Calculation Policy: Y2

Mathematical **Manipulatives** | Key **Representations**

Progression in **Procedures**

Avonwood Primary School

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Part of United Learning

YEAR 2: Vocabulary

Key vocabulary

Place value: ones, tens, hundreds, column

Addition: sum, addend, add

Subtraction: difference, subtrahend, subtract, partition

Multiplication: product, multiplicand, multiplier, multiply, multiple, repeated addition

Division: quotient, dividend, divisor, divide, repeated subtraction

Fractions: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth

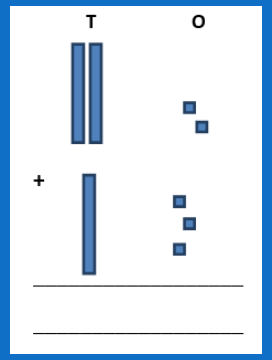
Manipulatives: place value counters, Dienes, 10 frame

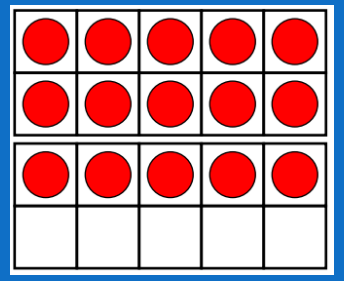
Representations: represent, representation, numberline, array, row/column, Part-Part-Whole diagram, bar model

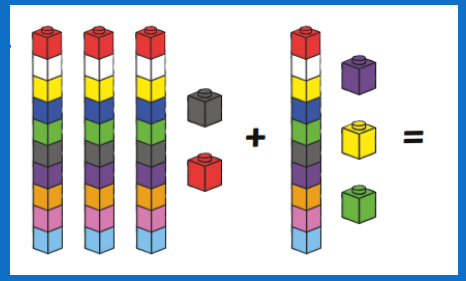
YEAR 2: Addition

Manipulatives

The recommended manipulatives (physical resources) for adding two 2- digit numbers crossing 10 are **Counters, cubes, dienes and 10 frames.**

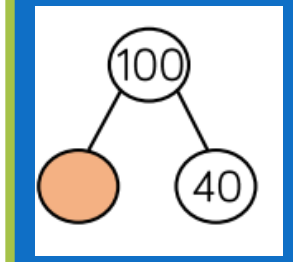


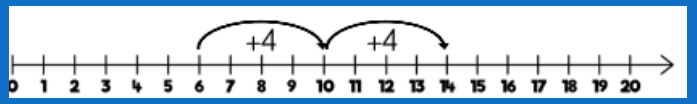


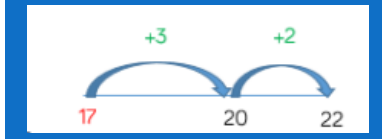


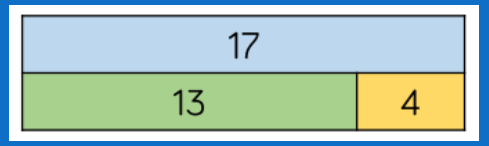
Representations

The key representations used are **Populated and blank number lines, bar models and part-part-whole diagrams** (which encourage children to apply their knowledge of place value).



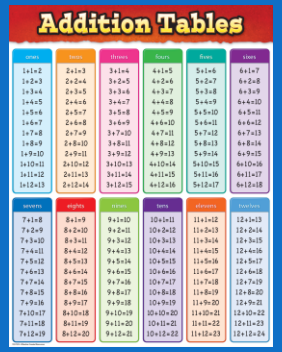


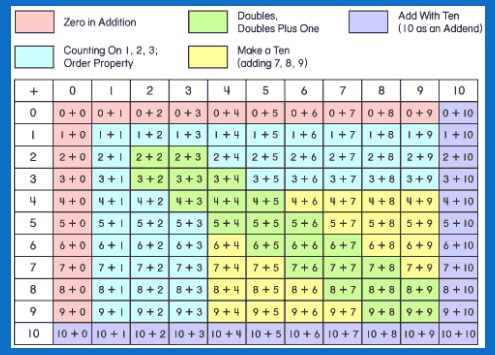




Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 20, doubling/halving facts to 20.

