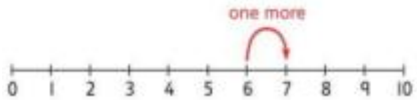
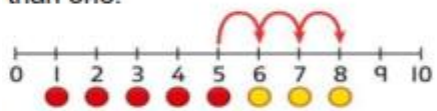
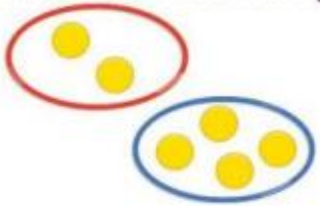
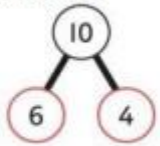
St Andrew the Apostle Calculation Policy

Addition			
EYFS	**Counting and adding more** Children add one more person or object to a group to find one more.	**Counting and adding more** Children add one more cube or counter to a group to represent one more.  *One more than 4 is 5.*	**Counting and adding more** Use a number line to understand how to link counting on with finding one more.  *One more than 6 is 7.* *7 is one more than 6.* Learn to link counting on with adding more than one.  *5 + 3 = 8*
	Understanding part-part-whole relationship Sort people and objects into parts and understand the relationship with the whole.  *The parts are 2 and 4. The whole is 6.*	**Understanding part-part-whole relationship** Children draw to represent the parts and understand the relationship with the whole.  *The parts are 1 and 5. The whole is 6.*	**Understanding part-part-whole relationship** Use a part-whole model to represent the numbers.  $\boxed{6} + \boxed{4} = \boxed{10}$ *6 + 4 = 10*

Addition

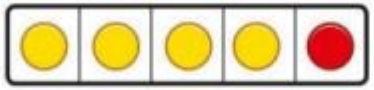
EYFS

Knowing and finding number bonds within 10
Break apart a group and put back together to find and form number bonds.

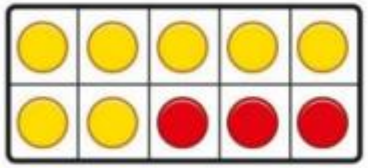
3 + 4 = 7

6 = 2 + 4

Knowing and finding number bonds within 10
Use five and ten frames to represent key number bonds.



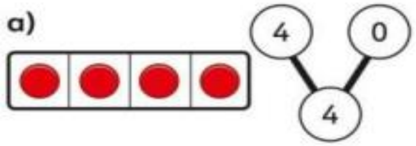
5 = 4 + 1



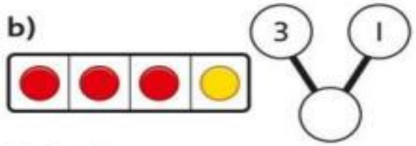
10 = 7 + 3

Knowing and finding number bonds within 10
Use a part-whole model alongside other representations to find number bonds. Make sure to include examples where one of the parts is zero.

a)

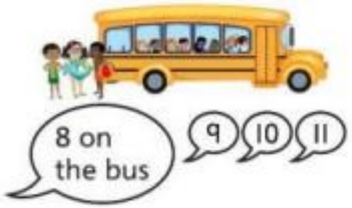


b)

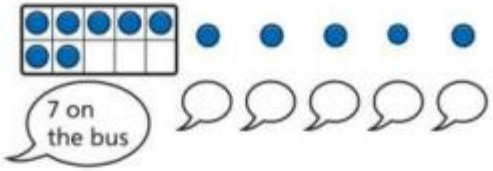


4 + 0 = 4
3 + 1 = 4

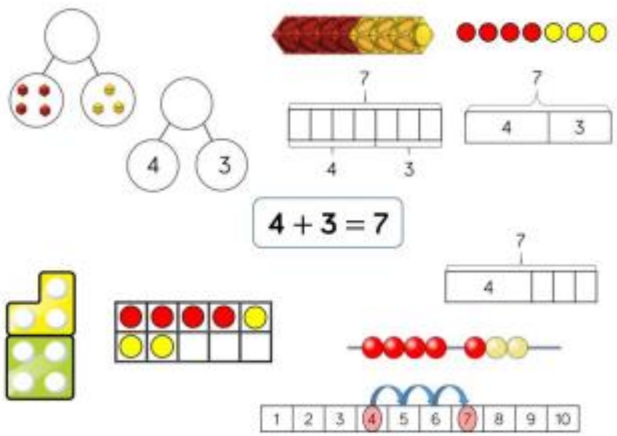
Adding by counting on
Children use knowledge of counting to 20 to find a total by counting on using people or objects.



Adding by counting on
Children use counters to support and represent their counting on strategy.



