EFFECTIVE MATHS

Calculation policy

Addition and subtraction

August 2023

INTRODUCTION

This document provides an overview of the content and methods encountered in each year group from Year 1 to Year 6. For Years 1-4 it also includes the visual representations of the methods. (In Year 5 and 6 there are no new methods and the representations encountered are the same as in earlier years. What is different is the range of number that children work with.)

For each year group in Years 1-4 the document provides:
i. a content summary section;
ii. details about the approaches used for teaching the above;
iii. the representations used.
(For Year 5 and 6 the document contains (i) and (ii).)

The *content summary sections* (i) and the *details about the approaches used* sections (ii) include content from:
- addition and subtraction units 1 and 2;
- the Block 3 calculation unit;
- money and decimals units;
- fractions unit 2 (Years 3-6).

The *representations* sections do not include the representations used in money/decimals units or fractions units. (These representations are essentially the same as those used in the main addition and subtraction units.)

The document is provided in several versions:
- whole school version (this document);
- year group specific versions;
- a Key Stage 1 only version (for infant schools).

For Years 1-4 there are two versions of each year group specific version:
- a landscape version, like a PowerPoint slide, containing (i), (ii) and (iii);
- a portrait version of the representations section (iii) with notes to support the representations.

CALCULATION POLICY FOR ADDITION AND SUBTRACTION

YEAR 1

Year 1			
	Block 1	Block 2	Block 3
Calculation content	CALCULATION (UNIT 1) • Addition facts for 5-10 CALCULATION (UNIT 2) • Subtraction from 5-10 MONEY (UNIT 1) • Adding amounts to a total of 10p • Subtracting from a total of up to 10p	CALCULATION (UNIT 3) • Number bonds for ten (r) • Adding to numbers to ten and related subtraction facts (11-20) CALCULATION (UNIT 4) • Add and subtract to/from 11-15 CALCULATION (UNIT 5) • Add and subtract to/from 11-15 (r) • Add and subtract to/from 16-18 • Adding single digit numbers to 11-19 • Subtracting single digit numbers from 11 to 19 • Number bonds for 20 MONEY (UNIT 2) • Adding amounts to a total of 20p • Subtracting from a total of up to 20p	Ongoing practice of number bonds for numbers to ten and related facts.

Year 1			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Addition facts for 5-10</u> The core representation that supports children's learning of addition facts for 5-10 is the tens frame with two-colour counters. Children use their ability to subitise to articulate addition facts for numbers to 10. Teachers need to have two tens frames with two colour counters on display throughout Year 1 and children need access to their own tens frames and counters. Other representations of facts for 5-10 are also encountered within the lessons to provide more opportunities for children to derive number facts. These include dominoes, bar models and part-whole models. <u>Subtraction from 5-10</u> The first two subtraction lessons focus on subtraction as reduction (taking away) and make use of pictorial representations to support this. From lesson three, as for learning about addition facts, the core representation that supports children's learning of subtraction facts for 5-10 is the tens frame with two-colour counters.	<u>Number bonds for ten (r)</u> Cuisenaire® rods were encountered in some lessons in Block 1, but were not essential for successful learning. In this revision lesson they are integral to the lesson. Knowing additive facts to 10 is a key goal for the end of Year 1 and ongoing practise is essential to achieve this. It is suggested that ongoing number facts practice for 5-10 is supported by additional resources from this point, including Cuisenaire rods. During this practice children need to be taught to derive additive facts within 10 from previously memorised facts. For example, using knowledge of doubles to derive near doubles, eg: 5 + 4 = 4 + 4 + 1 = 9	Ongoing practice of number bonds for numbers to ten and related facts.

Year 1			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Subtraction from 5-10 (ctd)</u> The relationship triangle is introduced during the lesson on subtracting from 9. <u>Adding amounts to a total of 10p</u> As for earlier work on addition facts for 5-10 the tens frame with two-colour counters supports understanding about adding amounts to a total of 10p. Representations of coins are also used. <u>Subtracting from a total of up to 10p</u> The core representation that supports children's learning of subtraction from amounts to a total of 10p is the tens frame with two-colour counters. Representations of coins are also used.	<u>Adding to numbers to ten and related subtraction facts (11-20)</u> Children need secure recall of facts such as 10 + 1, 10 + 2 and their related subtraction facts (11 – 1, 12 – 2). This will support later work on additive facts that bridge ten using the making the next/previous ten method: 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14 The lessons on adding to numbers to ten and related subtraction facts make extensive use of number tracks, tens frames and place value cards to support understanding. <u>Add and subtract to/from 11-15</u> Children engage in a series of lessons about making 11, 12, 13 etc with numbers other than 10 and 1, 10 and 2, 10 and 3. The purpose is to lay the foundations of understanding that will support the ability to use the making the next/previous ten strategy in Year 2 and beyond.	

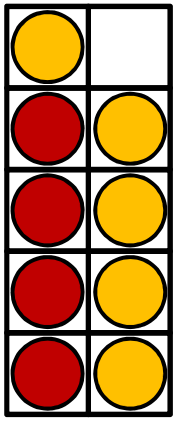
Year 1			
	Block 1	Block 2	Block 3
Strategies/ methods		Whole lessons are spent exploring all the ways to make numbers from 11-15 (and the related subtraction facts). For example 15 = 9 + 6 = 8 + 7 = 7 + 8 = 6 + 9 Tens frames support the understanding that 9 + 6 = 10 + 5. Children also encounter the numeric representation for this. <u>Add and subtract to/from 11-15 (r)</u> Revision of making next/previous ten Relationships - using an anchor fact to find new facts: 10 + 5 = 15 so 9 + 5 is one less than 15 <u>Add and subtract to/from 16-18</u> Same approach as for adding and subtracting to/from 11-15 in Block 2.	

Year 1			
	Block 1	Block 2	Block 3
Strategies/ methods		<u>Adding single digit numbers to 11-19</u> Using known facts to derive new facts, eg: 6 + 2 = 8 so 16 + 2 = 18. Also partitioning first addend into tens and ones then combining ones, eg: 16 + 2 = 10 + 6 + 2. <u>Subtracting single digit numbers from 11 to 19</u> Similar approach to above, eg: 6 – 2 = 4 so 16 – 2 = 14 <u>Number bonds for 20</u> The core representations that support children's learning of facts for 20 (and related facts) is tens frames with two-colour counters and the relationship triangle. <u>Adding amounts to a total of 20p and subtracting from a total of up to 20p</u> Within the lessons coins are the core representation. Teachers may want to support the calculation process for some children by using tens frames with two-colour counters.	

Year 1 - Block 1

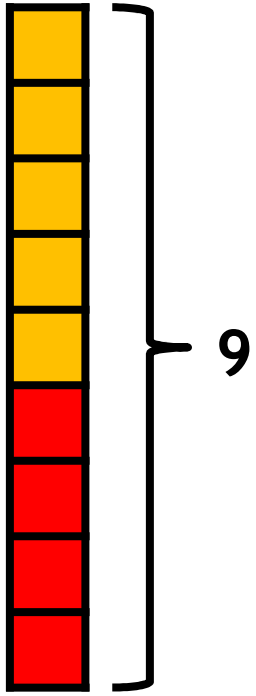
4 + 5 = 9

Addition facts for 5-10

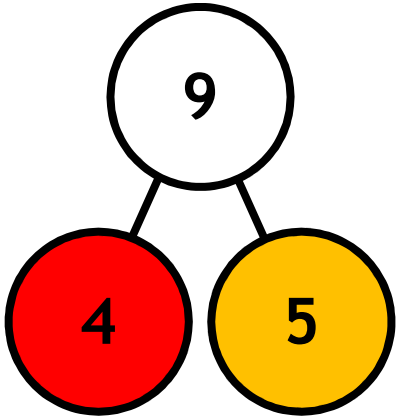


4 + 5 = 9

tens frame



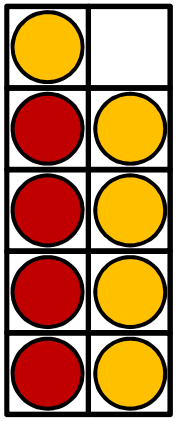
bar model

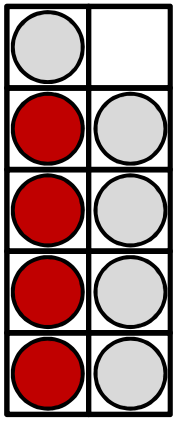


part-whole model

9 - 5 = 4

Subtraction from 5-10

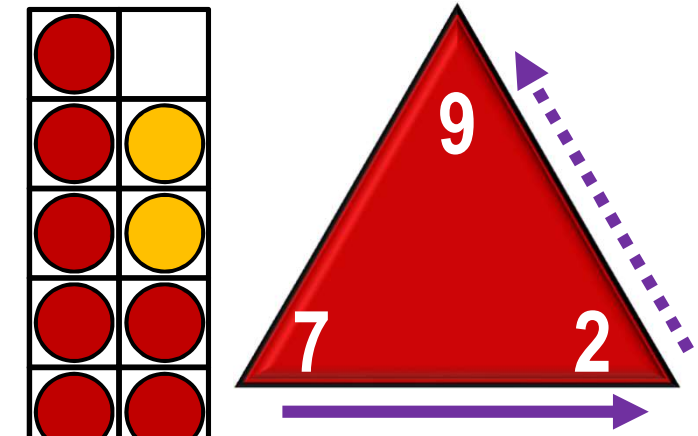




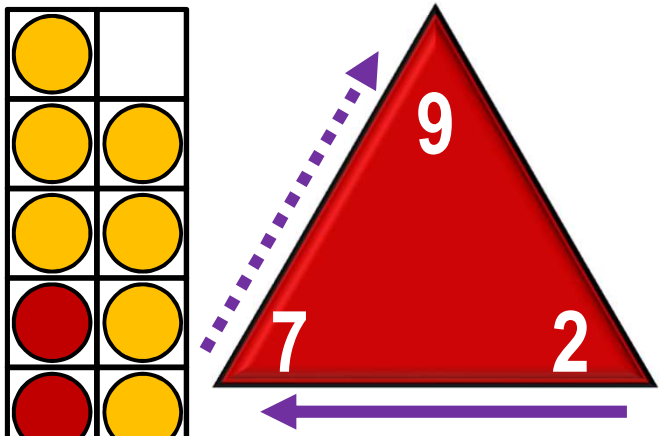
9 - 5 = 4

9 - 5 = 4

Children encounter two representations of tens frames.
The first reflects the nature of the concrete apparatus – two-colour counters.
The second representation shows the subtrahend greyed out. This is often used when addition and subtraction calculations are displayed on the same slide. (See next page.)

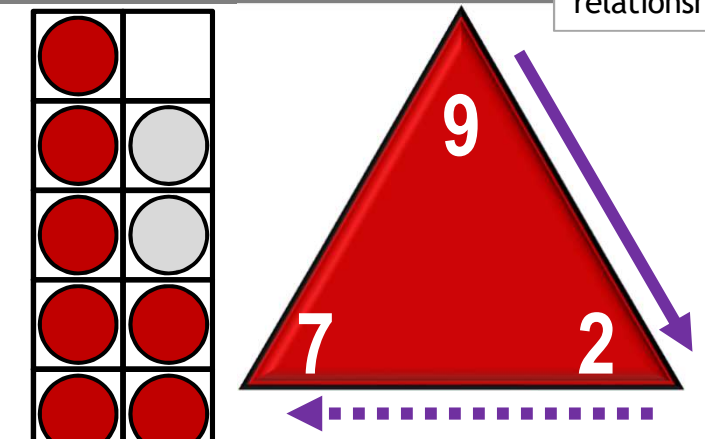


7 + 2 = 9

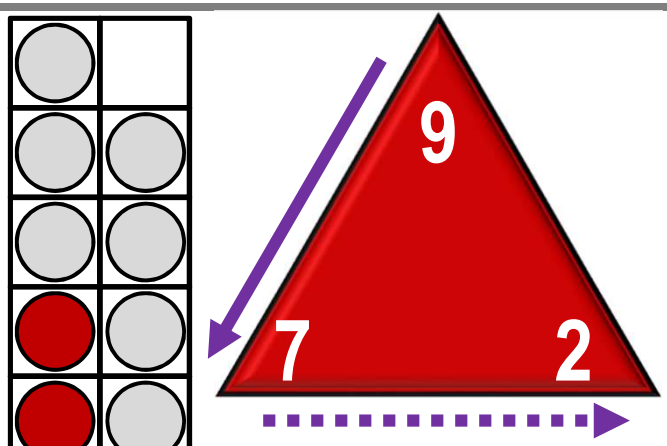


2 + 7 = 9

relationship triangles



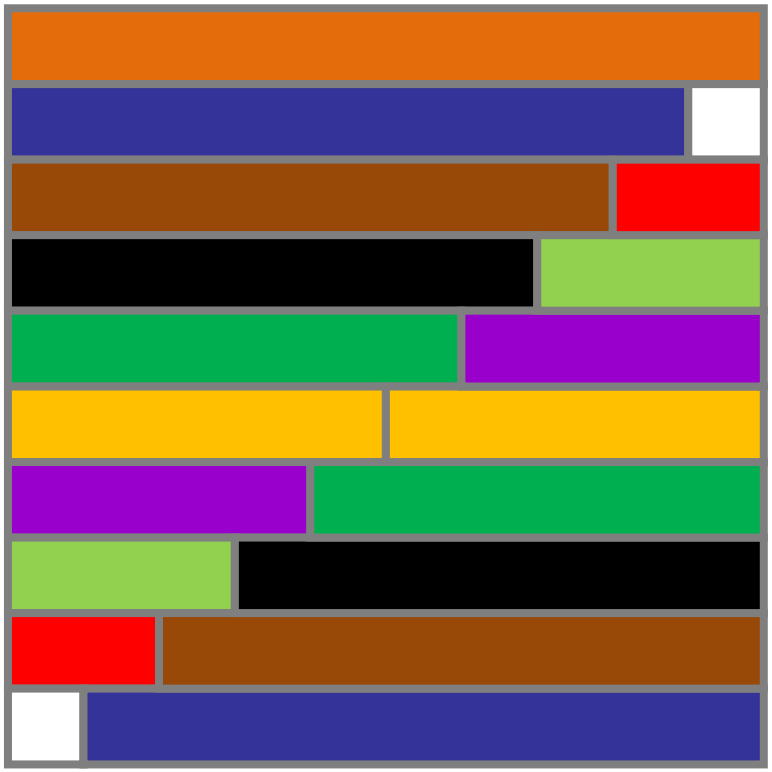
9 - 2 = 7



9 - 7 = 2

Year 1 - Block 2

Number bonds for ten (r)

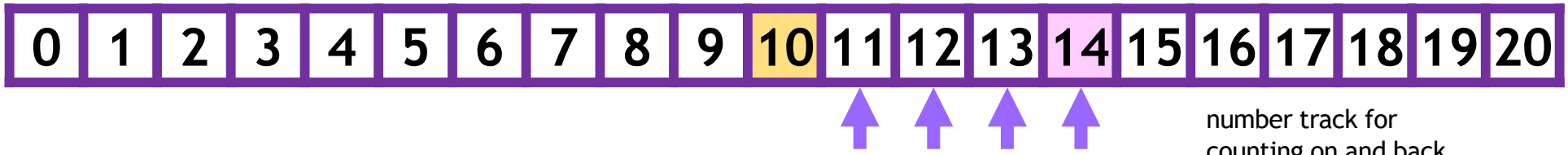


Cuisenaire® rods

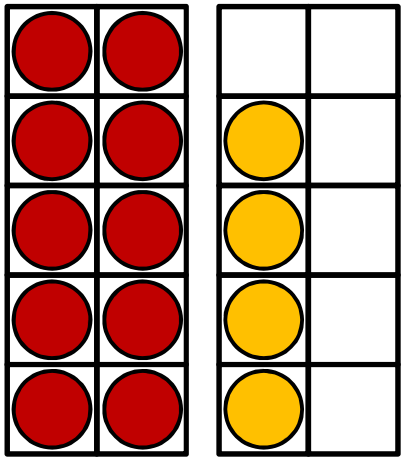
Year 1 - Block 2

10 + 4 = 14 • 14 - 4 = 10

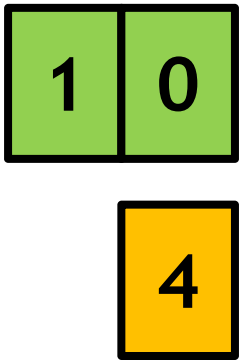
Adding to numbers to ten and related subtraction facts (11-20)



