

Calculation Policy: Y2

Mathematical Manipulatives | Key Representations
Progression in Procedures



Avonwood Primary School

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Key vocabulary

Addition: sum, addend, add

Subtraction: difference, subtrahend, subtract, partition

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

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

Manipulatives: place value counters, Dienes, 10 frame

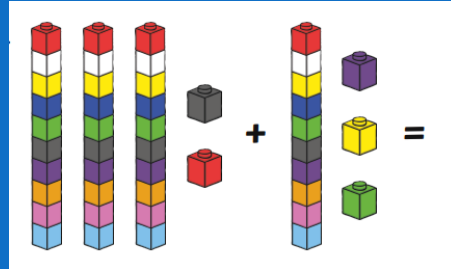
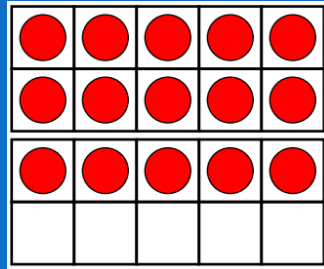
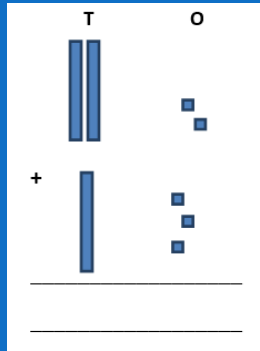
Representations: represent, representation, numberline, array, row/column, Part-Part-Whole diagram, bar model



YEAR 2: Addition

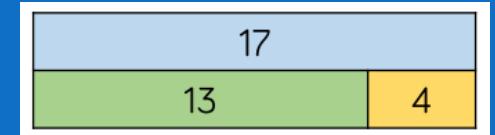
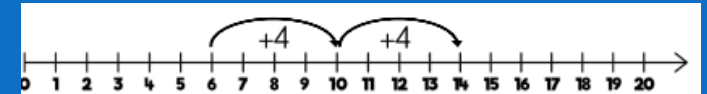
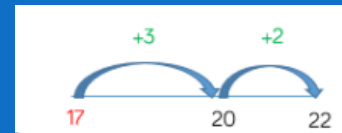
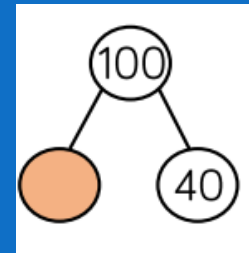
Manipulatives

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).



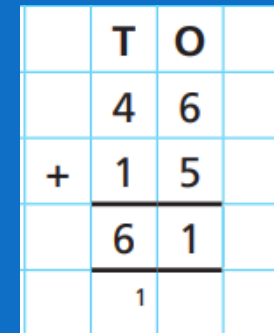
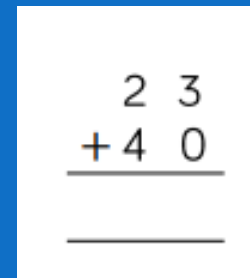
Factual knowledge

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

Addition Tables						
Counting On 1, 2, 3; Order Property	Zero in Addition	Doubles, Doubles Plus One	Make a Ten (adding 7, 8, 9)	Add With Ten (10 as an Addend)		
10+0	2+0	3+0	4+0	5+0	6+0	7+0
10+1	2+1	3+1	4+1	5+1	6+1	7+1
10+2	2+2	3+2	4+2	5+2	6+2	7+2
10+3	2+3	3+3	4+3	5+3	6+3	7+3
10+4	2+4	3+4	4+4	5+4	6+4	7+4
10+5	2+5	3+5	4+5	5+5	6+5	7+5
10+6	2+6	3+6	4+6	5+6	6+6	7+6
10+7	2+7	3+7	4+7	5+7	6+7	7+7
10+8	2+8	3+8	4+8	5+8	6+8	7+8
10+9	2+9	3+9	4+9	5+9	6+9	7+9
10+10	2+10	3+10	4+10	5+10	6+10	7+10
10+11	2+11	3+11	4+11	5+11	6+11	7+11
10+12	2+12	3+12	4+12	5+12	6+12	7+12
10+13	2+13	3+13	4+13	5+13	6+13	7+13
10+14	2+14	3+14	4+14	5+14	6+14	7+14
10+15	2+15	3+15	4+15	5+15	6+15	7+15
10+16	2+16	3+16	4+16	5+16	6+16	7+16
10+17	2+17	3+17	4+17	5+17	6+17	7+17
10+18	2+18	3+18	4+18	5+18	6+18	7+18
10+19	2+19	3+19	4+19	5+19	6+19	7+19
10+20	2+20	3+20	4+20	5+20	6+20	7+20

Procedural knowledge

The key methods is **formal column addition up to 100**. It is suggested that the children write the calculation alongside the concrete resources to ensure they can see the link between the two.

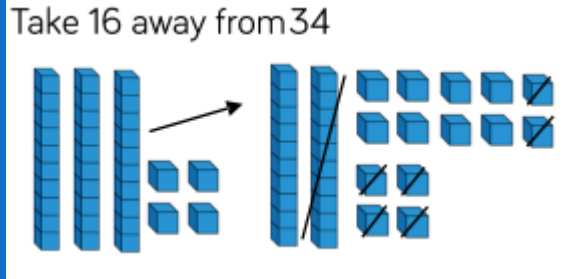
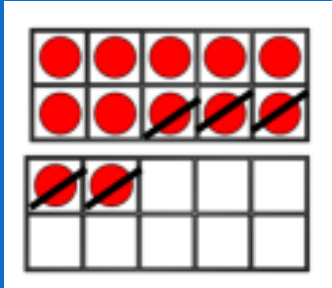




YEAR 2: Subtraction

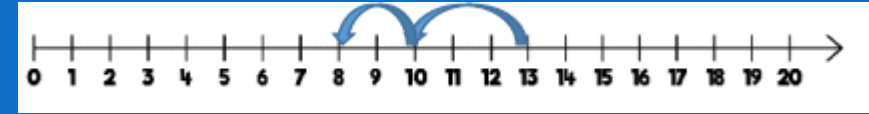
Manipulatives

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.