<table>
<tr><th colspan="3">Addition</th></tr>
<tr><th></th><th>Concrete and Pictorial representations</th><th>Abstract</th></tr>
<tr>
<td>1</td>
<td>



<u>Vocabulary</u>

add total more count number bond number story inverse part whole

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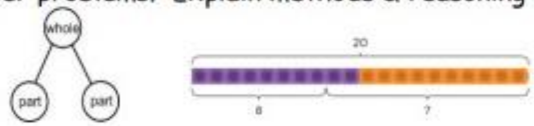
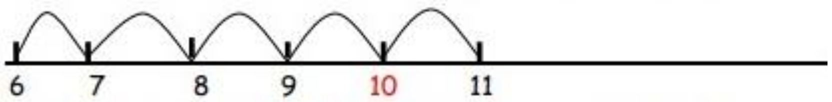
<td>

Solve simple one-step problems that involve addition using concrete objects and pictorial representations and missing number problems. Explain methods & reasoning



Use the 100 square to add 10 to a single digit number
Record addition by:
- showing jumps on prepared number lines
- recording number sentences e.g. 6 + 5 = 11 is 6 + 4 + 1 = 11



Read, write and interpret mathematical statements involving addition (+) and equals (=) signs

Use tens frames and number lines to support understanding of bridging to 10

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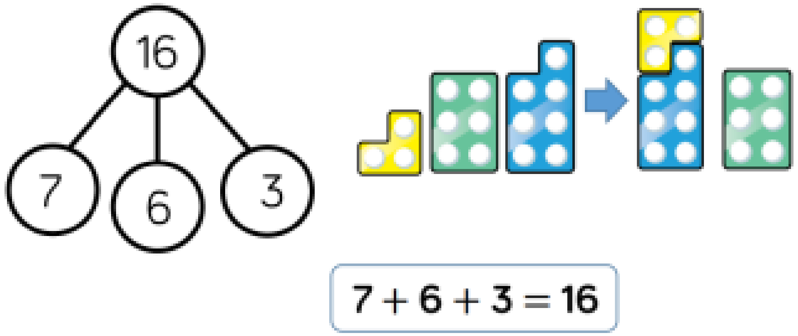
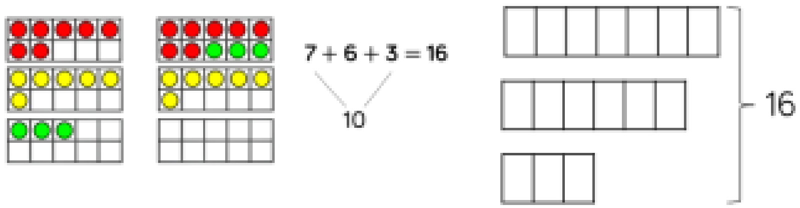
</table>

2

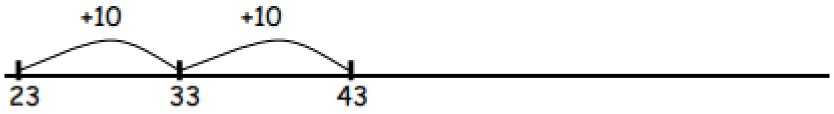




Vocabulary

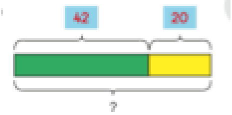
add sum more than total altogether plus partition into tens and ones regroup inverse commutative

Count or add in multiples of 10 using 100 square or number line



Add by using partitioning of TO + TO

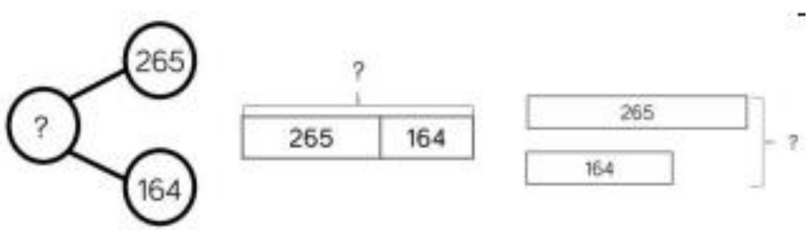
Solve simple problems with addition using concrete objects and pictorial representations, involving numbers and measures



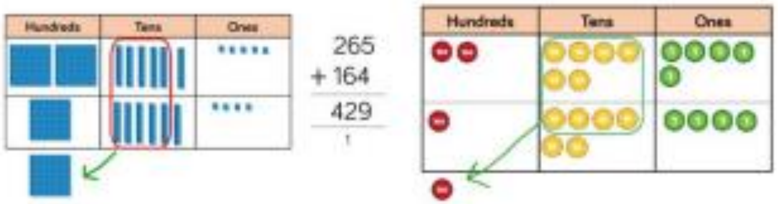
Recognise and use the inverse relationship between addition and subtraction to check calculations and missing number problems. Check by adding in different order e.g. 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5

Record addition in columns to support place value and prepare for efficient written methods.

3

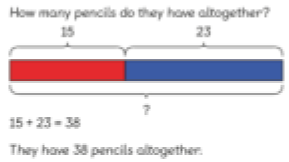


$265 + 164 = 429$



Vocabulary

partition hundreds, tens, ones digit number line regroup inverse adjust, compensate commutative regroup addend sum



Estimate answers and use inverse operations to check

Solve problems, including missing number problems, using number facts, place value, and more complex addition.

<u>Add by using partitioning</u>

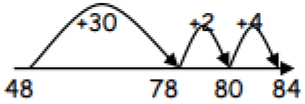
67 + 24 = 60 + 20 + 7 + 4
= 80 + 11
= 91

40 + 9
<u>20 + 3</u>
60 + 12 = 72

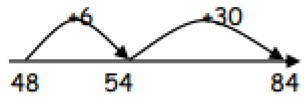
Children use number lines with increasingly large numbers.

