


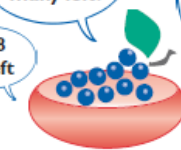







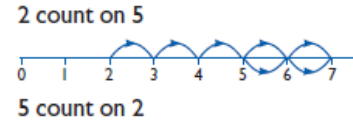
Key representations to support conceptual understanding of addition and subtraction

 $5 = 3 + 2$

 $3 + 2 = 5$

 $20 = 12 + 8$

 How many more forks do we need?
 10 grapes, eat two. How many left?
 9, 8
 8 left
 10 grapes, eat one, how many left? 9.
 And another? 8.
 Another, 7...

 $10 = 5 + 5$
 $10 = 1 + 9$
 $10 = 2 + 8$



 $2 + 5 = 7$ 2 count on 5
 $5 + 2 = 7$ 5 count on 2


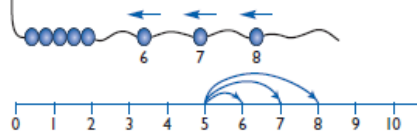
$3 + \square = 5$  $9 - 8 = 1$ 





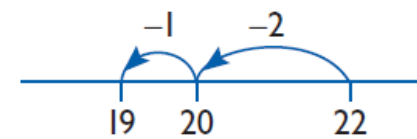
9 and 1 more is 10
 9 add 1 equals 10
 $9 + 1 = 10$

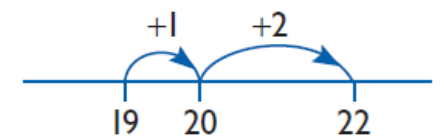



 $6 + 3 + 4 = 13$


5 and 1 more is? **6**
 5 and 2 more is? **6, 7**
 5 and 3 more is? **6, 7, 8**


 $5 - \square = 3$ $\square - 2 = 3$


$22 - 3$


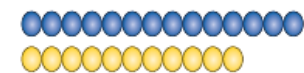

$22 - 19 = 3$






Which line has most money?
 How much more?

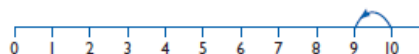
The difference is?

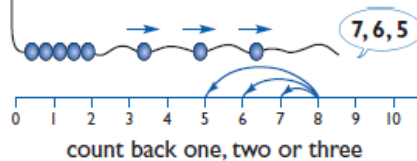



The difference between 11 and 14 is 3.
 $14 - 11 = 3$
 $11 + \square = 14$



1 less than 10 is 9
 10 subtract 1 equals 9
 $10 - 1 = 9$



1 less than 8 is? **7**
 2 less than 8 is? **7, 6**
 3 less than 8 is? **7, 6, 5**



 6 and how many more make 10?
 $6 + \square = 10$

Nursery addition/subtraction

Reception addition/subtraction

Mental/

I've got 2 sweets and I am given one more. How many have I got now?

Jane had 3 bears. She was given 2 more. How many does she have now?

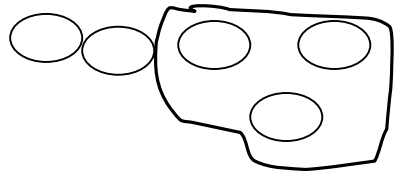
Written



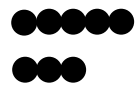
Establish combining two groups

There were 5 beads but I hid some. You can see there are 3 left. How many did I hide? I've got 3 beads. You've got 5 beads. How many more beads have you got?

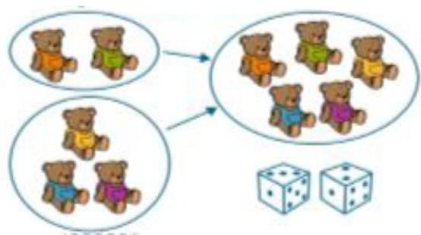
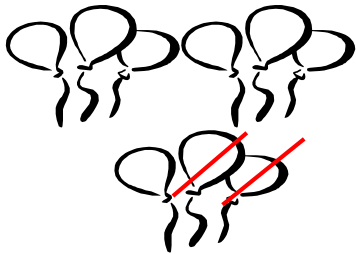
Establish counting on from the first number



Introduce number line from Summer term (see example opposite)



There were 9 balloons. Two popped. How many left? I've got 9 balloons. You've got 2 balloons. How many more balloons have I got?