number track for counting on and back



tens frames

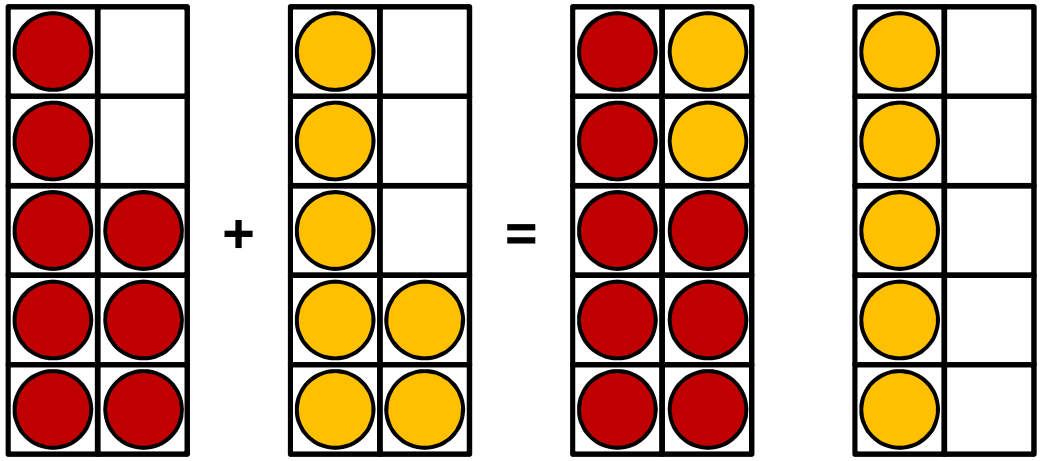


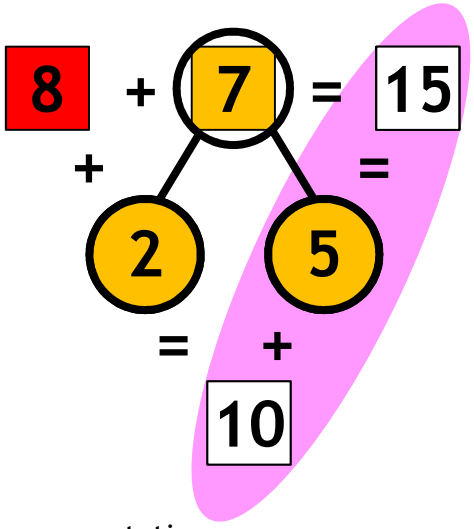
place value cards

Year 1 - Block 2

8 + 7 = 15 • 15 - 7 = 8

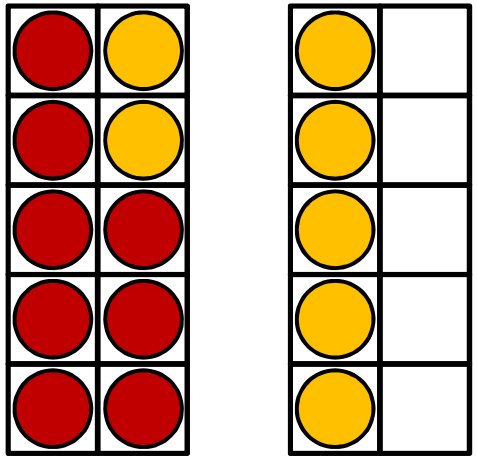
Add and subtract to/from 11-18

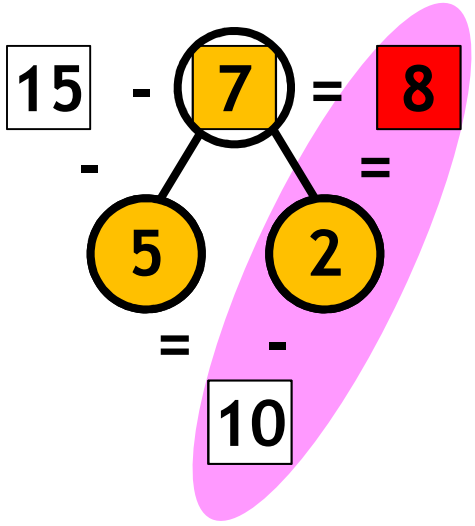




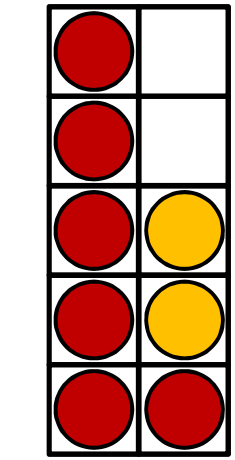
tens frames

numeric representations

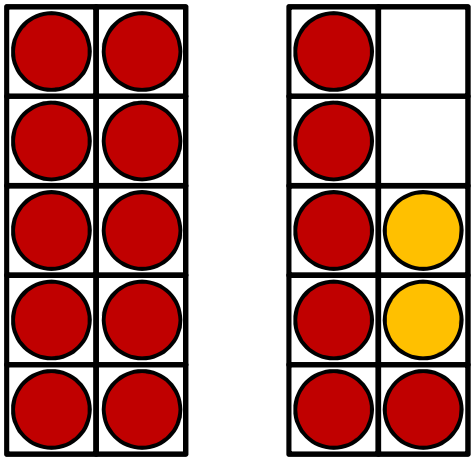




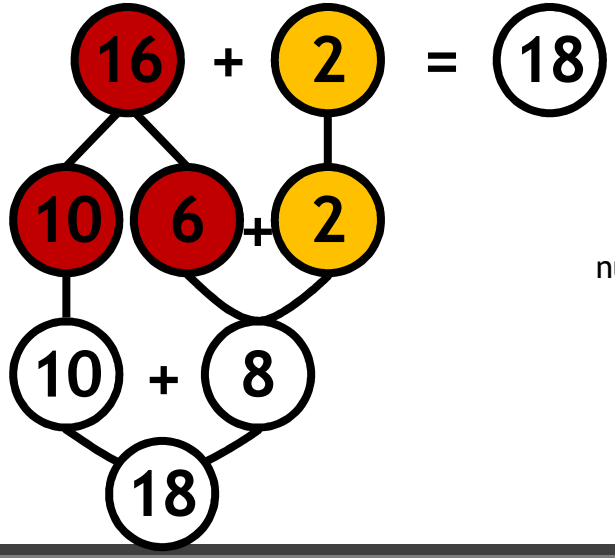
Adding single digit numbers to 11-19



6 + 2 = 8



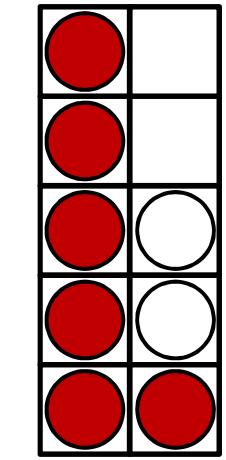
tens frames



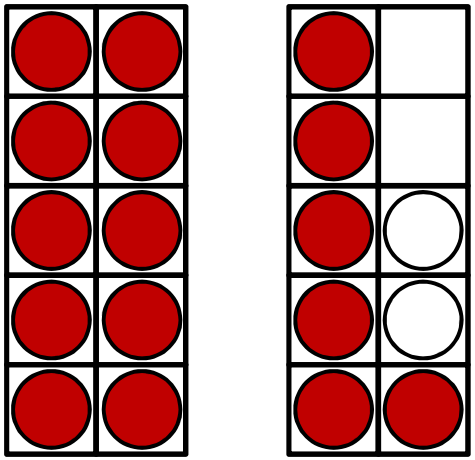
numeric representation

8 - 2 = 6 • 18 - 2 = 16

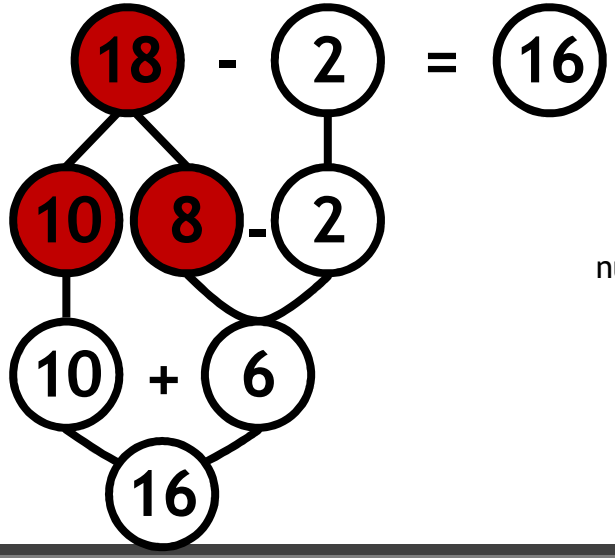
Subtracting single digit numbers from 11-19



8 - 2 = 6



tens frames

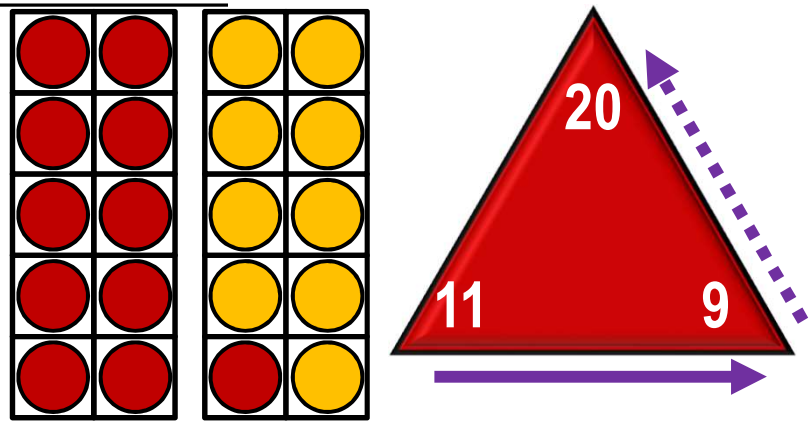


numeric representation

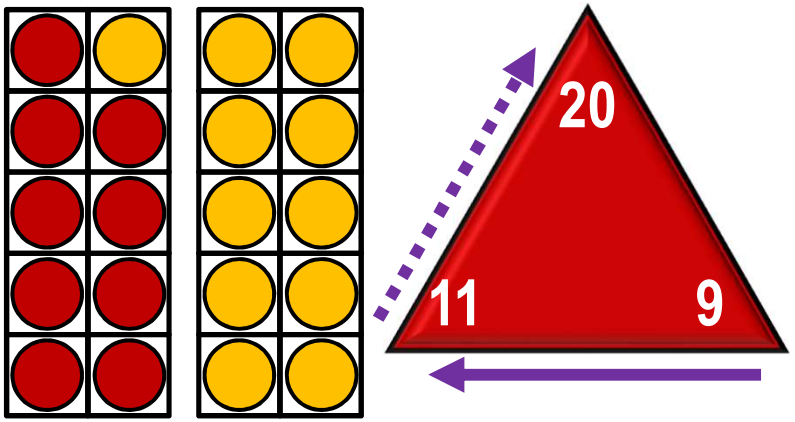
Year 1 - Block 2

Number bonds for 20

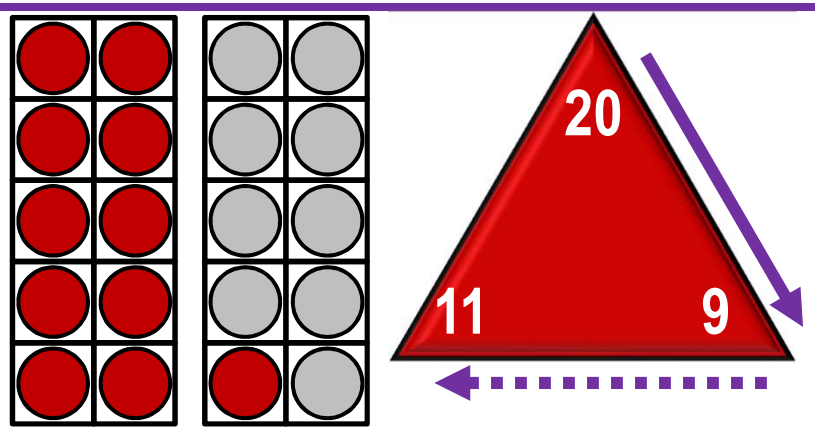
tens frames and relationship triangles



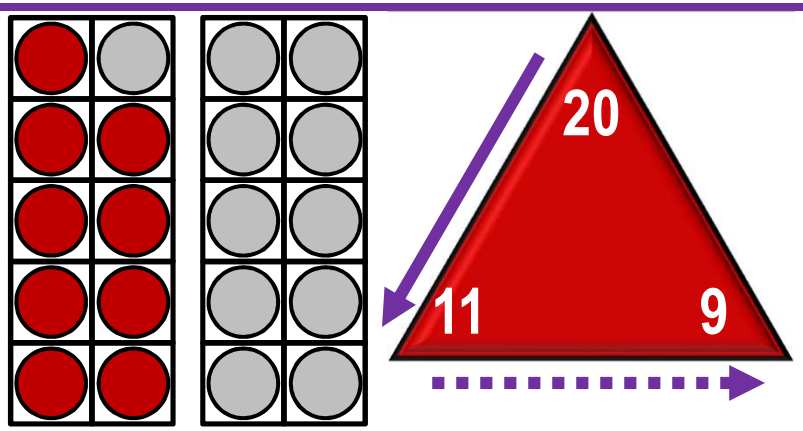
11 + 9 = 20



9 + 11 = 20



20 - 9 = 11



20 - 11 = 9

CALCULATION POLICY FOR ADDITION AND SUBTRACTION

YEAR 2

Year 2			
	Block 1	**Block 2**	**Block 3**
Calculation content	**ADDITION AND SUBTRACTION (UNIT 1)** • **Number bonds for 20** (r) • **Add a two-digit number and ones** – no exchanging • **Add multiples of ten** • **Friendly number pairs** • **Subtract ones from a two-digit number** – no exchanging • **Subtract multiples of ten** • **Subtract ones from a multiple of ten** • **Add single digit numbers bridging ten** (eg 8 + 6) • **Subtract single digit numbers from 11-18 bridging ten** (eg 15 – 8)	**MONEY (UNIT 1)** • **Finding the total** (two-digit amount + 1 digit amount (no exchanging); add multiples of ten pence; adding single digit pounds bridging ten pounds) • **Change** (change from 20p; change from 50p) **ADDITION AND SUBTRACTION (UNIT 2)** • **Add a two-digit number and ones** – bridging the next ten (eg 28 + 6) • **Add 3 one-digit numbers** • **Subtract ones from a two-digit number** – making the previous ten (eg 25 – 8) • **Adding 2 two-digit numbers** • **Subtracting a two-digit number from a multiple of ten** • **Subtracting a two-digit number from a two-digit number**	**CALCULATION UNIT** • **Adding two 2-digit numbers** (r) • **Subtracting a 2-digit number from a 2-digit number** (r) **MONEY (UNIT 2)** • **Adding coins** (finding different combinations to make totals) • **Adding notes** (adding multiples of ten and five) • **Subtracting amounts of money** (eg £60 - £15 = £60 - £10 - £5)

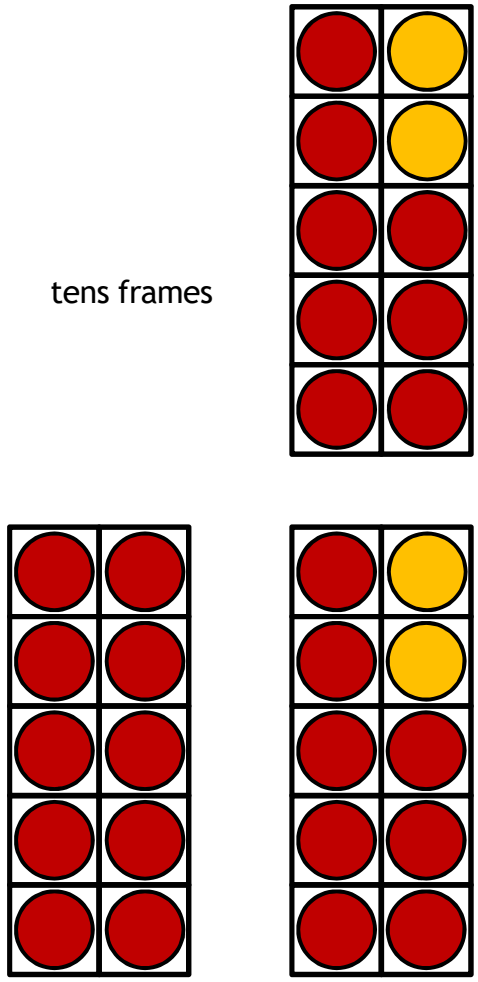
Year 2			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	Number bonds for 20 Partitioning first addend into tens and ones then combining ones, eg: 18 + 2 = 10 + 8 + 2. *NB Number bonds for 20 are revisited early on in the Block 2 unit on money.* Add a two-digit number and ones – no exchanging Counting on; partitioning first addend into tens and ones, then combining ones; column method. Add multiples of ten Use known facts, eg: 3 + 2 = 5 so 3 tens + 2 tens = 5 tens. Friendly number pairs Friendly numbers fit together to make a number that is easy to work with. Re-ordering is often used to simplify calculations. Eg: 14 + 30 + 6 becomes 14 + 6 + 30 which becomes 20 + 30.	Finding the total Two-digit amount + 1 digit amount (no exchanging) using partitioning, eg: 54p + 5p = 50p + 4p + 5p. Column method used as well. Add multiples of ten pence using representations of coins. Adding single digit pounds bridging ten pounds, eg: £8 + £6 = £8 + £2 + £4 Change Change from 20p using tens frames and recall of number bonds for 20. Change from 50p using base 10 and mental calculation to subtract multiples of five and ten from 50p.	Calculation unit Revisits methods from Block 2. Adding coins Children use their mental calculation skills to find totals supported by representations of coins. Adding notes Children use their mental calculation skills to add multiples of ten and five pounds supported by representations of bank notes. Subtracting amounts of money Children subtract amounts using notes and coins. The core strategy is to partition the subtrahend, eg: £60 - £15 = £60 - £10 - £5

Year 2			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Subtract ones from a two-digit number – no exchanging</u> Counting back; partitioning minuend; column method. <u>Subtract multiples of ten</u> Use known facts, eg: 5 – 2 = 3 so 5 tens - 2 tens = 3 tens. <u>Subtract ones from a multiple of ten</u> Use known facts, eg: 10 – 2 = 8 so 30 – 2 = 28. <u>Add single digit numbers bridging ten</u> Making the next ten, eg: 8 + 6 = 8 + 2 + 4. <u>Subtract single digit numbers from 11-18 bridging ten</u> Making the previous ten, eg: 15 – 8 = 15 – 5 – 3.	<u>Add a two-digit number and ones</u> Making the next ten, eg: 28 + 6 = 28 + 2 + 4; expanded column method; compact column method. <u>Add 3 one-digit numbers</u> Add 3 one-digit numbers Children use their developing ability to make the next ten to add 3 one-digit numbers. The core representation is the tens frame, eg: 9 + 7 + 5 = 16 + 5 = 16 + 4 + 1 = 21 <u>Subtract ones from a two-digit number</u> Making the previous ten; compact column method. <u>Adding 2 two-digit numbers</u> Partitioning addends into tens and ones and combining; expanded column method; compact column method.	

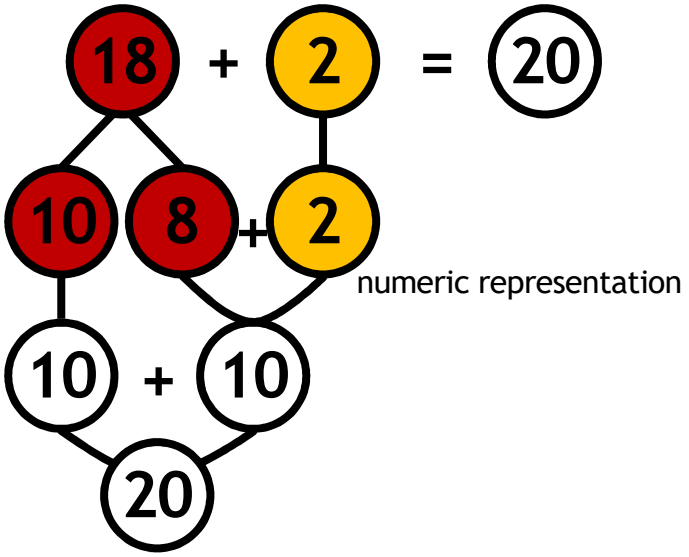
Year 2			
	Block 1	Block 2	Block 3
Strategies/ methods		<u>Subtracting a two-digit number from a multiple of ten</u> Partitioning the subtrahend, eg: 30 – 19 = 30 – 10 – 9. <u>Subtracting a two-digit number from a two-digit number</u> Partitioning the subtrahend; compact column method.	