<u>Count on from the largest number</u>

48+36=84



or



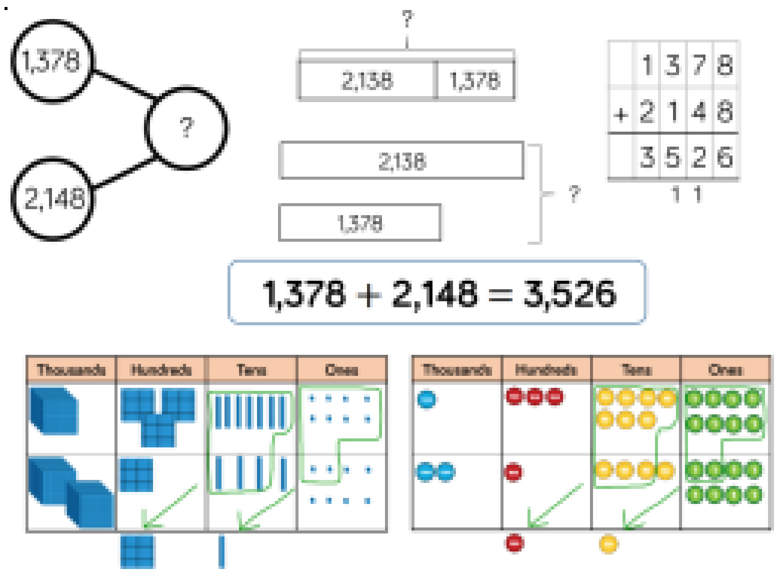
<u>Expanded columnar addition</u>

```
  4 7
+ 2 4
  1 1   7 + 4
  6 0  40 + 20
  7 1
```

<u>Compact columnar addition</u>

```
  3 2        2 9
+ 6 4      + 4 6
  9 6        7 5
             1
```

4



Vocabulary

jottings sum total rename partition place value regroup digit crossing tens, hundreds boundary inverse addend sum

<u>Columnar addition</u>

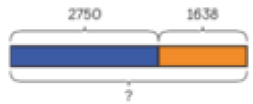
Add numbers up to 4 digits using efficient written column method

Practise with increasingly large numbers to aid fluency.

```
  372      357      1306
+  74    + 145    +  722
  446      502      2028
   1        1 1
```

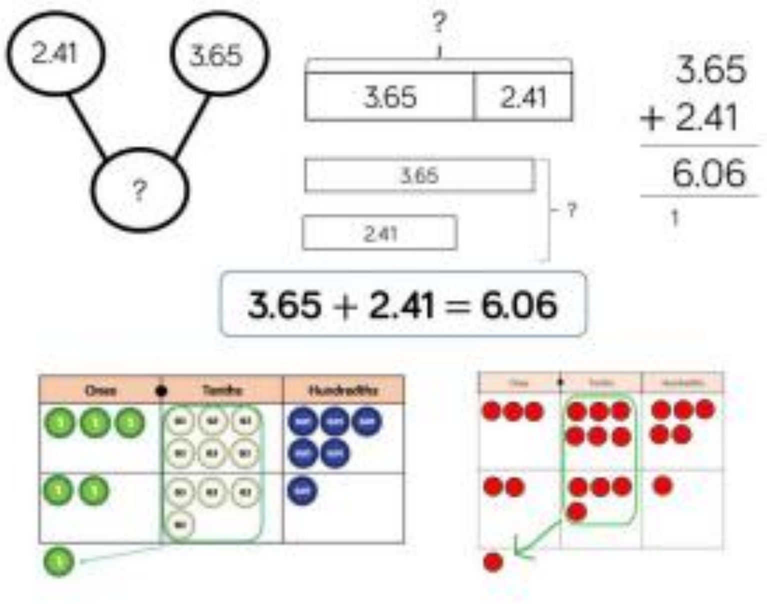
Add using pictorial representations

Estimate and use inverse operations to check answers



Solve addition two-step problems in contexts, deciding which operations and methods to use and why. Include problems involving decimals in money or measures e.g. 6.3m + 3.7m = 10m

```
  £23.59
+ £ 7.55
  £31.14
   1 1 1
```

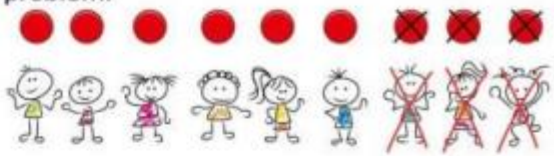
<table>
<tr>
<td>5
and
6</td>
<td>


<u>Vocabulary</u>
jottings rounding inverse addend sum, addend sum adjust compensate
</td>
<td>
Add whole numbers with more than 4 digits and increasingly large numbers using efficient column written methods to aid fluency

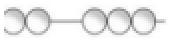
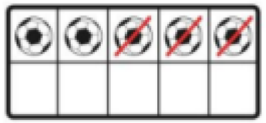
$$\begin{array}{r} 372 \\ +\ 474 \\ \hline 846 \\ \hline {\scriptstyle 1} \end{array} \qquad \begin{array}{r} 27.03 \\ +\ 13.98 \\ \hline 41.01 \\ \hline {\scriptstyle 1\,1\ \ 1} \end{array}$$

Solve multi-step problems in contexts, deciding which methods are most efficient.
</td>
</tr>
</table>

