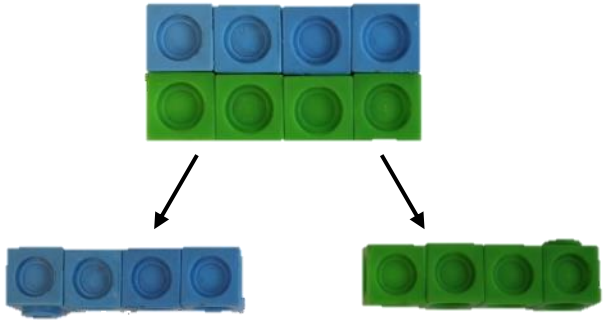
Unifix

3 + 4 = 7
4 + 3 = 7

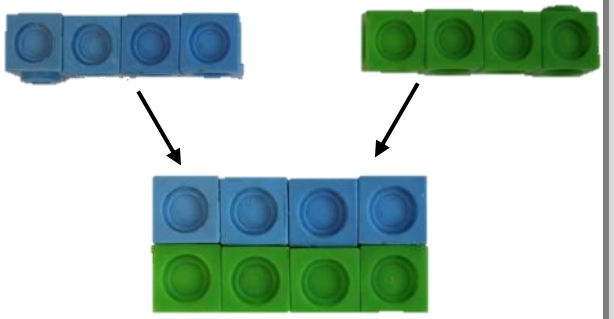
Multilink

9 – 3 = 6





8 ÷ 2 = 4
Half of 8 = 4
2 x 4 = 8
Double 4 = 8



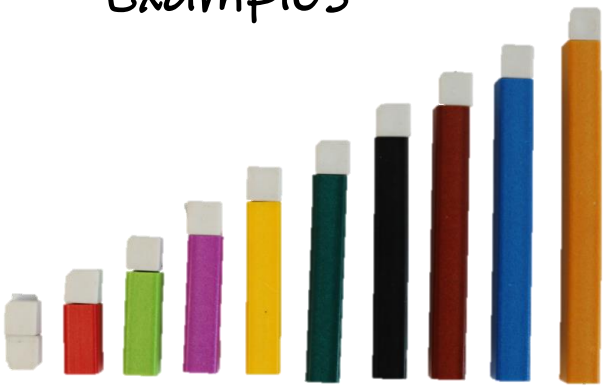
Useful for:

- adding 1-digit numbers
- subtracting 1-digit numbers, including finding the difference between numbers
- multiplying and dividing, including halving and doubling numbers
- squaring and cubing numbers

Cuisenaire Rods

1+9=10	6+4=10
2+8=10	7+3=10
3+7=10	8+2=10
4+6=10	9+1=10
5+5=10	10+0=10

Examples



1+1=2
2+1=3
3+1=4
4+1=5
5+1=6
6+1=7
7+1=8
8+1=9
9+1=10
10+1=11

$$\frac{2}{8} + \frac{6}{8} = \frac{8}{8}$$
$$\frac{6}{8} + \frac{2}{8} = \frac{8}{8}$$
$$\frac{8}{8} - \frac{2}{9} = \frac{6}{8}$$
$$\frac{8}{8} - \frac{6}{9} = \frac{2}{8}$$

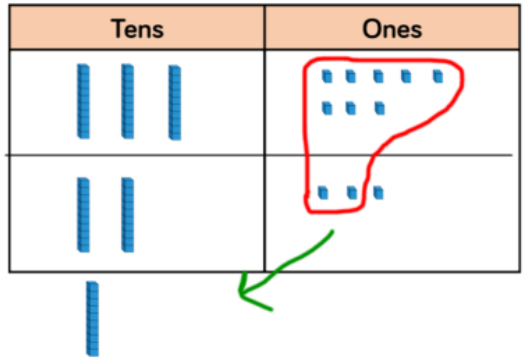
4 + 3 = 7
3 + 4 = 7
7 − 4 = 3
7 − 3 = 4

Useful for:

- subitising numbers
- adding and subtracting 1
- number bonds to 10
- adding and subtracting within 10 and beyond
- adding and subtracting fractions

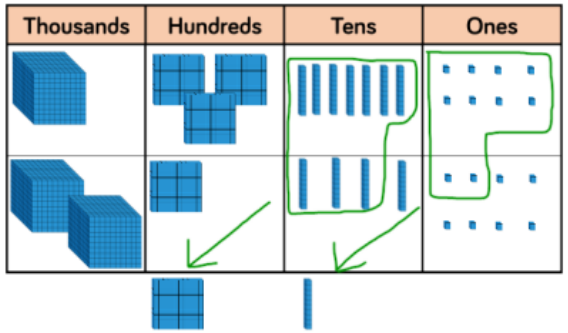
Dienes/Base 10 (+/-)

Examples



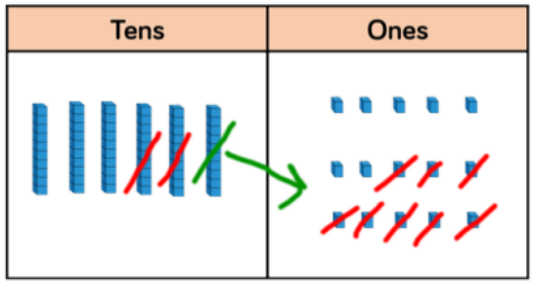
$$\begin{array}{r} 38 \\ +\ 23 \\ \hline 61 \\ \hline 1 \end{array}$$

38 + 23 = 61



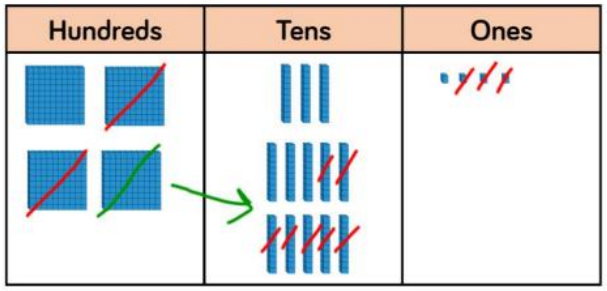
$$\begin{array}{r} 1378 \\ +\ 2148 \\ \hline 3526 \\ \hline 1\ 1 \end{array}$$

1,378 + 2,148 = 3,526



$$\begin{array}{r} {}^{5}\cancel{6}{}^{1}5 \\ -\ 28 \\ \hline 37 \end{array}$$

65 – 28 = 37



$$\begin{array}{r} {}^{3}\cancel{4}{}^{1}35 \\ -\ 273 \\ \hline 262 \end{array}$$

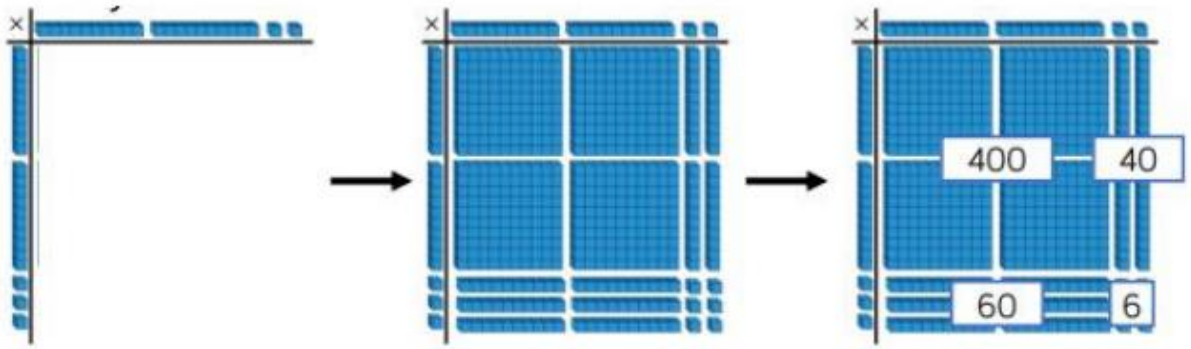
435 – 273 = 262

Useful for:

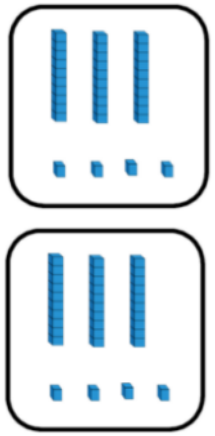
- Understanding place value of up to 4-digit numbers
- supporting understanding of column addition and column subtraction, with the written method alongside the model
- first adding/subtracting without an exchange, then learning about how and why we exchange

Dienes/Base 10 (x/÷)

Examples

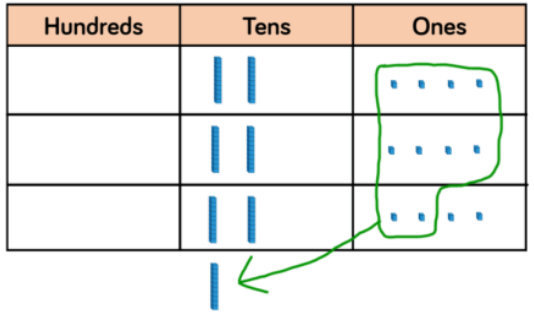


22 x 23 = 506



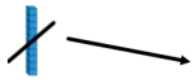
68 ÷ 2 = 34

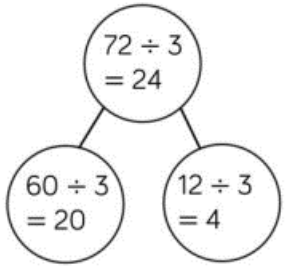
Hundreds	Tens	Ones



$$\begin{array}{r} 24 \\ \times\ 3 \\ \hline 72 \\ \hline 1 \end{array}$$

Tens	Ones





24 x 3 = 72

72 ÷ 3 = 24

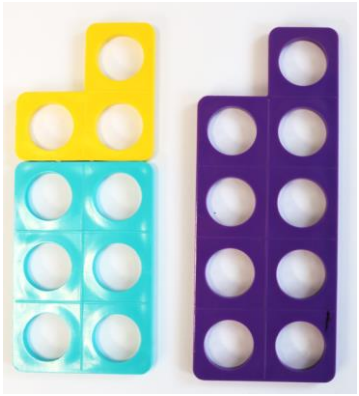
Useful for:

- dividing by sharing
- supporting understanding of column multiplication when multiplying by a 1-digit number
- supporting understanding of the grid method for multiplication
- supporting understanding of division as sharing with a part-whole model

Number Shapes/Numicon

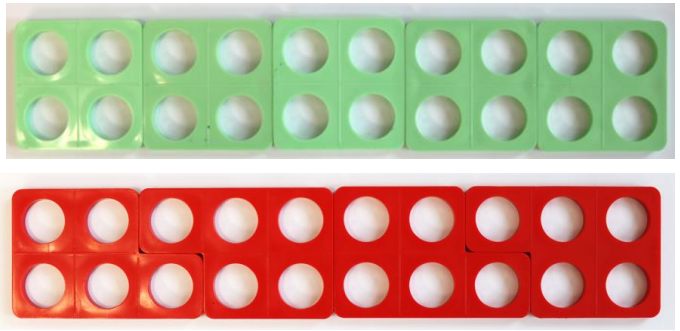
Examples

odd even odd even odd even



6 + 3 = 9
3 + 6 = 9
9 − 3 = 6
9 − 6 = 3

5+5=10 5+5=10	6+4=10 4+6=10	7+3=10 3+7=10	8+2=10 2+8=10	9+1=10 1+9=10



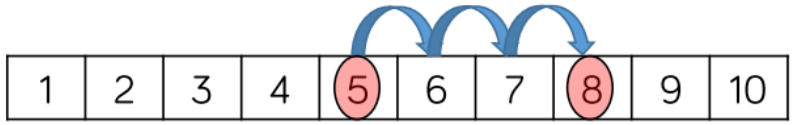
5 x 4 = 20
20 ÷ 5 = 4
4 x 5 = 20
20 ÷ 4 = 5

Useful for:

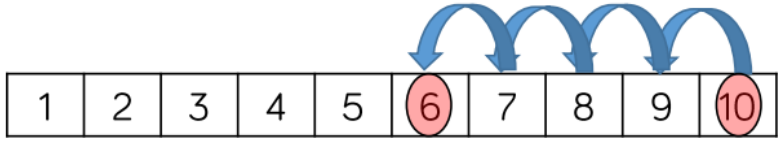
- odd and even numbers
- number bonds to 10
- adding and subtracting within 10 and beyond
- multiplying and dividing numbers

Number Tracks

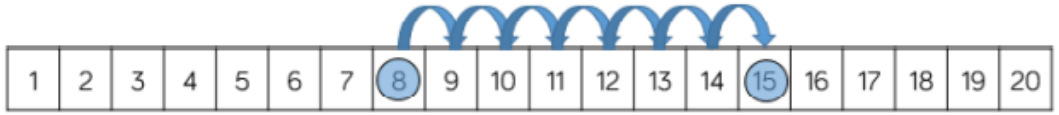
Examples



5 + 3 = 8

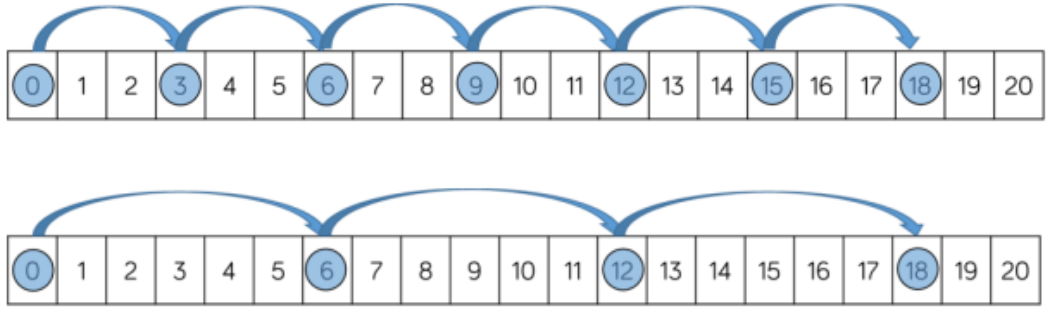


10 - 4 = 6



8 + 7 = 15

6 x 3 = 18
3 x 6 = 18



18 ÷ 3 = 6

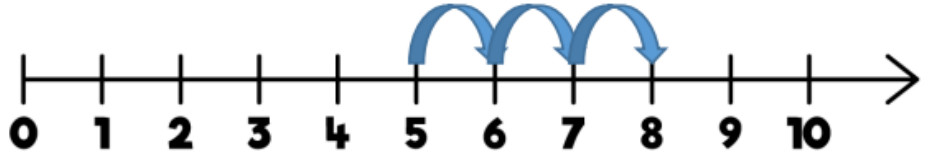
Useful for:

- adding and subtracting 1-digit numbers, including when crossing 10
- multiplying and dividing, counting up and down in smaller multiples, recording the number of jumps made

Number Lines (Labelled)