Year 1 addition/subtraction

Year 2 addition/subtraction

Mental



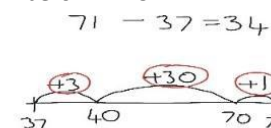
If we know $4 + 5 = 9$
 We also know: ,
 $5 + 4 = 9$
 $9 - 5 = 4$
 $9 - 4 = 5$
 $14 + 5 = 19$
 $19 - 14 = 5$, etc
 Work with all numbers up to 20.

Using known facts

If I know:
 $2 + 3 = 5$
 I also know:
 $3 + 2 = 5$
 $20 + 30 = 50$
 $30 + 20 = 50$
 $50 - 30 = 20$
 $50 - 20 = 30$
Bridge through 10
 $26 + 7 = 26 + 4 + 3$
 $26 + 4 = 30$
 $30 + 3 = 33$
Counting on/back in 10s
 $26 + 20 =$
 $67 - 20 =$

Partitioning

$23 + 34 =$
 $46 - 25 =$
Special Strategy
Rounding and adjusting
 $+9 - 9 + 11 - 11$
Bonds to 10
 $2 + 7 + 8 = 8 + 2 + 7$
Finding the difference between two numbers. $71 - 37 =$



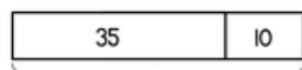
Written

Immerse children in practical opportunities to develop understanding of addition and subtraction. Link practical representations on a number track on a bead-string to recording on a number line. By the end of Year 1 children should be able to recall and use facts within and to 20.

2 bears and 3 bears is 5 bears altogether: $2 + 3 = 5$



Work out the missing values.

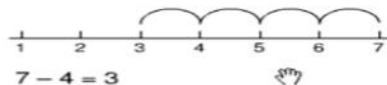
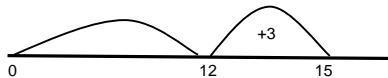


bar model ↗

Some hens lay 12 eggs and 3 eggs. How many eggs did they lay altogether?



$12 + 3 = 12 + 1 + 1 + 1$

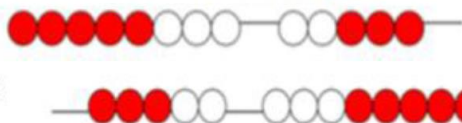


$8 + 5 = 13$

$13 - 5 = 8$

$5 + 8 = 13$

$13 - 8 = 5$

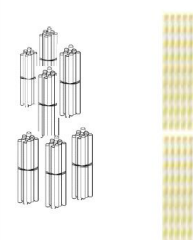
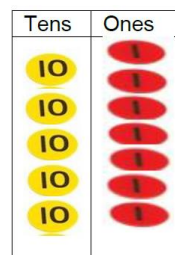


My cat is 29 cm tall. My dog is 56 cm taller. How tall is my dog? $29 + 56 =$

Partition and add on in 10s and 1s with or without a number line

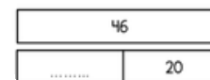
$29 + 50 + 1 + 5 = 85$ cm OR $29 + 10 + 10 + 10 + 10 + 10 + 1 + 5$ (no illustration)

Recording addition and subtraction in columns supports place value and prepares for formal written methods.



Work out the missing values.

Bar model →



$94 - 67 =$



There are 94 bean bags in the red bucket and 67 bean bags in the blue bucket. How many more bean bags are in the red bucket?
 Where there is a small 'difference', and initially modelling both amounts separately, use 'adding on' to find 'difference', either on a number line and then record informally:

Year 3 addition/subtraction

Year 4 addition/subtraction

Mental

Bridging to 10

$$425 + 8 = 425 + 5 + 3$$

$$= 430 + 3$$

$$= 433$$

Counting forwards or backwards in 100s

$$636 - 500 = 136$$

Rounding and Adjusting

$$425 + 90 = 425 + 100$$

$$= 525 - 10$$

$$= 515$$

$$146 - 9 = 146 - 10 + 1$$

$$= 136 + 1$$

$$= 137$$

$$146 - 50 = 146 - 40 - 10$$

$$= 106 - 10$$

$$= 96$$

Develop confidence at calculating mentally with larger numbers. Using the full range of strategies:

- Counting in 1s/10s
- Bridging through multiples of 10
- Partitioning
- Rounding and Adjusting
- Reordering

- Near Doubles
 - Bridging through 60 when calculating with time.
- Can I do it mentally?
Should I use a jotting?
Should I use a written method?