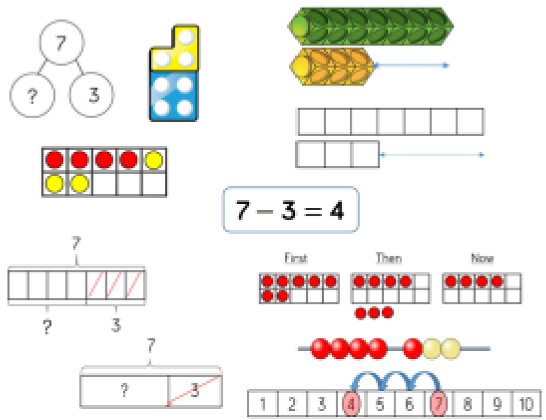
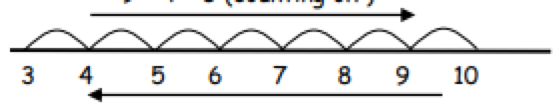
<table>
<tr><th colspan="4">Subtraction</th></tr>
<tr><td rowspan="2">EYFS</td>
<td>Counting back and taking away
Children arrange objects and remove to find how many are left.

1 less than 6 is 5.
6 subtract 1 is 5.</td>
<td>Counting back and taking away
Children draw and cross out or use counters to represent objects from a problem.

9 − ☐ = ☐
There are ☐ children left.</td>
<td>Counting back and taking away
Children count back to take away and use a number line or number track to support the method.


9 − 3 = 6</td></tr>
<tr>
<td>Subtraction within 10
Understand when and how to subtract 1s efficiently.

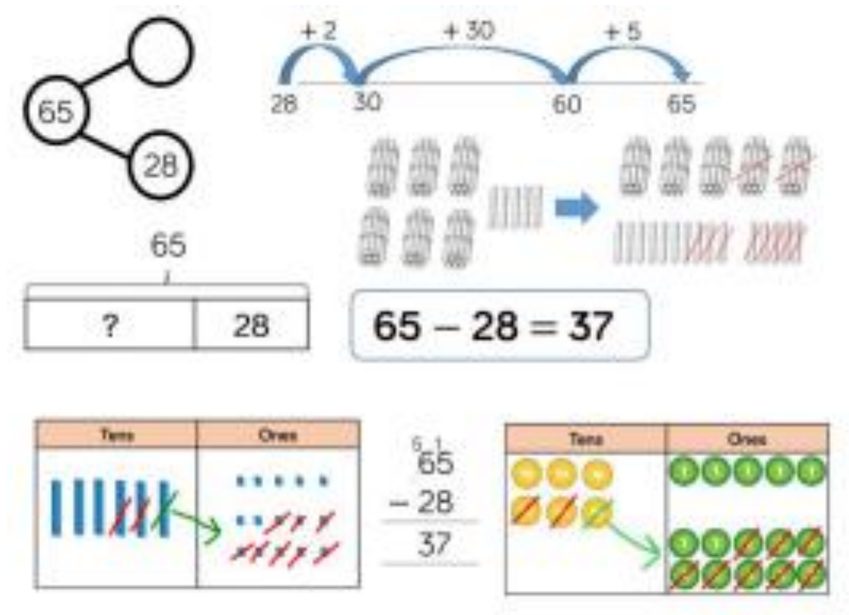
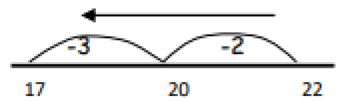
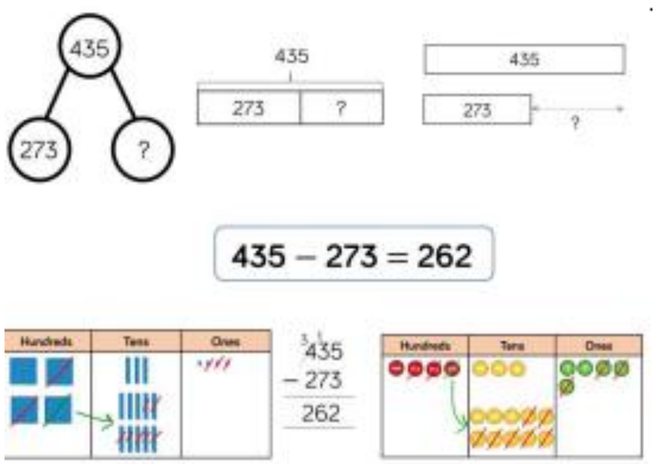
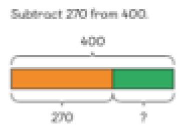
Use a bead string to subtract 1s efficiently.

5 − 3 = 2</td>
<td>Subtraction within 10
Understand when and how to subtract 1s efficiently.

5 − 3 = 2</td>
<td>Subtraction within 10
Understand how to use knowledge of bonds within 10 to subtract efficiently.