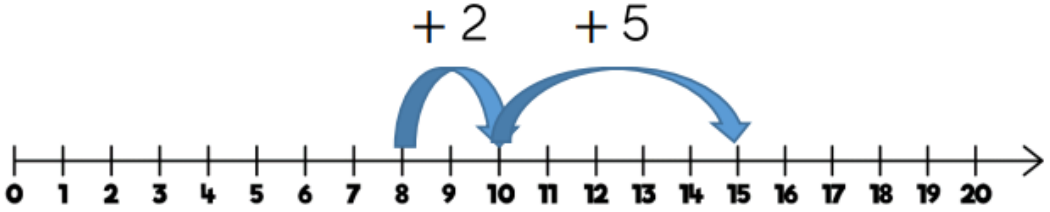
Examples

$5 + 3 = 8$



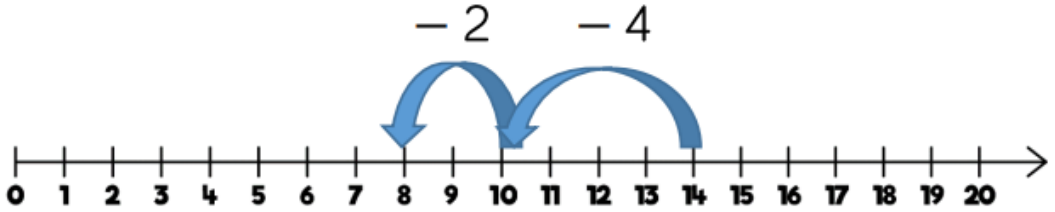
$8 + 7 = 15$

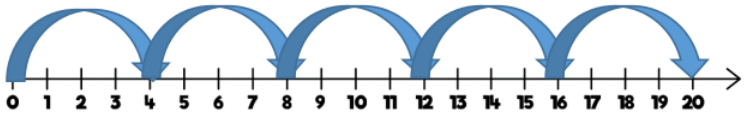
2 5



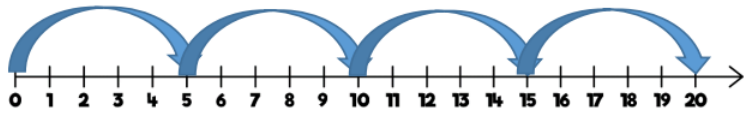
$14 - 6 = 8$

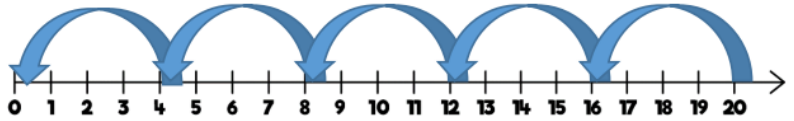
4 2





$4 \times 5 = 20$
$5 \times 4 = 20$
$20 \div 4 = 5$
$20 \div 5 = 4$





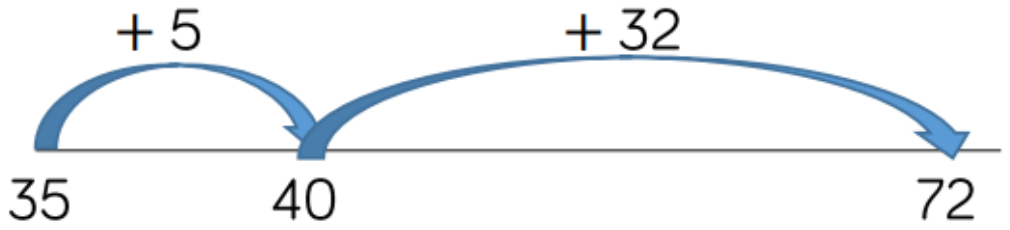
Useful for:

- support in understanding addition and subtraction as counting on or counting back
- adding or subtracting by jumping to the nearest 10 and then jumping then jumping the rest
- multiplying and dividing with smaller multiples

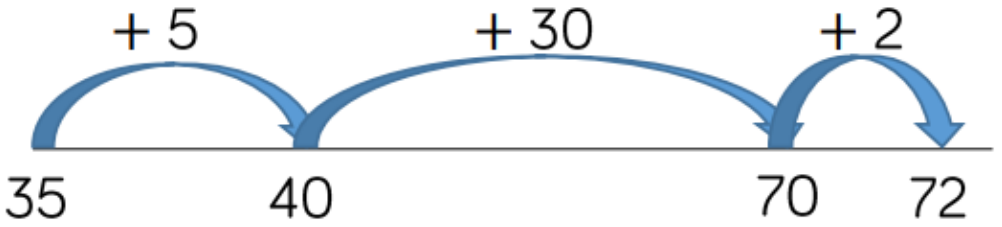
Number Lines (Blank)

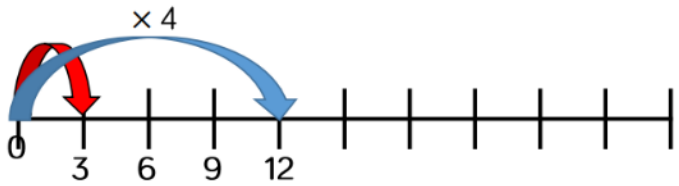
Examples

35 + 37 = 72

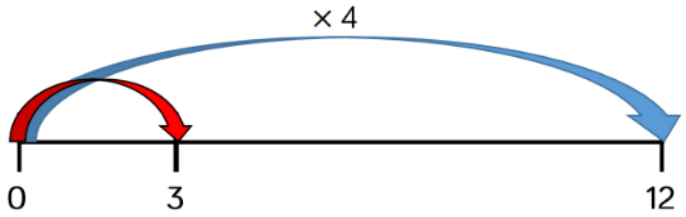


72 – 35 = 37
Because the difference between 35 and 72
= 5 + 30 + 2 = 37





A red car travels 3km.
A blue car travels 4 times further.
How far does the blue car travel?



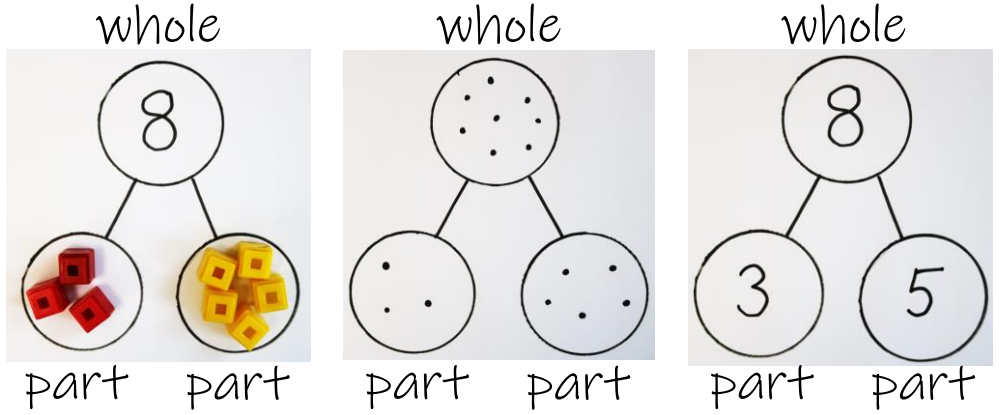
A blue car travels 12km.
A red car travels 4 times less.
How far does the red car travel?

Useful for:

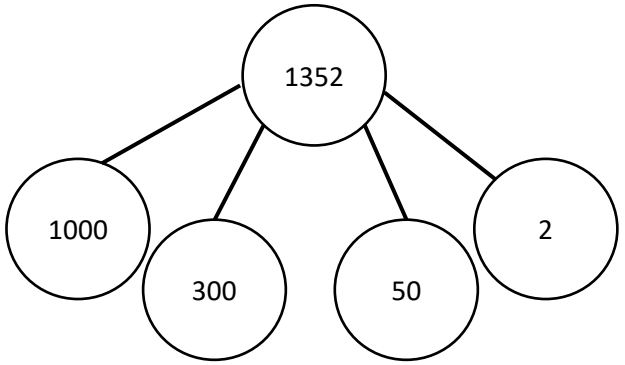
- adding and subtracting numbers in smaller parts
- adding or subtracting by jumping to the nearest 10 and then jumping then jumping the rest
- subtracting by finding the difference
- representing scaling as multiplication or division

Part-Whole Models

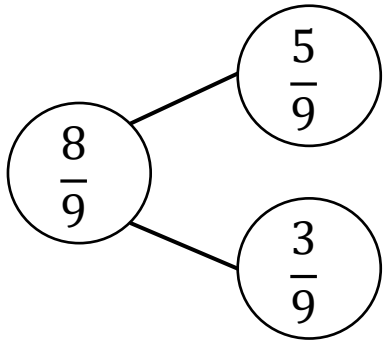
Examples



$$3 + 5 = 8$$
$$5 + 3 = 8$$
$$8 - 5 = 3$$
$$8 - 3 = 5$$



$$1352 = 1000 + 300 + 50 + 2$$



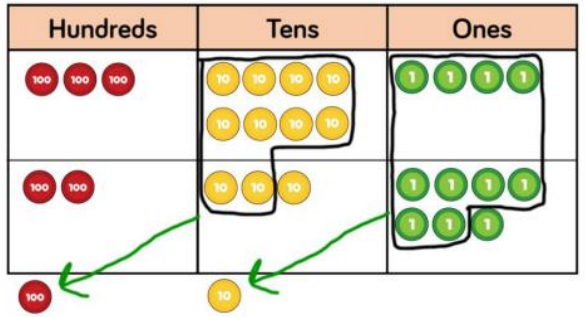
$$\frac{5}{9} + \frac{3}{9} = \frac{8}{9}$$
$$\frac{3}{9} + \frac{5}{9} = \frac{8}{9}$$
$$\frac{8}{9} - \frac{3}{9} = \frac{5}{9}$$
$$\frac{8}{9} - \frac{5}{9} = \frac{3}{9}$$

Useful for:

- adding and subtracting numbers concretely (e.g. cubes), pictorially (e.g. dots) and abstractly (with numerals)
- partitioning numbers into 1000s, 100s, 10s and 1s
- adding and subtracting fractions

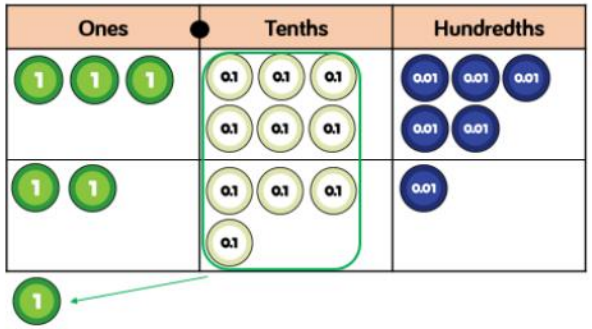
Place Value Counters (+/-)

Examples



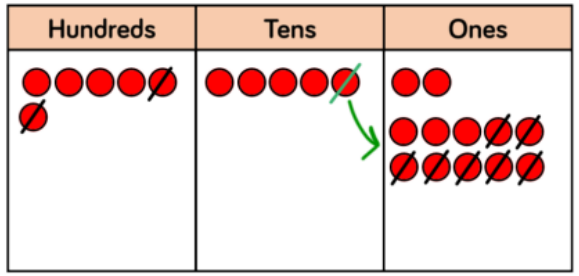
$$\begin{array}{r} 384 \\ +\ 237 \\ \hline 621 \\ \hline 1\ 1 \end{array}$$

384 + 237 = 621



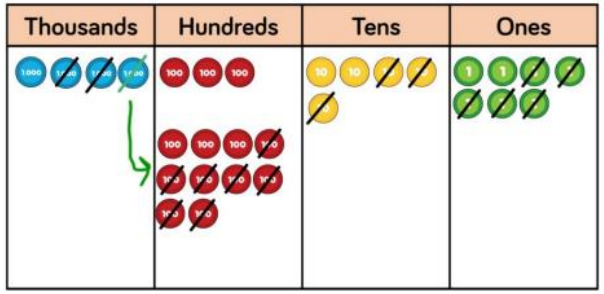
$$\begin{array}{r} 3.65 \\ +\ 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

3.65 + 2.41 = 6.06



$$\begin{array}{r} {}^{4}\not{6}{}^{1}52 \\ -\ 207 \\ \hline 445 \end{array}$$

652 – 207 = 445



$$\begin{array}{r} {}^{3}\not{4}{}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$$

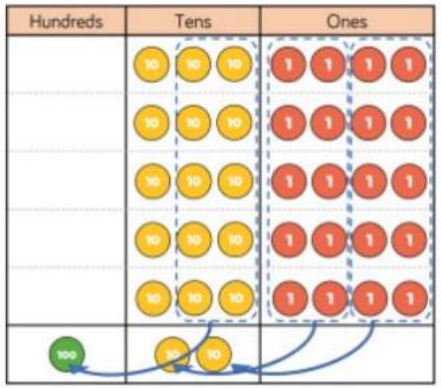
4357 – 2735 = 1622

Useful for:

- supporting understanding of column addition and column subtraction, with the written method alongside the model
- first adding/subtracting without an exchange, then learning about how and why we exchange

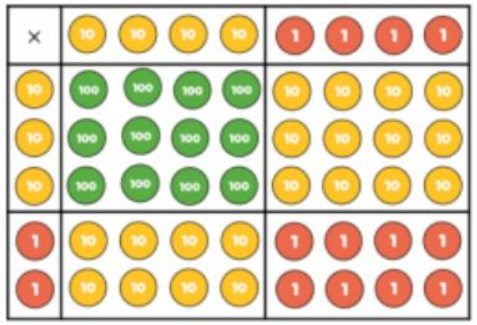
Place Value Counters (x/÷)

Examples



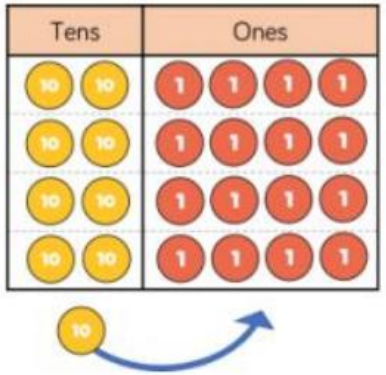
$$\begin{array}{r} 34 \\ \times\ 5 \\ \hline 170 \\ \hline 1\ 2 \end{array}$$

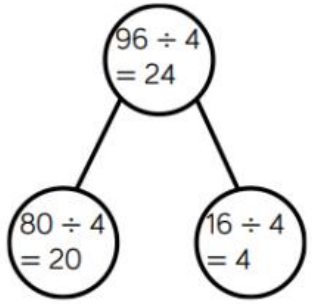
34 x 5 = 170



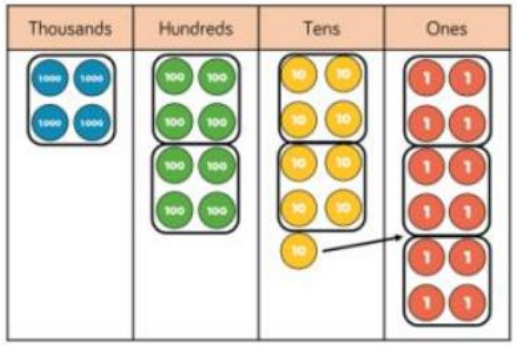
$$\begin{array}{r} 44 \\ \times\ 32 \\ \hline 8 \\ 80 \\ 120 \\ +\ 1200 \\ \hline 1408 \\ \hline 1 \end{array}$$

44 x 32 = 1408





96 ÷ 4 = 24



$$\begin{array}{r} 1223 \\ 4\overline{)\,4892^{1}} \end{array}$$

4892 ÷ 4 = 1223

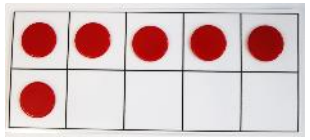
Useful for:

- supporting understanding of column multiplication, with the written method alongside the model
- supporting understanding of division; first (Y3/4), linked to a part-whole model – sharing counters. Later (Y5/6), short division – grouping counters.

