

Darrick Wood Infant and Nursery School

Calculation Policy

Our policy outlines the different strategies used throughout the school for the four different operations; addition, subtraction, multiplication and division. Each operation is then broken down into skills and each skill has a dedicated page showing the different models and images that could be used to effectively teach that concept.

The aim of our calculation policy is to ensure all children receive equity of offer. Calculation procedures are taught according to this document so they can be seamlessly built upon year after year, as the child moves throughout our school. The use of concrete resources and visuals underpins this calculation policy.

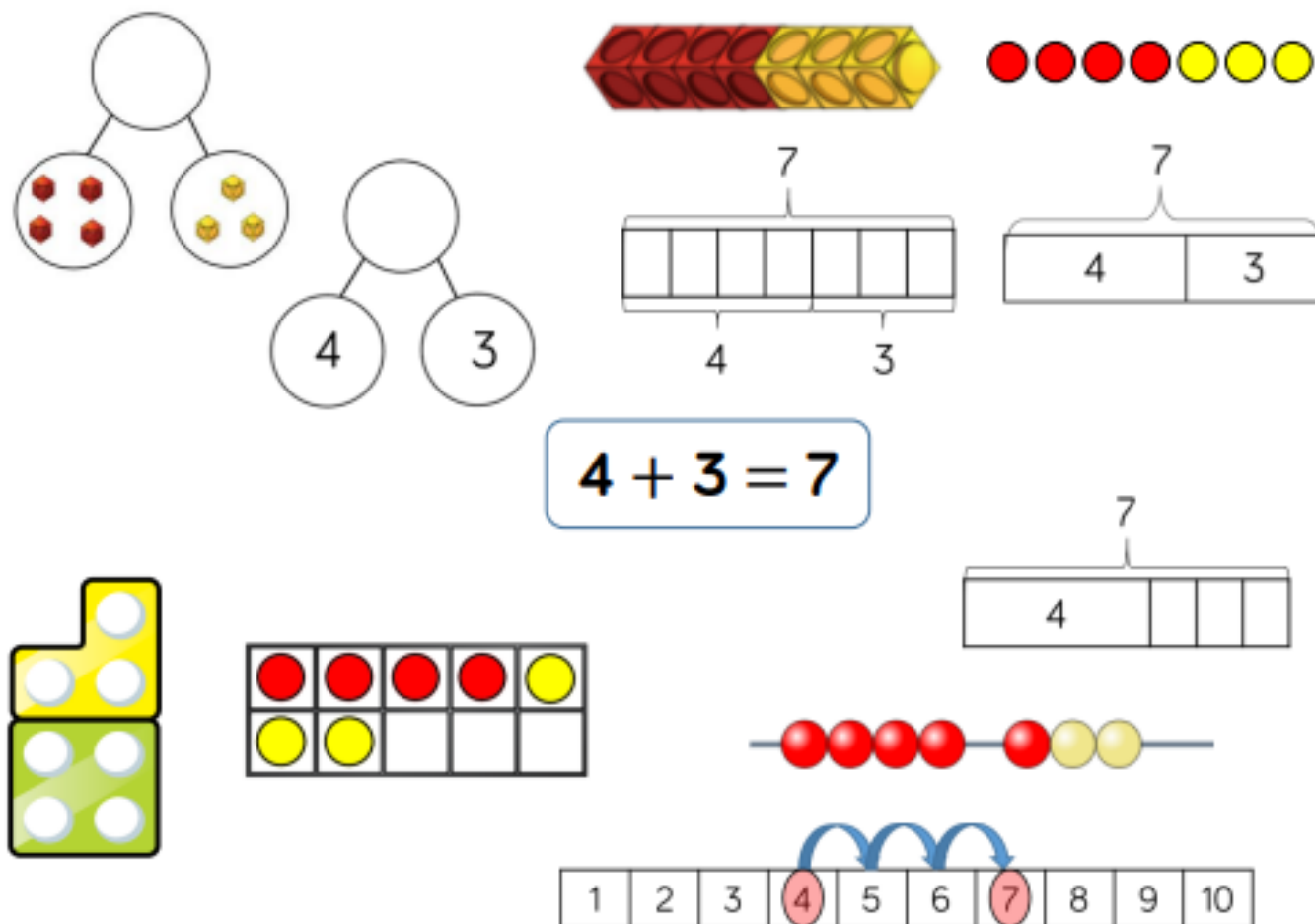
Our policy is adapted from White Rose Maths, which is our chosen scheme of work.