Written

Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent.

Hundreds	Tens	Ones
100	10	1
100	10	1
	10	1
		1
		1
		1

376 - 168 =
Using my knowledge of partitioning in different ways. 376 = 360 + 16.

H	T	O
100	10	10
100	10	10
100	10	10
		1
		1
		1

Add and subtract numbers up to four digits.

Expanded vertical layout

$$100 \ 40 \ 5$$

$$+ \ 20 \ 7$$

$$100 + 60 + 12$$

= 172

Revert to expanded methods if the children experience any difficulty. Use the written method with decimals in the context of money

$$£ 32.50 + £ 21.75 = £ 54.25$$

$$£ 32.50$$

$$+ £ 21.75$$

$$£ 54.25$$

$$£ 42.50 - £ 13.35 = £ 29.15$$

$$£ 42.50$$

$$- £ 13.35$$

$$£ 29.15$$

Using number to ensure children understand the process before quickly moving into numbers that do require a written method.

Year 5 addition/subtraction

Year 6 addition/subtraction

Mental

12 462 – 2300
Use knowledge of place value to calculate mentally with increasingly larger numbers. Employ a range of special strategies to develop confidence in calculating mentally.

E.g.

- 2364 + 1999 =**
- 2364 + 2000 = 4364
- 4364 – 1 = 4363
- 13484 + 2400 =**
- 13000 + 2000 = 15000
- 484 + 400 = 884
- 15000 + 884 = 15884

4 = 2001 – 1997

1997 2000 2001

13486 – 5000

13486 – 3000 = 10486

10486 – 2000 = 8486

Ensure children use a wide range of mental strategies when calculating including decimals and increasingly larger numbers.

57 + = 125

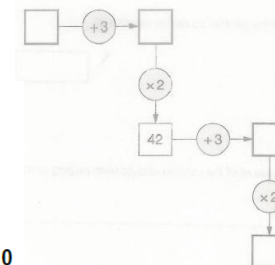
911 – 47 =

149 + 137 + 158 =

(+) x = 10

What is 2 minus 0.005?

What is 5.7 added to 8.3?



Written

Children to work and become confident with increasingly bigger numbers. At each stage, children to show secure knowledge of expanded vertical layout before moving on to work with compact vertical. Continue to model with base 10 equipment.

Recording for expanded vertical layout, moving onto compact vertical (columnar) recording.

Estimate:

800 + 640 = 1440	900 – 500 = 400	900 – 500 = 400	
789 + 642 becomes	874 – 523 becomes	932 – 457 becomes	932 – 457 becomes
$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline 11 \end{array}$	$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \end{array}$	$\begin{array}{r} 8\ 12\ 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$	$\begin{array}{r} 1\ 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$
Answer: 1431	Answer: 351	Answer: 475	Answer: 475

Check:

Is your estimate close to the answer you have calculated?

25.356 + 346.28 becomes:

Estimate:

25 + 350 = 375

$$\begin{array}{r} 25.356 \\ +346.28 \\ \hline 371.636 \end{array}$$

9.076 – 3.142 becomes:

Estimate:

9 – 3 = 6

$$\begin{array}{r} 9.076 \\ - 3.142 \\ \hline 5.934 \end{array}$$

As Year 5, to progress to working with decimals

12 462 + 8456

Tth	Th	H	T	U

Estimate:

21 000 = 12 500 + 8 500

$$\begin{array}{r} 12\ 462 \\ + 8\ 456 \\ \hline 20\ 918 \\ \hline 11 \end{array}$$

3906 = 12 462 – 8556

Estimate:

4000 = 12 500 – 8 500

$$\begin{array}{r} 12\ 462 \\ - 8\ 556 \\ \hline 3\ 906 \end{array}$$

Add and subtract numbers with a different number of decimal places.

12.4 – 3.56 =

Estimate: 12 – 4 = 8 (my answer should be between 8 and 9)

$$\begin{array}{r} 12.40 \\ - 3.56 \\ \hline 8.84 \end{array}$$