Number bonds for 20

tens frames



8 + 2 = 10

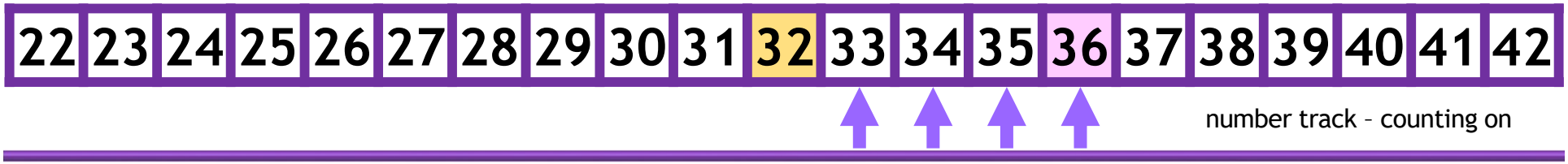


numeric representation

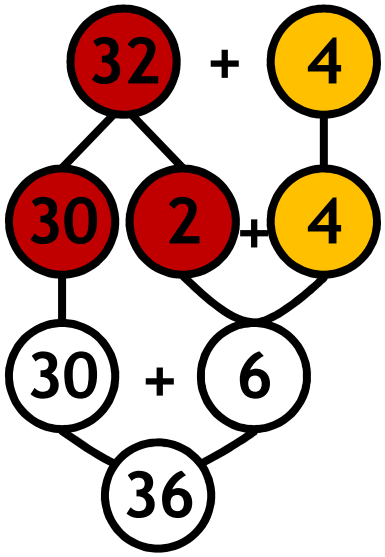
Year 2 - Block 1

32 + 4 = 36

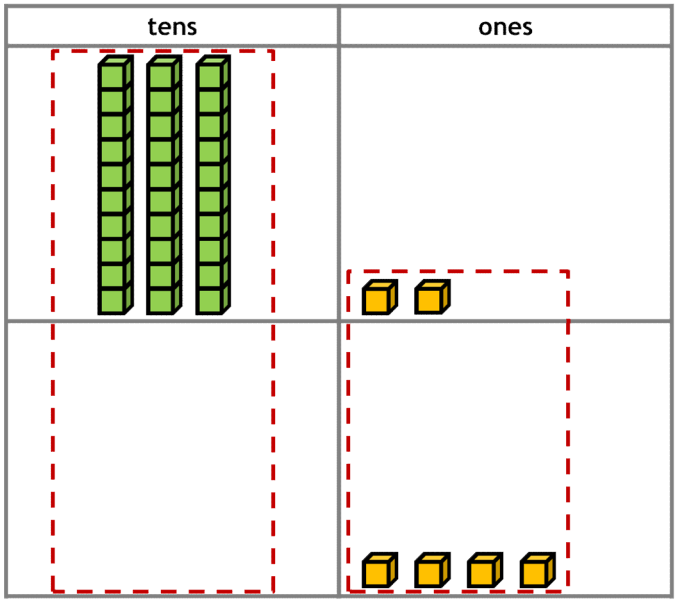
Add a two-digit number and ones - no exchanging



number track - counting on



partitioning first addend into tens and ones, then combining ones



Add the ones

Add the tens

+	3	2
		4
	3	6

column method supported by base ten

Year 2 - Block 1

3 + 2 = 5 • 30 + 20 = 50

Add multiples of ten

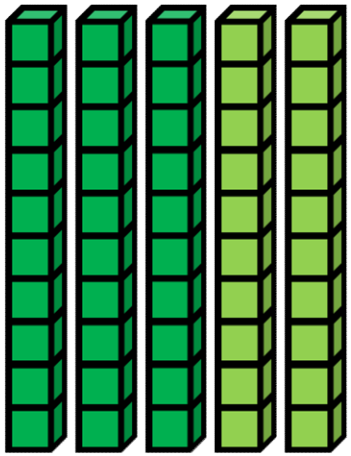
3 + 2 =

3 ones + 2 ones =

5

5 ones

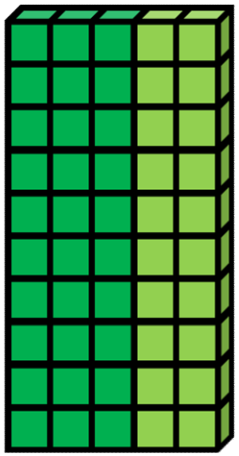
30 + 20 =



3 tens + 2 tens =

30 + 20 =

50



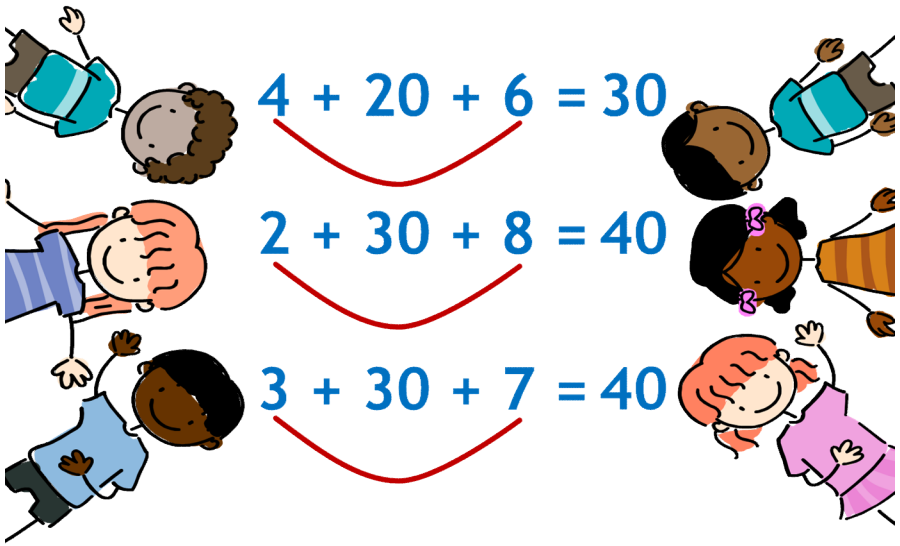
5 tens

50

base ten supports understanding of scaling

Year 2 - Block 1

Friendly number pairs

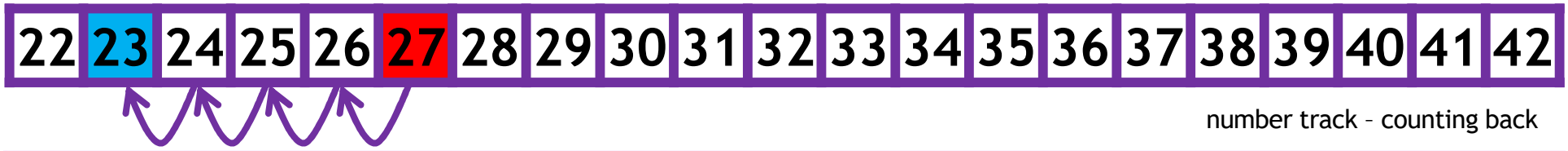


number bonds from Year 1

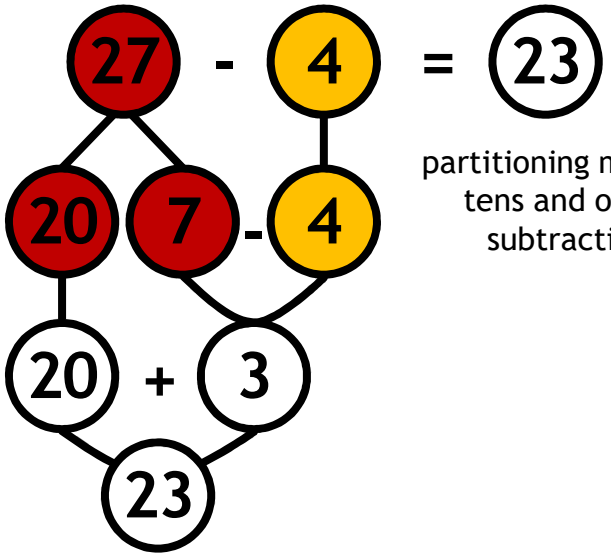
Year 2 - Block 1

27 - 4 = 23

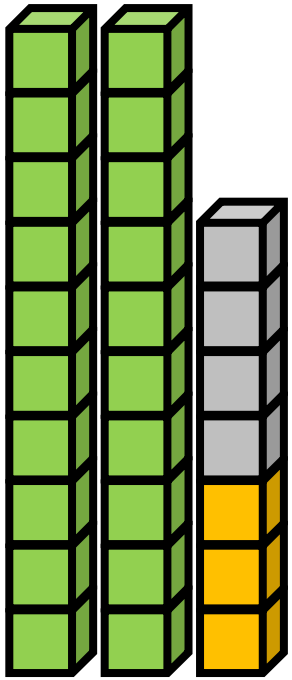
Subtract ones from a two-digit number - no exchanging



number track - counting back



partitioning minuend into tens and ones, then subtracting ones



column method supported by base ten

	2	7
−		4
	2	3

Subtract the ones

Subtract the tens

There are no tens to subtract...

Year 2 - Block 1

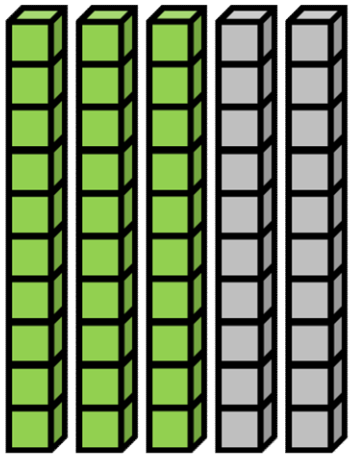
5 - 2 = 3 • 50 - 20 = 30

Subtract multiples of ten

5 - 2 = 3

5 ones - 2 ones = 3 ones

50 - 20 = 30



5 tens - 2 tens = 3 tens

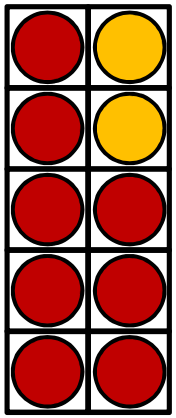
50 - 20 = 30

base ten supports understanding of scaling

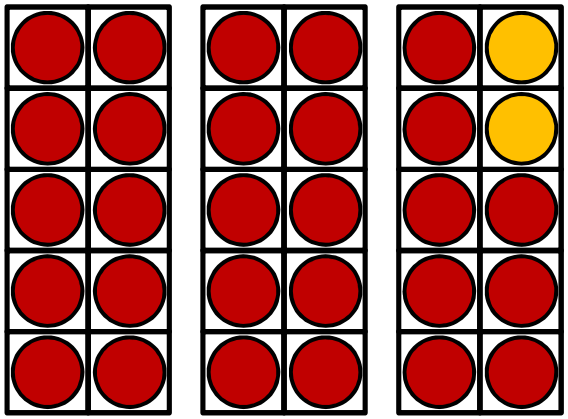
Year 2 - Block 1

10 - 2 = 8 • 30 - 2 = 28

Subtract ones from a multiple of ten



10 - 2 = 8



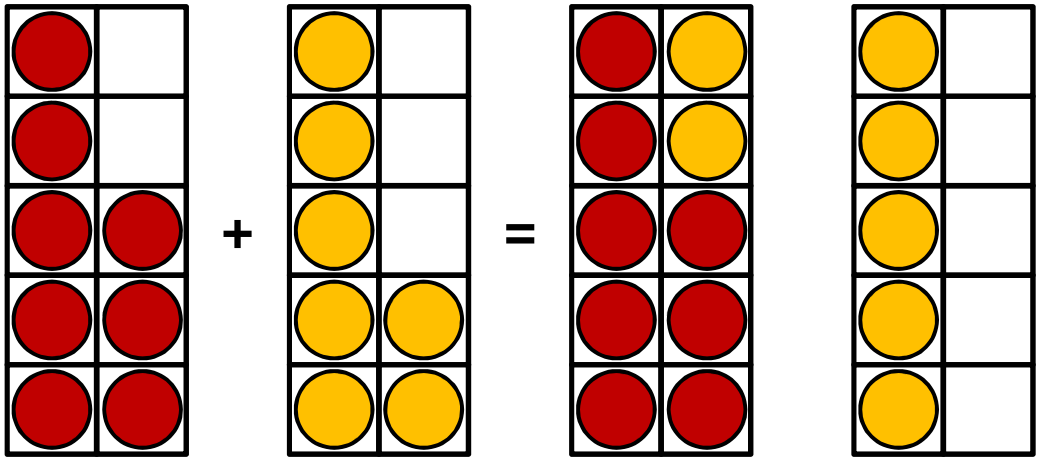
30 - 2 = 28

tens frames representations support understanding of related facts

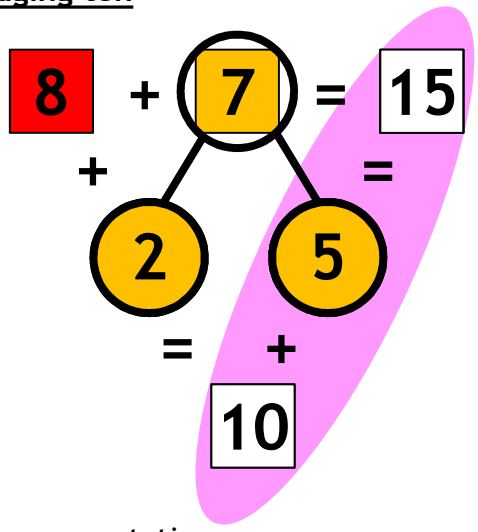
Year 2 - Block 1

8 + 7 = 15 • 15 - 7 = 8

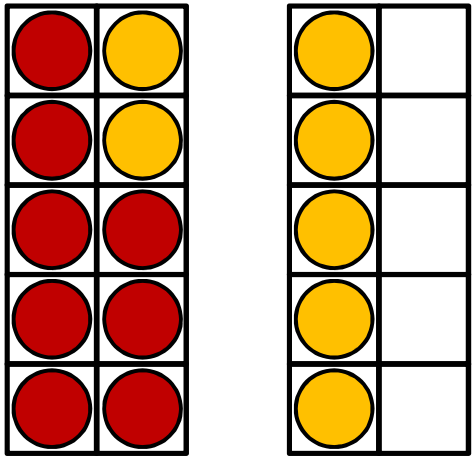
Add single digit numbers bridging ten/ subtract single digit numbers from 11-18 bridging ten

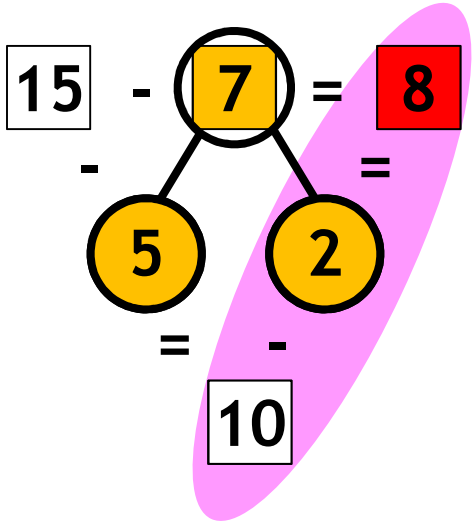


tens frames



numeric representations





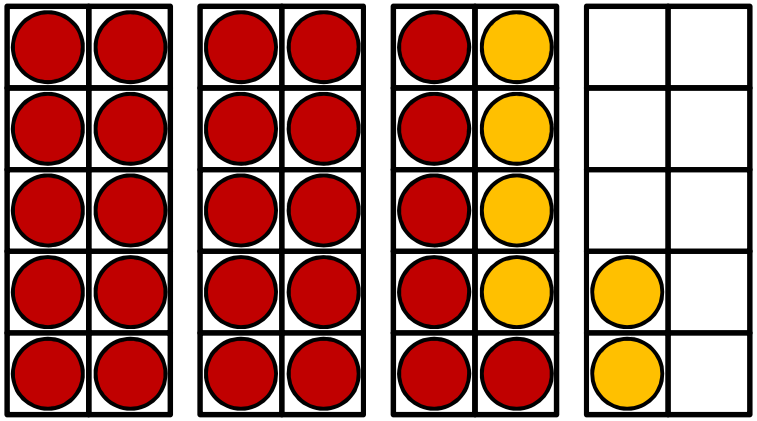
Year 2 - Block 2

26 + 6 = 32

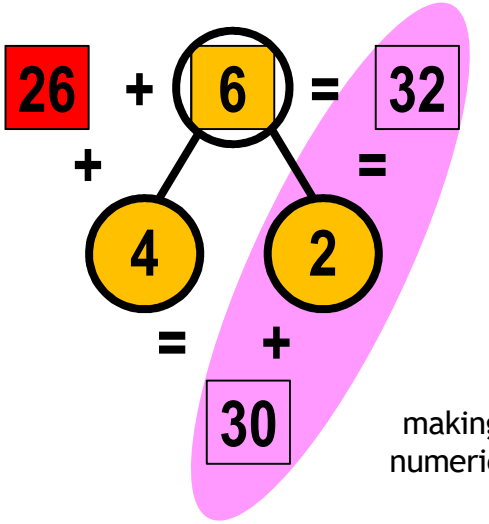
Add a two-digit number and ones

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

making the next ten –
100 square representation



making the next ten –
tens frame representation



making the next ten –
numeric representation

Year 2 - Block 2

26 + 6 = 32

Add a two-digit number and ones

	T	O
	2	6
+		6
	1	2
	2	0
	3	2

expanded column method

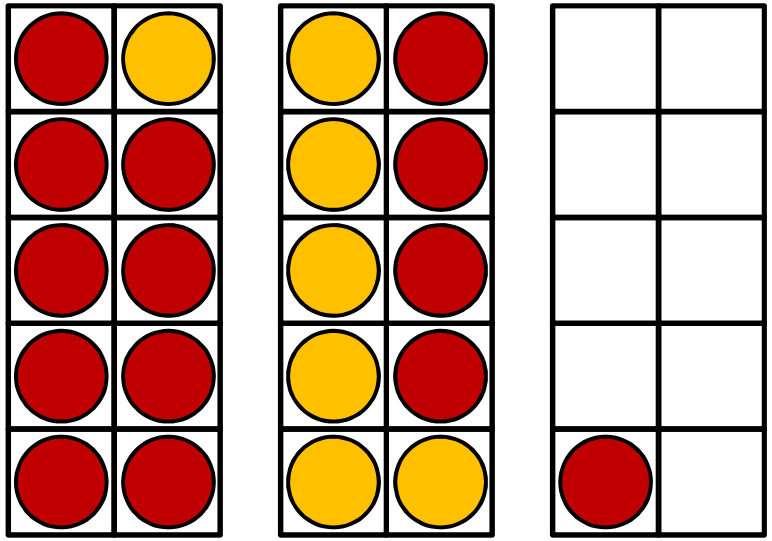
	T	O
	2	6
+		6
	3	2
	1	

compact column method

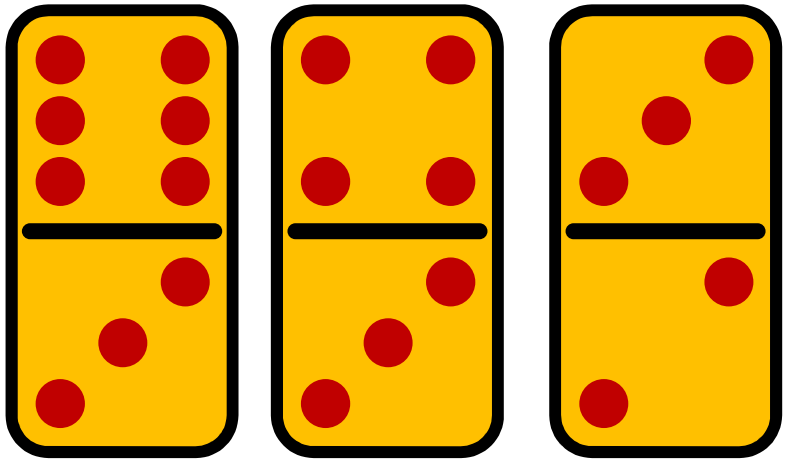
Year 2 - Block 2

9 + 7 + 5 = 21

Add 3 one-digit numbers



tens frames



dominoes

Cuisenaire® rods

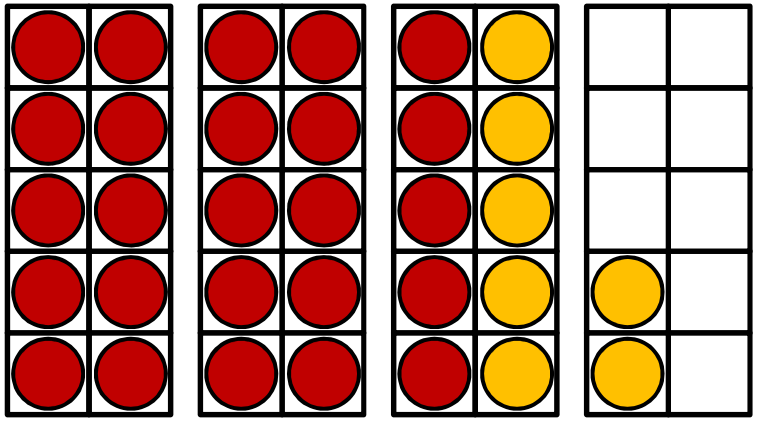
Year 2 - Block 2

32 - 7 = 25

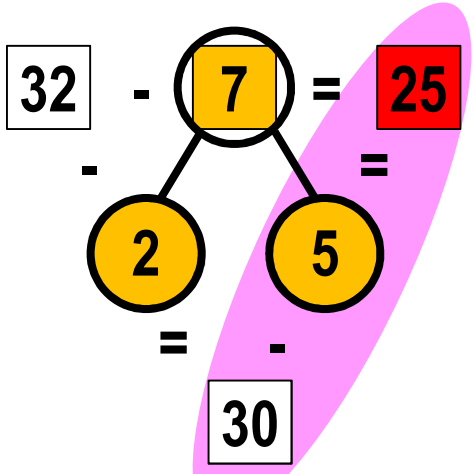
Subtract ones from a two-digit number

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					
		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

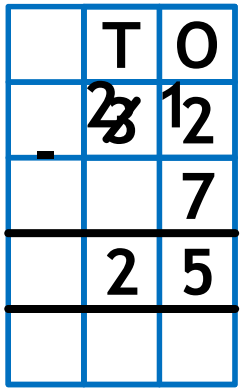
making the previous ten –
100 square representation



making the previous ten –
tens frame representation



making the previous ten –
numeric representation



compact column method

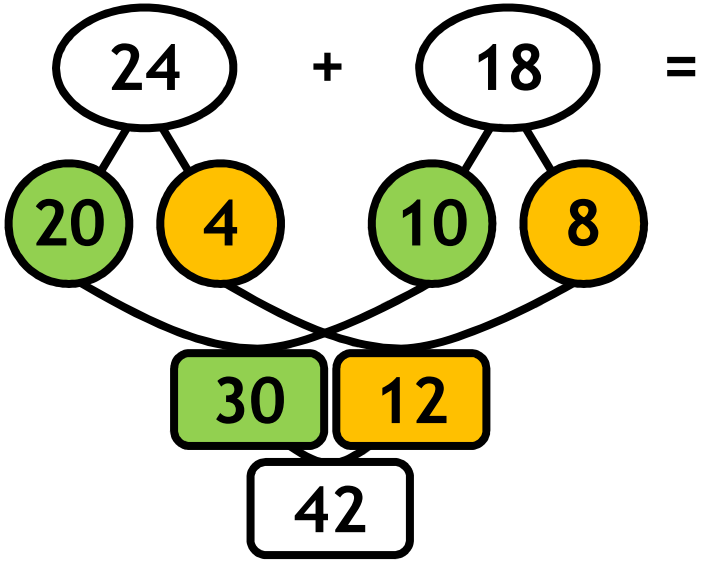
Year 2 - Block 2

24 + 18 = 42

Adding 2 two-digit numbers

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

partitioning the second addend-
100 square representation



partitioning both addends:
combine the tens; combine the ones; combine the results

Year 2 - Block 2

24 + 18 = 42

Adding 2 two-digit numbers

	T	O
	2	4
+	1	8
	1	2
	3	0
	4	2

expanded column method

	T	O
	2	4
+	1	8
	4	2
	1	

compact column method

Add the ones.