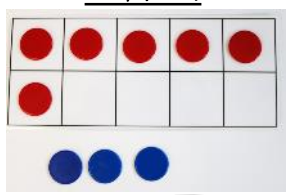
Ten-Frame

Examples

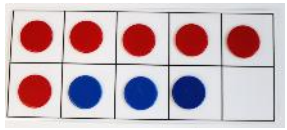
First



Then

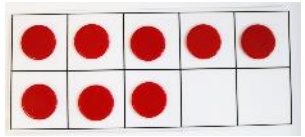


Now

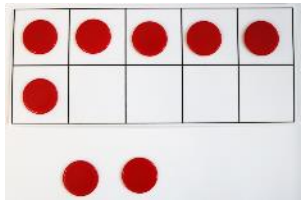


6 + 3 = 9

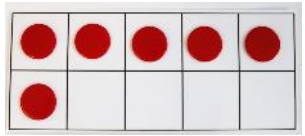
First



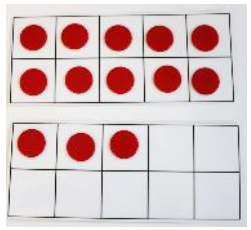
Then

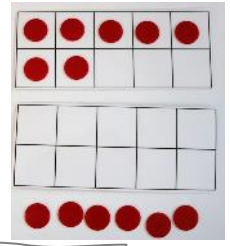


Now

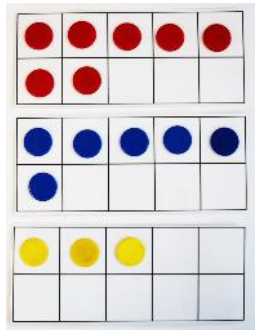


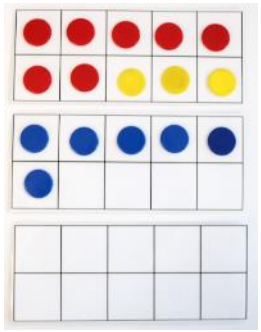
8 − 2 = 6





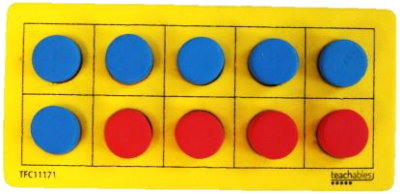
13 − 6 = 7



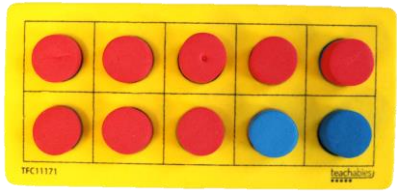


7 + 6 + 3 = 16

10



6 + 4 = 10
4 + 6 = 10



8 + 2 = 10
2 + 8 = 10

Useful for:

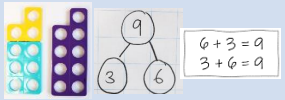
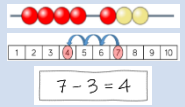
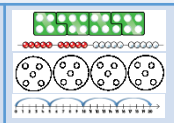
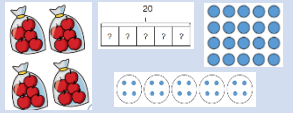
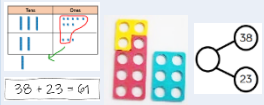
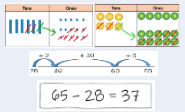
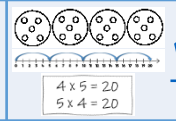
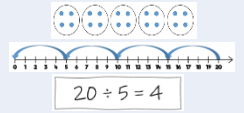
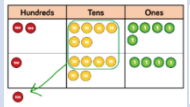
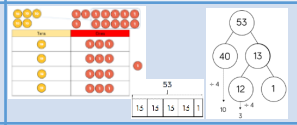
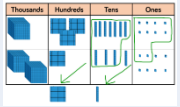
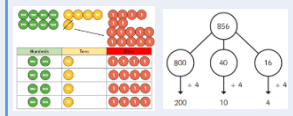
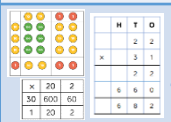
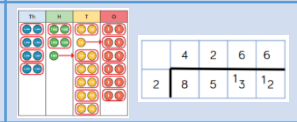
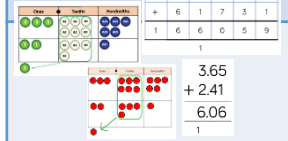
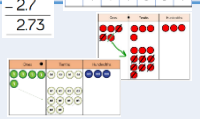
- number bonds to 10
- adding and subtracting numbers within 10
- adding and subtracting numbers within 20

Calculation Policies

Click on the link to see the policy.
Then, click the back arrow in the top left corner to return to this page.



Maths in Rainbows (Reception)


 Addition – Y1	 Subtraction – Y1	 Multiplication – Y1	 Division – Y1
 Addition – Y2	 Subtraction – Y2	 Multiplication – Y2	 Division – Y2
 Addition – Y3	 Subtraction – Y3	 Multiplication – Y3	 Division – Y3
 Addition – Y4	 Subtraction – Y4	 Multiplication – Y4	 Division – Y4
 Addition – Y5	 Subtraction – Y5	 Multiplication – Y5	 Division – Y5
 Addition – Y6	 Subtraction – Y6	 Multiplication – Y6	 Division – Y6

Some of the images are sourced from White Rose, the Maths scheme we follow.

Maths in Reception

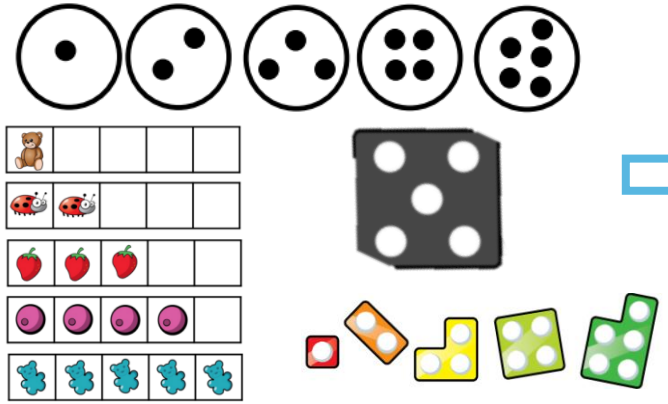
In Reception, children learn to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. Using manipulatives (such as Numicon, Multilink and Unifix, as well as tens frames, dots plates, number tracks and part/whole diagrams for organising counting) helps children develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. Children learn to talk to adults and their peers about what they notice.

Concrete

Counting to 5

Pictorial

Counting to 5



Abstract

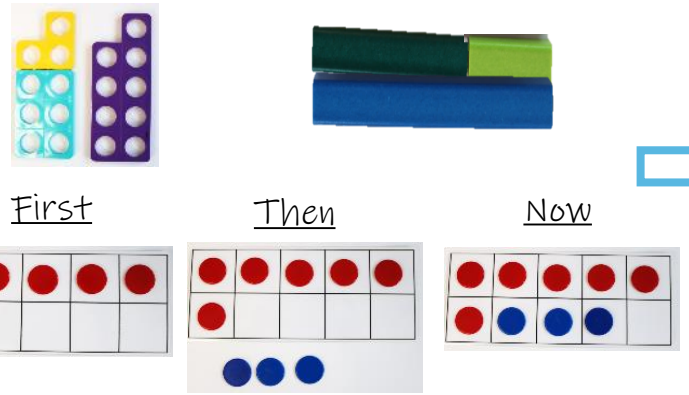
Counting to 5

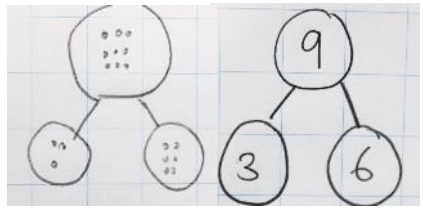
1 2 3 4 5

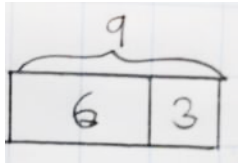
"one, two, three, four, five"

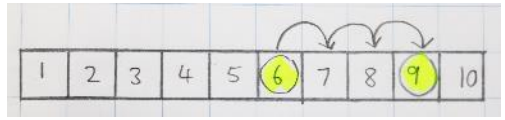
Addition - Y1

Concrete	Pictorial	Abstract
Add 1-digit numbers within 10	Add 1-digit numbers within 10	Add 1-digit numbers within 10
Add 1 and 2-digit numbers to 20	Add 1 and 2-digit numbers to 20	Add 1 and 2-digit numbers to 20

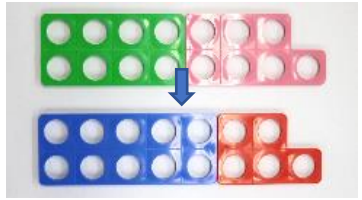


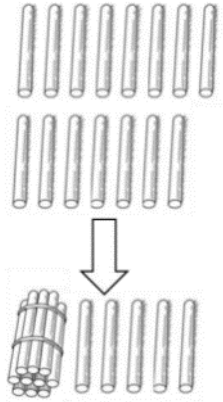


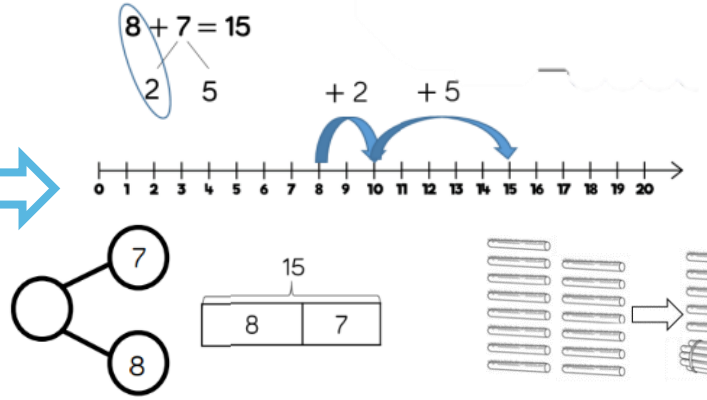


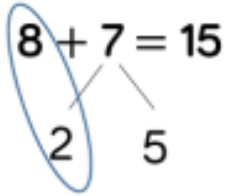


$6 + 3 = 9$
$3 + 6 = 9$



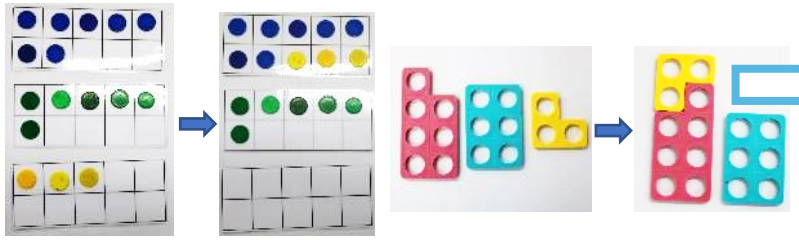
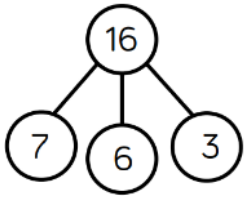
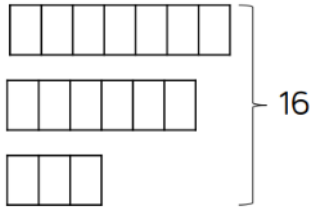
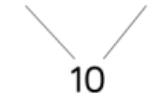
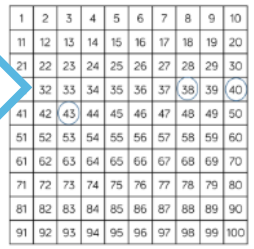
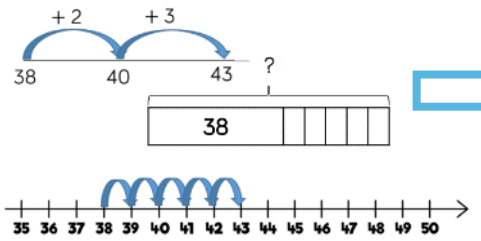
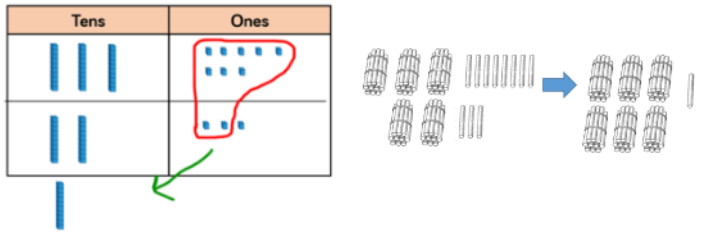
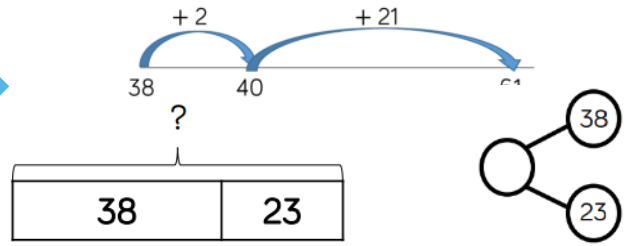






$8 + 7 = 15$
$7 + 8 = 15$

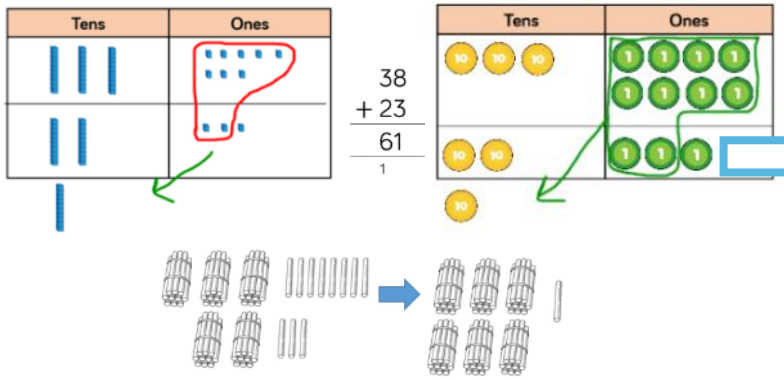
Addition – Y2

Concrete	Pictorial	Abstract
Add three 1-digit numbers 	**Add three 1-digit numbers**  	**Add three 1-digit numbers** $7 + 6 + 3 = 16$  $7 + 6 + 3 = 16$
Add 1 and 2-digit numbers to 100 	**Add 1 and 2-digit numbers to 100**  	**Add 1 and 2-digit numbers to 100** $38 + 5 = 43$ $38 + 2 = 40$ $40 + 3 = 43$ $38 + 5 = 43$
Add two 2-digit numbers to 100 	**Add two 2-digit numbers to 100** 	**Add two 2-digit numbers to 100** $38 + 23 = 61$

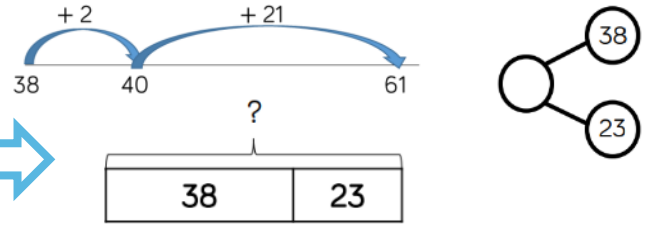
Addition – Y3

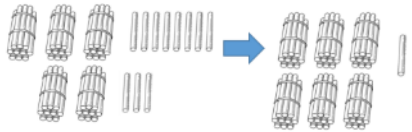
Concrete	Pictorial	Abstract

Add two 2-digit numbers to 100



Add two 2-digit numbers to 100



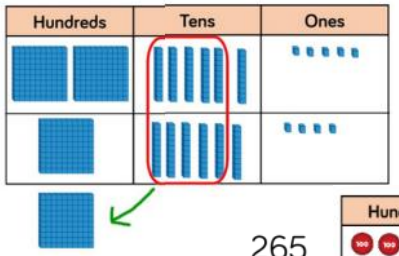


Add two 2-digit numbers to 100

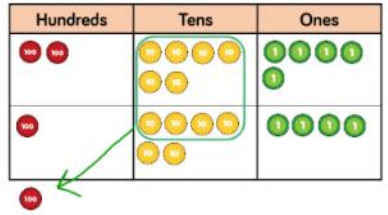
$$\begin{array}{r} 38 \\ +\ 23 \\ \hline 61 \\ \hline 1 \end{array}$$