Addition		
Skill	Year	Representation and models
Gain a sense of the number system through the use of counting concrete objects.	R	Objects, Numicon, Cubes, Bead string (20), Number lines
Combine objects in practical ways and count all.	R	
Understand addition as counting on and count on in ones and twos using objects, cubes, bead string, and number line.	R	Numicon, Objects, Cubes, Bead string, Number line, Number tracks
Use concrete and pictorial representation to record their calculations. Begin to use + and =	R	
Add two 1-digit numbers to 10	1	Part-whole model, Bar model Number shapes, Ten frames (within 10) Bead strings (10), Number tracks
Add 1 and 2-digit numbers to 20	1	Part-whole model, Bar model Number shapes, Ten frames (within 20) Bead strings (20), Number tracks, Number lines, Straws

Add three 1-digit numbers	2	Part-whole model, Bar model, ten frames (within 20), Numbers shapes
Add 1 and 2-digit numbers to 100	2	Part-whole model, Bar model, Number lines (labelled and blank), Straws, Hundred squares
Add two 2-digit numbers	2	Part-whole model, Bar model, Number lines (blank), Straws, Base 10, Place value counters

Skill: Add 1-digit numbers within 10

Year: 1



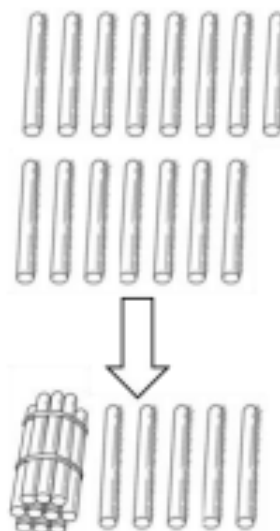
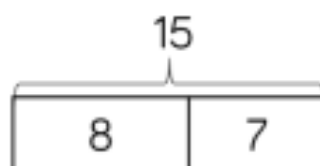
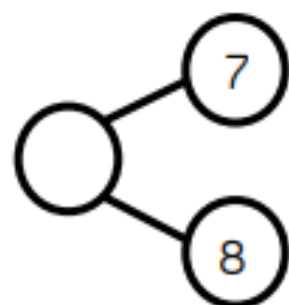
When adding numbers to 10, children can explore both aggregation and augmentation.

The part-whole model, discrete and continuous bar model, number shapes and ten frame support aggregation.

The combination bar model, ten frame, bead string and number track all support augmentation.

Skill: Add 1 and 2-digit numbers to 20

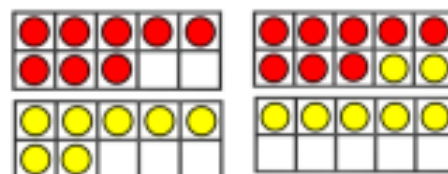
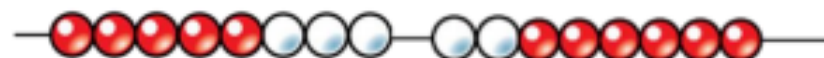
Year: 1/2



$$8 + 7 = 15$$

$$8 + 7 = 15$$

$$+ 2 \quad + 5$$

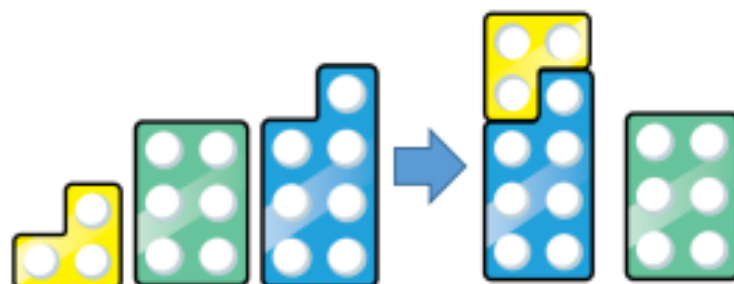
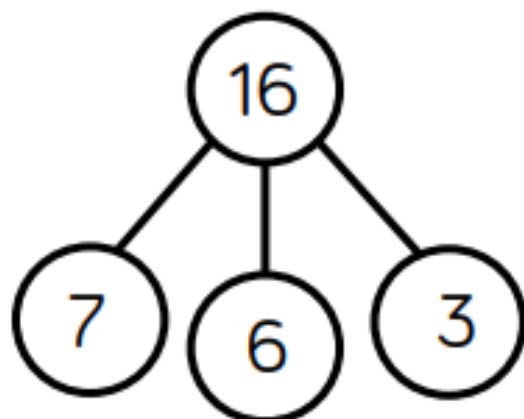


$$8 + 7 = 15$$

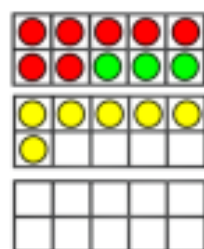
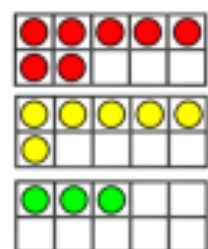
When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten. In Year 1, this is only done just by counting on. From Year 2, use different manipulatives can be used to represent this exchange alongside number lines to support children in understanding how to partition their jumps.