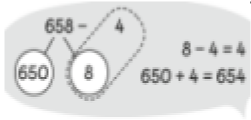
5 − 3 = 2</td></tr>
</table>

<table>
<tr><th colspan="3">Subtraction</th></tr>
<tr><td></td><td>Concrete and Pictorial representations</td><td>Abstract</td></tr>
<tr><td>1</td><td>
</td><td>Count back orally or use a number line to find the difference by counting on in ones
9 - 4 = 5 (counting back)
and when secure
9 - 4 = 5 (counting on)


Solve simple problems and missing number problems involving subtraction using practical equipment, concrete objects and pictorial representations

Explain methods & reasoning
Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs</td></tr>
</table>

2		Understand when it is sensible to **count back** (take away) and when to **count on** (find the difference) Use number lines to bridge through multiple of 10 22 - 5 = 17(counting back)  Subtract by using partitioning of TU - TU Solve simple problems involving numbers, quantities and measures using concrete objects and pictorial representations,  Recognise and use the inverse relationship between addition and subtraction to check calculations. Record subtraction in columns to support understanding of place value and prepare for efficient written methods.
3		Solve problems, including missing number problems, using number facts, place value, and more complex subtraction Subtract with up to three digits, using efficient written columnar methods, understanding of place value and partitioning 



658 - 4 = 654

Use partitioning to subtract

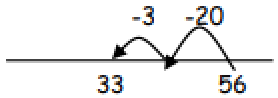
67 - 24 = 60 - 20 + 7 - 4

= 40 + 3

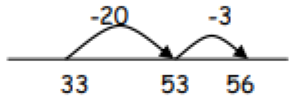
= 43

Count back from the largest number

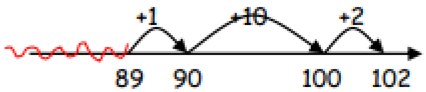
56 - 23 = 33



or



Count on or find the difference when the numbers involved are close together **102 - 89 = 13**



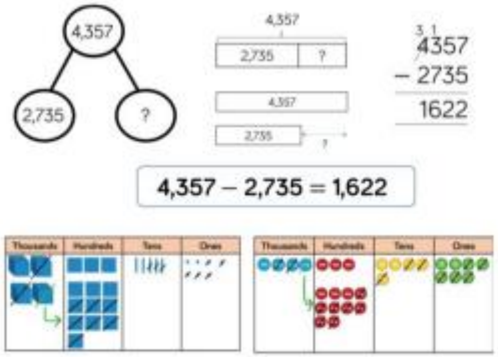
Expanded columnar subtraction

$$89 - 57 \text{ is } \begin{array}{r} 80 + 9 \\ -\ \underline{50 + 7} \\ \underline{30 + 2} \end{array} = 32$$

Columnar subtraction

$$\begin{array}{r} 86 \\ -\ \underline{64} \\ 22 \end{array} \qquad \begin{array}{r} 86 \\ -\ \underline{28} \\ 58 \end{array}$$

Estimate answers calculations and use inverse operations to check

<table>
<tr>
<td>4</td>
<td>
</td>
<td>Subtract numbers with up to 4 digits using efficient written column method with increasingly large numbers to aid fluency.

Estimate and use inverse operations to check answers

Solve subtraction of two-step problems in contexts, deciding which operations and methods to use and why.

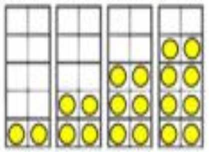
<u>Compact columnar subtraction with decomposition</u>
6 14
~~7~~ ~~4~~
- 2 7
4 7</td>
</tr>
<tr>
<td>5
and
6</td>
<td></td>
<td>Subtract whole numbers with up to 7digits using efficient column written methods including decomposition e.g. 754 - 86
6 4 14
~~7~~ ~~5~~ 4
- 8 6
6 6 8

With decimals in the context of money or measures
e.g £21.31 - £18.06
1 2
~~2~~ 16 ~~3~~ 11
-1 8 . 0 6
8 . 2 5

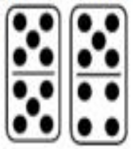
Solve multi-step problems in contexts, deciding which operations and methods to use and why.</td>
</tr>
</table>

<table>
<tr><th colspan="3">Multiplication</th></tr>
<tr><td></td><td>Concrete and Pictorial representations</td><td>Abstract</td></tr>
<tr><td></td><td colspan="2">

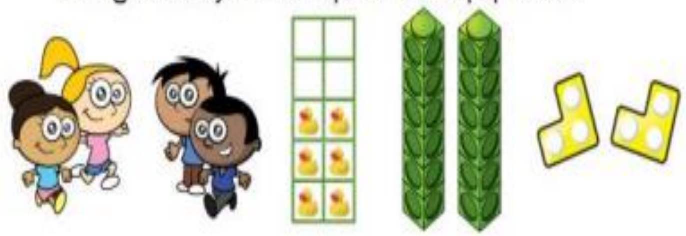
The children will learn that double means 'twice as many'. They should be given opportunities to build doubles using real objects and mathematical equipment. Building numbers using the pair-wise patterns on 10 frames helps the children to see the doubles. Mirrors and barrier games are a fun way for children to see doubles as they build and to explore early symmetry. Encourage children to say the doubles as they build them, e.g. Double 2 is 4 Provide examples of doubles and non-doubles for the children to sort and explain why.



Pair-wise pattern



Allow the children to explore different ways to build doubles using real objects and practical equipment.



Children will be encouraged to find doubles within their surroundings e.g. finding matching numicon or tens frames, looking at ladybirds and butterflies and drawing their own - concentrating on doubles. Children will use stem sentences such as double 5 is 10, 10 is double 5

</td></tr>
</table>

1

Solve simple problems calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Practical problem solving activities involving equal sets or groups. Through grouping and sharing small quantities, pupils should begin to understand multiplication; doubling numbers and quantities.