38 + 23 = 61

Add numbers with up to 3 digits

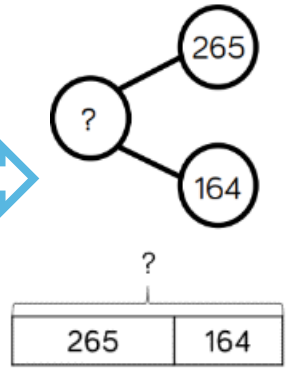


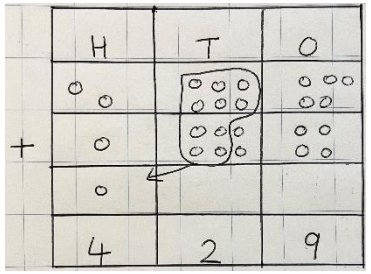
$$\begin{array}{r} 265 \\ +\ 164 \\ \hline 429 \\ \hline 1 \end{array}$$



$$\begin{array}{r} 265 \\ +\ 164 \\ \hline 429 \\ \hline 1 \end{array}$$

Add numbers with up to 3 digits





Add numbers with up to 3 digits

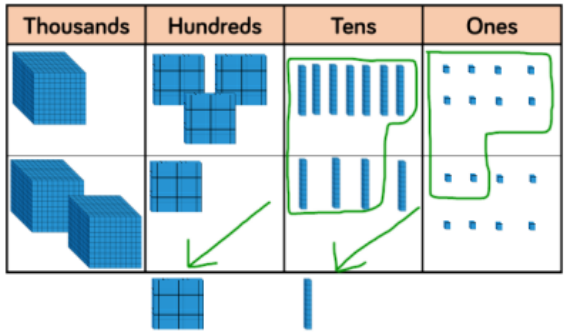
$$\begin{array}{r} 265 \\ +\ 164 \\ \hline 429 \\ \hline 1 \end{array}$$

265 + 164 = 429

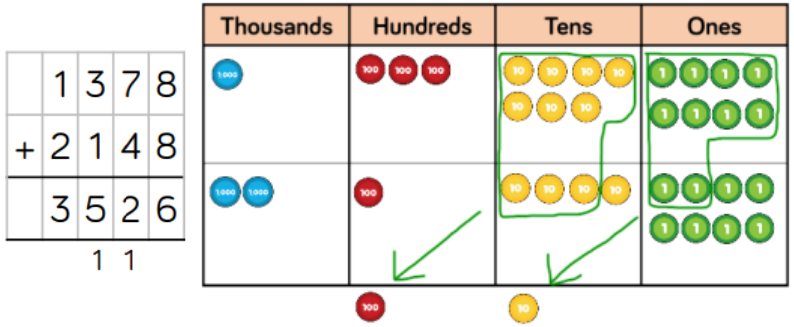
Addition – Y4

Concrete

Add numbers with up to 4 digits



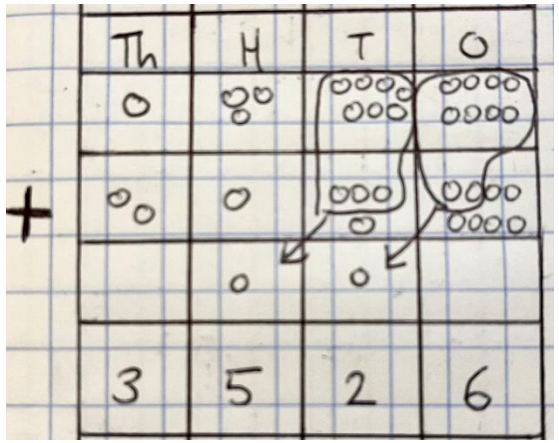
	1	3	7	8
+	2	1	4	8
	3	5	2	6
		1	1	

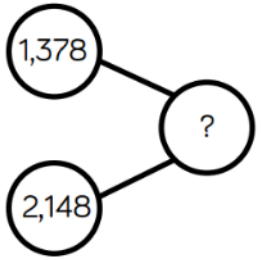


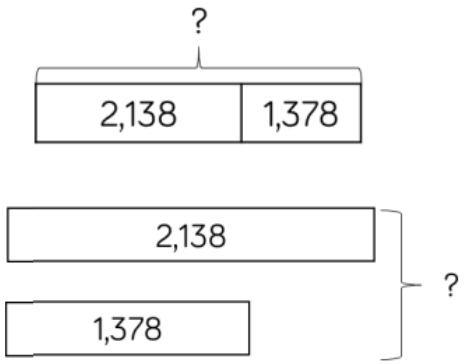
	1	3	7	8
+	2	1	4	8
	3	5	2	6
		1	1	

Pictorial

Add numbers with up to 4 digits







Abstract

Add numbers with up to 4 digits

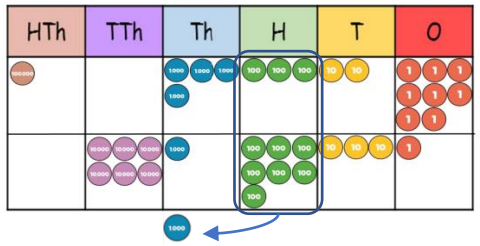
	1	3	7	8
+	2	1	4	8
	3	5	2	6
		1	1	

1,378 + 2,148 = 3,526

Addition – Y5

Concrete

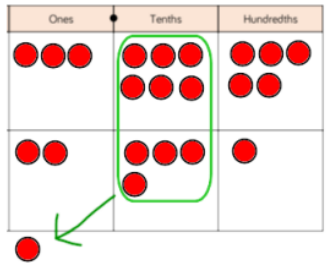
Add numbers with more than 4 digits

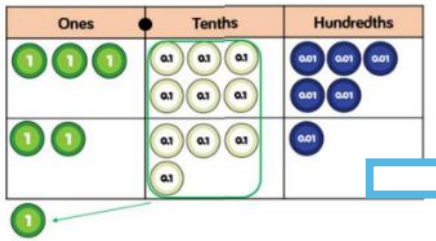


1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9

1

Add with up to 3 decimal places

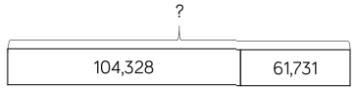


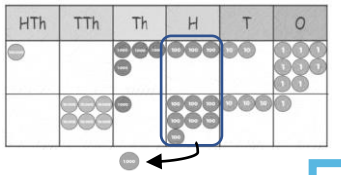


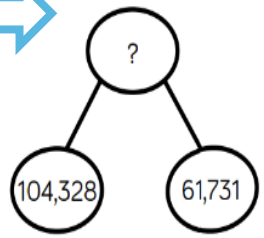
3.65
+ 2.41
6.06
1

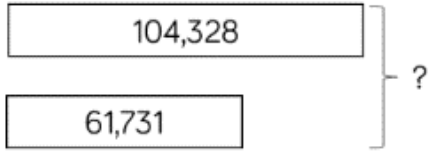
Pictorial

Add numbers with more than 4 digits

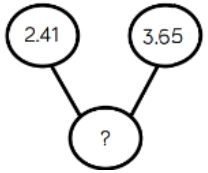


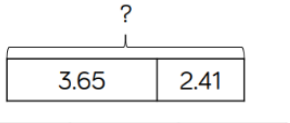


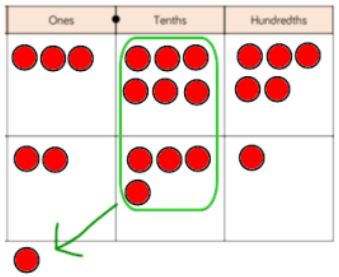


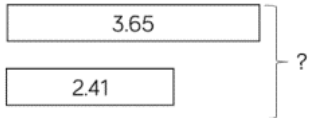


Add with up to 3 decimal places









Abstract

Add numbers with more than 4 digits

1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9

1

104,328 + 61,731 = 166,059

Add with up to 3 decimal places

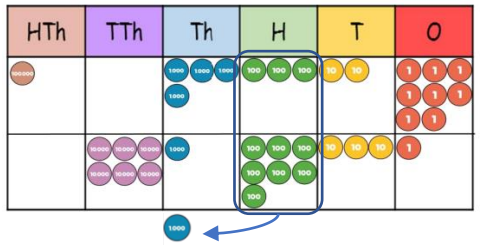
3.65
+ 2.41
6.06
1

3.65 + 2.41 = 6.06

Addition – Y6

Concrete	Pictorial	Abstract

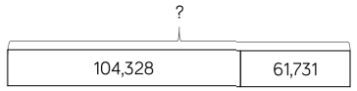
Add numbers with more than 4 digits

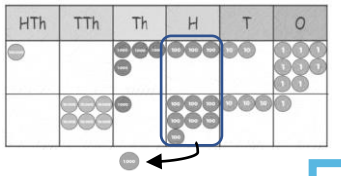


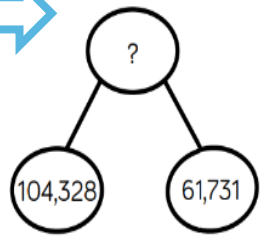
1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9

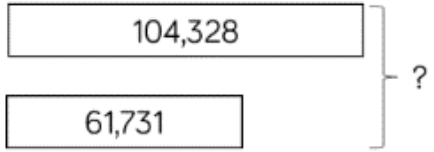
1

Add numbers with more than 4 digits









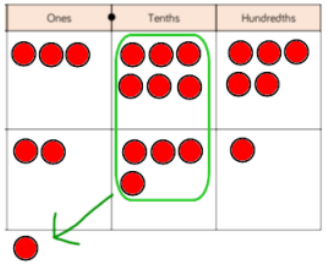
Add numbers with more than 4 digits

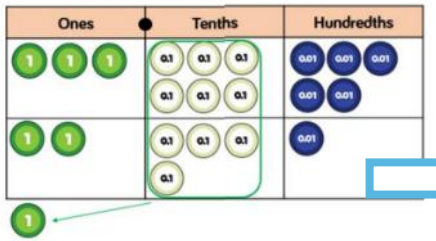
1	0	4	3	2	8
+	6	1	7	3	1
1	6	6	0	5	9

1

104,328 + 61,731 = 166,059

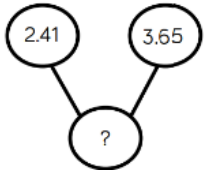
Add with up to 3 decimal places

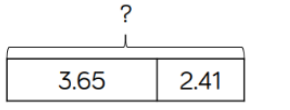


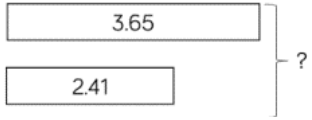


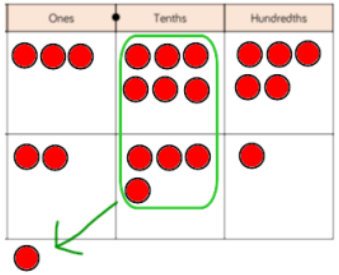
3.65
+ 2.41
6.06
1

Add with up to 3 decimal places









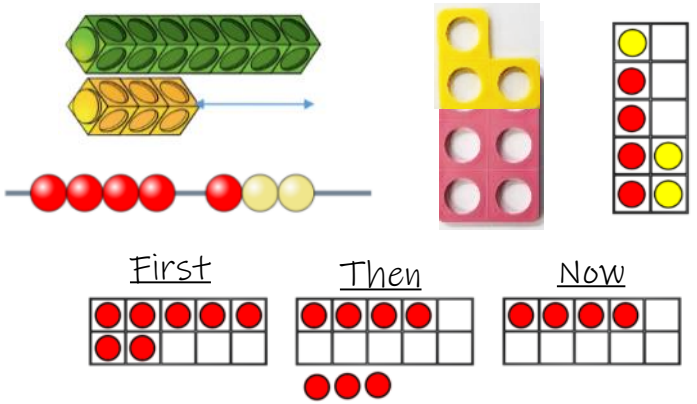
Add with up to 3 decimal places

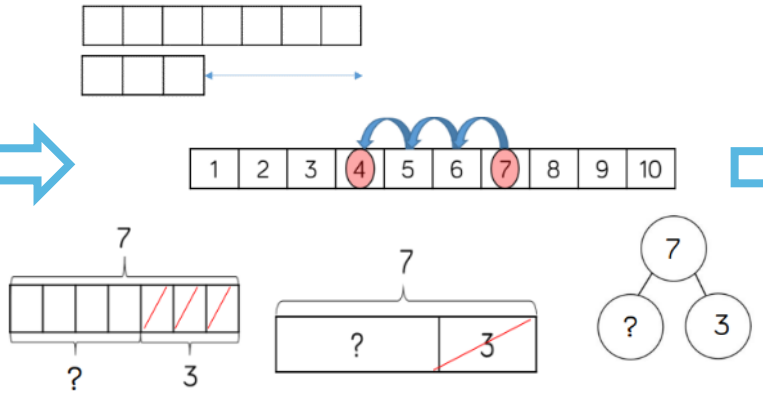
3.65
+ 2.41
6.06
1

3.65 + 2.41 = 6.06

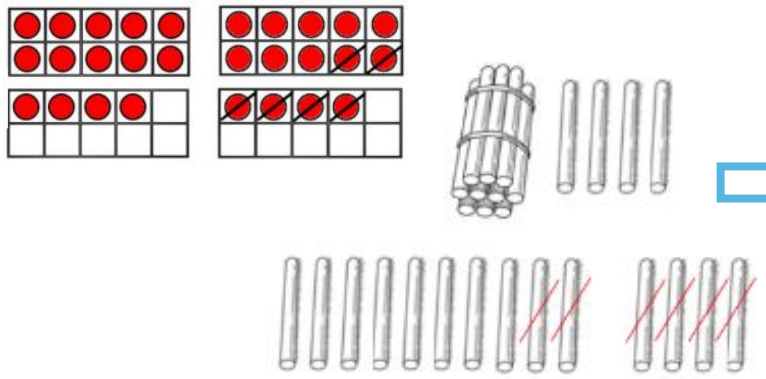
Subtraction – Y1

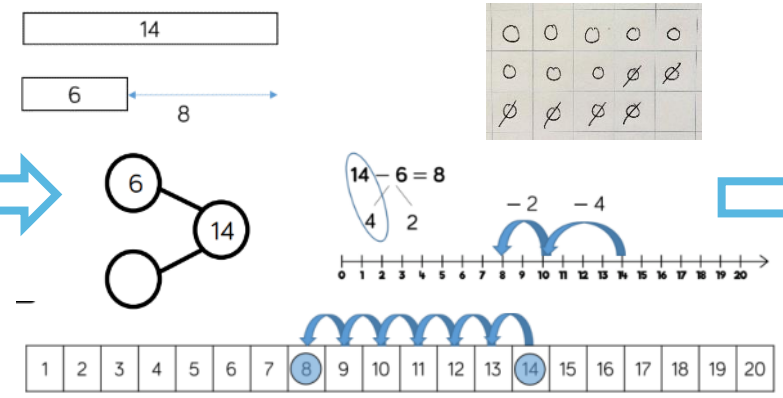
Concrete	Pictorial	Abstract
Subtract 1-digit numbers within 10	Subtract 1-digit numbers within 10	Subtract 1-digit numbers within 10
Subtract 1 and 2-digit numbers to 20	Subtract 1 and 2-digit numbers to 20	Subtract 1 and 2-digit numbers to 20