4 ones + 8 ones = 12 ones

12 ones = 1 ten and 2 ones

Add the tens.

2 tens + 1 ten + 1 ten = 4 tens

Year 2 - Block 2

30 - 19 = 11

Subtracting a two-digit number from a multiple of ten

1	2	3	4	5	6	7	8	9	10
11									
21	22	23	24	25	26	27	28	29	
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

30 - 19 is the same as
30 - 10 - 9.

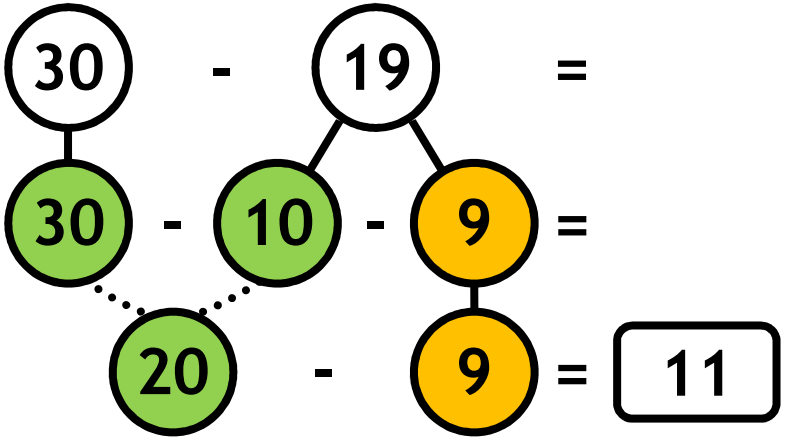
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

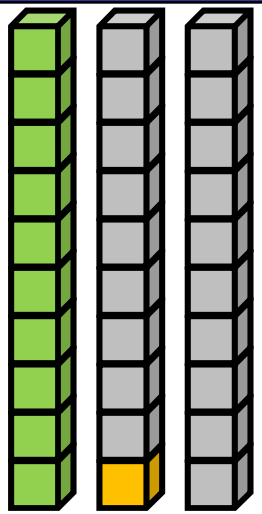
30 - 19 is the same as
30 - 9 - 10.

Year 2 - Block 2

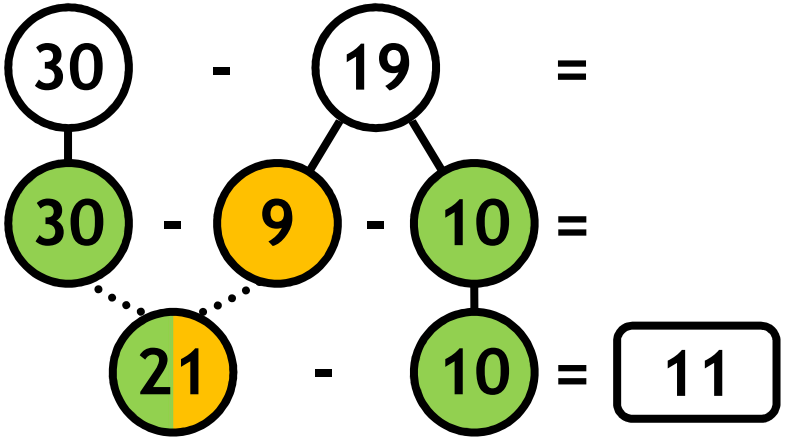
30 - 19 = 11

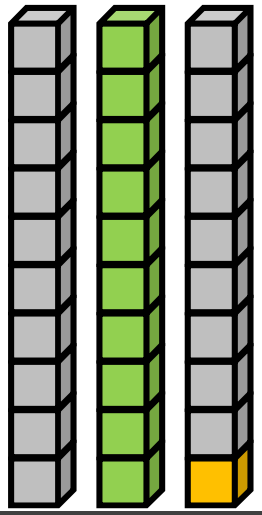
Subtracting a two-digit number from a multiple of ten





partitioning the subtrahend

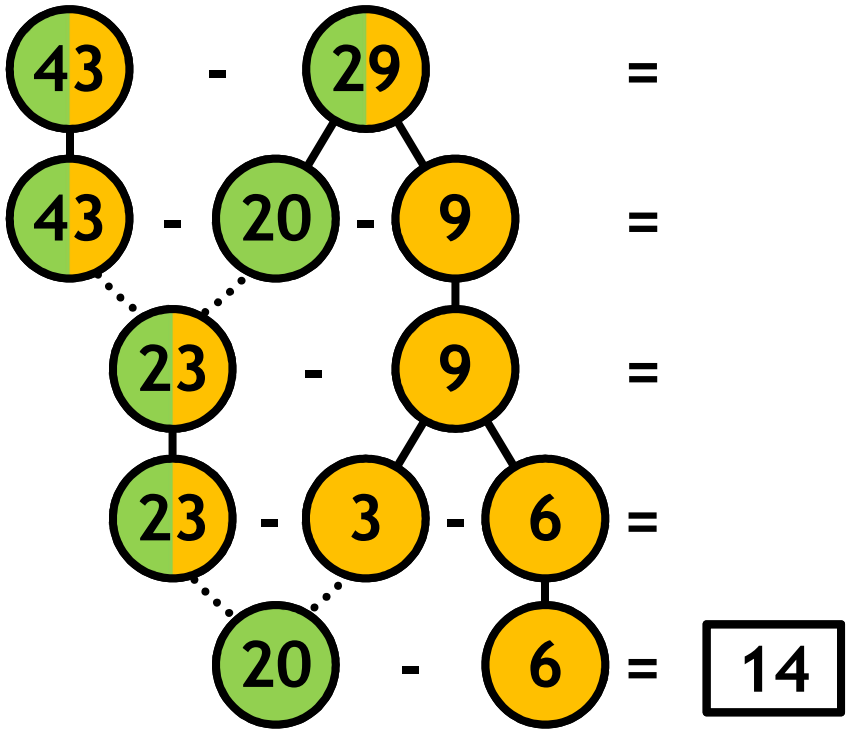




Year 2 - Block 2

43 - 29 = 14

Subtracting a two-digit number from a two-digit number

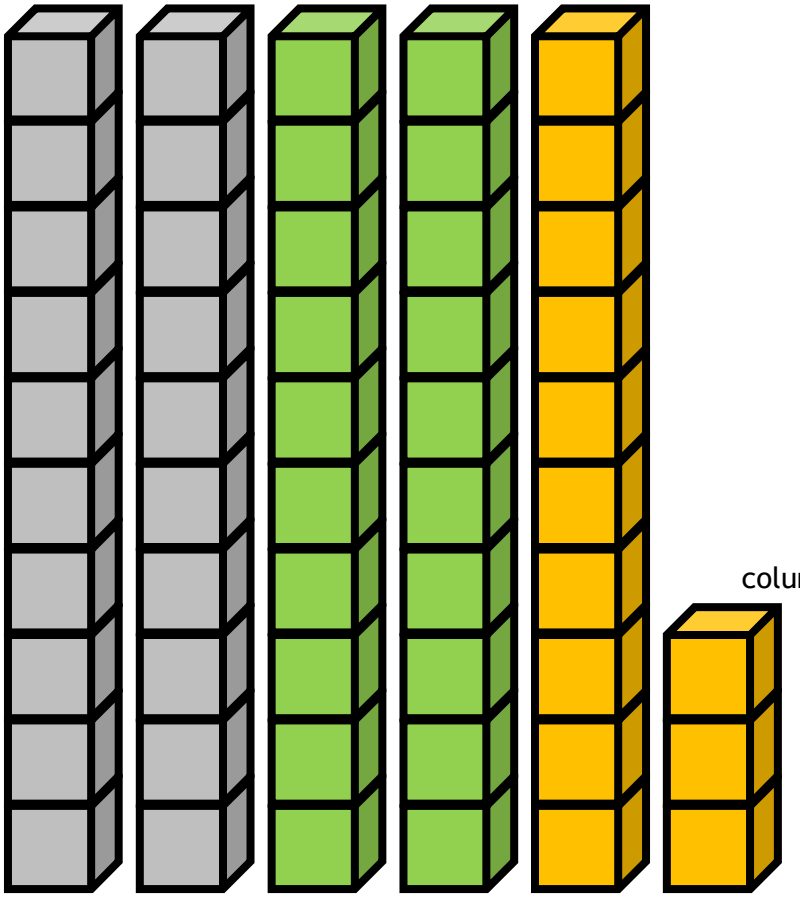


partitioning the subtrahend

Year 2 - Block 2

43 - 29 = 14

Subtracting a two-digit number from a two-digit number



	T	O
	3 ~~4~~	1 3
-	2	9
	1	4

column method supported by base ten

Subtract 9 ones.

There are not enough ones.

Let's exchange 1 ten for 10 ones.

Subtract 9 ones.

Subtract 2 tens.

CALCULATION POLICY FOR ADDITION AND SUBTRACTION

YEAR 3

Year 3			
	Block 1	**Block 2**	**Block 3**
Calculation content	**ADDITION AND SUBTRACTION (UNIT 1)** • **+ and - facts for 100 using multiples of 5 and 10** • **Add a 3-digit number and ones** • **Subtract ones from a three-digit number** (exchanging) • **Add a three-digit number and tens; subtract tens from a three-digit number** • **Adding multiples of ten beyond one hundred** • **Subtract multiples of ten** • **Add numbers with up to three-digits** (without and with exchanging) • **Subtract numbers with up to three-digits** (without and with exchanging)	**MONEY (UNIT 1)** • **Making £1, £2 and £5** • **Adding 2 two-digit amounts** (eg 35p + 25p = 30p + 20p + 5p +5p) • **Adding pounds and pence, including bridging through £1** (eg £4 and 70p + £3 and 60p) **ADDITION AND SUBTRACTION (UNIT 2)** • **+ and - facts for 100 and related facts** • **Add a three-digit number to a three-digit number** (exchanging ones to tens and tens to hundreds) • **Subtract a three-digit number from a three-digit number** (exchanging hundreds to tens and tens to ones) **FRACTIONS (UNIT 2)** • **Add and subtract fractions with the same denominator** • **Subtract from one whole**	**CALCULATION UNIT** • **Scaling additive facts by ten** • **Add a three-digit number to a three-digit number** (r) • **Subtract a three-digit number from a three-digit number** (r) **MONEY (UNIT 2)** • **Subtracting amounts of money** (empty number line and subtracting by partitioning the minuend)

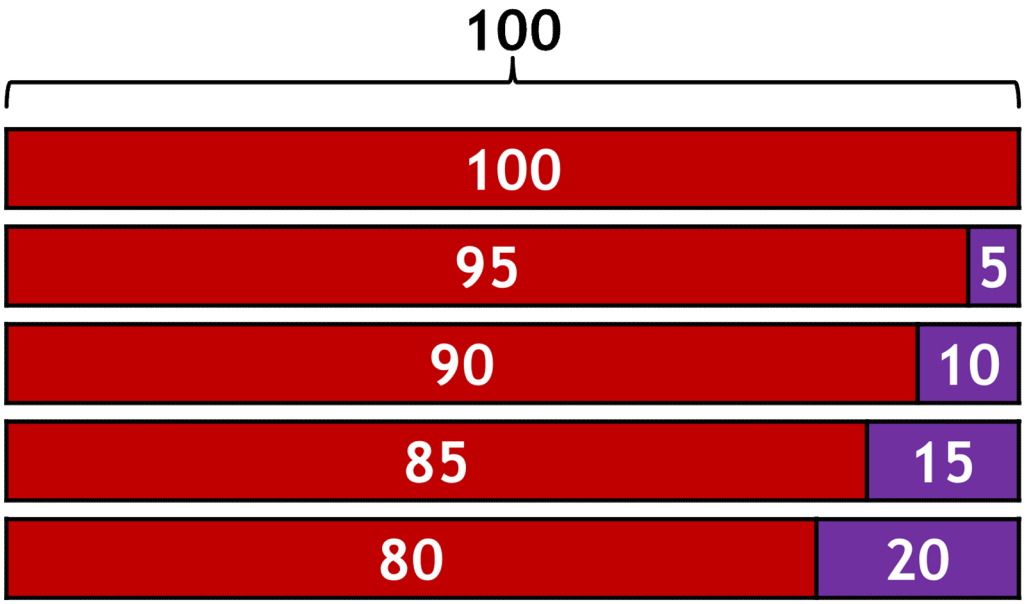
Year 3			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	+ and - facts for 100 using multiples of 5 and 10 Teaching needs to stress how to avoid common errors when calculating complements to 100, eg: 65 + 45 = 110 instead of 100. See notes in lesson. Add a 3-digit number and ones Making the next ten, eg: 167 + 9 = 170 + 3 + 6. Subtract ones from a three-digit number Making the previous ten, eg: 167 – 9 = 167 – 7 – 2. Add a three-digit number and tens; subtract tens from a three-digit number For addition: partition the three-digit number into hundreds and tens and ones, eg: 258 + 30 = 250 + 8 + 30 = 280 + 8. For subtraction: partition the minuend, eg: 258 – 30 = 58 – 30 + 200	Making £1, £2 and £5 Representations of coins and money number lines support calculating amounts to £1, £2 and £5. Adding 2 two-digit amounts Both amounts are partitioned into multiples of ten pence and multiples of one pence, eg: 35p + 25p = 30p + 5p + 20p +5p Adding pounds and pence, including bridging through £1 The core strategy is to add the pounds, then add the pence, then combine, eg: £4 and 70p + £3 and 60p = £7 and 130p = £8 and 30p NB Remember that children in Year 3 have not formally encountered decimal notation. Pounds and pence are presented as either £8 and 30p or £8.30 – but the decimal is referred to as a separator.	Scaling additive facts by ten Use known facts, eg: 5 – 2 = 3 so 5 tens - 3 tens = 2 tens. Add a three-digit number to a three-digit number Partitioning to expand second addend; partitioning both addends; compensation. Subtract a three-digit number from a three-digit number Counting on using empty number line; compensation. Subtracting amounts of money Empty number line and subtracting by partitioning the minuend.

Year 3			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Adding multiples of ten</u> Making the next hundred, eg: 80 + 60 = 80 + 20 + 40. <u>Subtract multiples of ten</u> Making the previous hundred, eg: 140 – 60 = 140 – 40 – 20. <u>Add numbers with up to three-digits</u> (three-digit + two-digit) Partitioning the second addend – 100 square representation; column method. <u>Subtract numbers with up to three-digits</u> (three-digit - two-digit) Using hundred square; counting back on empty number line; column method.	<u>+ and - facts for 100 and related facts</u> For addition: partitioning both addends into ten and ones and combining parts, eg: 73 + 27 = 70 + 3 + 20 + 7 = 90 + 10. For subtraction: partitioning the subtrahend, eg: 100 – 68 = 100 – 60 – 8; counting on with number line. <u>Add a three-digit number to a three-digit number</u> Column method (exchanging ones to tens and tens to hundreds). <u>Subtract a three-digit number from a three-digit number</u> Column method (exchanging hundreds to tens and tens to ones).	

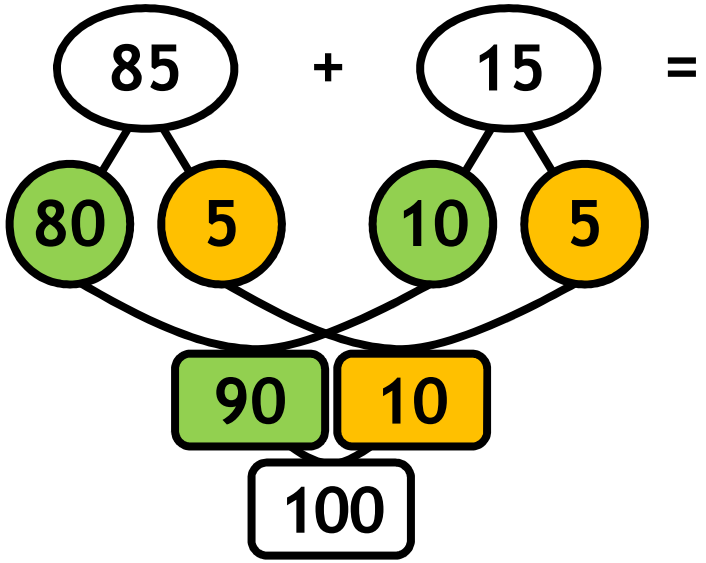
Year 3			
	Block 1	Block 2	Block 3
Strategies/ methods		<u>Add and subtract fractions with the same denominator</u> Teaching uses dual-naming. For example: $\frac{2}{6}+\frac{3}{6}=$ First say: *Two one-sixths and three one-sixths = five one-sixths.* (Unitising the fraction by verbally describing a non-unit fraction as a multiple of its unit fraction – this is important to avoid the misconception that two-sixths plus three-sixths = five twelfths. Then say: *Two sixths plus three sixths = five sixths.* <u>Subtract from one whole</u> Key teaching point is that when the numerator and denominator are the same the fraction is equivalent to a whole number. For example: $1-\frac{5}{6}=\frac{6}{6}-\frac{5}{6}$	

Year 3 - Block 1

+ and - facts for 100 using multiples of 5 and 10



bar model supports understanding that
one addend decreases by 5 and
the other increases by 5



partitioning both addends:
combine the tens; combine the ones; combine the results