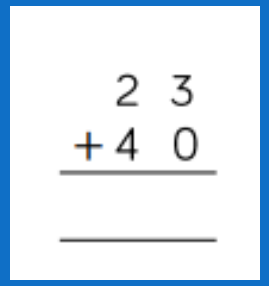


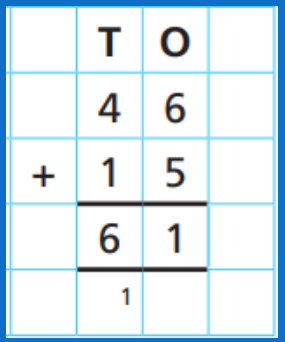


+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9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

Procedural knowledge

The key methods is **formal column addition.** It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.





Key vocabulary: sum, addend, add

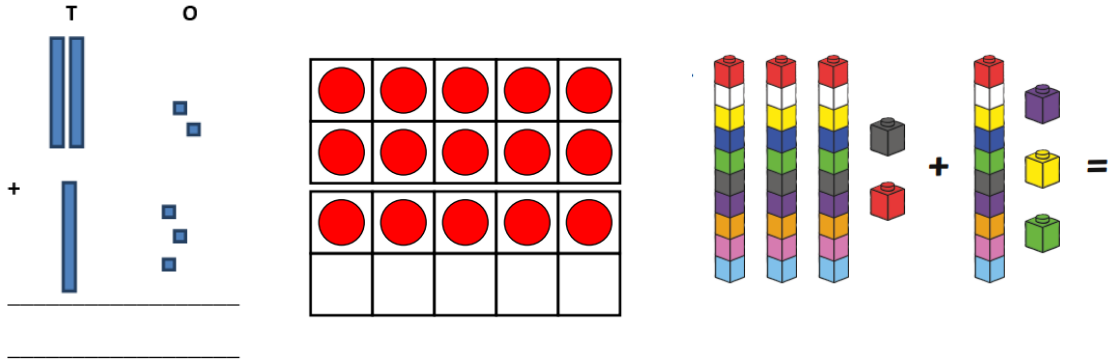
Addition in Year 2

1. The recommended manipulatives (physical resources) for adding two 2- digit numbers are Counters, cubes, dienes and 10 frames.

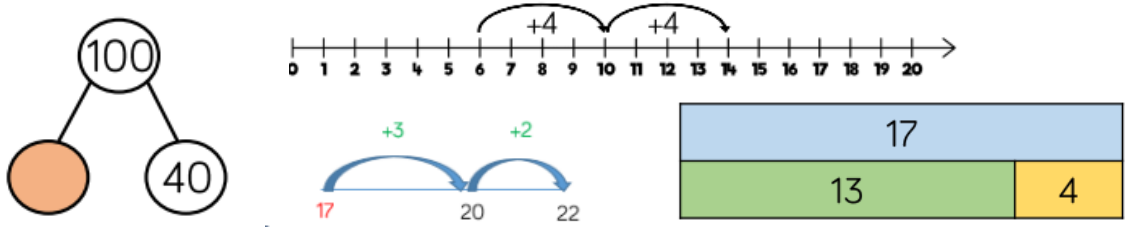
2. The key representations used are: **Populated and blank number lines, bar models and part-part-whole diagrams** (which encourage children to apply their knowledge of place value) and **place value grids**.