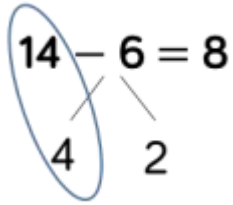




7 – 3 = 4



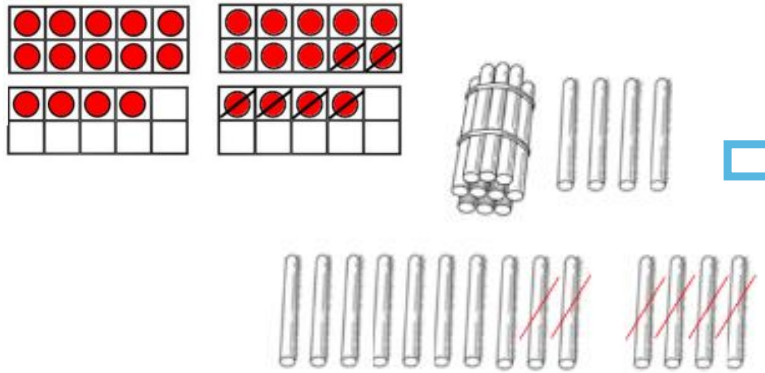


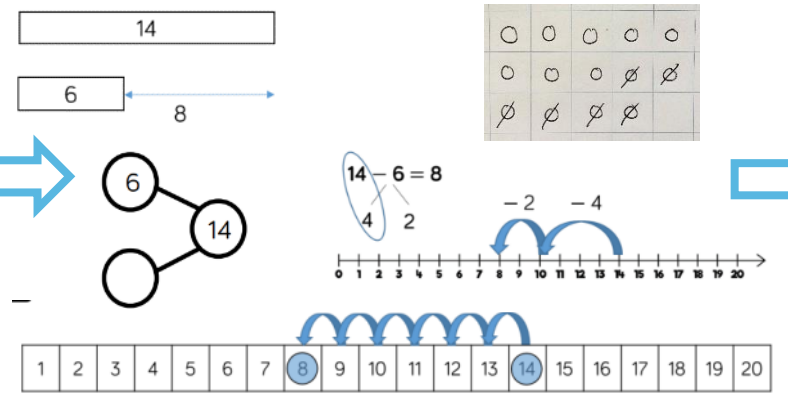


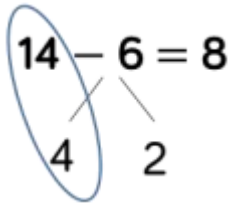
14 – 6 = 8

Subtraction – Y2

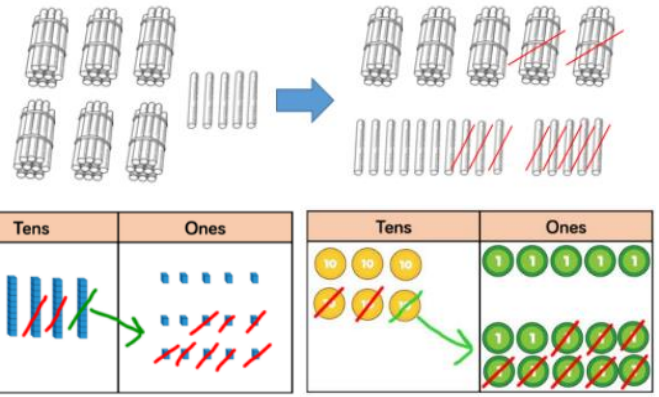
Concrete	Pictorial	Abstract
Subtract 1 and 2-digit numbers to 20	Subtract 1 and 2-digit numbers to 20	Subtract 1 and 2-digit numbers to 20
Subtract 1 and 2-digit numbers to 100	Subtract 1 and 2-digit numbers to 100	Subtract 1 and 2-digit numbers to 100

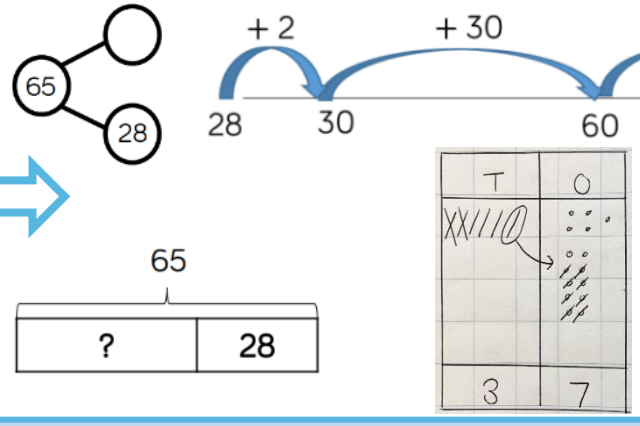






14 – 6 = 8



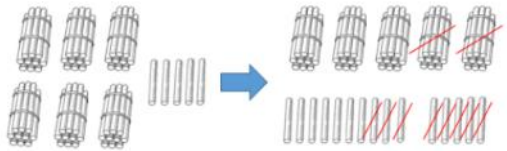


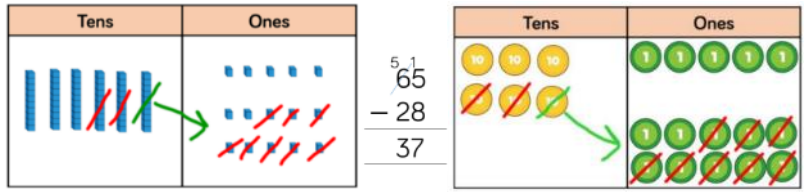
65 – 28 = 37

Subtraction – Y3

Concrete	Pictorial	Abstract

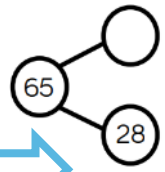
Subtract 1 and 2-digit numbers to 100

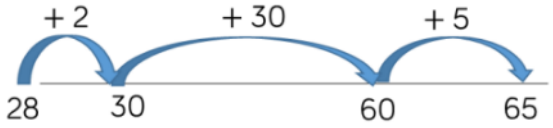


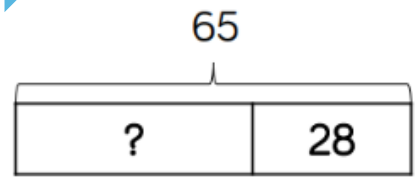


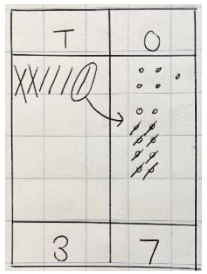
$$\begin{array}{r} {}^{5}\not{6}^{1}5 \\ -\ 2\ 8 \\ \hline 3\ 7 \end{array}$$

Subtract 1 and 2-digit numbers to 100







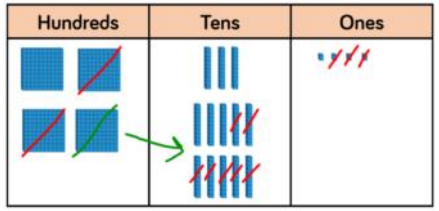


Subtract 1 and 2-digit numbers to 100

$$\begin{array}{r} {}^{5}\not{6}^{1}5 \\ -\ 2\ 8 \\ \hline 3\ 7 \end{array}$$

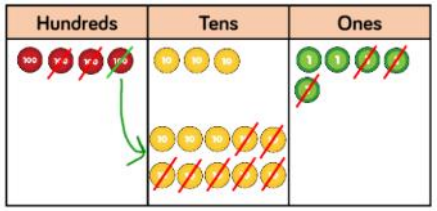
$$65 - 28 = 37$$

Subtract numbers with up to 3 digits

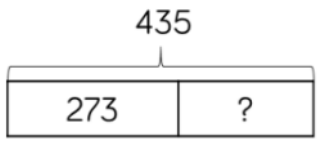


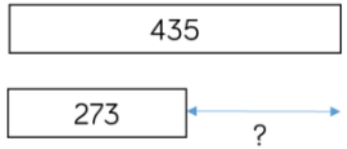
$$\begin{array}{r} {}^{3}4^{1}35 \\ -\ 273 \\ \hline 162 \end{array}$$

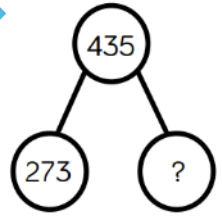
$$\begin{array}{r} {}^{3}4^{1}35 \\ -\ 273 \\ \hline 162 \end{array}$$

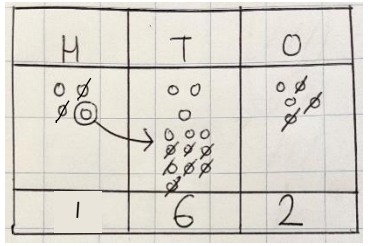


Subtract numbers with up to 3 digits









Subtract numbers with up to 3 digits

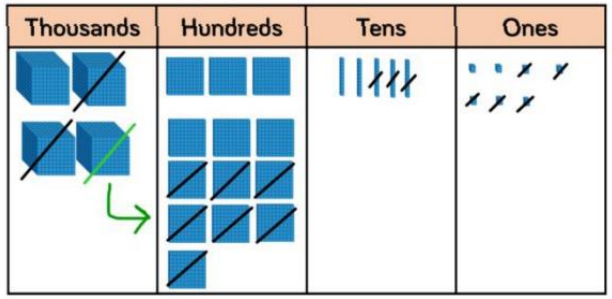
$$\begin{array}{r} {}^{3}4^{1}35 \\ -\ 273 \\ \hline 162 \end{array}$$

$$435 - 273 = 162$$

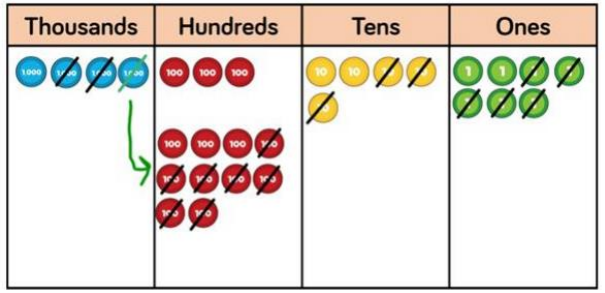
Subtraction – Y4

Concrete

Subtract numbers with up to 4 digits



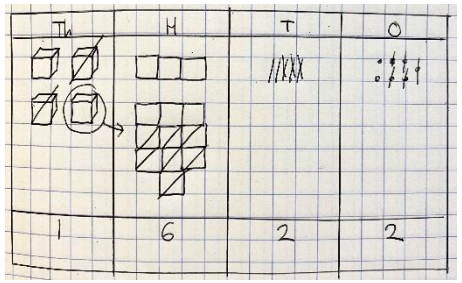
$$\begin{array}{r} {}^{3}\not{4}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$$

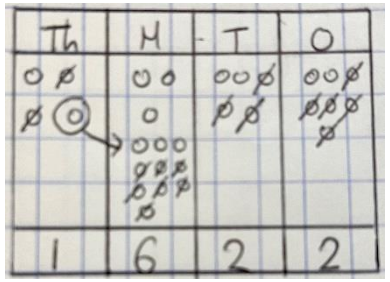


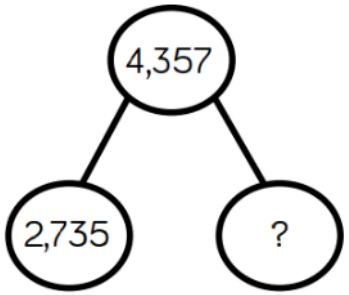
$$\begin{array}{r} {}^{3}\not{4}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$$

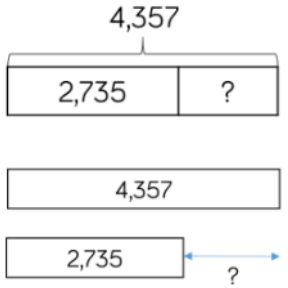
Pictorial

Subtract numbers with up to 4 digits









Abstract

Subtract numbers with up to 4 digits

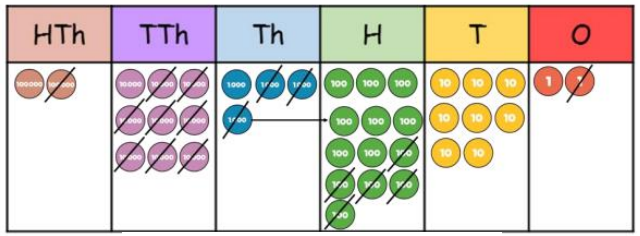
$$\begin{array}{r} {}^{3}\not{4}^{1}357 \\ -\ 2735 \\ \hline 1622 \end{array}$$

4,357 – 2,735 = 1,622

Subtraction – Y5

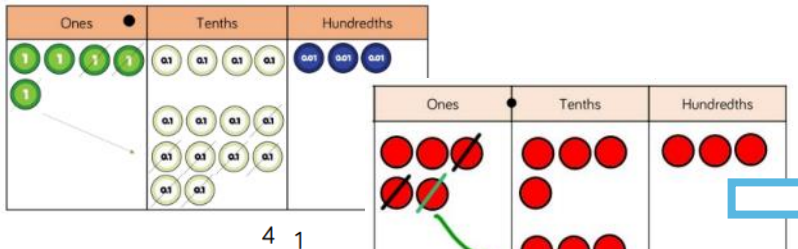
Concrete

Subtract with more than 4 digits



	2	9	$\cancel{3}$	$^{1}3$	8	2
–	1	8	2	5	0	1
	1	1	1	8	8	1

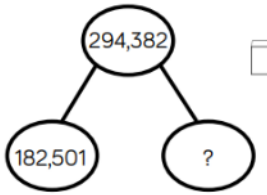
Subtract with up to 3 decimal places

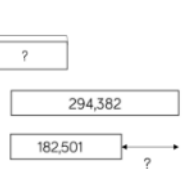


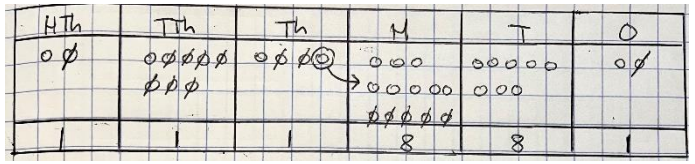
$$\begin{array}{r} {}^{4}\cancel{5}.{}^{1}43 \\ -\ 2.7 \\ \hline 2.73 \end{array}$$

Pictorial

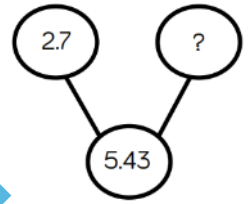
Subtract with more than 4 digits

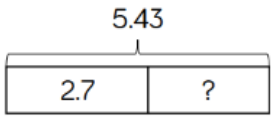


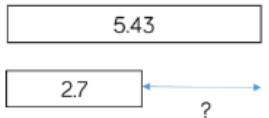


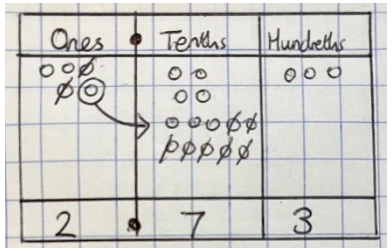


Subtract with up to 3 decimal places









Abstract

Subtract with more than 4 digits

	2	9	$\cancel{3}$	$^{1}3$	8	2
–	1	8	2	5	0	1
	1	1	1	8	8	1

294,382 – 182,501 = 111,881

Subtract with up to 3 decimal places

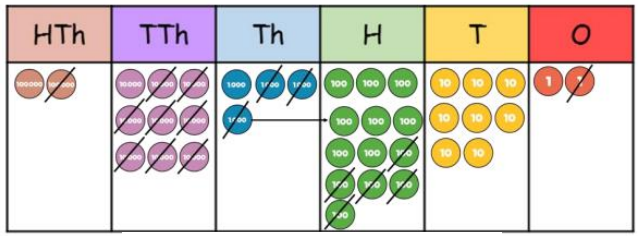
$$\begin{array}{r} {}^{4}\cancel{5}.{}^{1}43 \\ -\ 2.7 \\ \hline 2.73 \end{array}$$