How many legs will 5 children have?

2 + 2 + 2 + 2 + 2

There are _ groups of _ flowers.

There are _ flowers altogether.

<u>Vocabulary</u>

sets

groups,

equal groups

array

doubles

pairs

2

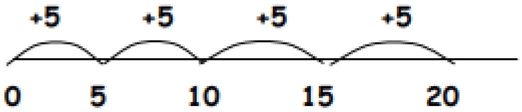
Solve one-step x problems using materials, arrays, repeated addition and x facts, include problems in contexts.

<u>Understand multiplication as repeated addition</u>

There are 5 pencils in one packet.
How many pencils in 4 packets?

5 + 5 + 5 + 5   4 lots of 5 or 5 x 4

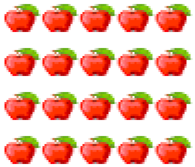
<u>On a number line:</u>



<u>and on a bead bar:</u>

5 x 3 = 5 + 5 + 5

<u>Understand x as an Array</u> (of objects)



5 x 4 = 20

4 x 5 = 20

Begin to use other x tables and recall facts in written calculation
Recognise and use the inverse relationship between multiplication and division in checking calculations.

Vocabulary

lots of

groups of

multiply multiplied

symbol x

times

repeated addition

times as big

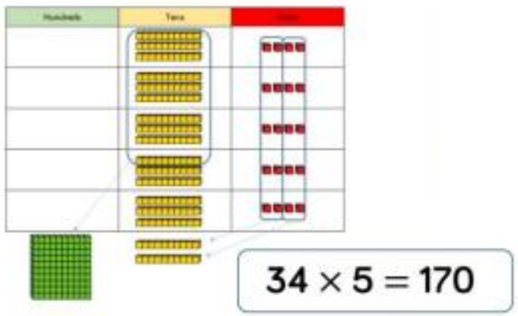
...as wide

...as long

commutative

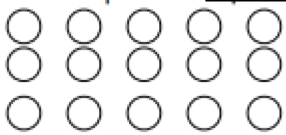
inverse

3



Count on a number line and/or a 100 square in various multiples

Understand multiplication represented as an array



5 x 3 = 15

3 x 5 = 15

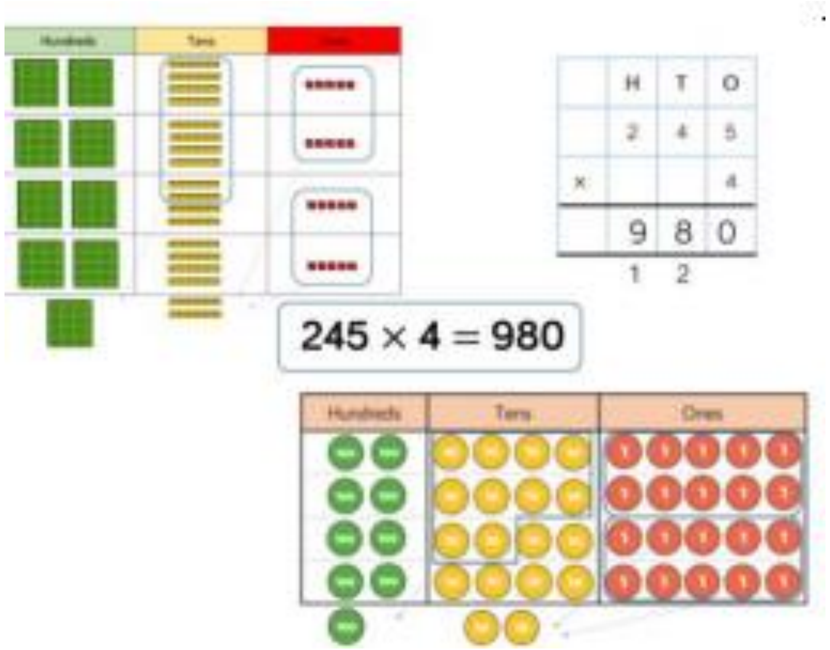
	H	T	O	
		3	4	
x			5	
	1	7	0	
	1	2		

Use the pictorial representations to consolidate understanding of carrying into the next column.

Vocabulary

multiply partition hundreds, tens, ones, digit multiple inverse factor product

4



Vocabulary

multiply partition digit inverse short multiplication brackets factor product multiplicand multiplier

Develop fluency in written methods of <u>short multiplication</u>

```
   3 0 4        3 0 4
 X     9      x     9
     3 6      2 7 3 6
 2 7 0 0
 2 7 3 6
```

<u>Multiply using partitioning</u> (recorded informally)

43 x 6 =

40 x 6 = <u>240</u>

3 x 6 = <u>18</u>

<u>240</u> + <u>18</u> = <u>258</u>

or

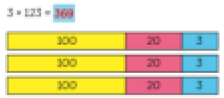
```
        43
   40   +   3
    ↓       ↓    × 6
   240  +   18   = 258
```