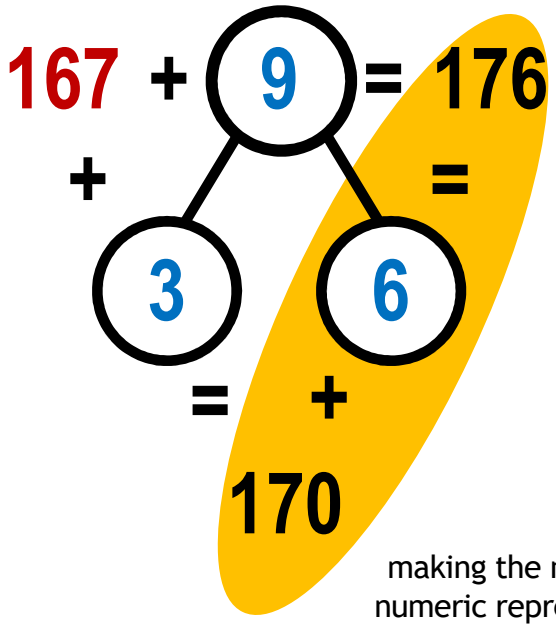
Year 3 - Block 1

167 + 9 = 176

Add a 3-digit number and ones

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

making the next ten – 100 square representation



making the next ten – numeric representation

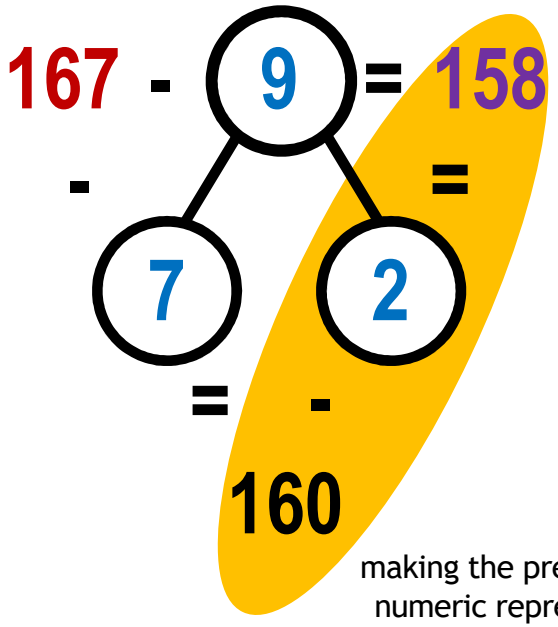
Year 3 - Block 1

167 - 9 = 158

Subtract ones from a three-digit number

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

making the previous ten –
100 square representation

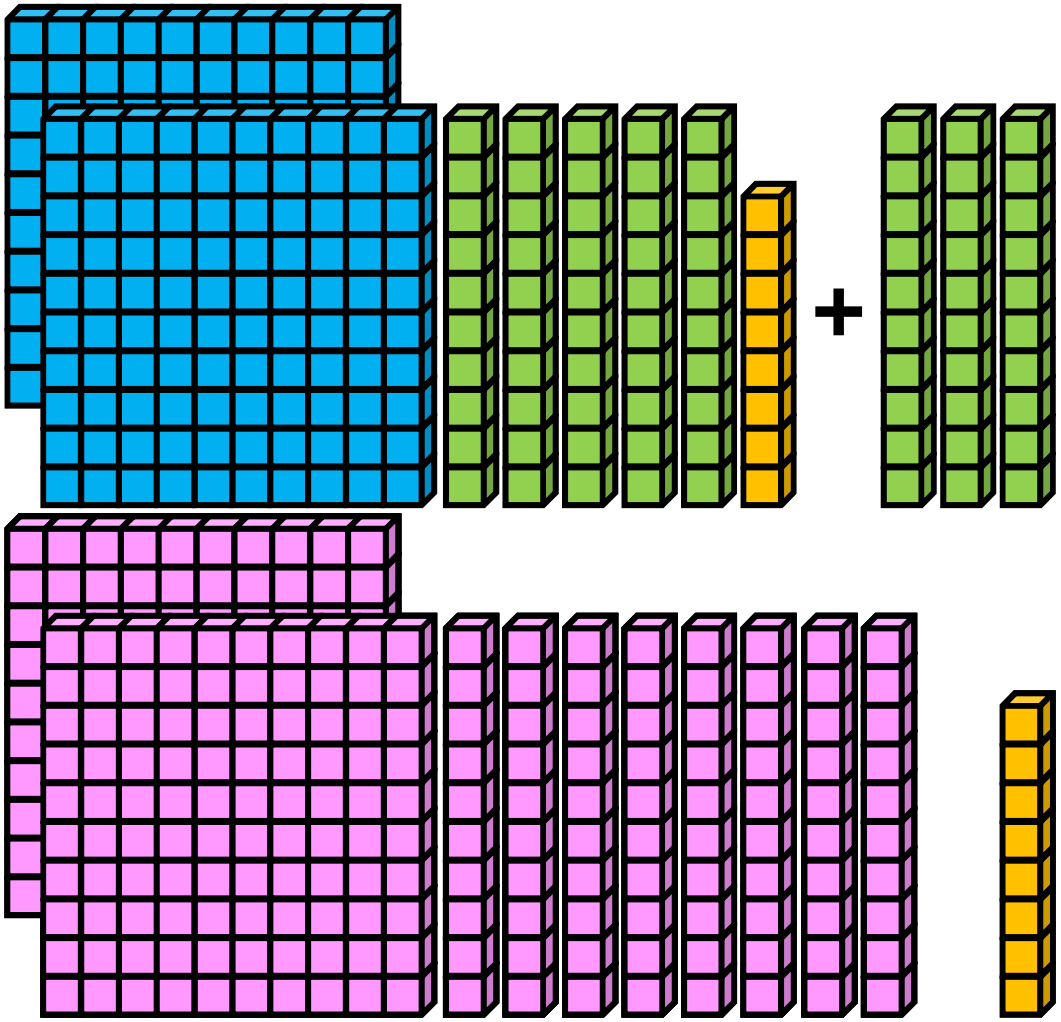


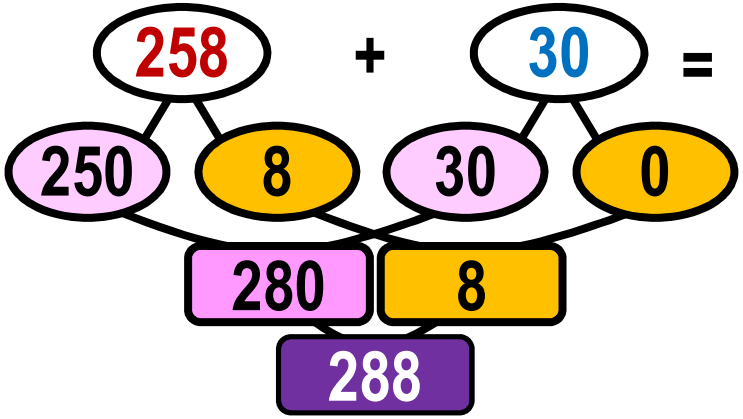
making the previous ten
numeric representation

Year 3 - Block 1

258 + 30 = 288

Add a three-digit number and tens



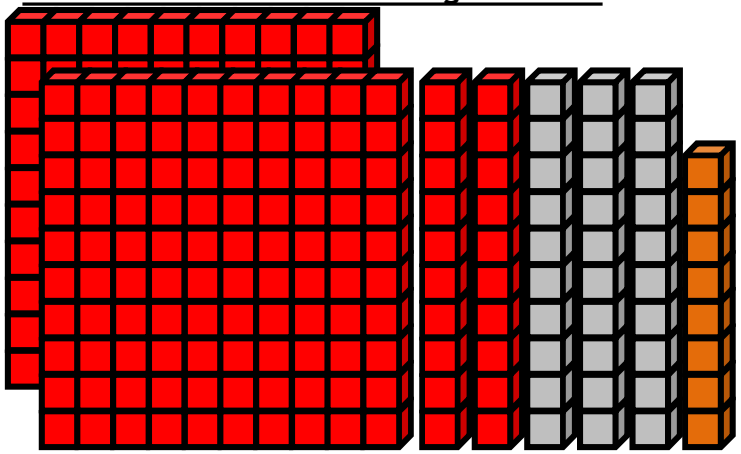


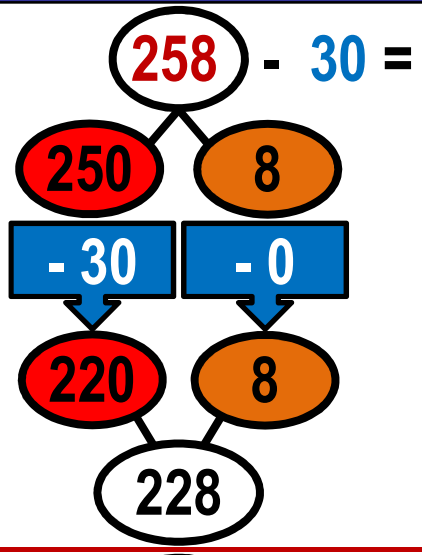
partition the three-digit number into
[a] hundreds and tens [b] ones;
partition the two-digit multiple of ten into tens and ones;
combine.

Year 3 - Block 1

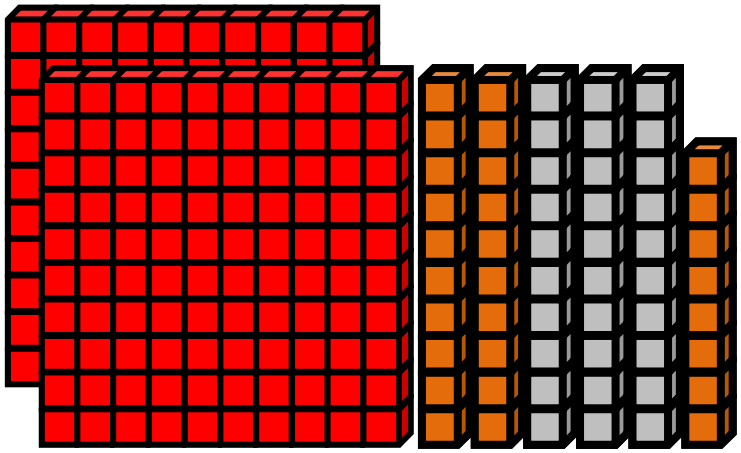
258 - 30 = 228

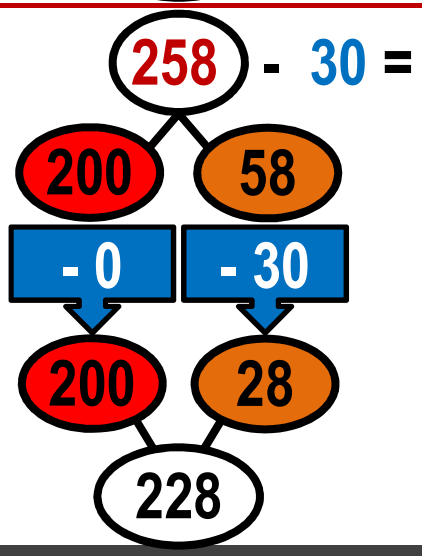
Subtract tens from a three-digit number





partitioning the minuend

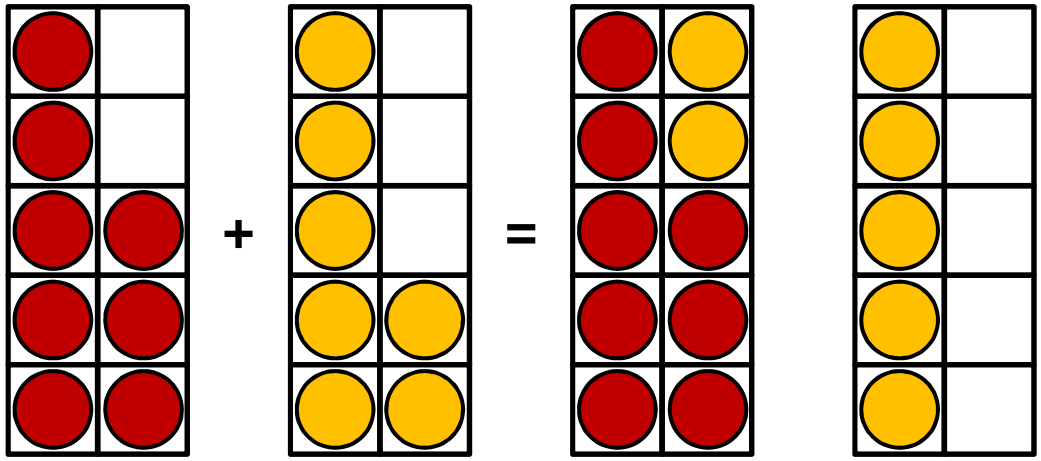




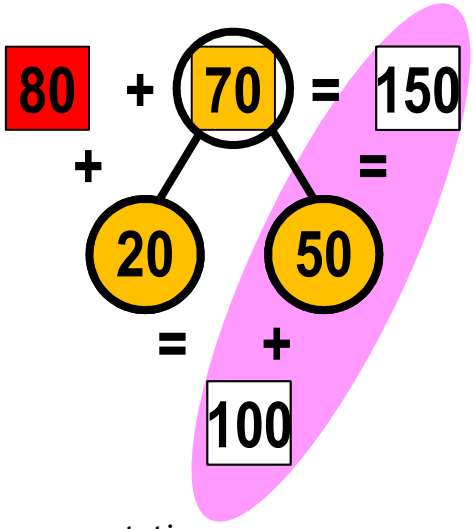
Year 3 - Block 1

80 + 70 = 150 • 150 - 70 = 80

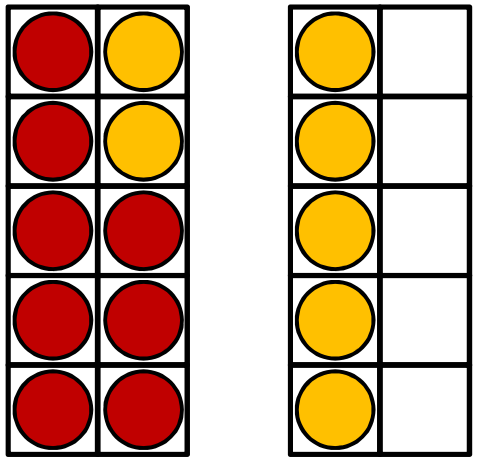
Add multiples of ten bridging hundreds/ subtract multiples of ten bridging hundreds

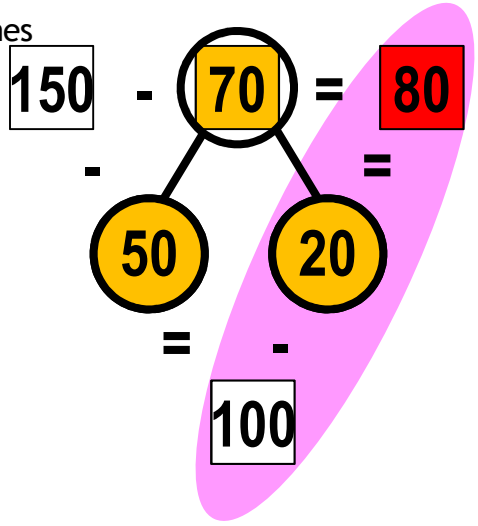


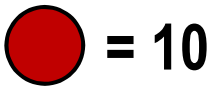
hundreds frames



numeric representations





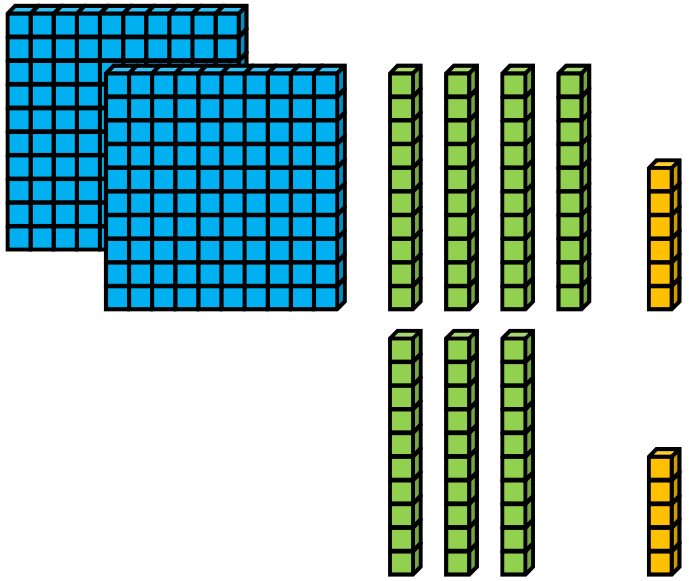


Year 3 - Block 1

246 + 35 = 281

Add numbers with up to three-digits

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300



	H	T	O
	2	4	6
+		3	5
	2	8	1
		1	

Add the ones.
6 ones + 5 ones = 11 ones
11 ones = 1 ten and 1 one

Add the tens.
4 tens + 3 tens + 1 ten = 8 tens

Add the hundreds.
2 hundreds + 0 hundreds = 2 hundreds

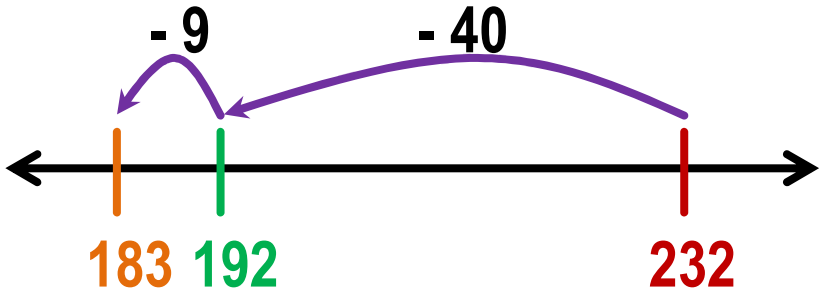
Year 3 - Block 1

232 - 49 = 183

Subtract numbers with up to three-digits

181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280

partitioning the subtrahend - empty number line representation



	H	T	O
	1 ~~2~~	~~2~~ ~~3~~	12
-		4	9
	1	8	3

column method supported by base ten blocks in the lessons

Subtract the ones.

There are not enough ones. Let's exchange.

Exchange 1 ten for 10 ones.

Subtract the ones.

12 ones - 9 ones = 3 ones

Subtract the tens.

There are not enough tens. Let's exchange.

Exchange 1 hundred for 10 tens.

Subtract the tens.

12 tens - 4 tens = 8 tens

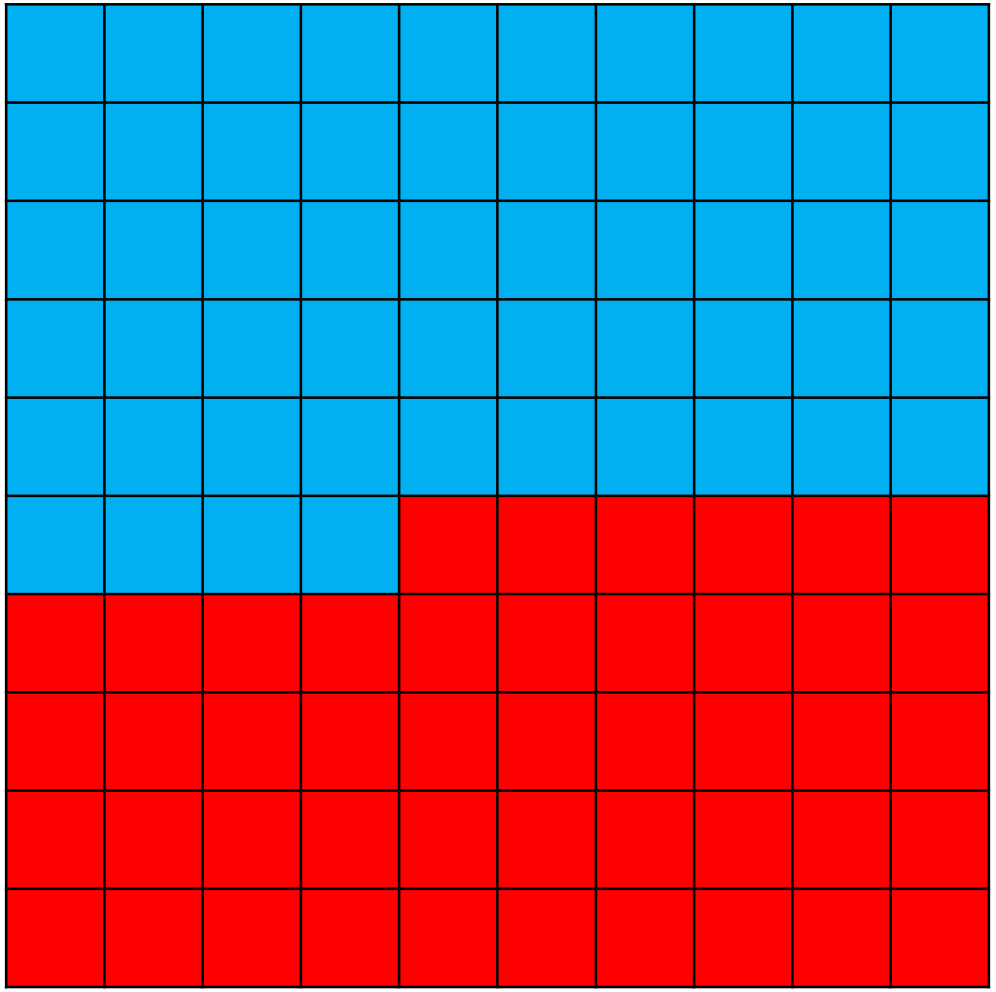
Subtract the hundreds.