3. The key method (procedural knowledge) is **formal column addition** for adding two 2- digit numbers crossing 10. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

1



2



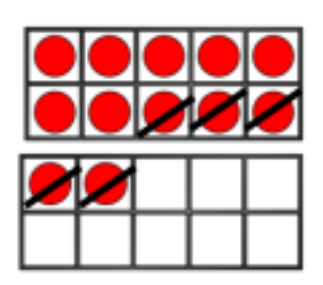
3

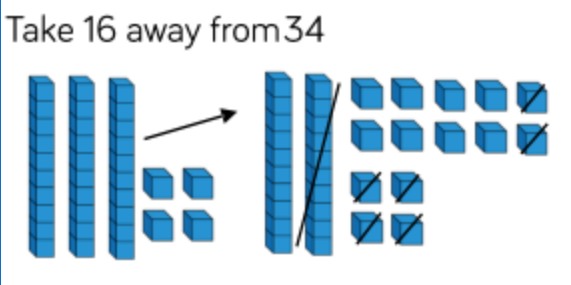
	T	O	
	4	6	
+	1	5	
	6	1	
	1		

YEAR 2: Subtraction

Manipulatives

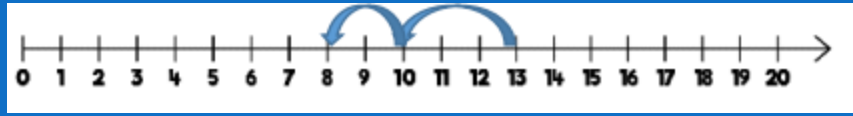
The recommended manipulatives (physical resources) for subtracting two 2- digit numbers crossing 10 are **Dienes and 10 frames.**

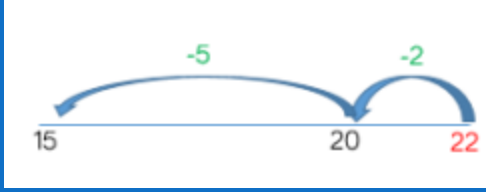




Representations

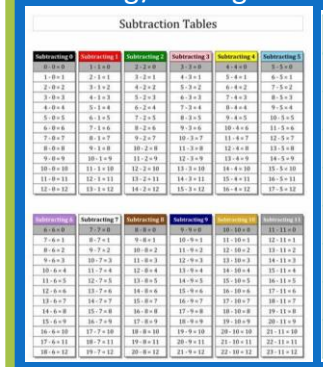
The key representations used are **Populated and blank number lines and bar models** (which encourage children to apply their knowledge of place value).





Factual knowledge

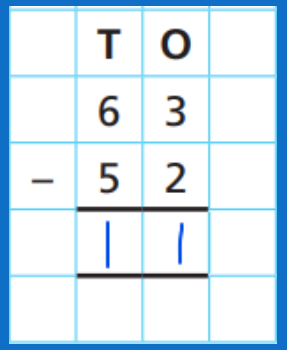
The key factual knowledge includes recall of addition/subtraction facts to 20, doubling/halving facts to 20.



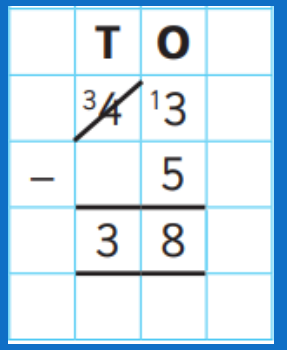
10 – 1	11– 2	12 – 3	13 – 4	14 – 5	15 – 6	16 – 7	17 – 8	18 – 9
9 – 1	10 – 2	11 – 3	12 – 4	13 – 5	14 – 6	15 – 7	16 – 8	17 – 9
8 – 1	9 – 2	10 – 3	11 – 4	12 – 5	13 – 6	14 – 7	15 – 8	16 – 9
7 – 1	8 – 2	9 – 3	10 – 4	11 – 5	12 – 6	13 – 7	14 – 8	15 – 9
6 – 1	7 – 2	8 – 3	9 – 4	10 – 5	11 – 6	12 – 7	13 – 8	14 – 9
5 – 1	6 – 2	7 – 3	8 – 4	9 – 5	10 – 6	11 – 7	12 – 8	13 – 9
4 – 1	5 – 2	6 – 3	7 – 4	8 – 5	9 – 6	10 – 7	11 – 8	12 – 9
3 – 1	4 – 2	5 – 3	6 – 4	7 – 5	8 – 6	9 – 7	10 – 8	11 – 9
2 – 1	3 – 2	4 – 3	5 – 4	6 – 5	7 – 6	8 – 7	9 – 8	10 – 9

Procedural knowledge

The key methods is **formal column subtraction.** It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.