Skill: Add three 1-digit numbers

Year: 2

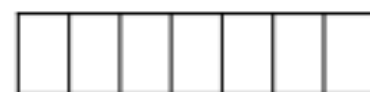


$$7 + 6 + 3 = 16$$



$$7 + 6 + 3 = 16$$

10



16

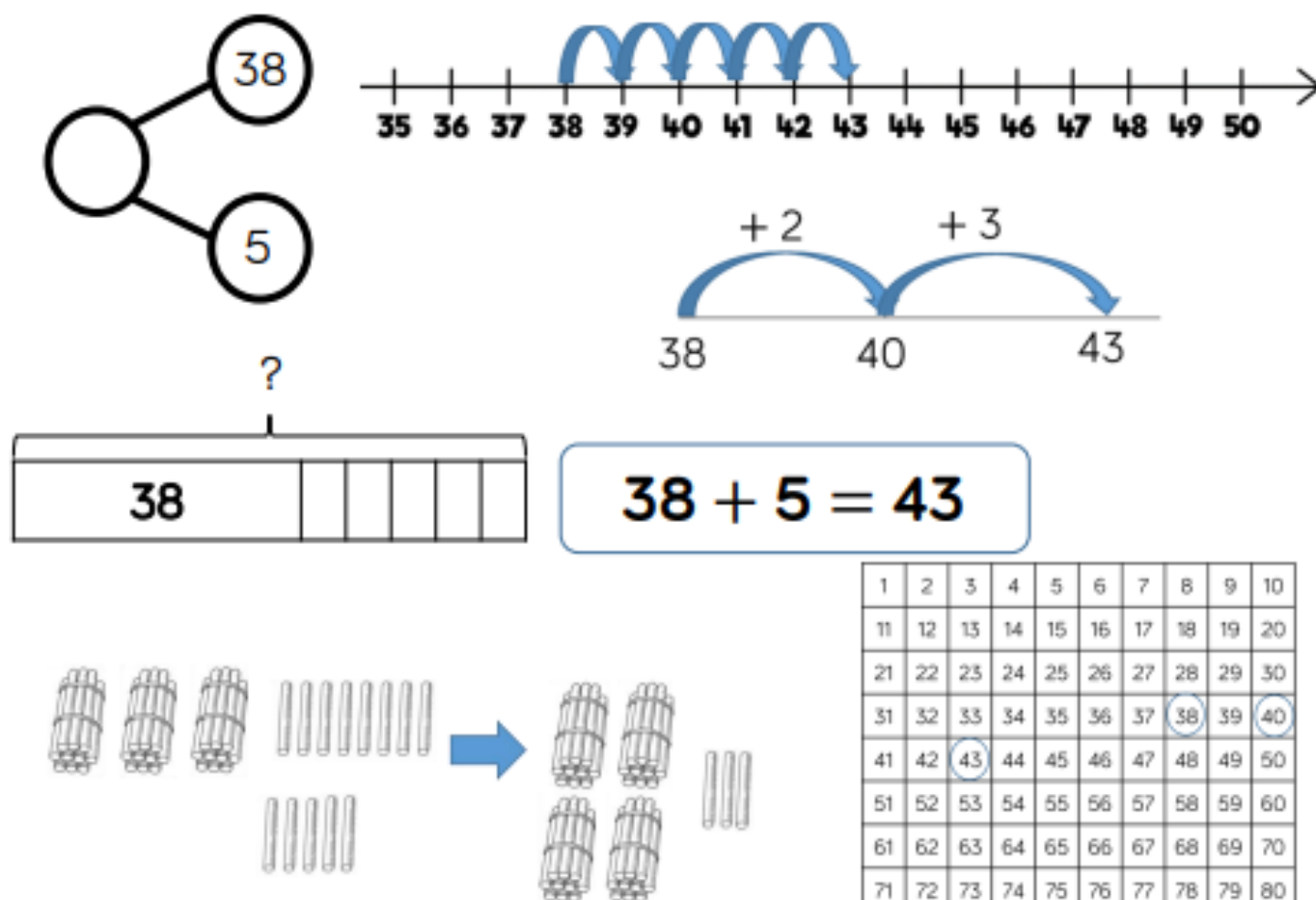
When adding three 1-digit numbers, children should be encouraged to look for number bonds to 10 or doubles to add the numbers more efficiently.