Subtraction Tables					
Subtracting 1	Subtracting 2	Subtracting 3	Subtracting 4	Subtracting 5	Subtracting 6
10-1	11-2	12-3	13-4	14-5	15-6
9-1	10-2	11-3	12-4	13-5	14-6
8-1	9-2	10-3	11-4	12-5	13-6
7-1	8-2	9-3	10-4	11-5	12-6
6-1	7-2	8-3	9-4	10-5	11-6
5-1	6-2	7-3	8-4	9-5	10-6
4-1	5-2	6-3	7-4	8-5	9-6
3-1	4-2	5-3	6-4	7-5	8-6
2-1	3-2	4-3	5-4	6-5	7-6

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	

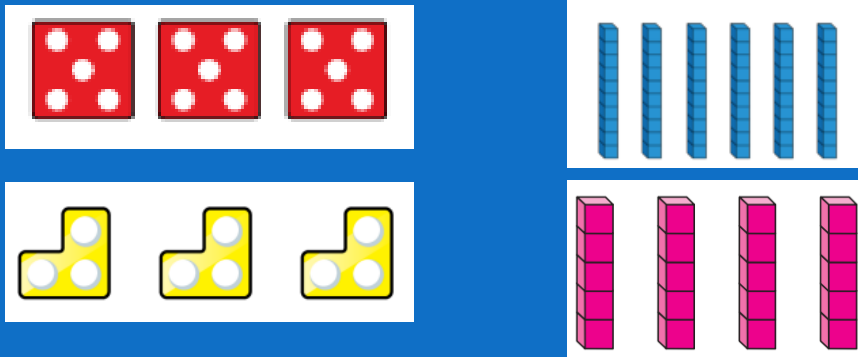
	T	O	
	3 4	13	
-		5	



YEAR 2: Multiplication

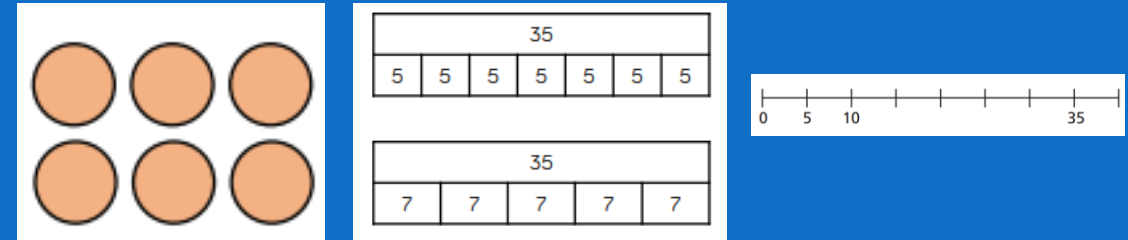
Manipulatives

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.

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



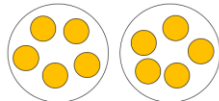
YEAR 2: Division

Manipulatives

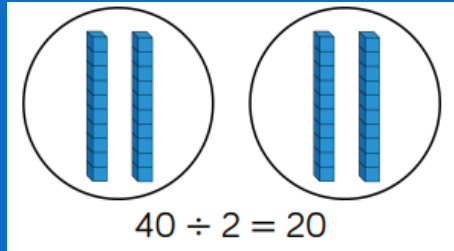
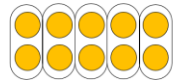
The recommended manipulatives (physical resources) for division are **place value counters and Dienes**.

$$10 \div 2$$

Sharing



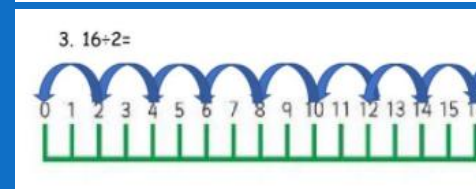
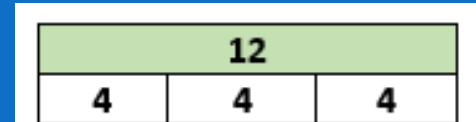
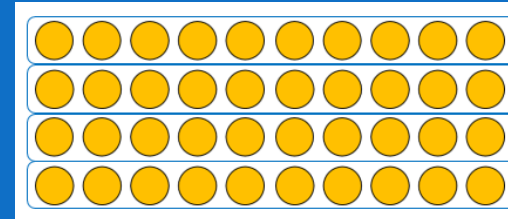
Grouping



$$40 \div 2 = 20$$

Representations

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



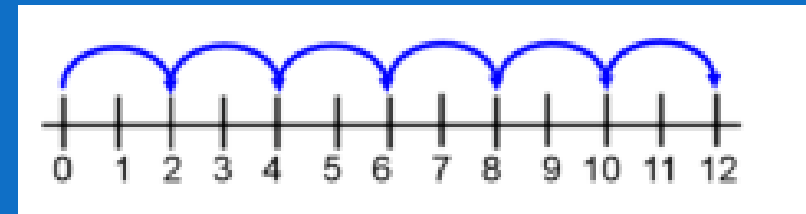
Factual knowledge

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

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

Procedural knowledge

The key method is repeated subtraction on a number line.



Calculation Policy: Y2

Any questions?



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