	T	O
	6	3
–	5	2
	1	1



	T	O
	3 4	13
–		5
	3	8

Key vocabulary: difference, minuend, subtrahend, subtract, partition

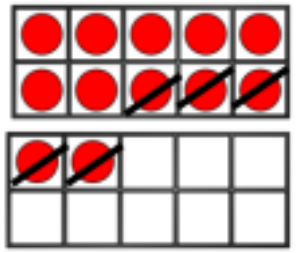
Subtraction in Year 2

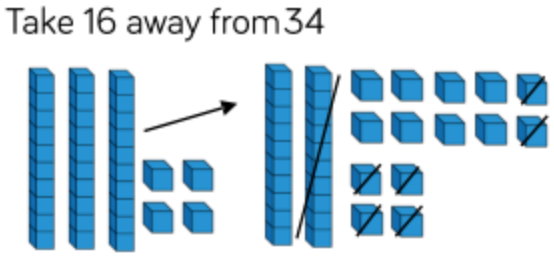
1. The recommended manipulatives (physical resources) for subtracting two 2 digit numbers crossing 10 are **Dienes and 10 frames**.

2. The key representations used are**: populated and blank number lines and bar models** (which encourage children to apply their knowledge of place value) and **place value grids**.

3. The key method (procedural knowledge) is **formal column subtraction** for two 2- digit numbers crossing 10. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

1





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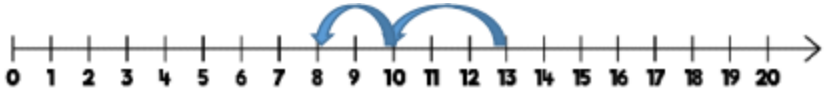


3

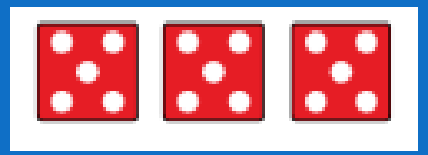
	T	O	
	6	3	
−	5	2	
	1	1	

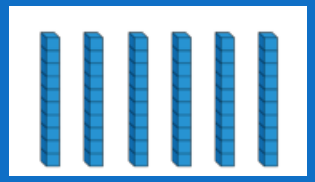
	T	O	
	3 4	13	
−		5	
	3	8	

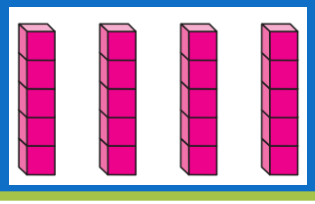
YEAR 2: Multiplication

Manipulatives

The recommended manipulatives (physical resources) for calculating statements within the multiplication tables 2, 5 and 10 are **numicon, denies, cubes and dice.**

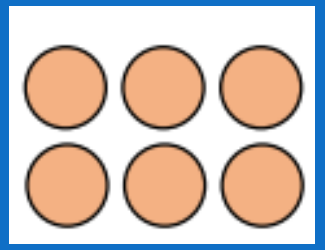


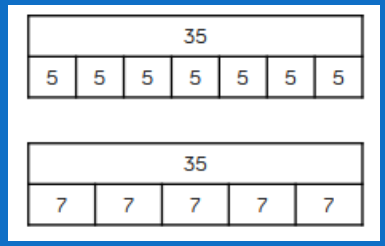




Representations

The key representations used are **arrays and bar models and partially completed number lines.**





Factual knowledge

The key factual knowledge includes recall of 2, 5 and 10 multiplication tables.