5.43 – 2.7 = 2.73

Subtraction – Y6

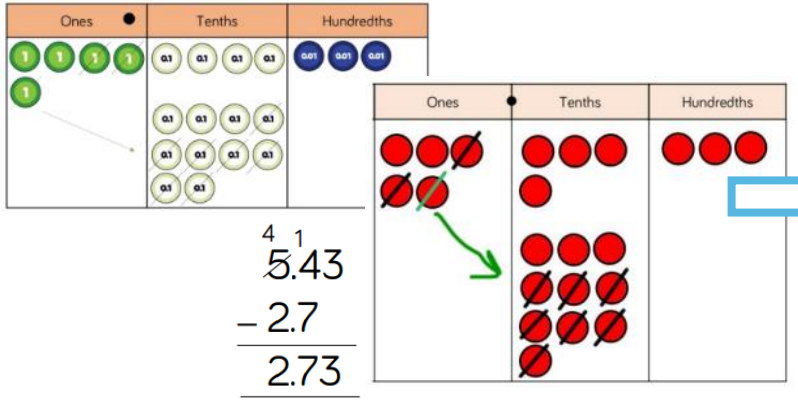
Concrete

Subtract with more than 4 digits



	2	9	$\cancel{3}\,4$	$^{1}3$	8	2
–	1	8	2	5	0	1
	1	1	1	8	8	1

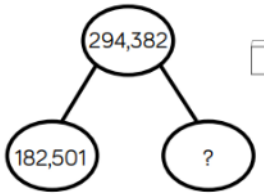
Subtract with up to 3 decimal places

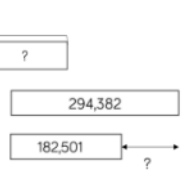


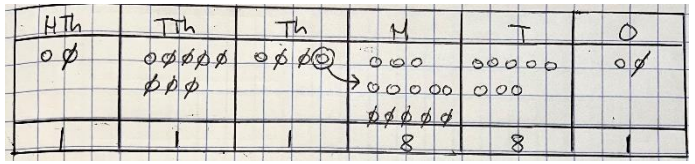
$$\begin{array}{r} {}^{4}\cancel{5}.{}^{1}43 \\ -\ 2.7 \\ \hline 2.73 \end{array}$$

Pictorial

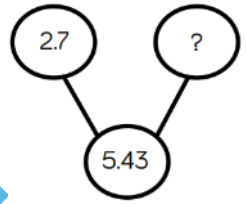
Subtract with more than 4 digits

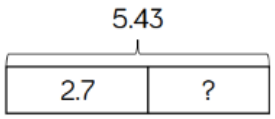


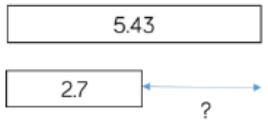


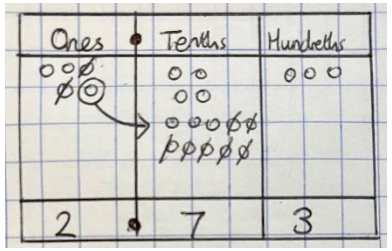


Subtract with up to 3 decimal places









Abstract

Subtract with more than 4 digits

	2	9	$\cancel{3}\,4$	$^{1}3$	8	2
–	1	8	2	5	0	1
	1	1	1	8	8	1

294,382 – 182,501 = 111,881

Subtract with up to 3 decimal places

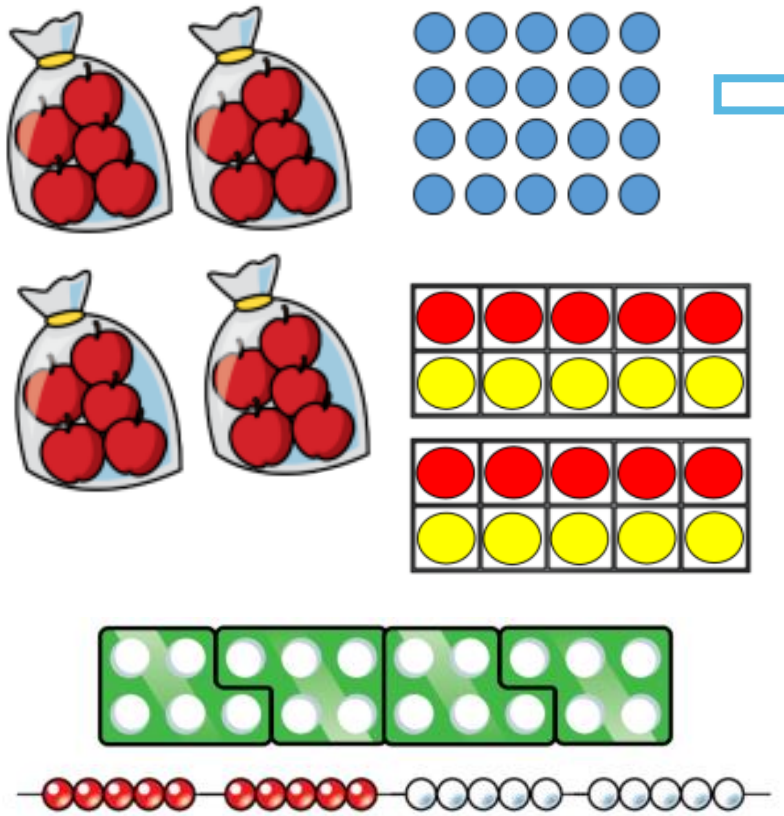
$$\begin{array}{r} {}^{4}\cancel{5}.{}^{1}43 \\ -\ 2.7 \\ \hline 2.73 \end{array}$$

5.43 – 2.7 = 2.73

Multiplication – Y1

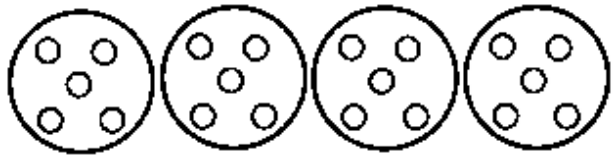
Concrete

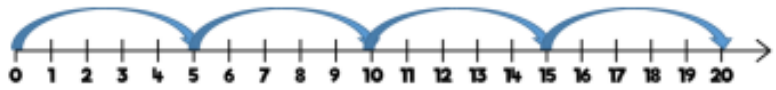
Solve 1-step problems using multiplication

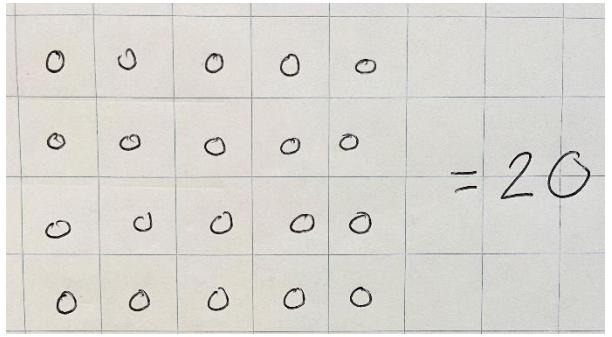


Pictorial

Solve 1-step problems using multiplication







Abstract

Solve 1-step problems using multiplication

One bag holds 5 apples. How many apples do 4 bags hold?

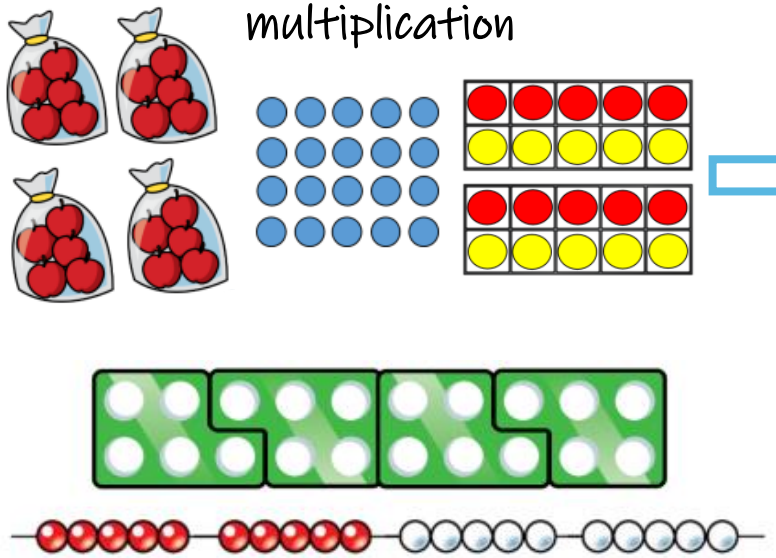
5 + 5 + 5 + 5 = 20

In Y1, children use the concrete and pictorial representations. They are not expected to record multiplication formally or use the multiplication symbol.

Multiplication – Y2

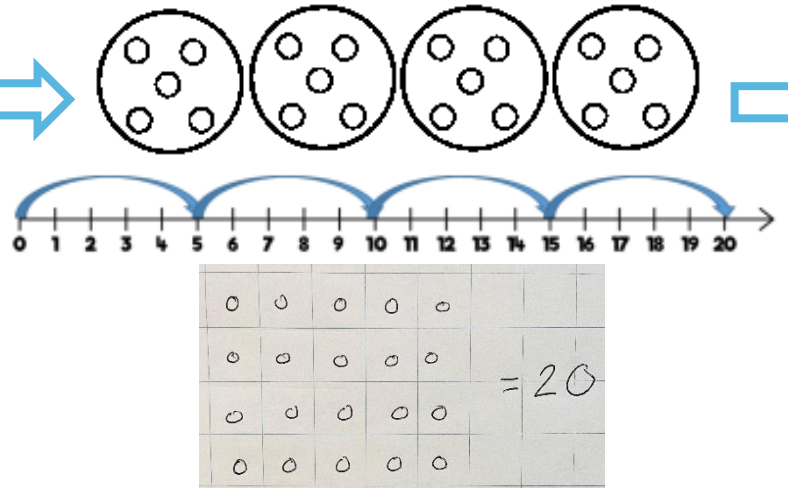
Concrete

Solve 1-step problems using multiplication



Pictorial

Solve 1-step problems using multiplication



Abstract

Solve 1-step problems using multiplication

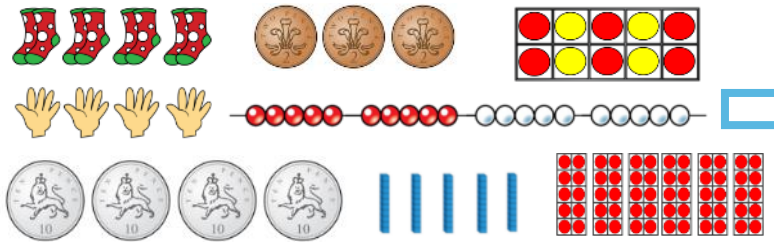
One bag holds 5 apples. How many apples do 4 bags hold?

5 + 5 + 5 + 5 = 20

4 x 5 = 20
5 x 4 = 20

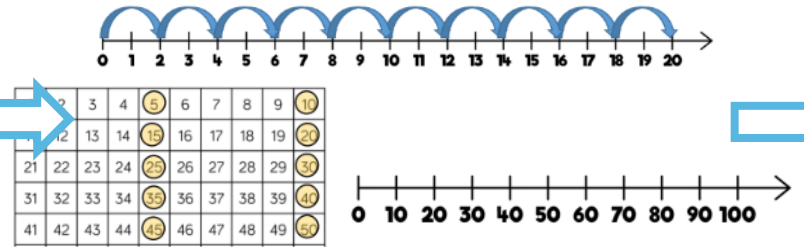
Concrete

2x 5x 10x Tables



Pictorial

2x 5x 10x Tables



Abstract

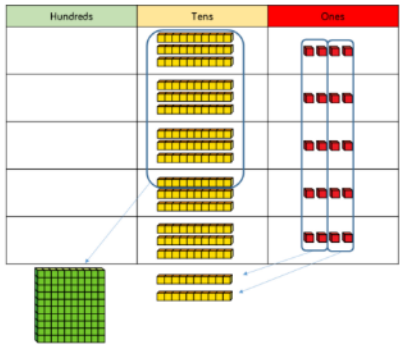
2x 5x 10x Tables

1 x 2 = 2	7 x 2 = 14	1 x 5 = 5	7 x 5 = 35	1 x 10 = 10	7 x 10 = 70
2 x 2 = 4	8 x 2 = 16	2 x 5 = 10	8 x 5 = 40	2 x 10 = 20	8 x 10 = 80
3 x 2 = 6	9 x 2 = 18	3 x 5 = 15	9 x 5 = 45	3 x 10 = 30	9 x 10 = 90
4 x 2 = 8	10 x 2 = 20	4 x 5 = 20	10 x 5 = 50	4 x 10 = 40	10 x 10 = 100
5 x 2 = 10	11 x 2 = 22	5 x 5 = 25	11 x 5 = 55	5 x 10 = 50	11 x 10 = 110
6 x 2 = 12	12 x 2 = 24	6 x 5 = 30	12 x 5 = 60	6 x 10 = 60	12 x 10 = 120

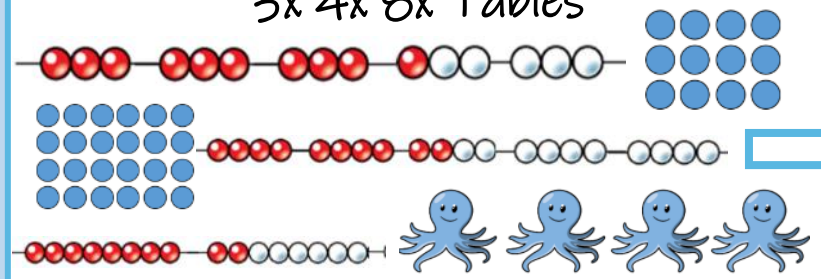
Multiplication – Y3

Concrete

Multiply 2-digit by 1-digit numbers

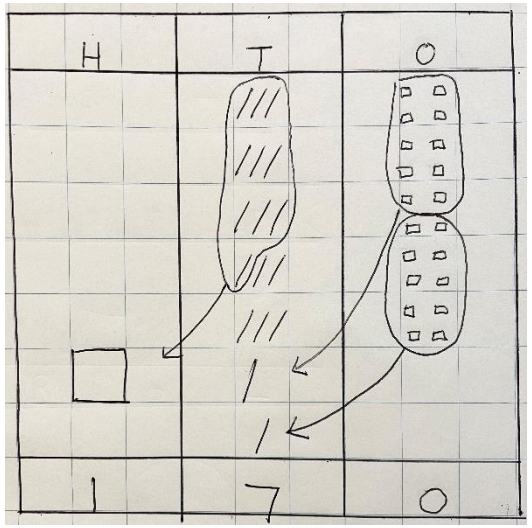


3x 4x 8x Tables

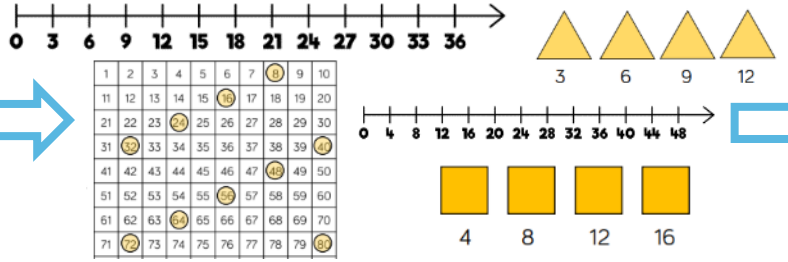


Pictorial

Multiply 2-digit by 1-digit numbers



3x 4x 8x Tables



Abstract

Multiply 2-digit by 1-digit numbers

	H	T	O	
		3	4	
×			5	
	1	7	0	
	1	2		

34 x 5 = 170

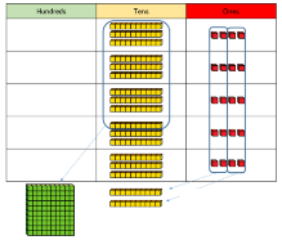
3x 4x 8x Tables (and 2x 5x 10x)