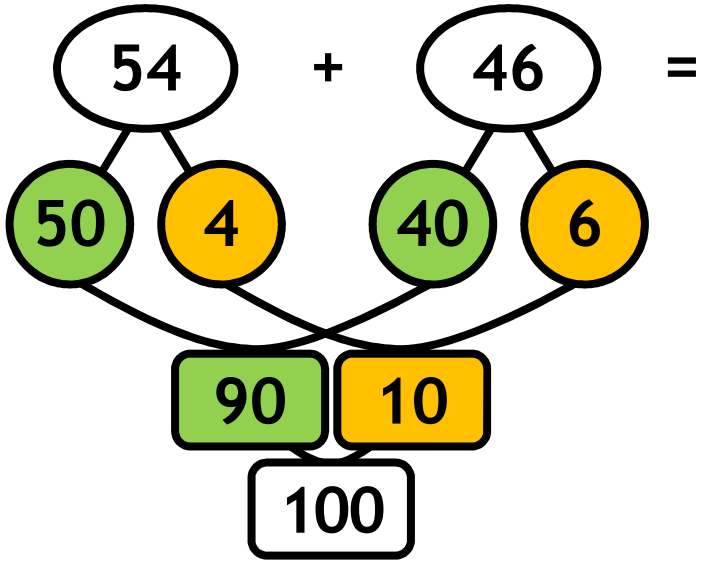
1 hundred - 0 hundreds = 1 hundred

Year 3 - Block 2

54 + 46 = 100

+ and - facts for 100 and related facts





partitioning both addends:
combine the tens; combine the ones; combine the results

Year 3 - Block 2

100 - 46 = 54

+ and - facts for 100 and related facts

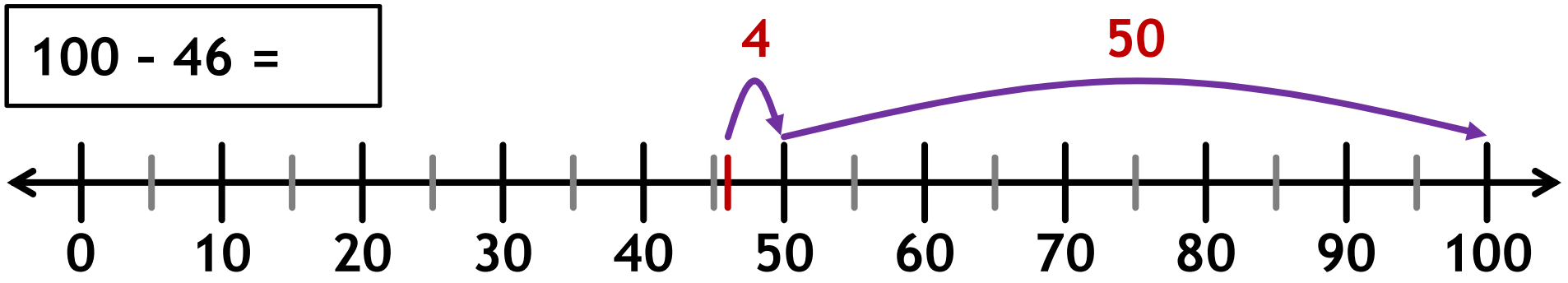
100 - 46 =

100 - 40 - 6 =

60 - 6 = 54

partitioning the subtrahend

100 - 46 =

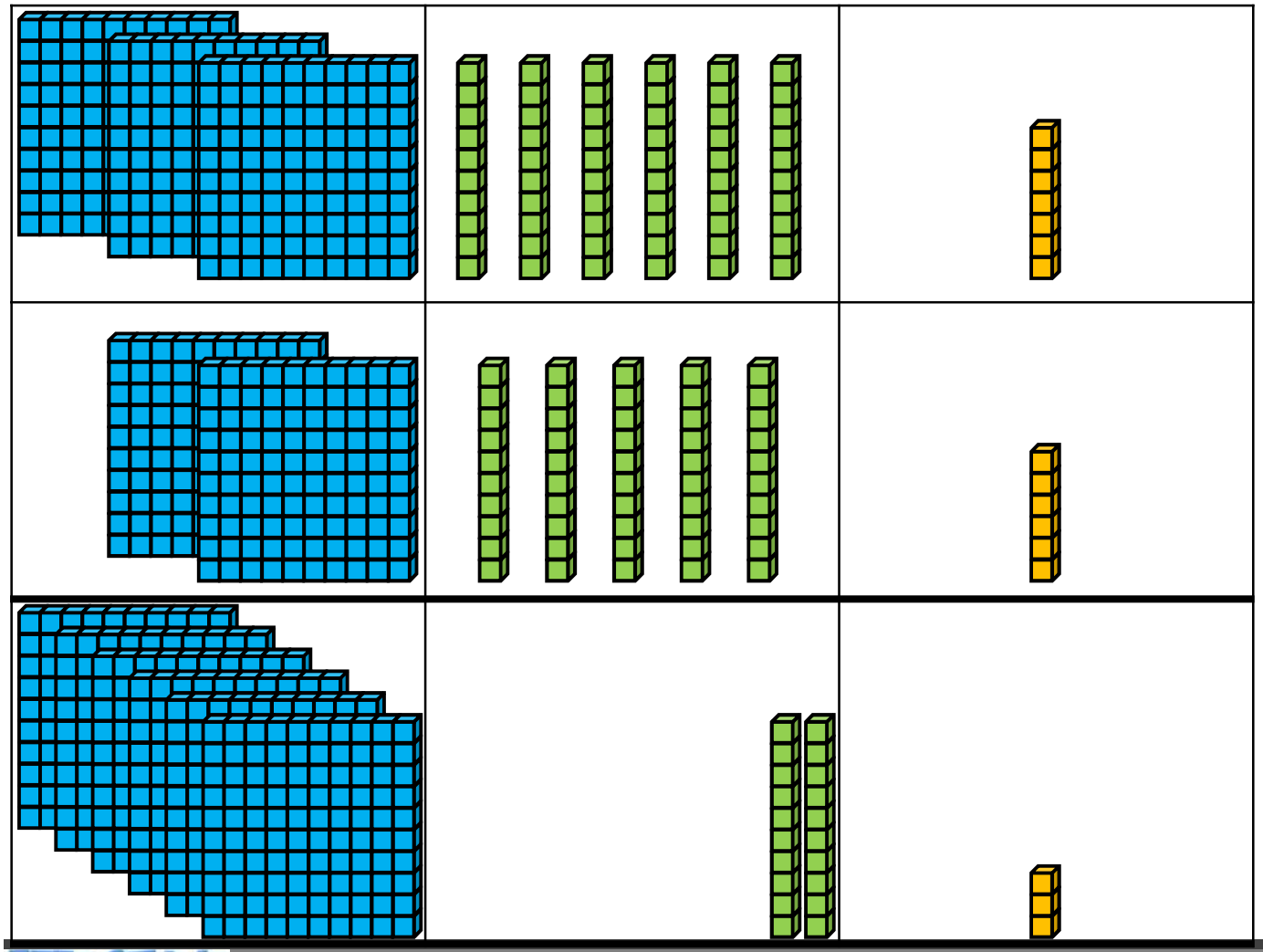


counting on -
number line representation

Year 3 - Block 2

367 + 256 = 623

Add a three-digit number to a three-digit number



	H	T	O
	3	6	7
+	2	5	6
	6	2	3
	1	1	

Add the ones.

7 ones + 6 ones = 13 ones

13 ones = 1 ten and 3 ones

Add the tens.

6 tens + 5 tens + 1 ten = 12 tens

12 tens = 1 hundred and 2 tens

Add the hundreds.

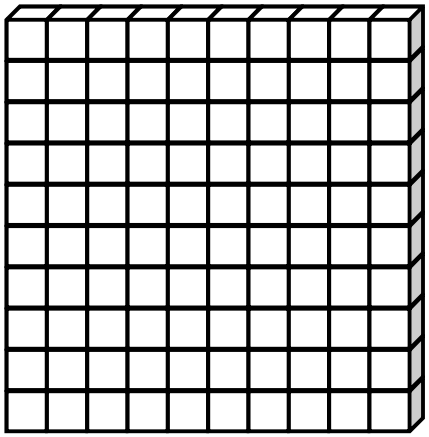
3 hundreds + 2 hundreds + 1 hundred = 6 hundreds

column method supported by base ten

Year 3 - Block 2

341 - 187 = 154

Subtract a three-digit number from a three-digit number



	H	T	O
	2	13	1
	~~3~~	~~4~~	1
-	1	8	7
	1	5	4

Subtract the ones.

There are not enough ones. Let's exchange.

Exchange 1 ten for 10 ones.

Subtract the ones.

11 ones – 7 ones = 4 ones

Subtract the tens.

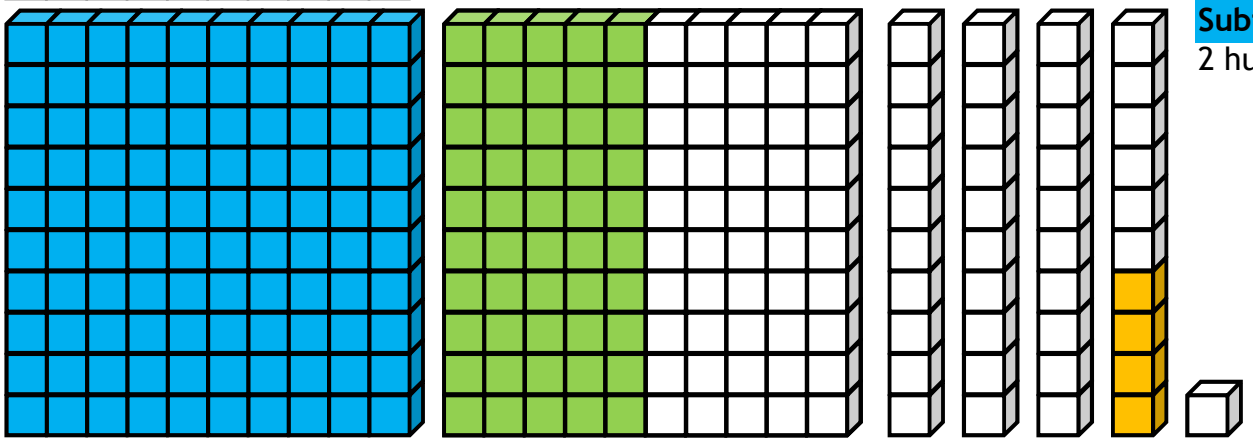
There are not enough tens. Let's exchange.

Exchange 1 hundred for 10 tens.

13 tens – 8 tens = 5 tens

Subtract the hundreds.

2 hundreds – 1 hundred = 1 hundred

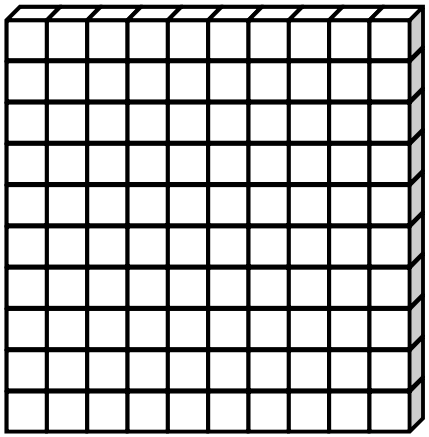


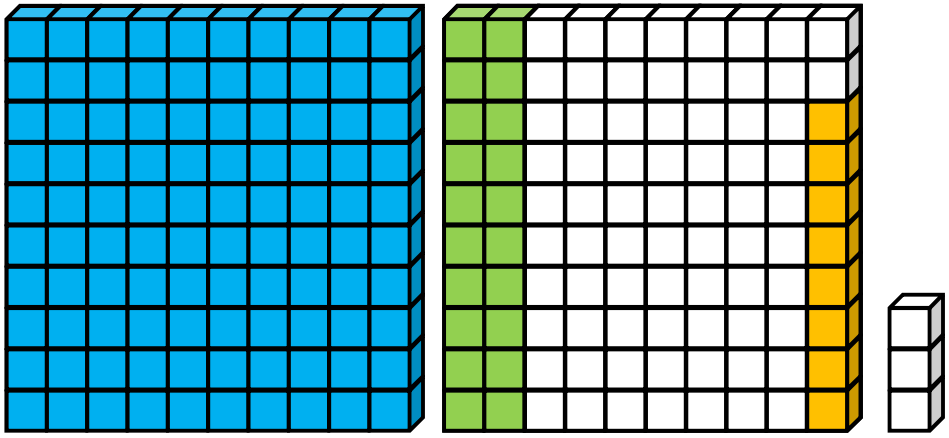
column method supported by base ten

Year 3 - Block 2

303 - 175 = 128

Subtract a three-digit number from a three-digit number





	H	T	O
		9	
	2	10	
	~~3~~	~~0~~	13
-	1	7	5
	1	2	8

Subtract the ones.

There are not enough ones. Let's exchange.

Exchange 1 hundred for 10 tens.

Exchange 1 ten for 10 ones.

Subtract the ones.

13 ones – 5 ones = 8 ones

Subtract the tens.

9 tens – 7 tens = 2 tens

Subtract the hundreds.

2 hundreds – 1 hundred = 1 hundred

column method supported by base ten

Scaling additive facts by ten

3 + 2 =

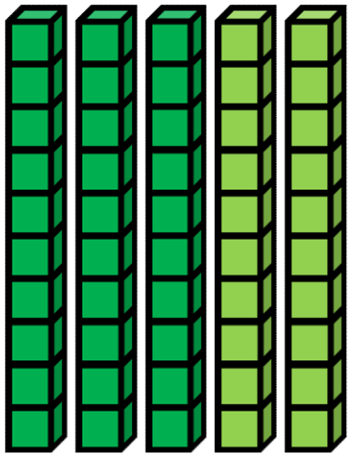
3 ones + 2 ones =

5

5 ones

base ten supports understanding of scaling

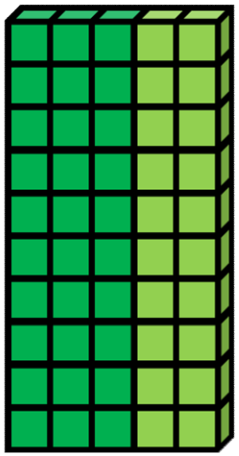
30 + 20 =



3 tens + 2 tens =

30 + 20 =

50



5 tens

50

Scaling additive facts by ten

The way you use language and write can really support children.

Say:

6 tens + 8 tens = 14 tens

14 tens = one hundred and forty

Write as you say:

60 + 80 = 140

140 = 140

You are writing and underlining the digit zero as you say 'tens'.

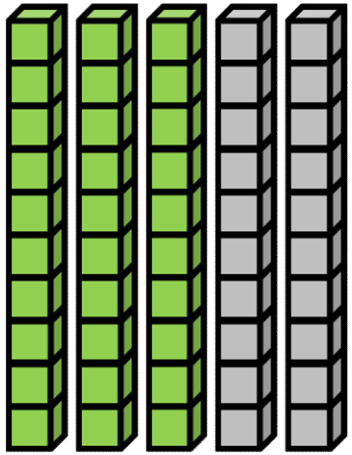
6 tens = 60

Scaling additive facts by ten

5 - 2 = 3

5 ones - 2 ones = 3 ones

50 - 20 = 30



5 tens - 2 tens = 3 tens

50 - 20 = 30

base ten supports understanding of scaling

Year 3 - Block 3

375 + 129 = 504

Add a three-digit number to a three-digit number

375 + 100 + 20 + 9 =

475 + 20

495 + 9 = 504

partitioning second addend

375 + 129 =

300 + 100 = 400

70 + 20 = 90

5 + 9 = 14

400 + 90 + 14 = 504

partitioning both addends

375 + 129 =

+ 25 + 0

400 + 129 =

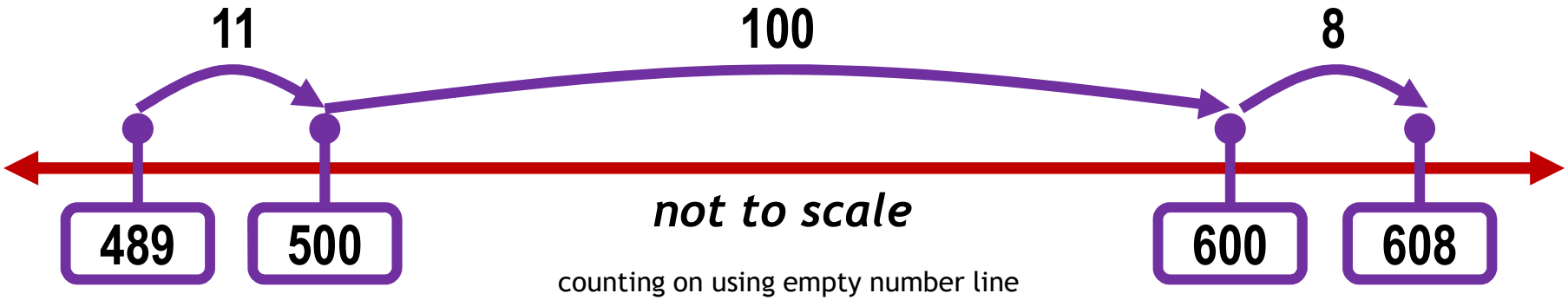
629 - 25 = 504

compensation

Year 3 - Block 3

608 - 489 = 119

Subtract a three-digit number from a three-digit number



counting on using empty number line

608 - 489 =

- 8

600 - 489 = 111

+ 8

119

compensation

608 - 489 =

+ 11

608 - 500 = 108

+ 11

119

CALCULATION POLICY FOR ADDITION AND SUBTRACTION

YEAR 4

Year 4			
	Block 1	**Block 2**	**Block 3**

Calculation content	**ADDITION AND SUBTRACTION (UNIT 1)**
	
	• **+ and - facts for 100** (r)
	• **Friendly number pairs**
	• **Scaling addition and subtraction number facts by 100**
	• **Mental calculation:**
	  • Making next ten/previous ten
	  • Near doubles
	  • Left to right addition
	  • Empty number line
	
	• **Add a four digit number to a four digit number** (exchanging ones, tens and hundreds)
	• **Subtract a three-digit number from a three-digit number** (exchanging hundreds for tens and tens for ones)
		MONEY AND DECIMALS (UNIT 1)
		n/a
		
		ADDITION AND SUBTRACTION (UNIT 2)
		
		• **Mental strategies for addition and subtraction** (r)
		• **Making the next/previous thousand**
		• **Subtract a four-digit number from a four-digit number**
		
		FRACTIONS (UNIT 2)
		
		• **Adding like fractions where sum is equal to or greater than one**
		• **Adding improper and mixed fractions**
		• **Subtracting fractions from whole numbers**
		• **Subtraction of improper and mixed fractions**
			CALCULATION UNIT
			
			• **Different methods for addition (a)**
			• **Different methods for addition (b)**
			• **Different methods for subtraction**
			
			MONEY (UNIT 2)
			
			• **Calculating with money**
			• **Add decimal numbers**
			• **Subtract decimal numbers**

Year 4			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	+ and - facts for 100 (r) As in Year 3, teaching needs to stress how to avoid common errors when calculating complements to 100. (eg: 64 + 46 = 110 instead of 100.) See notes in lesson. The core strategy for addition is to partition the addends in to tens and ones, combine the tens, combine the ones, combine the results. For subtraction the strategy is to partition the subtrahend: partition the subtrahend into tens and ones; subtract the tens from the minuend; subtract the ones from the result. Eg: 100 – 46 = 100 – 40 – 6. Friendly number pairs Children first encountered friendly numbers in Year 2. Friendly numbers fit together to make a number that is easy to work with. Re-ordering is often used to simplify calculations. Eg: 14 + 37 + 6 becomes 14 + 6 + 37 which becomes 20 + 37.	Mental strategies for addition and subtraction The unit begins with revisiting efficient strategies for mental calculation including near doubles and making the next/previous ten. Making the next/previous thousand Children's knowledge of making the next/previous is extended to examples where they make the next/previous thousand, eg: 900 + 600 = 900 + 100 + 500 Subtract a four-digit number from a four-digit number Column method (exchanging thousands for hundreds, hundreds for tens and tens for ones).	Different methods for addition Working with four-digit numbers children explore the following methods: ○ column method; ○ partitioning the second addend; ○ making the next hundred; ○ compensation. Different methods for subtraction Working with four-digit numbers children explore the following methods: ○ column method; ○ counting on using empty number line; ○ compensation.