2 times table					5 times table					10 times table				
0	x	2	=	0	0	x	5	=	0	0	x	10	=	0
1	x	2	=	2	1	x	5	=	5	1	x	10	=	10
2	x	2	=	4	2	x	5	=	10	2	x	10	=	20
3	x	2	=	6	3	x	5	=	15	3	x	10	=	30
4	x	2	=	8	4	x	5	=	20	4	x	10	=	40
5	x	2	=	10	5	x	5	=	25	5	x	10	=	50
6	x	2	=	12	6	x	5	=	30	6	x	10	=	60
7	x	2	=	14	7	x	5	=	35	7	x	10	=	70
8	x	2	=	16	8	x	5	=	40	8	x	10	=	80
9	x	2	=	18	9	x	5	=	45	9	x	10	=	90
10	x	2	=	20	10	x	5	=	50	10	x	10	=	100
11	x	2	=	22	11	x	5	=	55	11	x	10	=	110
12	x	2	=	24	12	x	5	=	60	12	x	10	=	120

Procedural knowledge

The key methods is **repeated addition.** It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

Key vocabulary: product, multiplicand, multiplier, multiply, multiple, repeated addition

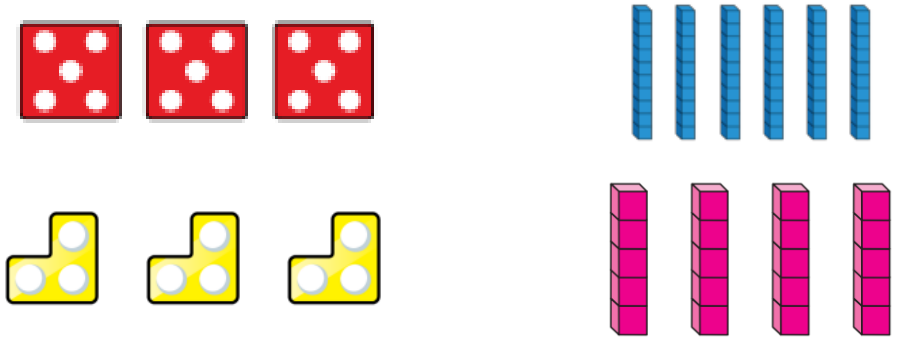
Multiplication in Year 2

1. The recommended manipulatives (physical resources) The key representations for calculating statements within the multiplication tables 2, 5 and 10 are: **numicon, denies, cubes and dice.**

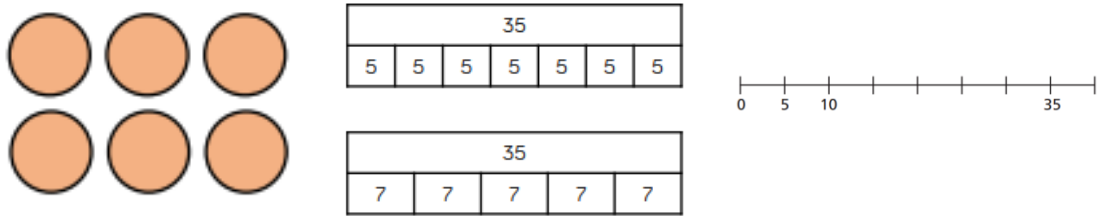
2. The key representations used are: **arrays and bar models**

3. The key methods (procedural knowledge) is repeated addition. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

1



2



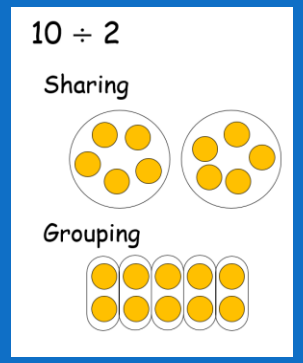
3

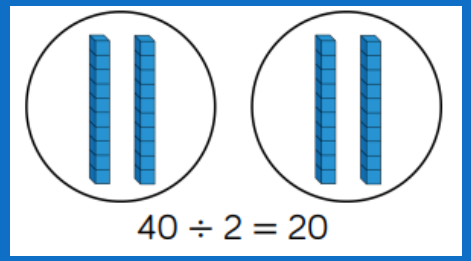
$3 + 3 + 3 = \square$ $3 \times 3 = \square$