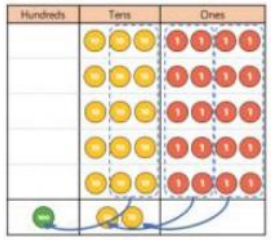
1 x 3 = 3	7 x 3 = 21	1 x 4 = 4	7 x 4 = 28	1 x 8 = 8	7 x 8 = 56
2 x 3 = 6	8 x 3 = 24	2 x 4 = 8	8 x 4 = 32	2 x 8 = 16	8 x 8 = 64
3 x 3 = 9	9 x 3 = 27	3 x 4 = 12	9 x 4 = 36	3 x 8 = 24	9 x 8 = 72
4 x 3 = 12	10 x 3 = 30	4 x 4 = 16	10 x 4 = 40	4 x 8 = 32	10 x 8 = 80
5 x 3 = 15	11 x 3 = 33	5 x 4 = 20	11 x 4 = 44	5 x 8 = 40	11 x 8 = 88
6 x 3 = 18	12 x 3 = 36	6 x 4 = 24	12 x 4 = 48	6 x 8 = 48	12 x 8 = 96

Multiplication – Y4

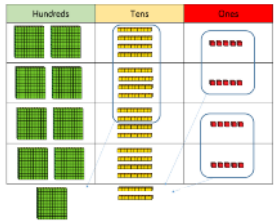
Concrete

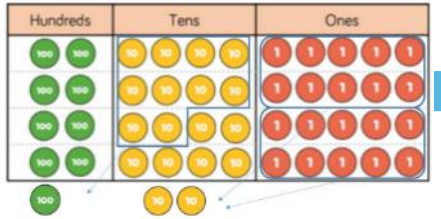
Multiply 2-digit by 1-digit numbers



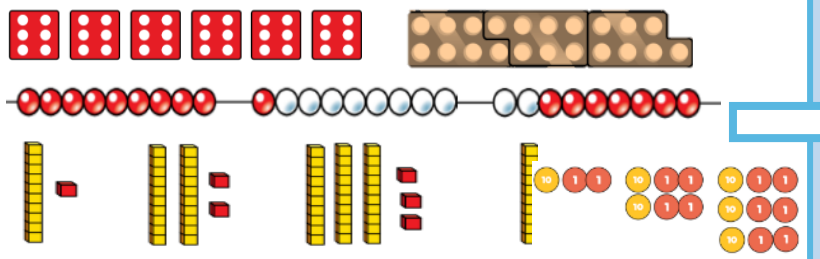


Multiply 3-digit by 1-digit numbers



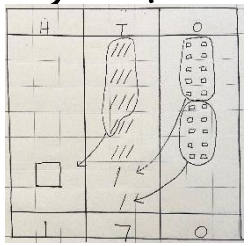


6x 7x 9x 11x 12x Tables

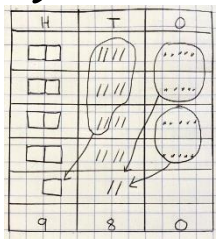


Pictorial

Multiply 2-digit by 1-digit numbers

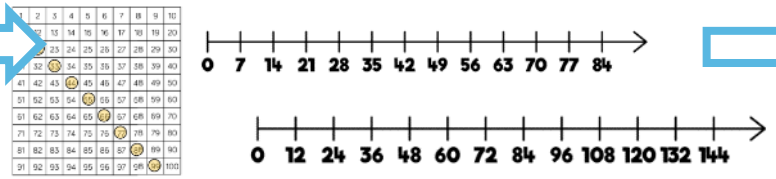


Multiply 3-digit by 1-digit numbers



6x 7x 9x 11x 12x Tables

9	18	27	36	45
54	63	72	81	90



Abstract

Multiply 2-digit by 1-digit numbers

	H	T	O	
		3	4	
×			5	
		2	0	(5 × 4)
+	1	5	0	(5 × 30)
	1	7	0	

	H	T	O	
		3	4	
×			5	
	1	7	0	
	1	2		

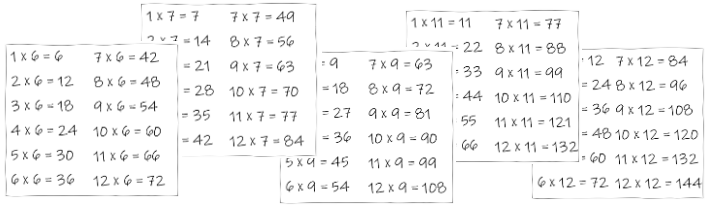
34 x 5 = 170

Multiply 3-digit by 1-digit numbers

	H	T	O
	2	4	5
×			4
	9	8	0
	1	2	

245 x 4 = 980

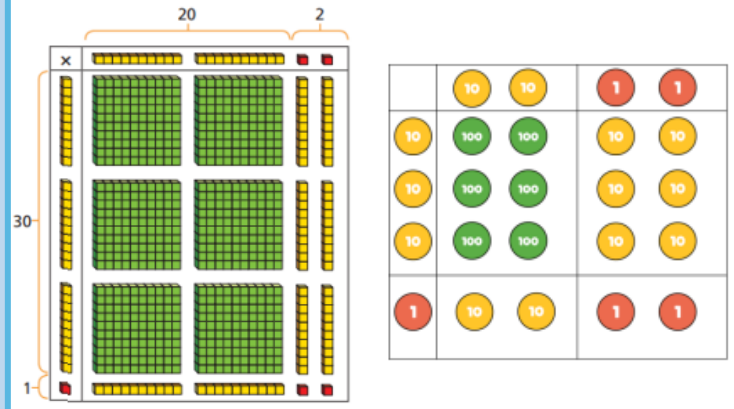
6x 7x 9x 11x 12x Tables (and 1x 2x 3x 4x 5x 8x 10x)



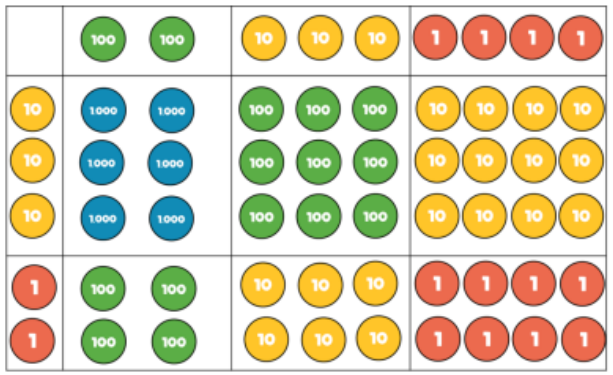
Multiplication – Y5

Concrete

Multiply 2-digit by 2-digit numbers

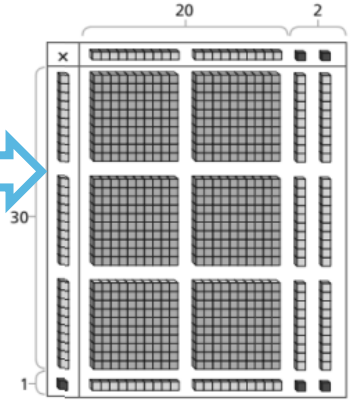


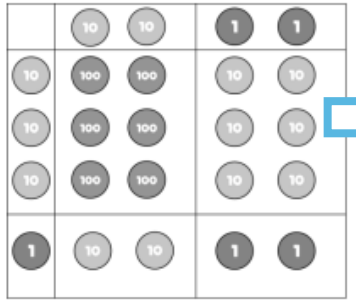
Multiply 3-digit by 2-digit numbers



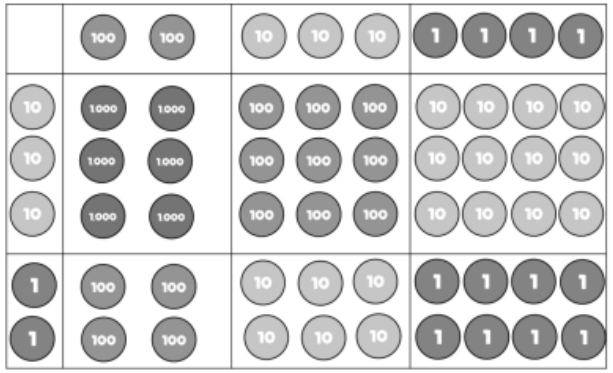
Pictorial

Multiply 2-digit by 2-digit numbers





Multiply 3-digit by 2-digit numbers



Abstract

Multiply 2-digit by 2-digit numbers

	H	T	O
		2	2
×		3	1
		2	2
	6	6	0
	6	8	2

×	20	2
30	600	60
1	20	2

22 x 31 = 682

3-digit by 2-digit

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

	Th	H	T	O
		2	3	4
×			3	2
		4	6	8
	7	0	2	0
	7	4	8	8

234 x 32 = 7,488

4-digit by 2-digit

	TTh	Th	H	T	O
		2	7	3	9
×				2	8
	2	1	9	1	2
	5	4	7	8	0
	7	6	6	9	2

2,739 x 28 = 76,692

Multiplication – Y6

Concrete → Pictorial → Abstract

Multiply 4-digit by 2-digit numbers

By Year 6, children should feel confident with the formal written method (the abstract).

Multiply 4-digit by 2-digit numbers

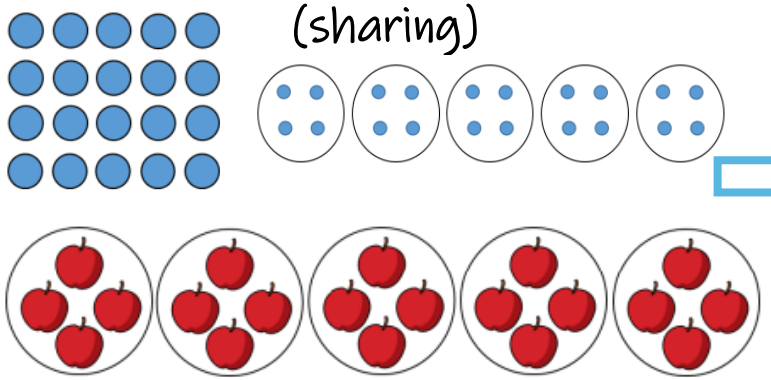
TTh	Th	H	T	O
	2	7	3	9
×			2	8
2 (2)	1 (5)	9 (3)	1 (7)	2
5 (1)	4	7 (1)	8	0
7	6	6	9	2
		1		

2,739 x 28 = 76,692

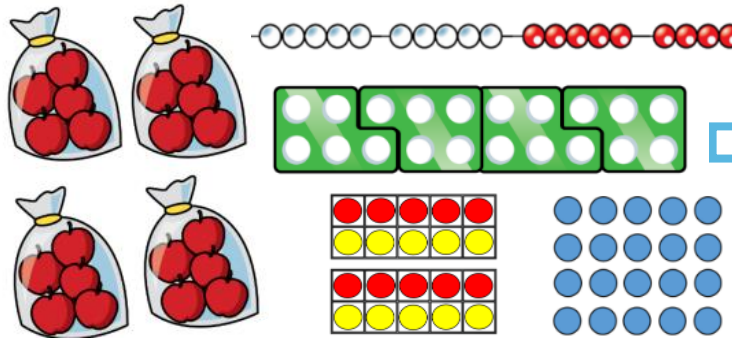
Division – Y1

Concrete

Solve 1-step problems using division (sharing)

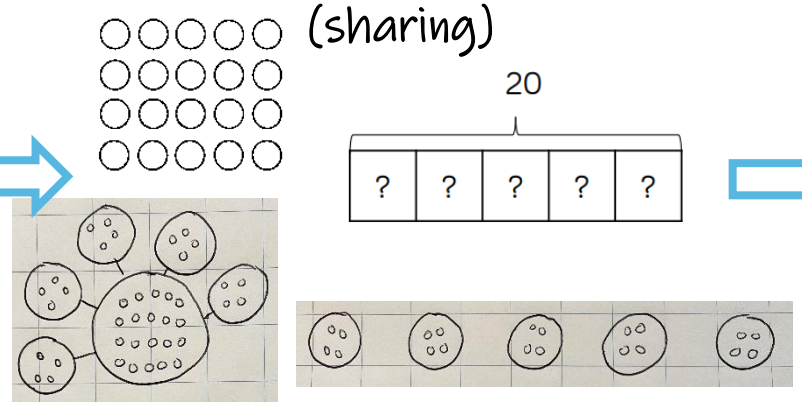


Solve 1-step problems using division (grouping)

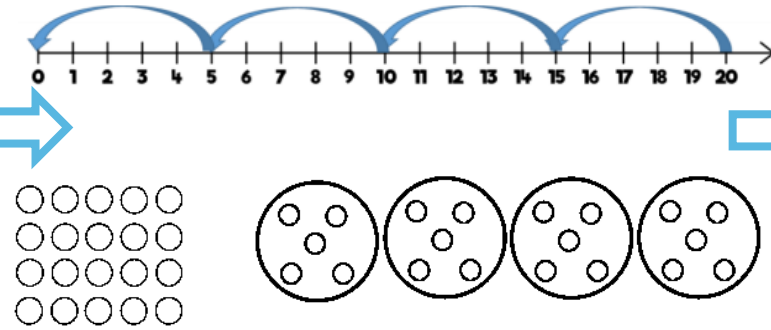


Pictorial

Solve 1-step problems using division (sharing)



Solve 1-step problems using division (grouping)



Abstract

Solve 1-step problems using division (sharing)

There are 20 apples altogether.
They are shared equally between 5 bags.
How many apples are in each bag?

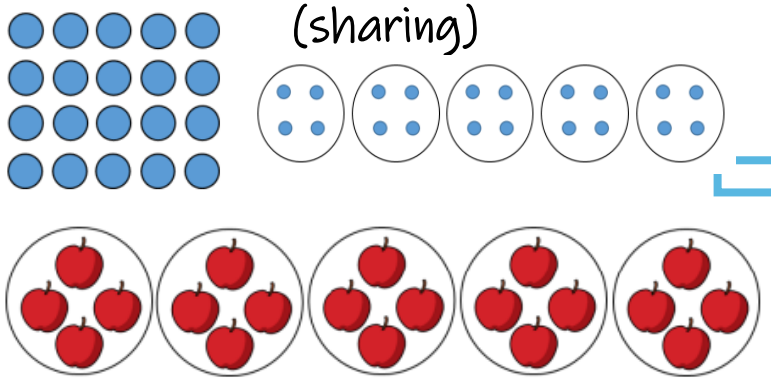
In Y1, children use the concrete and pictorial representations. They are not expected to record division formally or use the division symbol.