Year 4			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Scaling addition and subtraction number facts by 100</u> Use known facts, eg: 5 + 6 = 11 *so* 5 hundreds + 6 hundreds = 11 hundreds = 1 thousand and 1 hundred 5<u>00</u> + 6<u>00</u> = 11<u>00</u> = 1,100	<u>Adding like fractions less than one where sum is equal to or greater than one</u> Continue to develop the fact that when the denominators are the same, we add the numerators. Also introduce making the next whole, eg: $\frac{5}{6}+\frac{5}{6}=\frac{5}{6}+\frac{1}{6}+\frac{4}{6}=1\frac{4}{6}$ <u>Adding improper and mixed fractions</u> Same approaches as above, with numbers greater than one. An improper fraction example: $\frac{7}{6}+\frac{7}{6}=\frac{14}{6}=2\frac{2}{6}=2\frac{1}{3}$ *(when the denominators are the same, we add the numerators)* or $\frac{7}{6}+\frac{7}{6}=\frac{7}{6}+\frac{5}{6}+\frac{2}{6}=\frac{12}{6}+\frac{2}{6}=2\frac{2}{6}$ *(making the next whole).*	<u>Calculating with money (r)</u> Revision of methods for addition and subtraction of money. For addition the core strategy is to add the pounds, then add the pence, then combine, eg: £4 and 70p + £3 and 60p = £7 and 130p = £8 and 30p For subtraction, the strategies are using an empty number line and subtracting by partitioning the minuend. <u>Adding decimal numbers</u> Children learn to add ones and tenths using a strategies they are very familiar with: partitioning both addends and making the next whole. <u>Subtracting decimal numbers</u> Empty number line and subtracting by partitioning the minuend.

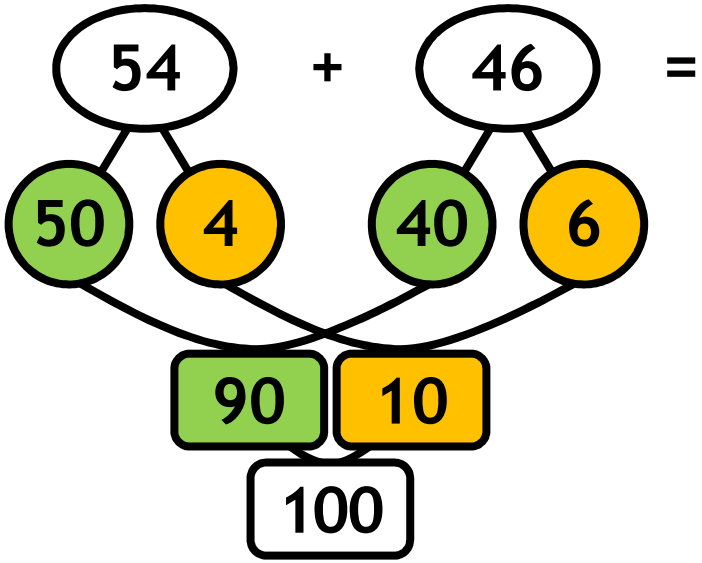
Year 4			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Mental calculation</u> ○ Making next ten/previous ten ○ Near doubles ○ Partitioning both addends - left to right addition ○ Partitioning the second addend - empty number line representation Children's knowledge of the making next/previous ten is extended to four-digit numbers plus/minus one digit numbers. Application of near doubles is applied to examples such as 72 + 74 = 72 + 72 + 2. Children learn that when we calculate with column methods we work from the smallest units to the largest; when we calculate mentally we tend to work with the largest parts first. Empty number lines are used to support consolidation of adding by partitioning the second addend, eg: 335 + 226 = 335 + 200 + 20 + 6.	<u>Subtracting fractions from whole numbers</u> Using improper fractions, eg: $3-1\frac{5}{6}=\frac{18}{6}-\frac{11}{6}=\frac{7}{6}=1\frac{1}{6}$ Counting back, including partitioning the subtrahend and counting back, eg: $3-1\frac{5}{6}=3-1-\frac{5}{6}=2-\frac{5}{6}=1\frac{1}{6}$ <u>Subtraction of improper and mixed fractions</u> Using improper fractions, eg: $3\frac{1}{5}-1\frac{2}{5}=\frac{16}{5}-\frac{7}{5}=\frac{9}{5}=1\frac{4}{5}$ Making the previous whole, eg: $3\frac{1}{5}-1\frac{2}{5}=3\frac{1}{5}-\frac{1}{5}-1\frac{1}{5}=3-1\frac{1}{5}=2\frac{4}{5}$	

Year 4			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Add a four digit number to a four digit number</u> Column method (exchanging ones, tens and hundreds). <u>Subtract a three-digit number from a three-digit number</u> Column method (exchanging hundreds for tens and tens for ones).		

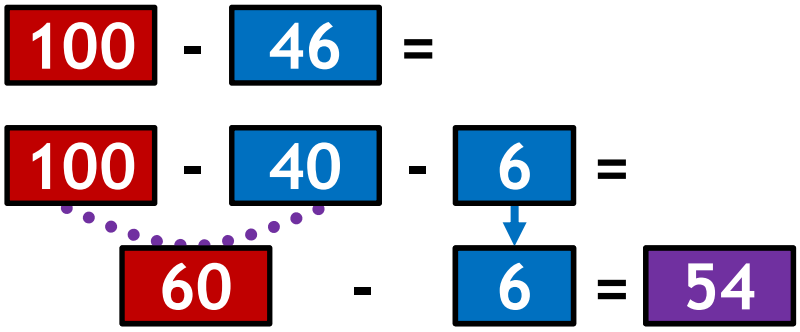
Year 4 - Block 1

54 + 46 = 100 • 100 - 46 = 54

+ and - facts for 100



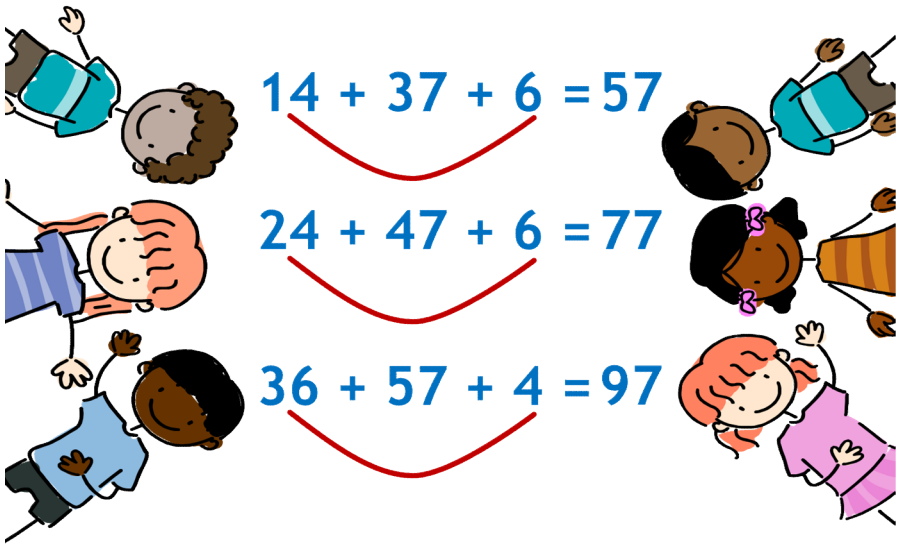
partitioning both addends:
combine the tens; combine the ones; combine the results



partitioning the subtrahend

Year 4 - Block 1

Friendly number pairs



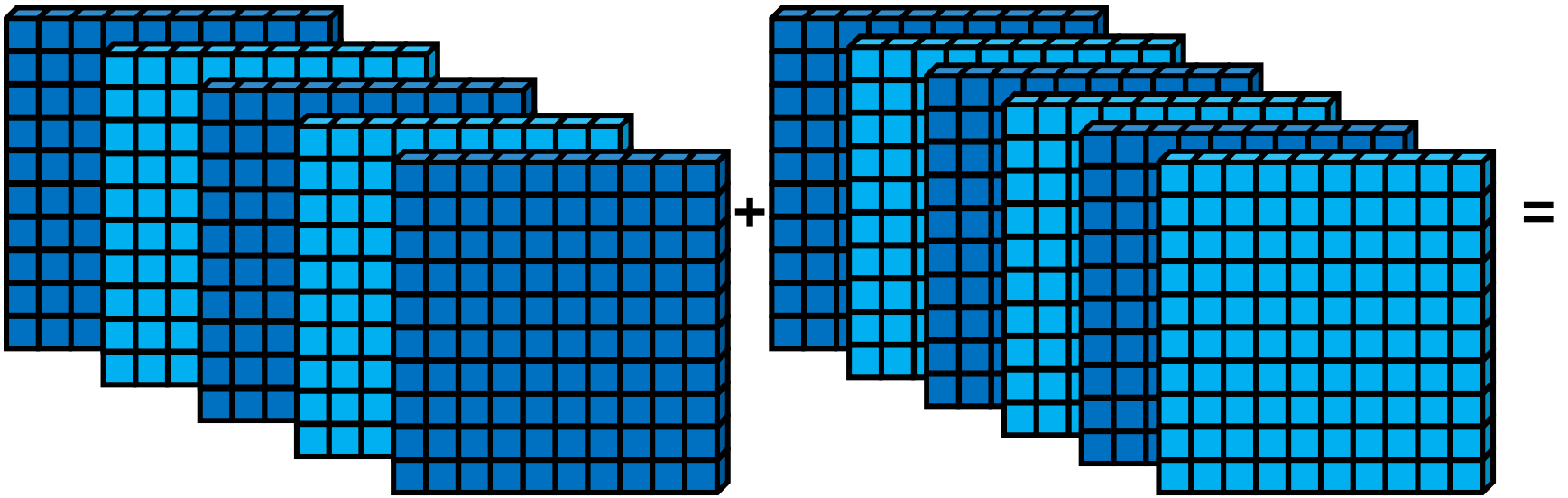
Year 4 - Block 1

5 + 6 = 11 • 500 + 600 = 1,100

Scaling addition and subtraction number facts by 100

5 + 6 = 5 ones + 6 ones = 11 ones = 11

base ten supports understanding of scaling



500 + 600 = 5 hundreds + 6 hundreds = 11 hundreds

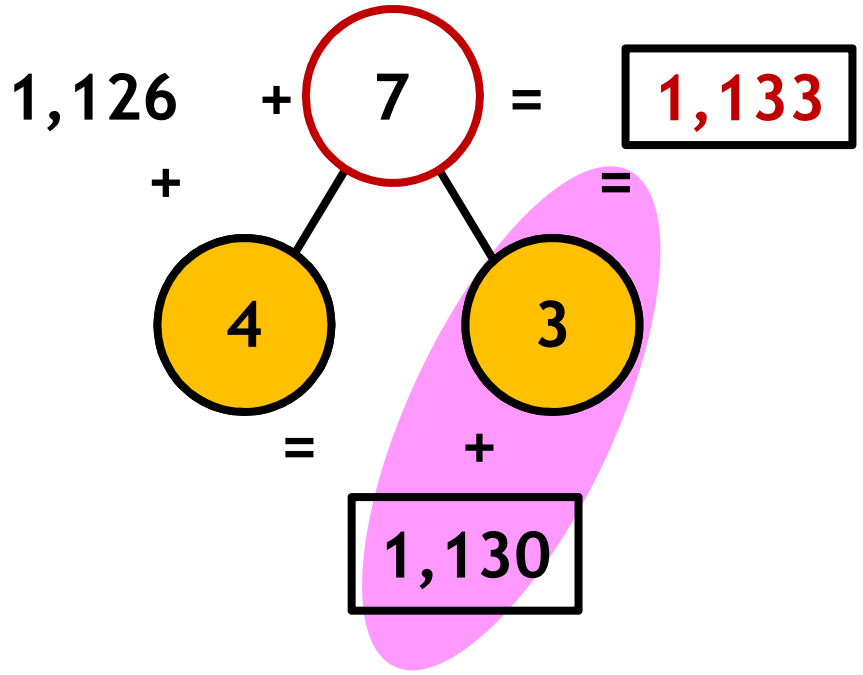
1100

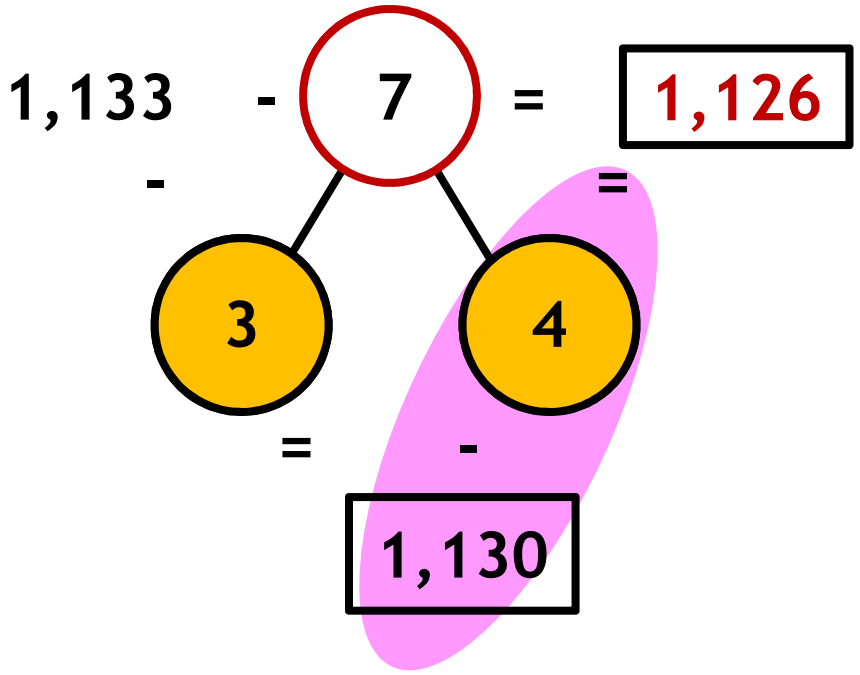
1,100

Year 4 - Block 1

1,126 + 7 = 1,133 • 1,133 - 7 = 1,126

Making next/previous ten



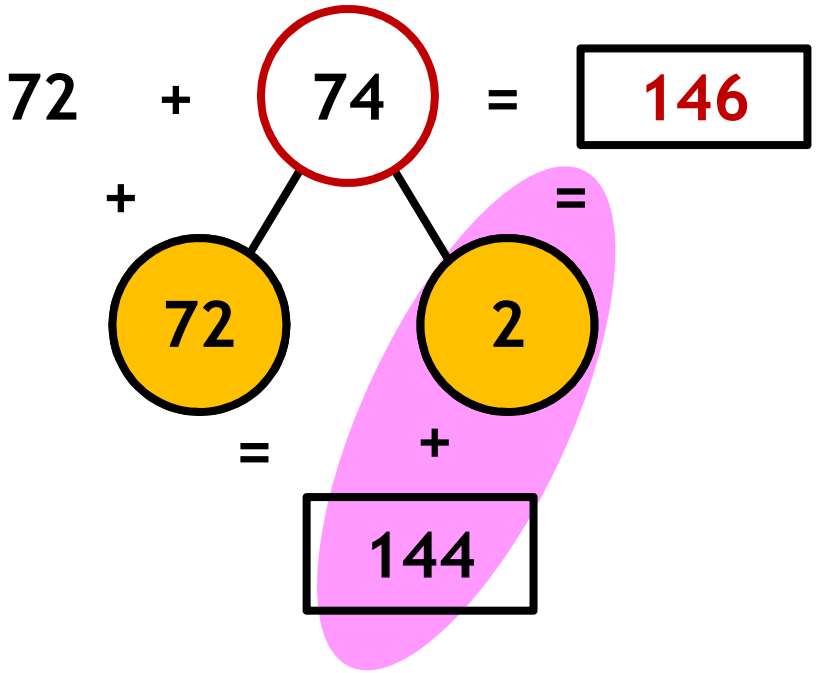


numeric representations of making the next/previous ten

Year 4 - Block 1

72 + 74 = 146

Near doubles

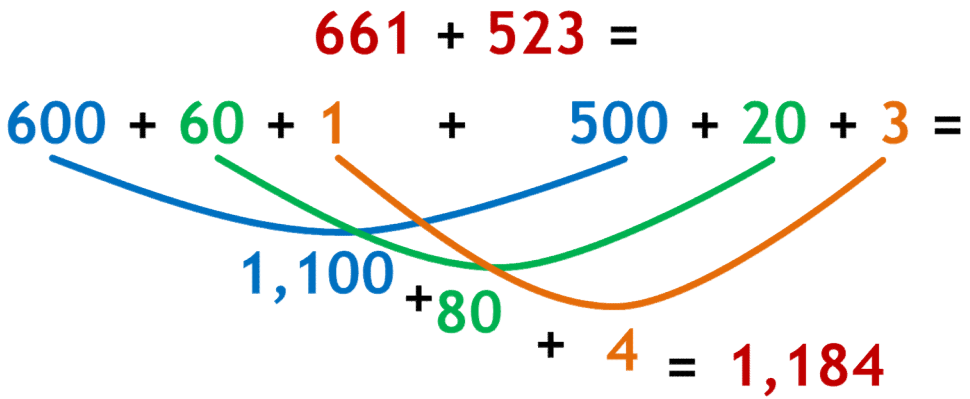


numeric representation for use of near doubles

Year 4 - Block 1

661 + 523 = 1,184

Partitioning both addends

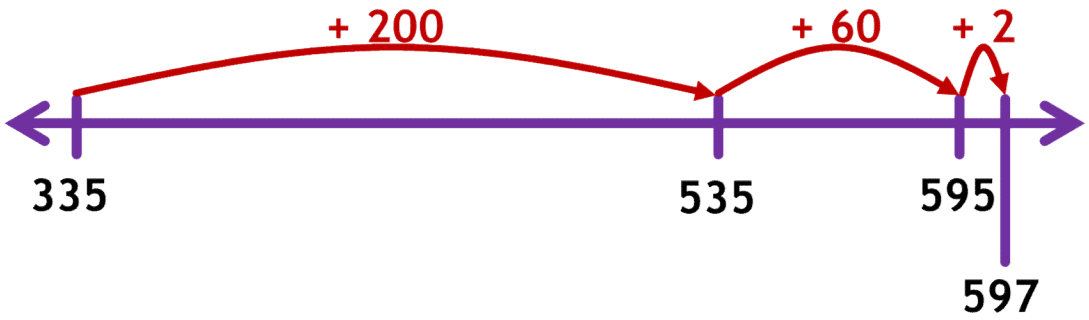


numeric representation of both addends being partitioned

335 + 262 = 597

Partitioning the second addend

335 + 200 + 60 + 2 =



counting on using an empty number line

Year 4 - Block 1

2,879 + 1,964 = 4,843

Add a four digit number to a four digit number

	Th	H	T	O
	2	8	7	9
+	1	9	6	4
	4	8	4	3
	1	1	1	

Add the ones.

9 ones + 4 ones = 13 ones

13 ones = 1 ten and 3 ones

Add the tens.

7 tens + 6 tens + 1 ten = 14 tens

14 tens = 1 hundred and 4 tens

Add the hundreds.

8 hundreds + 9 hundreds + 1 hundred = 18 hundreds = 1 thousand and 8 hundreds

Add the thousands.