YEAR 2: Division

Manipulatives

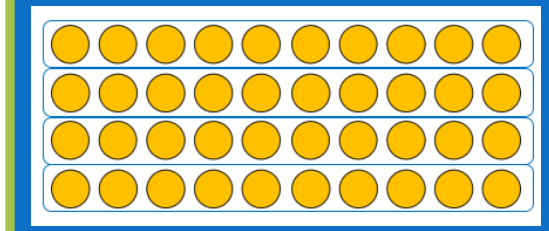
The recommended manipulatives (physical resources) for division are **place value counters and Dienes.**

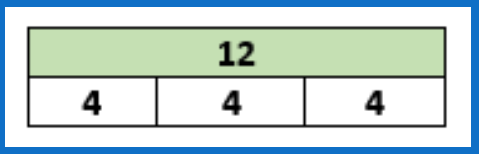


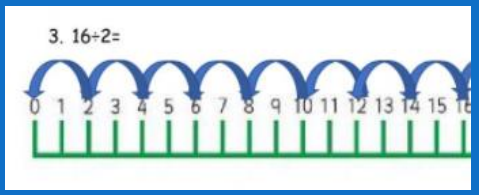


Representations

The key representations used are **arrays, bar models and number lines.**

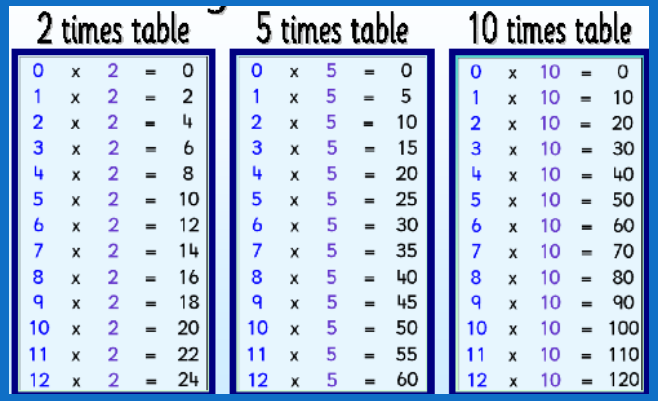






Factual knowledge

The key factual knowledge includes recall of 2, 5 and 10 multiplication tables.



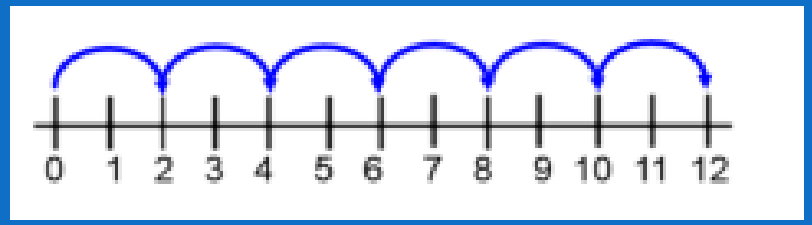
2 times table				
0	x	2	=	0
1	x	2	=	2
2	x	2	=	4
3	x	2	=	6
4	x	2	=	8
5	x	2	=	10
6	x	2	=	12
7	x	2	=	14
8	x	2	=	16
9	x	2	=	18
10	x	2	=	20
11	x	2	=	22
12	x	2	=	24

5 times table				
0	x	5	=	0
1	x	5	=	5
2	x	5	=	10
3	x	5	=	15
4	x	5	=	20
5	x	5	=	25
6	x	5	=	30
7	x	5	=	35
8	x	5	=	40
9	x	5	=	45
10	x	5	=	50
11	x	5	=	55
12	x	5	=	60

10 times table				
0	x	10	=	0
1	x	10	=	10
2	x	10	=	20
3	x	10	=	30
4	x	10	=	40
5	x	10	=	50
6	x	10	=	60
7	x	10	=	70
8	x	10	=	80
9	x	10	=	90
10	x	10	=	100
11	x	10	=	110
12	x	10	=	120

Procedural knowledge

The key method is repeated subtraction on a number line.