Where appropriate introduce grid multiplication for TO x O and HT

38 x 7

123 x 3

X	3
100	300
20	60
3	9
	369



Write statements using the distributive law 39 × 7 = 30 × 7 + 9 ×

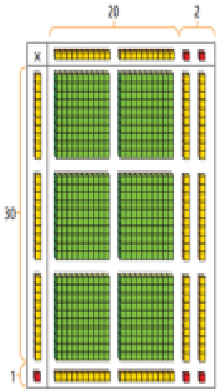
associative law (2 × 3) × 4 = 2 × (3 × 4)

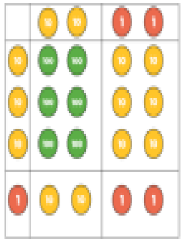
Solve two step problems with increasingly harder numbers and in wh

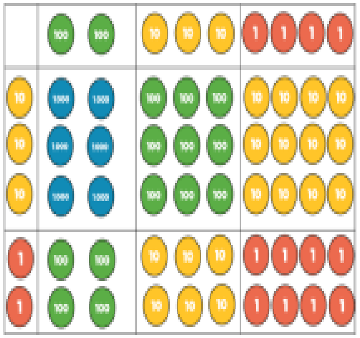
objects are connected to m objects eg. finding all possibilities '6 hats a

coats, how many different outfits?'

5 & 6







x	20	2
30	600	60
1	20	2

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

$22 \times 31 = 682$

Th	H	T	O
	2	3	4
x		3	2
	4	6	8
$_1$7	$_1$0	2	0
7	4	8	8

$234 \times 32 = 7{,}488$

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

<u>Vocabulary</u>

partition product multiple multiply add total factor factor pairs common factor prime square number cube numbers

Standard long columnar method

Th	H	T	O
	2	3	4
x		3	2
	4	6	8
$_1$7	$_1$0	2	0
7	4	8	8

TTh	Th	H	T	O
	2	7	3	9
×			2	8
$_2$2	$_5$1	$_3$9	$_7$1	2
$_1$5	4	$_1$7	8	0
7	6	6	9	2
	1			

Division

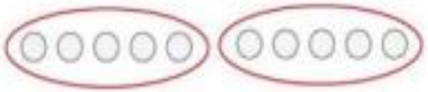
	Concrete and Pictorial representations	Abstract

Grouping
Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.

Sort a whole set people and objects into equal groups.

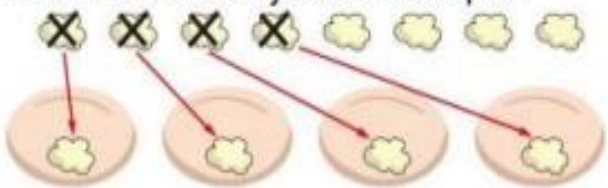
There are 10 children altogether.
There are 2 in each group.
There are 5 groups.

Grouping
Represent a whole and work out how many equal groups.



There are 10 in total.
There are 5 in each group.
There are 2 groups.

Sharing
Share a set of objects into equal parts and work out how many are in each part.



1

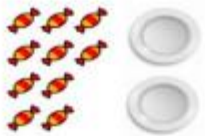
Practical problem solving activities involving equal sets or groups.
Begin to understand division through grouping and sharing and halving small quantities

Can you cut the cake in half?

How many pieces are there?

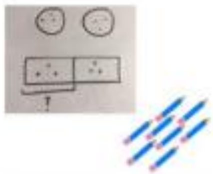
How many cakes are there in the box? Take half of them out.

Solve simple problems using concrete objects, pictorial representations and find simple fractions of objects, numbers and quantities. with the support of the teacher



Share the sweets equally between the two plates.

_ sweets shared equally between 2 is _



How many equal groups of 2 can you make with the pencils?

If you had 12 pencils, how many groups of 2 would be able to make?

Vocabulary

share

sharing

grouping

equal groups

left over

half

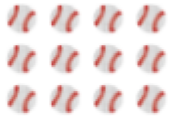
halving

each

2

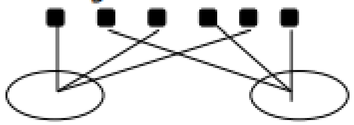
Calculate mathematical statements and write using division (÷) and equals (=) signs

Solve problems using materials, arrays, repeated subtraction and division facts, including problems in contexts.



Understand as <u>sharing</u> equally

6 sweets are shared equally between 2 people. How many sweets does each one get?

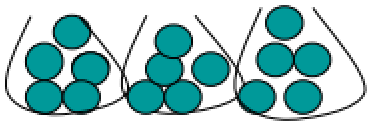


Understand as <u>grouping</u> (repeated subtraction).

There are 15 apples in a box.

How many bags of 5 apples can be filled?

How many groups of 5 can you make from 15?