This supports children in their understanding of commutativity.

Manipulatives that highlight number bonds to 10 are effective when adding three 1-digit numbers.

Skill: Add 1-digit and 2-digit numbers to 100

Year: 2/3



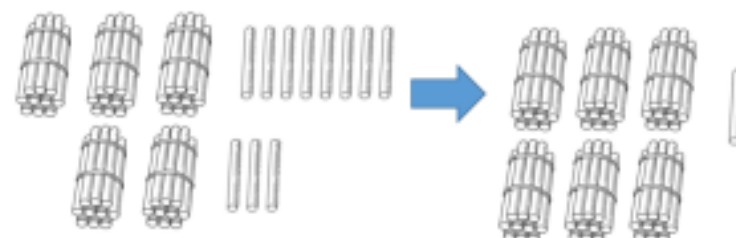
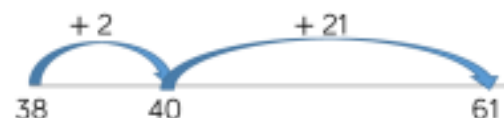
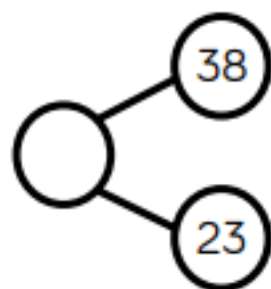
When adding single digits to a two-digit number, children should be encouraged to count on from the larger number.

They should also apply their knowledge of number bonds to add more efficiently e.g. $8 + 5 = 13$ so $38 + 5 = 43$.

Hundred squares and straws can support children to find the number bond to 10.

Skill: Add two 2-digit numbers to 100

Year: 2/3



$$38 + 23 = 61$$

?	
38	23

Tens	Ones

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

Tens	Ones
10 10 10	1 1 1 1 1 1 1 1
10 10	1 1 1

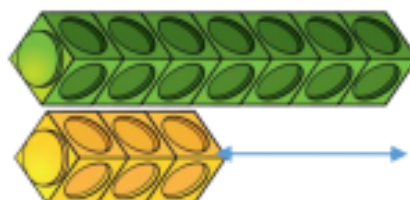
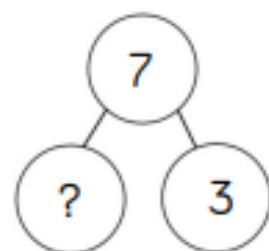
Children can use a blank number line and other representations to count on to find the total. Encourage them to jump to multiples of 10 to become more efficient. From Year 3, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient.

Subtraction		
Skill	Year	Representation and models
Gain a sense of the number system through the use of counting concrete objects.	R	Number tracks, Number lines.
Understand subtraction as counting out.	R	
Begin to count back in ones and twos.	R	Objects, Cubes, Bead strings and Number lines.
Use concrete and pictorial representation to record their calculations. Begin to use - and =.		
Subtract two 1-digit numbers to 10	1	Part-whole model, Bar model Number shapes, Ten frames (within 10) Bead strings (10), Number tracks
Subtract 1 and 2-digit numbers to 20	1	Part-whole model, Bar model Number shapes, Ten frames (within 20) Bead strings (20), Number tracks, Number lines, Straws
Subtract 1 and 2-digit numbers to 100	2	Part-whole model, Bar model, ten frames (within 20), Numbers shapes

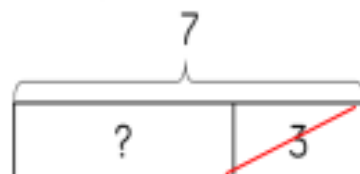
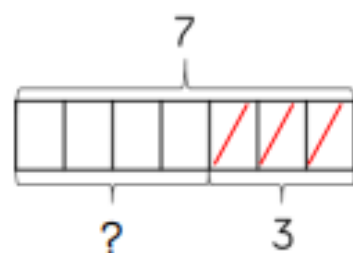
Subtract two 2-digit numbers	2	Part-whole model, Bar model, Number lines (labelled and blank), Base 10, Straws, Hundred squares, Place value counters
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Skill: Subtract 1-digit numbers within 10