Key vocabulary: quotient, divisor, dividend, divide, repeated subtraction

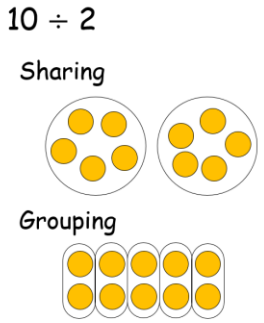
Division in Year 2

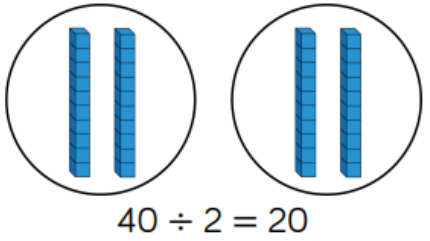
1. The recommended manipulatives (physical resources) for division are **place value counters and dienes.**

2. The key representations used are: **arrays, bar models and number lines.**

3. The key method (procedural knowledge) for dividing is **repeated subtraction** on a number line.

1





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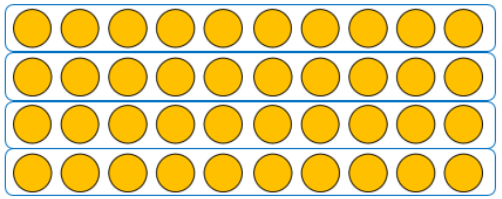

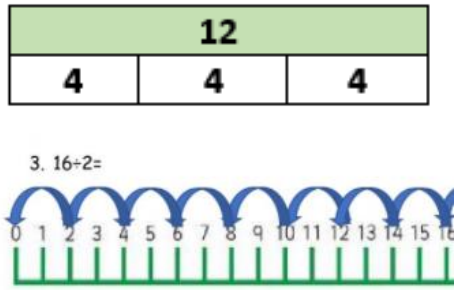

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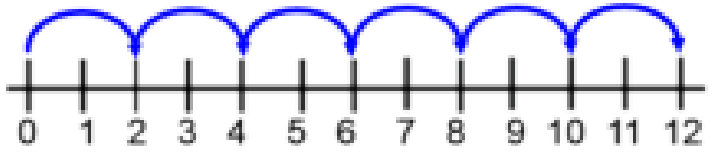
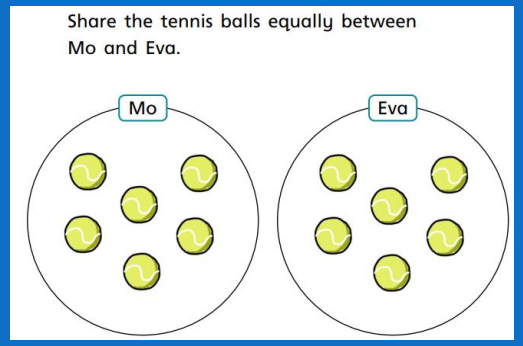