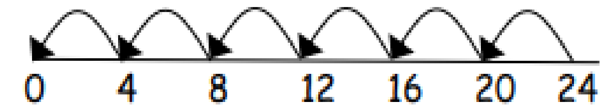


<u>Vocabulary</u>

divide divisible share equally, one each, two each…, grouping equal groups, how many lots of, groups of… array odd even repeated subtraction

<u>Model repeated subtraction using a number line</u>

24 ÷ 4 = 6

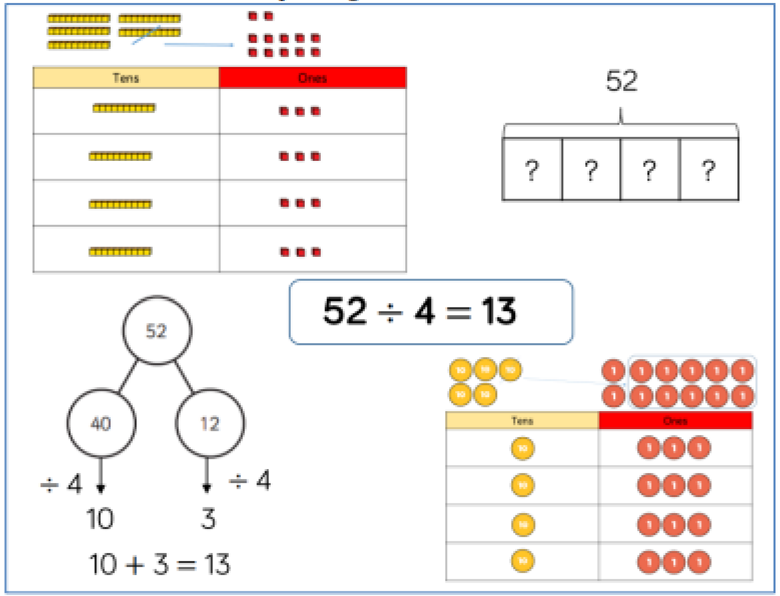


Begin to use other x tables and division facts to perform written calculation.

Relate to fractions and measures eg. 40÷2 =20, 20 is a half of 40

Check calculations using the inverse relationship between x and ÷

3



Vocabulary

divide short division share group equal groups regroup remainder left over repeated subtraction

Develop reliable written methods for TO ÷O progressing to efficient written

Use practical methods and jottings, including remainders

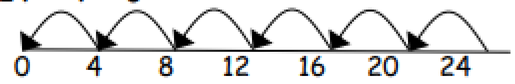
Sharing: If £20 is shared between 4 people, how much would each get?

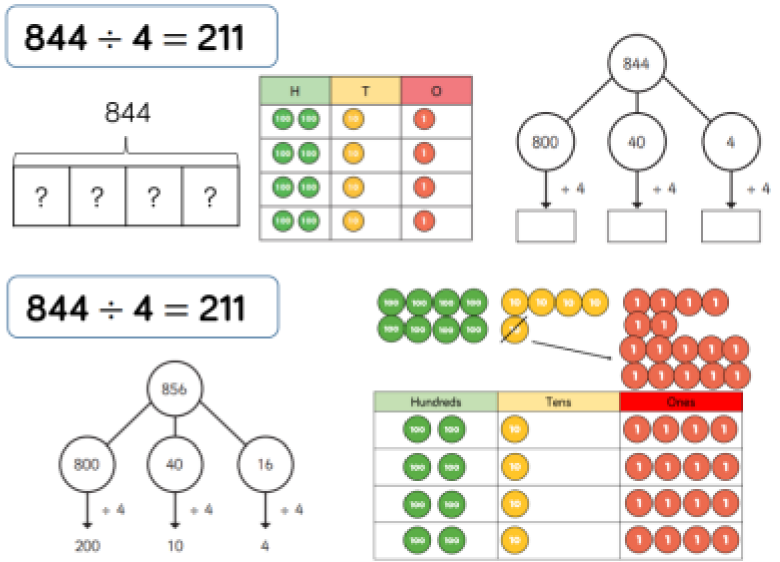
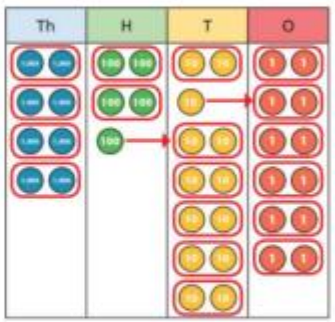
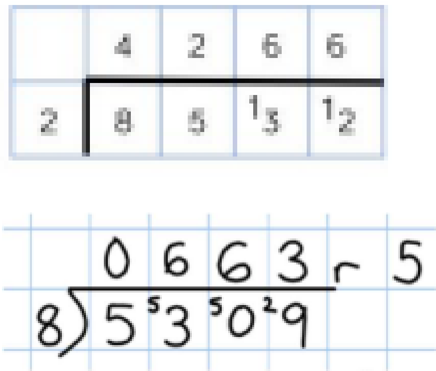
or

Grouping: There are 20 children and they sit in tables of 4. How many tables will we need?

<u>Repeated subtraction using a number line</u>

24 ÷ 4 = 6



4		Develop fluency in efficient strategies for short division Introduce dividing using subtracting 10 lots of divisor and asking 'how many more left over?' 52 ÷ 4 I know that 10 lots of 4 are 40, there will be 12 left over which is another 3 lots of 4 so there are 13 lots of 4 in 52 **Vocabulary** inverse divide quotient divisor dividend remainder short division
5	 8,532 ÷ 2 = 4,266	 **Vocabulary** inverse divide quotient divisor dividend remainder short division

6		

									facts
		0	4	9	9	r12			19
1	9	9	4	9	3				38
		7	6						57
		1	8	9					76
		1	7	1					95
		0	1	8	3				114
			1	7	1				133
			0	1	2				152
					0				171
				1	2				190