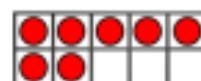
Year: 1



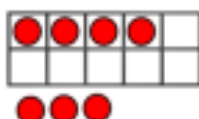
$$7 - 3 = 4$$



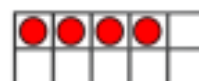
First



Then



Now



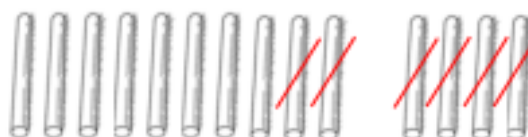
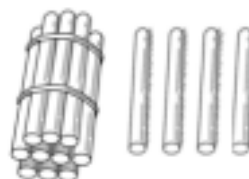
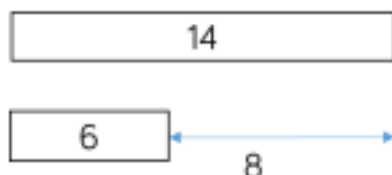
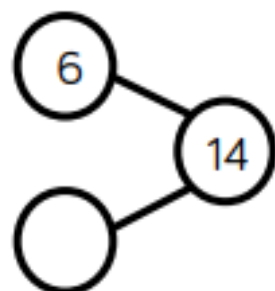
Part-whole models, bar models, ten frames and number shapes support partitioning.

Ten frames, number tracks, single bar models and bead strings support reduction.

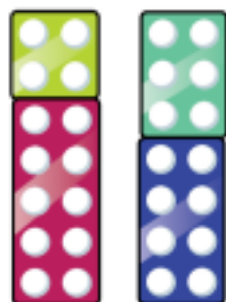
Cubes and bar models with two bars can support finding the difference.

Skill: Subtract 1 and 2-digit numbers to 20

Year: 1/2

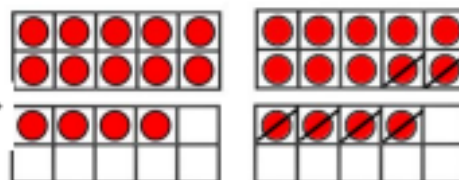
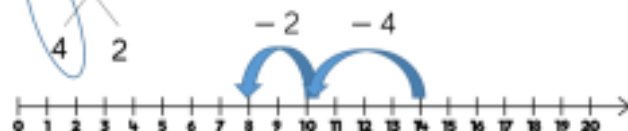


$$14 - 6 = 8$$



$$14 - 6 = 8$$

A diagram showing the number 14 with a bracket underneath it. The bracket is divided into two parts: the left part is labeled 4 and the right part is labeled 2.



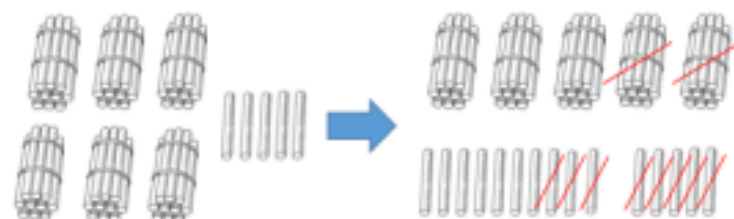
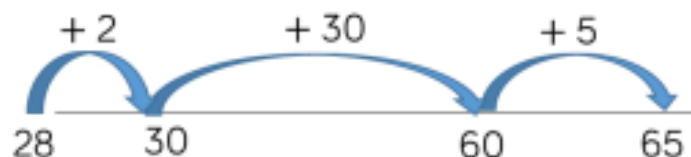
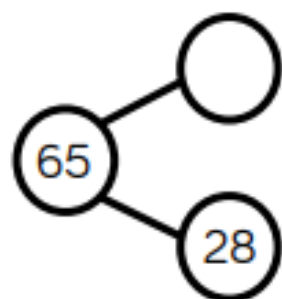
$$14 - 6 = 8$$

A diagram showing the number 14 with a bracket underneath it. The bracket is divided into two parts: the left part is labeled 4 and the right part is labeled 2.

In Year 1, subtracting one-digit numbers that cross 10, is done by counting back, using objects, number tracks and number lines. From Year 2, children should be encouraged to find the number bond to 10 when partitioning the subtracted number. Ten frames, number shapes and number lines are particularly useful for this.

Skill: Subtract 1 and 2-digit numbers to 100

Year: 2/3



65	
?	28

$$65 - 28 = 37$$

Tens	Ones

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

Tens	Ones

Children can also use a blank number line to count back to find the difference.

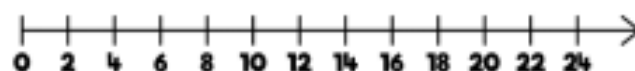
Encourage them to jump to multiples of 10 to become more efficient.

From Year 3, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient.