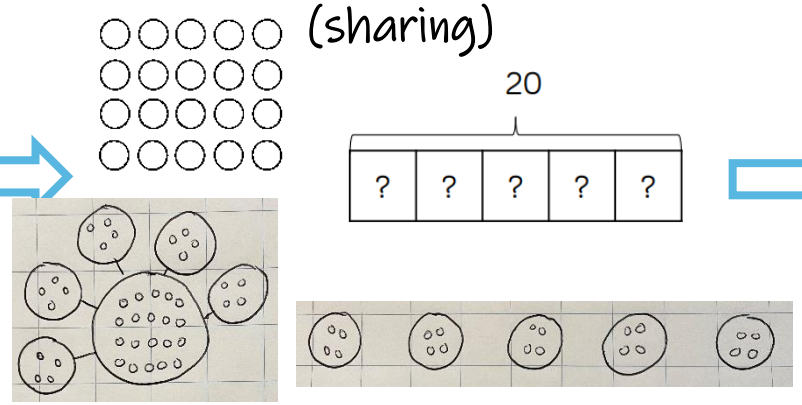
(grouping)

There are 20 apples altogether.
They are put in bags of 5.
How many bags are there?

Division – Y2

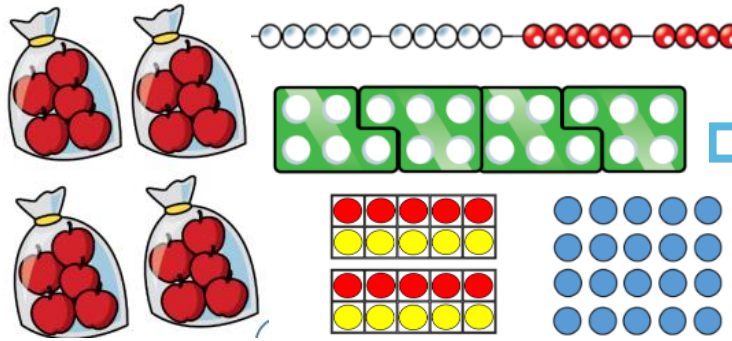
Concrete	Pictorial	Abstract
Solve 1-step problems using division (sharing)	Solve 1-step problems using division (sharing)	Solve 1-step problems using division (sharing)
Solve 1-step problems using division (grouping)	Solve 1-step problems using division (grouping)	Solve 1-step problems using division (grouping)

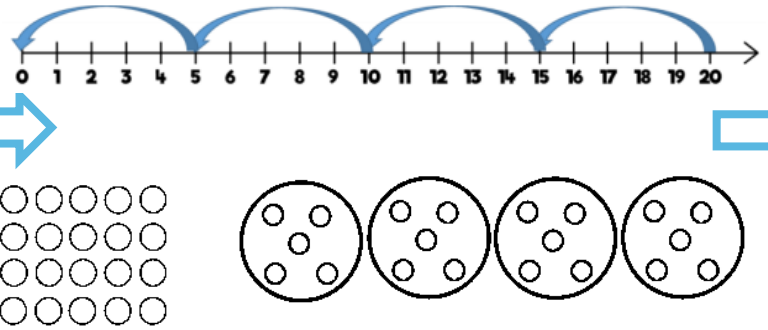




There are 20 apples altogether.
They are shared equally between 5 bags.
How many apples are in each bag?

20 ÷ 5 = 4





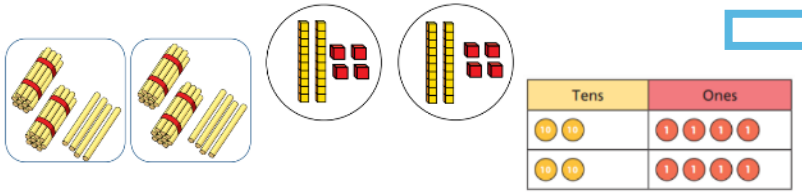
There are 20 apples altogether.
They are put in bags of 5.
How many bags are there?

20 ÷ 5 = 4

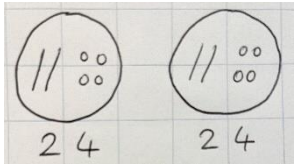
Division – Y3

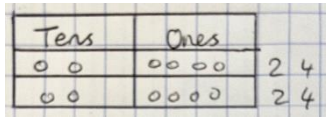
Concrete	Pictorial	Abstract

Divide 2-digits by 1-digit
(sharing with no exchange)



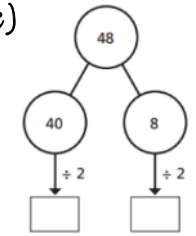
Divide 2-digits by 1-digit
(sharing with no exchange)





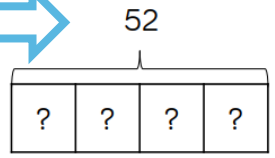
Divide 2-digits by 1-digit
(sharing with no exchange)

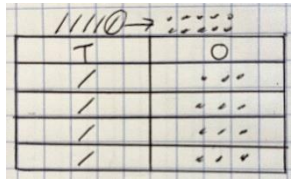
48 ÷ 2 = 24

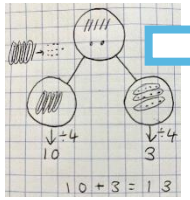


Divide 2-digits by 1-digit
(sharing with exchange)

Divide 2-digits by 1-digit
(sharing with exchange)

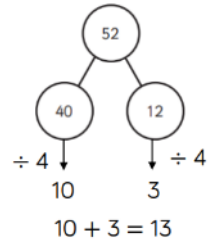




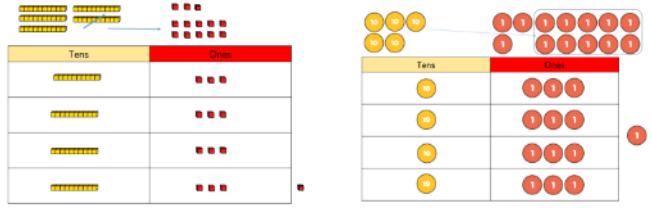


Divide 2-digits by 1-digit
(sharing with exchange)

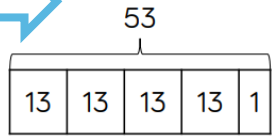
52 ÷ 4 = 13

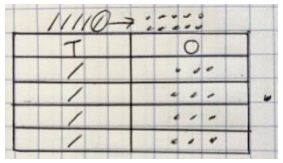


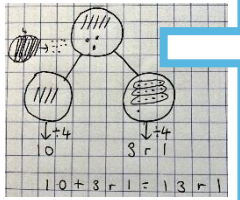
Divide 2-digits by 1-digit
(sharing with remainders)



Divide 2-digits by 1-digit
(sharing with remainders)

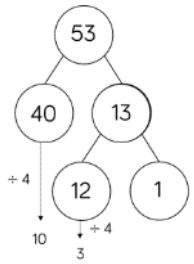






Divide 2-digits by 1-digit
(sharing with remainders)

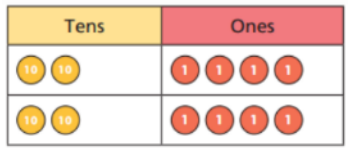
53 ÷ 4 = 13 r1

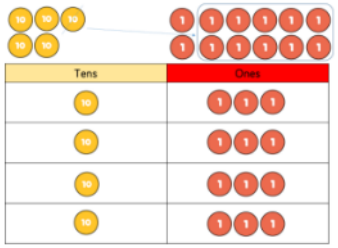


Division – Y4

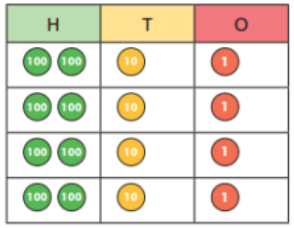
Concrete

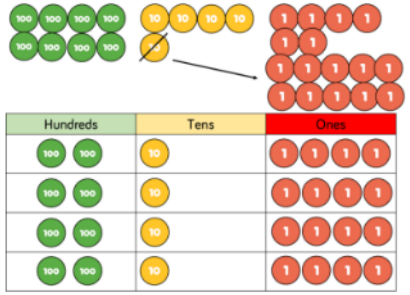
Divide 2-digits by 1-digit (sharing)





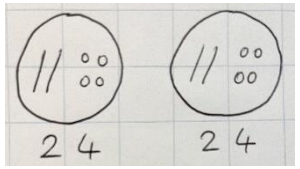
Divide 3-digits by 1-digit (sharing)

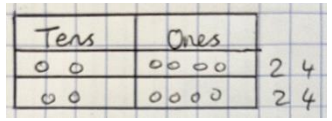


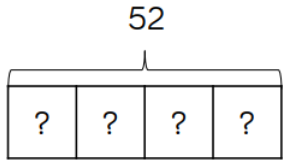


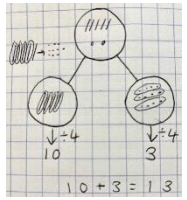
Pictorial

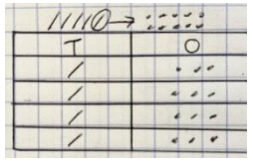
Divide 2-digits by 1-digit (sharing)



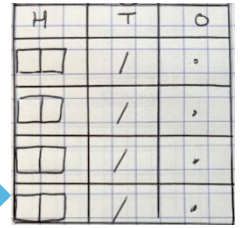


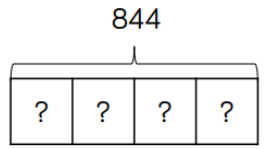


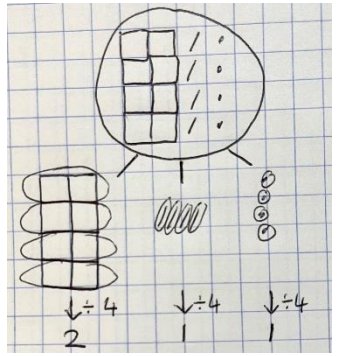




Divide 3-digits by 1-digit (sharing)

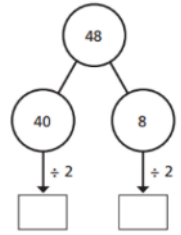






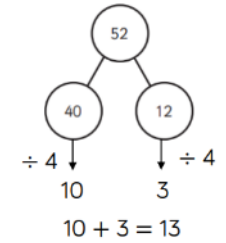
Abstract

Divide 2-digits by 1-digit (sharing)

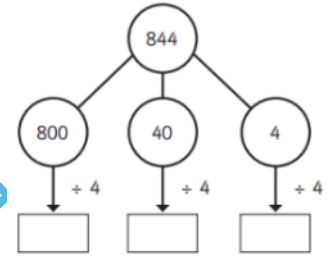


48 ÷ 2 = 24

52 ÷ 4 = 13

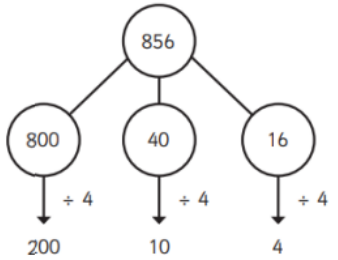


Divide 3-digits by 1-digit (sharing)



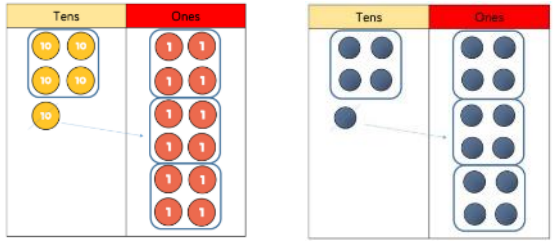
844 ÷ 4 = 211

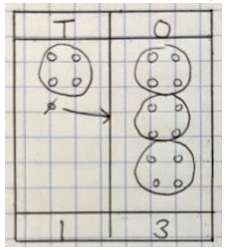
856 ÷ 4 = 214



Division – Y5

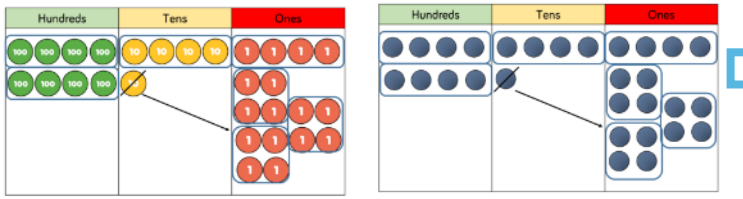
Concrete	Pictorial	Abstract
Divide 2-digits by 1-digit (grouping)	Divide 2-digits by 1-digit (grouping)	Divide 2-digits by 1-digit (grouping)
Divide 3-digits by 1-digit (grouping)	Divide 3-digits by 1-digit (grouping)	Divide 3-digits by 1-digit (grouping)
Divide 4-digits by 1-digit (grouping)	Divide 4-digits by 1-digit (grouping)	Divide 4-digits by 1-digit (grouping)

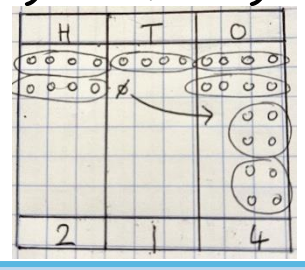




		1	3	
	4	5	$^{1}2$	

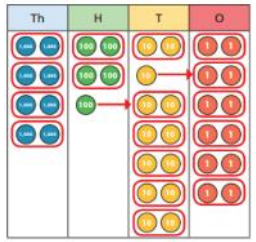
52 ÷ 4 = 13

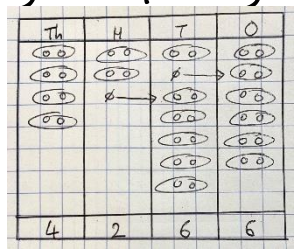




		2	1	4
	4	8	5	$^{1}6$

856 ÷ 4 = 214





	4	2	6	6	
2	8	5	$^{1}3$	$^{1}2$	

8,532 ÷ 2 = 4,266

Division – Y6

Concrete → Pictorial → Abstract

Divide by 2-digits (short division)

When dividing by 2-digits, written (abstract) methods are the most accurate - concrete and pictorial representations are less effective.

To support calculations with larger remainders, multiples can be written.

Divide by 2-digits (short division)

		0	3	6
	12	4	$4\ 3$	$7\ 2$

$432 \div 12 = 36$

15	30	45	60	75	90	105	120	135	150

	0	4	8	9
15	7	$7\ 3$	$13\ 3$	$13\ 5$

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

Divide by 2-digits (long division)

		0	3	6	
1	2	4	3	2	
	–	3	6	0	(×30)
			7	2	
	–		7	2	(×6)
				0	

$12 \times 1 = 12$
$12 \times 2 = 24$
$12 \times 3 = 36$
$12 \times 4 = 48$
$12 \times 5 = 60$
$12 \times 6 = 72$
$12 \times 7 = 84$
$12 \times 8 = 96$
$12 \times 7 = 108$
$12 \times 10 = 120$

$432 \div 12 = 36$

			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	$\frac{4}{5}$
1	5	3	7	2	
	–	3	0	0	
			7	2	
	–		6	0	
			1	2	

$372 \div 15 = 24$ r 12 or $24\ \frac{4}{5}$

Useful Websites/Links

For Parents/Carers

Curriculum at St Andrew's
https://www.st-andrews-pri.oxon.sch.uk/curriculum-at-st-andrews/

White Rose 'Parents' Advice and Guidance'
https://whiterosemaths.com/advice-and-guidance

White Rose 'Parent Resources' (including free workbooks)
https://whiterosemaths.com/parent-resources

White Rose 'Home Learning' (for videos that explain different concepts/methods covered)
https://whiterosemaths.com/homelearning

NRICH (for challenges and investigation tasks)
https://nrich.maths.org/8955

For Children

Doodle Learning (Doodle Maths and Doodle Tables)
https://doodlelearning.com/

BBC Bitesize
http://www.bbc.co.uk/bitesize/ks1/maths/
http://www.bbc.co.uk/bitesize/ks2/maths/

Maths Dictionary for Kids
http://amathsdictionaryforkids.com/

Multiplication.com
https://www.multiplication.com/

Topmarks
https://www.topmarks.co.uk/

Primary Games
https://primarygames.co.uk/