YEAR 2: Fractions

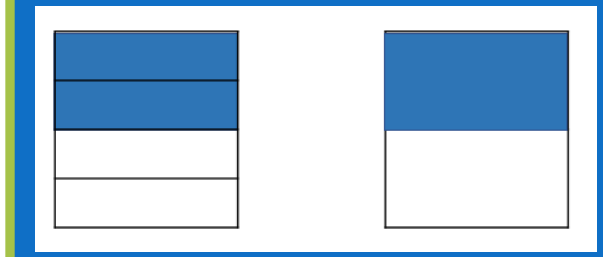
Manipulatives

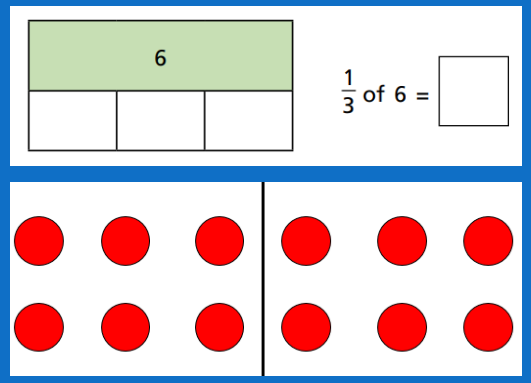
The recommended manipulatives (physical resources) for fractions are **counters or real-life objects.**



Representations

The key representations are **shapes, bar models and arrays.**



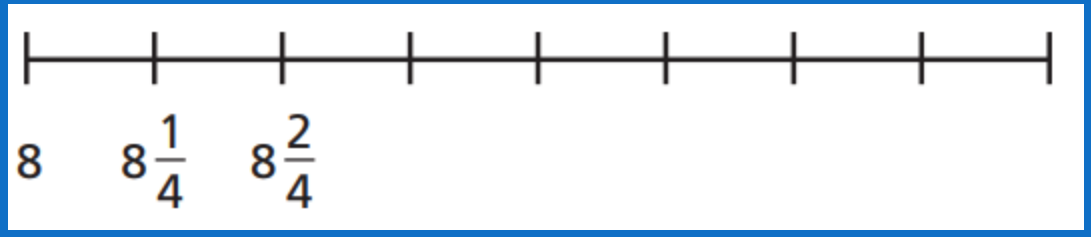


Factual knowledge

The key factual knowledge includes the recall and recognition of equivalent fractions of half and two quarters.

Procedural knowledge

The key procedure is counting up/down in fractions on a number line .



Key vocabulary: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth

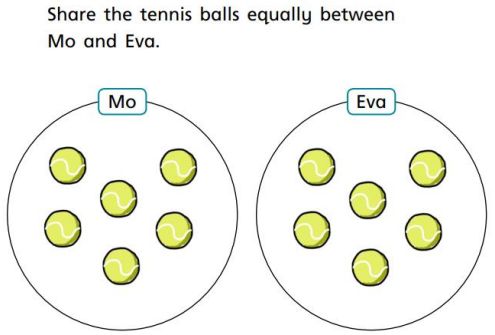
Fractions in Year 2

1. The recommended manipulatives (physical resources) for fractions are **counters or real-life objects.**

2. The key representations are **shapes, bar models and arrays**.

3. The key procedure is counting up/down in fractions on **a number line .**

1



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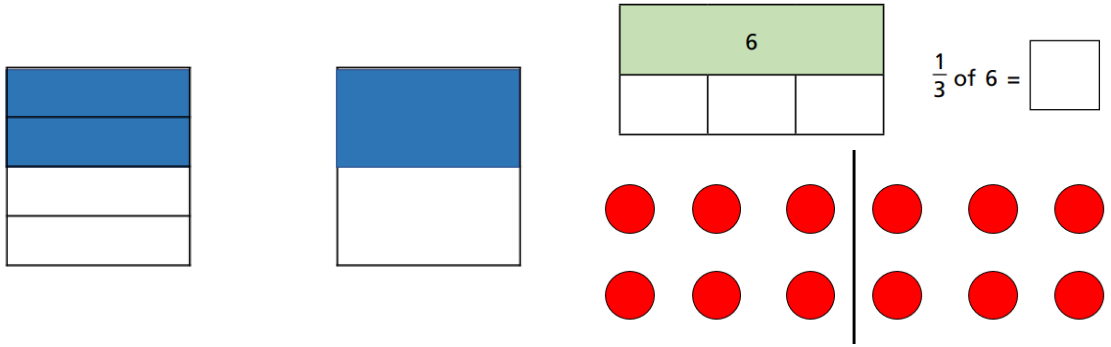

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