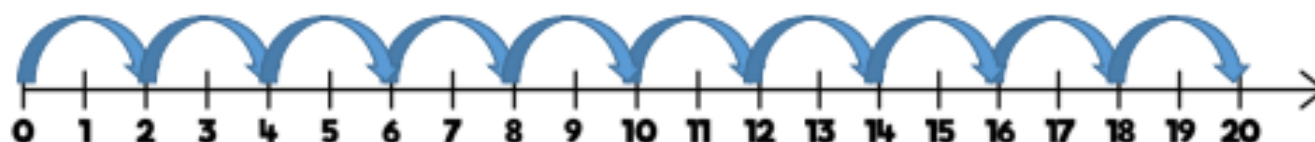
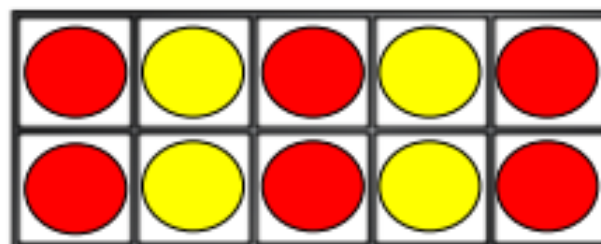
Times Tables		
Skill	Year	Representation and models
Recall and use multiplication and division facts for the 2-times table	2	Bar model, Number shapes, Counters, Money, Ten frames, Bead strings, Number lines, Everyday objects
Recall and use multiplication and division facts for the 5-times table	2	Bar model, Number shapes, Counters, Money, Ten frames, Bead strings, Number lines, Everyday objects
Recall and use multiplication and division facts for the 10-times table	2	Bar model, Number shapes, Counters, Money, Ten frames, Bead strings, Number lines, Everyday objects, Base 10

Skill: 2 times table

Year: 2



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50



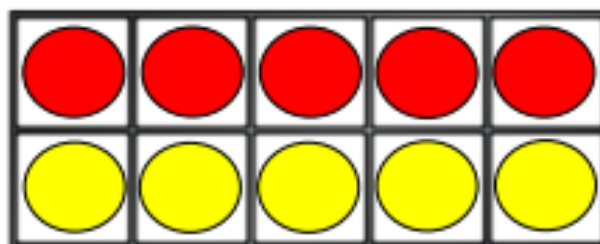
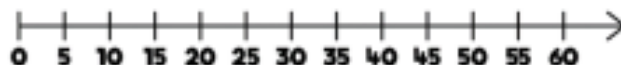
Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square.

Look for patterns in the two times table, using concrete manipulatives to support. Notice how all the numbers are even and there is a pattern in the ones.

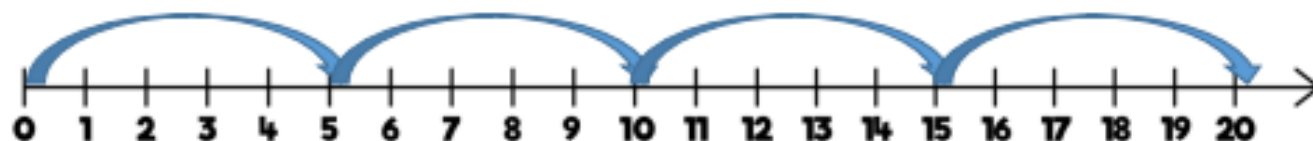
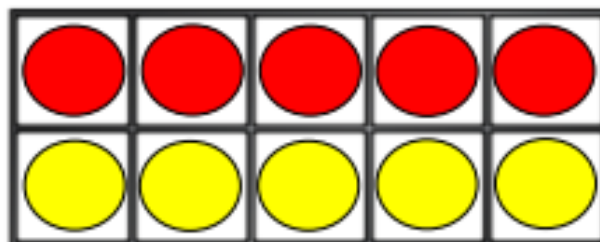
Use different models to develop fluency.

Skill: 5 times table

Year: 2



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

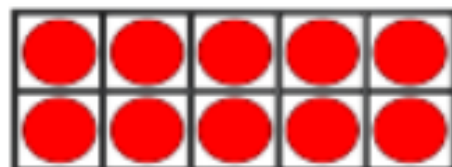
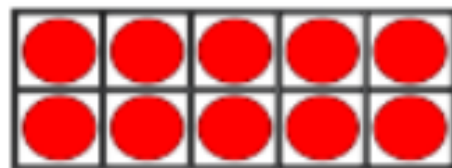
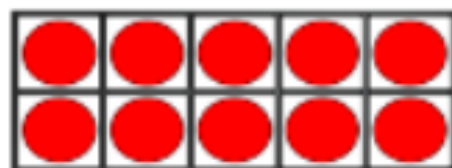
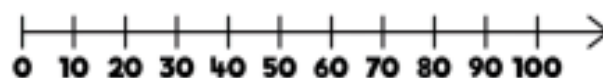


Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square.

Look for patterns in the five times table, using concrete manipulatives to support. Notice the pattern in the ones as well as highlighting the odd, even, odd, even pattern.

Skill: 10 times table

Year: 2



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square.

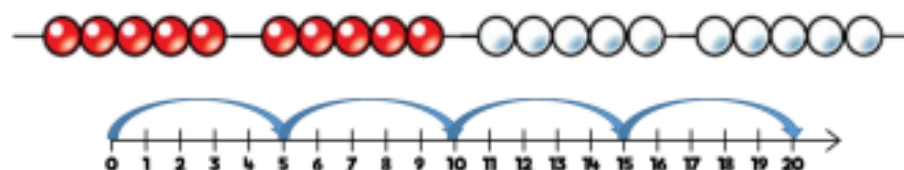
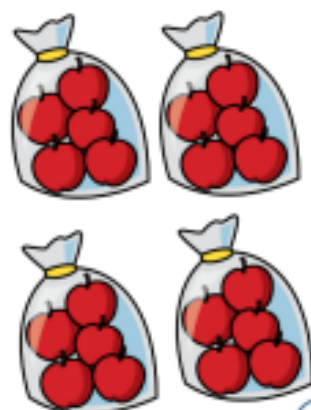
Look for patterns in the ten times table, using concrete manipulatives to support. Notice the pattern in the digits- the ones are always 0, and the tens increase by 1 ten each time.

Multiplication

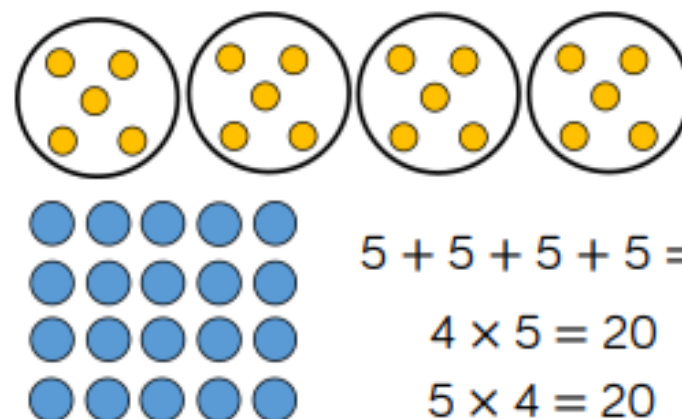
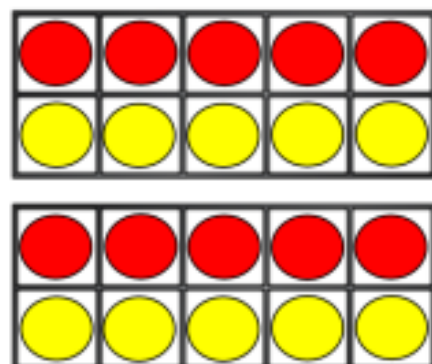
Skill	Year	Representation and models
Use concrete objects to make and count equal groups of objects.	R	Counting objects.
Count on in twos using a bead string and number line.	R	Bead strings, Number lines, Number tracks
understand doubling as repeated addition. $2 + 2 = 4$	R	Number shapes, Numicon, Ten frames
Use concrete and pictorial representation to record their calculations.	R	
Solve one-step problems with multiplication	1/2	Bar model, Number shapes, Counters, Ten frames, Bead strings, Number lines

Skill: Solve 1-step problems using multiplication

Year: 1/2



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



$$5 + 5 + 5 + 5 = 20$$

$$4 \times 5 = 20$$

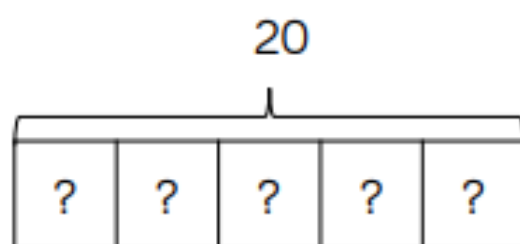
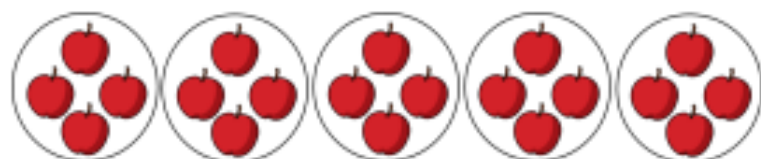
$$5 \times 4 = 20$$

Children represent multiplication as repeated addition in many different ways.

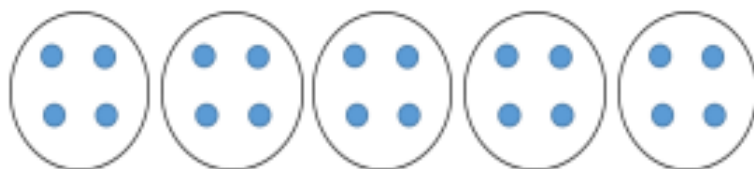
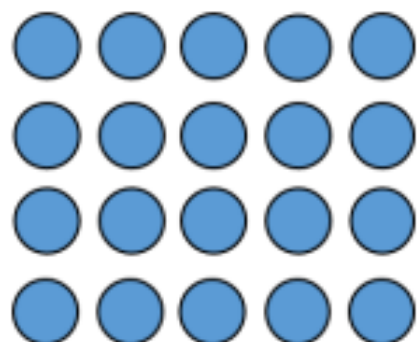
In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally.

In Year 2, children are introduced to the multiplication symbol.

Division		
Skill	Year	Representation and models
Use concrete objects to count and share equally into 2 groups	R	Counting objects.
Count a set of objects and halve them by making two equal groups.	R	Counting objects, Part-whole models
Understand sharing and halving as dividing by 2.	R	Counting objects, Part-whole models
Use concrete and pictorial representation to record their calculations.	R	
Solve one-step problems with division (sharing)	1/2	Bar model, Real life objects, Arrays, Counters
Solve one-step problems with division (grouping)	1/2	Real life objects, number shapes, Bead strings, Ten frames, Number lines, Arrays, Counters

Skill: Solve 1-step problems using multiplication (sharing)**Year: 1/2**

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



$$20 \div 5 = 4$$

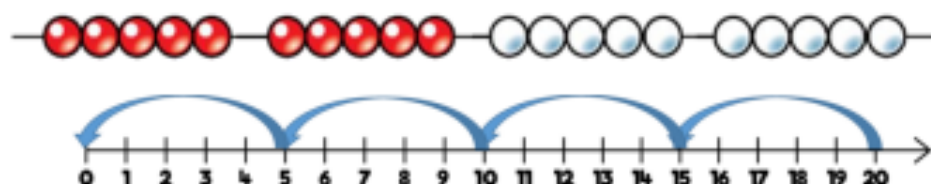
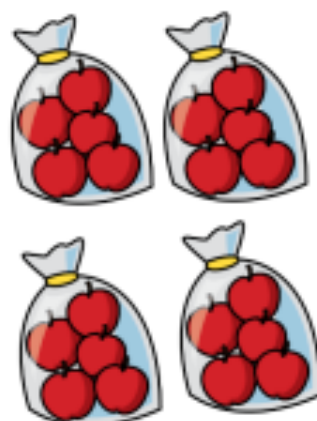
Children solve problems by sharing amounts into equal groups.

In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally.

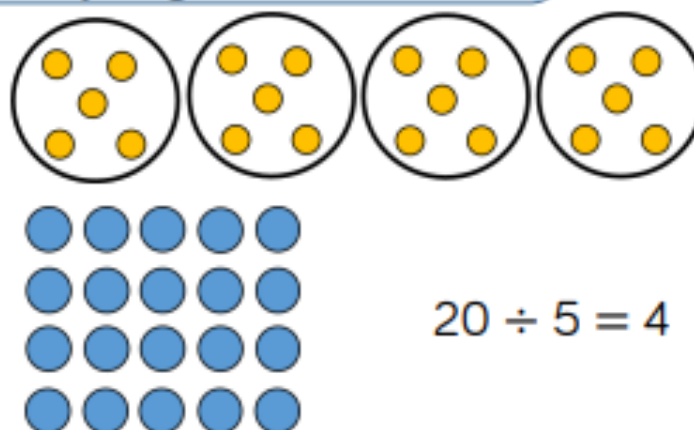
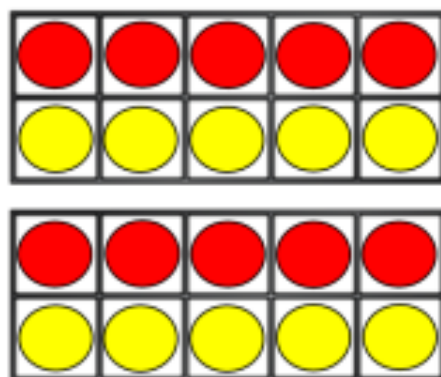
In Year 2, children are introduced to the division symbol.

Skill: Solve 1-step problems using division (grouping)

Year: 1/2



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



$$20 \div 5 = 4$$

Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated subtraction on a number line. They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division.