2 thousands + 1 thousand + 1 thousand = 4 thousands

column method supported by very clear use of language to ensure conceptual understanding

400 - 289 = 111

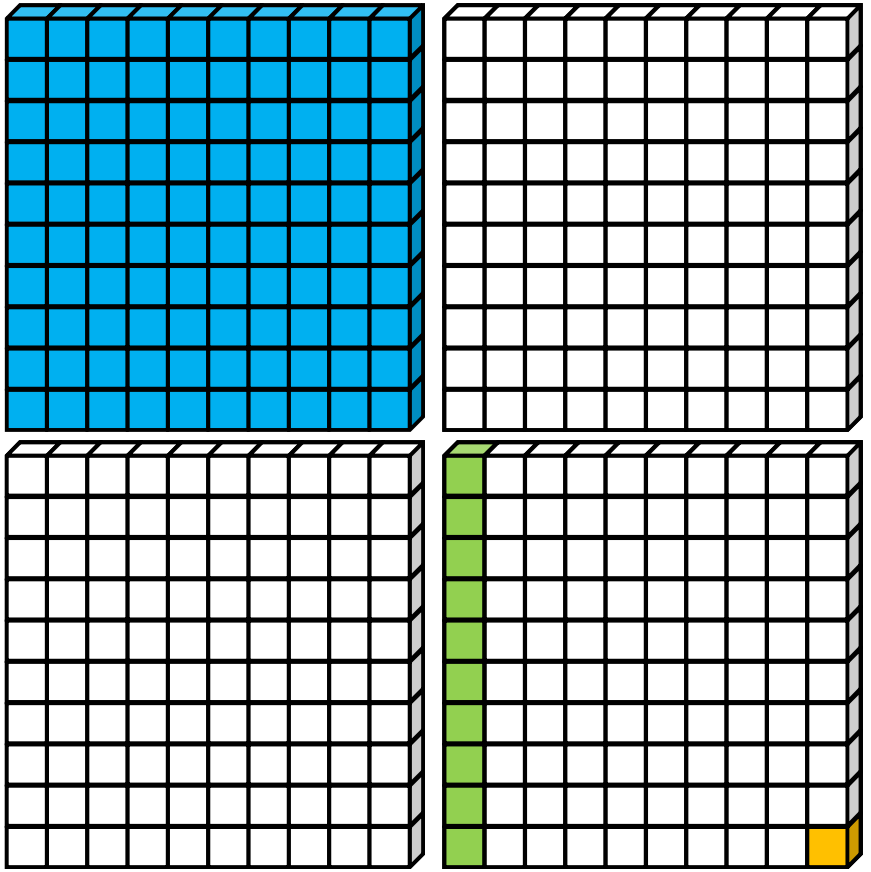
Subtract a three-digit number from a three-digit number

	H	T	O
		9	
	3 ~~4~~	1 ~~0~~	10
-	2	8	9
	1	1	1

Subtract the ones.
There are not enough ones. Let's exchange.
Exchange 1 hundred for 10 tens.
Exchange 1 ten for 10 ones.
Subtract the ones.
10 ones – 9 ones = 1 one

Subtract the tens.
9 tens – 8 tens = 1 ten

Subtract the hundreds.
3 hundreds – 2 hundreds = 1 hundred

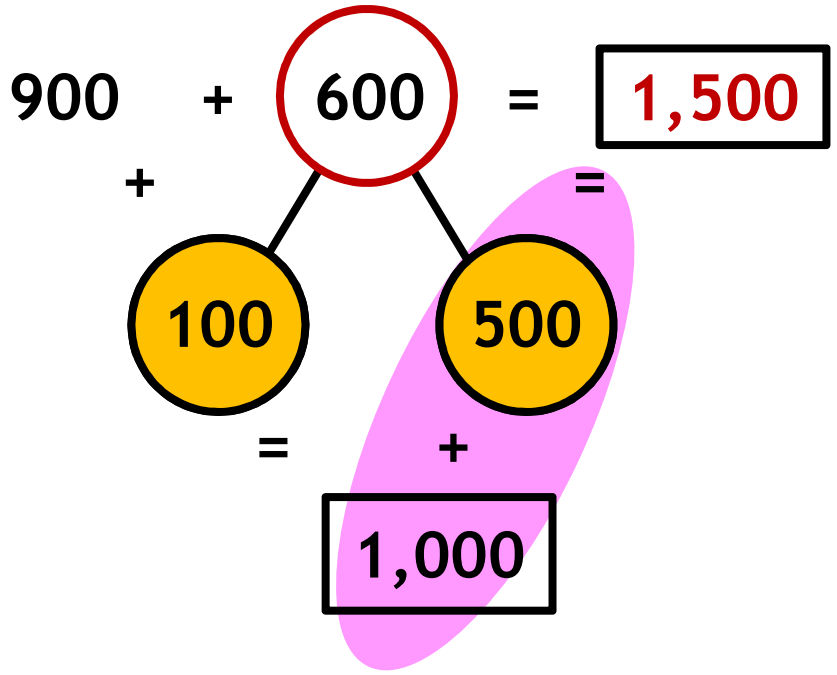


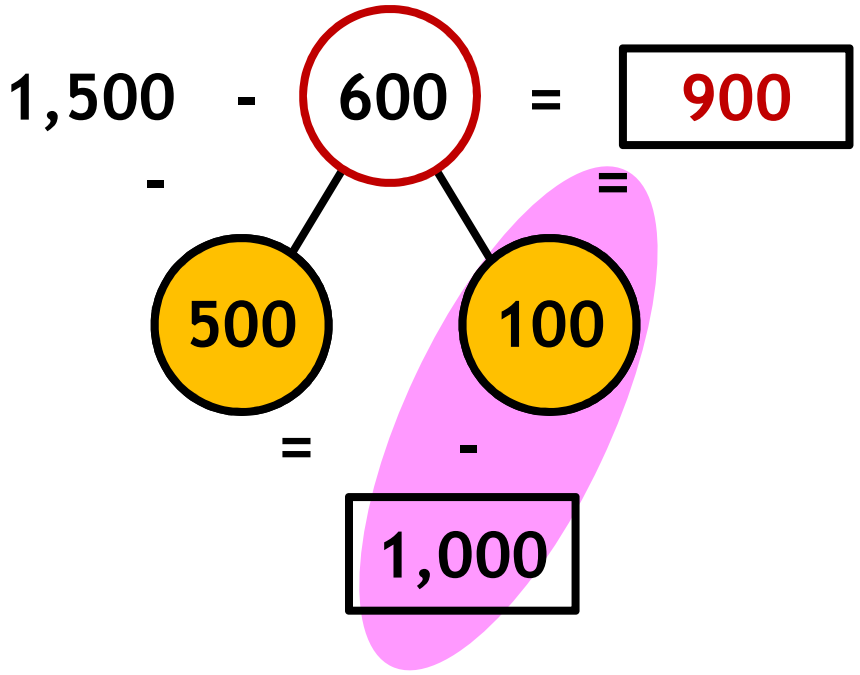
column method supported by base ten

Year 4 - Block 2

900 + 600 = 1,500 • 1,500 - 600 = 900

Making next/previous thousand





numeric representations of making the next/previous thousand

Year 4 - Block 2

6,052 - 4,367 = 1,685

Subtract a four-digit number from a four-digit number

	Th	H	T	O
		9		
	5	10	14	12
	~~6~~	~~1~~	~~4~~	~~2~~
-	4	3	6	7
	1	6	8	5

Subtract the ones.

There are not enough ones. Let's exchange.

Exchange 1 ten for 10 ones.

Subtract the ones.

12 ones – 7 ones = 5 ones

Subtract the tens.

There are not enough tens. Let's exchange.

Exchange 1 thousand for 10 hundreds.

Exchange 1 hundred for 10 tens

14 tens – 6 tens = 8 tens

Subtract the hundreds.

9 hundreds – 3 hundreds = 6 hundreds

Subtract the thousands

5 thousands – 4 thousands = 1 thousand

column method supported by very clear use of language to ensure conceptual understanding

Year 4 - Block 3

1,375 + 1,129 = 2,504

Different methods for addition

	1	3	7	5
+	1	1	2	9
	2	5	0	4
		1	1	

column method

1,375 + 1,129 =

1,375 + 25

1,400 + 1,129 =

2,529 - 25

= 2,504

compensation

partitioning the second addend

1,375 + 1,129 =

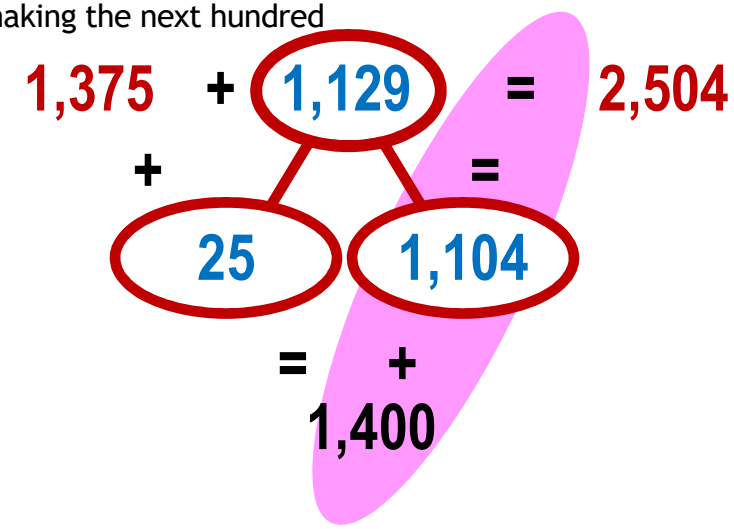
1,375 + 1,000 + 100 + 20 + 9 =

2,375 + 100

2,475 + 20

2,495 + 9 = 2,504

making the next hundred



Year 4 - Block 3

7,045 - 5,888 = 1,157

Different methods for subtraction

		9		
-	6	7 ,1	13	15
	5	8 ,8	8	8
	1	1 ,1	5	7

column method

7,045 - 5,888 =

- 45

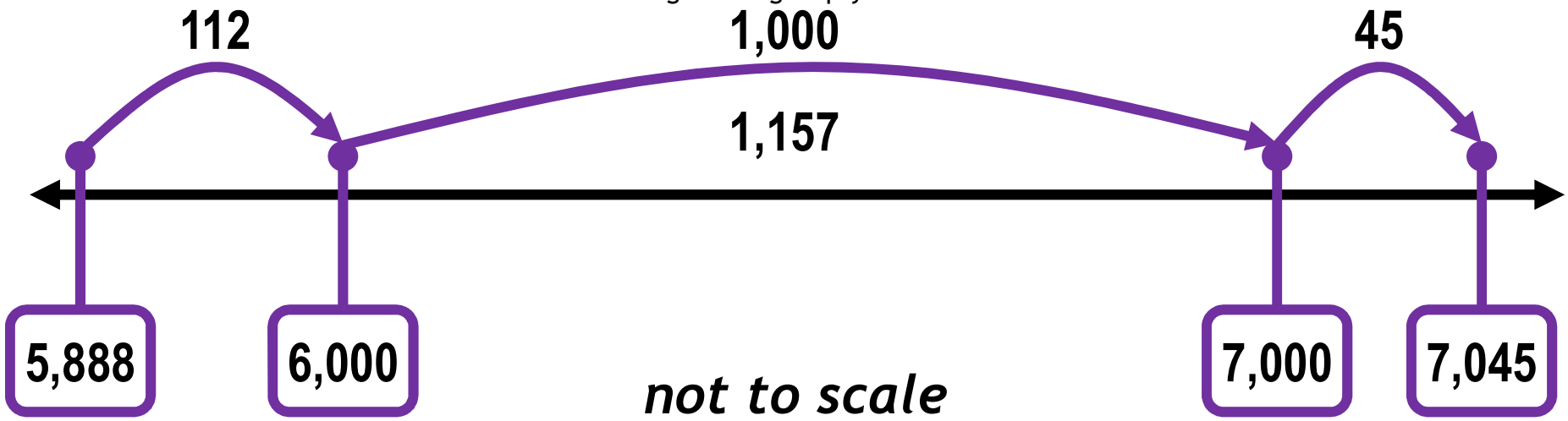
7,000 - 5,888 = 1,112

+ 45

1,157

compensation

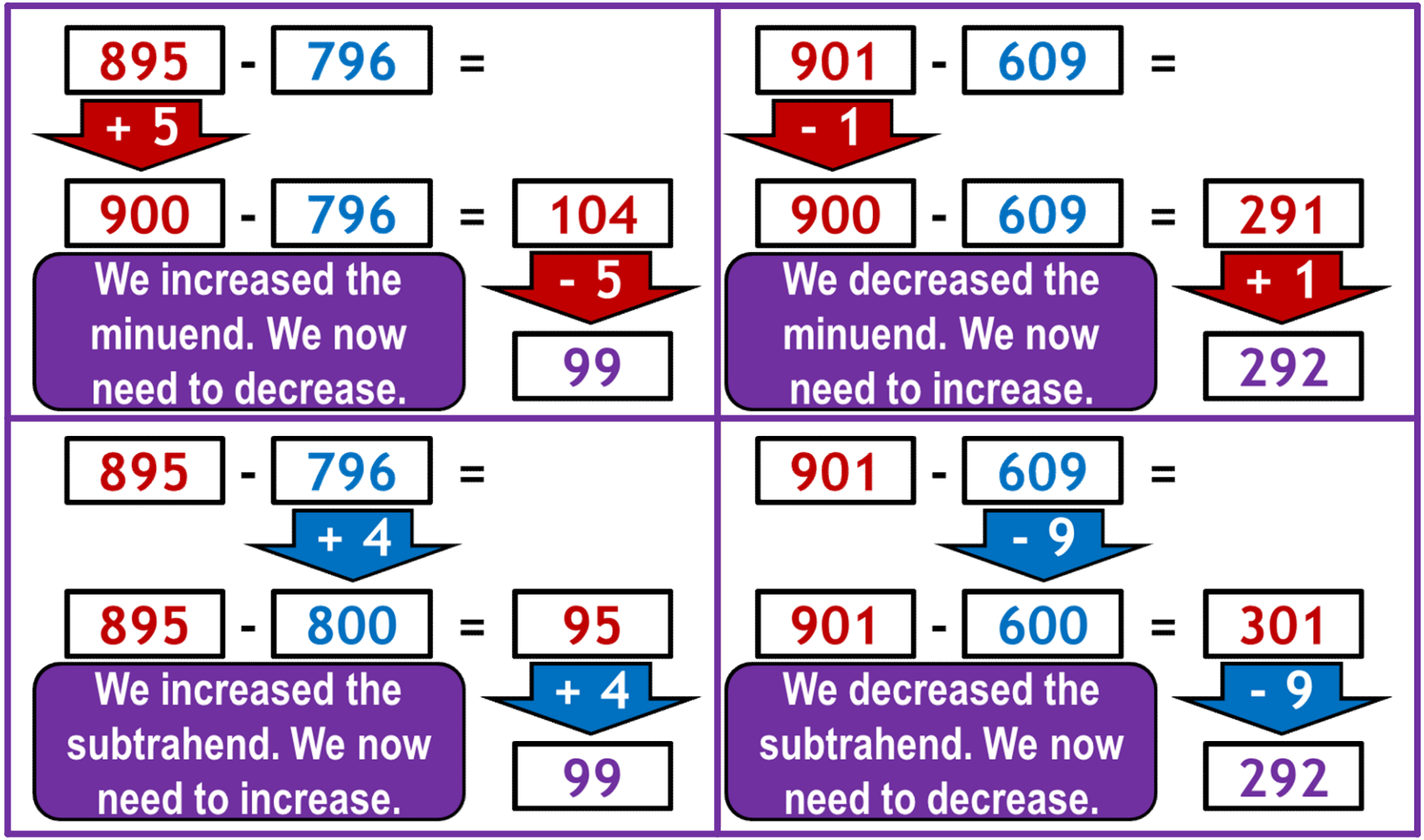
counting on using empty number line



Year 4 - Block 3

7,045 - 5,888 = 1,157

Different ways of using compensation



CALCULATION POLICY FOR ADDITION AND SUBTRACTION

YEAR 5

Year 5			
	Block 1	**Block 2**	**Block 3**

Calculation content	**ADDITION AND SUBTRACTION (UNIT 1)**
	• **Facts for one and ten with decimal numbers to one decimal place**
	• **Complements for one thousand and related facts**
	• **Mental calculation**
	  ○ Making next ten/previous ten
	  ○ Near doubles
	• **Calculation strategies**
	  ○ Left to right addition
	  ○ Number line methods
	  ○ Partitioning the minuend
	• **Add numbers with more than four digits** (with exchanging)
	• **Subtract numbers with more than four digits** (with exchanging)
		MONEY AND DECIMALS (UNIT 1)
		n/a
		
		ADDITION AND SUBTRACTION (UNIT 2)
		• **Addition and subtraction with decimal numbers to two decimal places** (facts for one and related facts)
		• **Strategies for adding lots of numbers**
		• **Methods for addition**
		  ○ Making the next hundred
		  ○ Near doubles
		• **Methods for subtraction**
		  ○ Making the previous thousand
		  ○ Counting on
		  ○ Compensation
		  ○ Partitioning the minuend
		
		FRACTIONS (UNIT 2)
		• **Addition of related fractions**
		• **Subtraction of related fractions**
			CALCULATION UNIT
			• **Methods for addition**
			  ○ Partitioning both addends
			  ○ Compensation
			  ○ Column method
			
			• **Methods for subtraction**
			  ○ Making the previous hundred
			  ○ Counting on
			  ○ Partitioning the subtrahend
			  ○ Column method
			
			MONEY (UNIT 2)
			• **Calculating amounts of money**
			• **Adding decimal numbers**
			• **Subtracting decimal numbers**

Year 5			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Facts for one and ten with decimal numbers to one decimal place</u> Bar models, tens frames and relationship triangles support recall of facts for one. Subtraction facts from ten are derived by partitioning the subtrahend into ones and tenths, eg: 10 – 8.4 = 10 – 8 – 0.4 Also by partitioning the minuend, eg: 10 – 8.4 = 9 – 8.4 + 1 <u>Complements for one thousand and related facts</u> Pictorial representations and the column method support understanding of pairs that make one thousand. Pairs of addends are also partitioned into hundred and tens/ones, eg: 725 + 275 = 700 + 25 + 200 + 75. The hundreds are combined, then the tens and ones are combined.	<u>Addition and subtraction with decimal numbers to two decimal places</u> (facts for one and related facts) Pictorial representations support recall of facts for one with decimal numbers to two decimal places . Chi Pairs of addends less than one are partitioned into tenths and hundredths, eg: 0.34 + 0.66 = 0.3 + 0.04 + 0.6 + 0.06. Subtracting tenths and hundredths from one is modelled by partitioning the subtrahend, eg: 1 – 0.71 = 1 – 0.7 – 0.01 <u>Strategies for adding lots of numbers</u> Continuing to promote flexible calculation strategies is the main emphasis in the lesson on strategies for adding lots of numbers. Teaching helps children find multiple ways to solve calculations such as 1 + 2 + 3 + 4 + 5 + 6 + 5 + 4 + 3 + 2 + 1.	<u>Methods for addition</u> ○ Partitioning both addends ○ Compensation ○ Column method Children are now very familiar with the methods above. They apply them in a lesson on palindromic numbers. <u>Methods for subtraction</u> ○ Making the previous hundred ○ Counting on ○ Partitioning the subtrahend ○ Column method Children are now very familiar with the methods above. They apply them in a lesson where they choose digits, make the largest number possible with those digits, then make the smallest number possible and find the difference. They keep repeating this and note what happens.

Year 5			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	<u>Mental calculation</u> ○ Making next ten/previous ten ○ Near doubles Children's knowledge of the making the next/previous ten is applied to calculations such as 11,126 + 6 = 11,126 + 4 + 2 They use making the next thousand and near doubles to solve calculations like 600 + 700, eg: 600 + 700 = 600 + 400 + 300; 600 + 700 = 600 + 600 + 100 <u>Calculation strategies</u> ○ Left to right addition ○ Number line methods ○ Partitioning the minuend Children revise the fact that when we calculate with column methods we work from the smallest units to the largest; when we calculate mentally we tend to work with the largest parts first. Empty number lines are used to support consolidation of adding by partitioning the second addend, eg: 2,335 + 1,226 = 2,335 + 1,000 + 200 + 20 + 6	<u>Methods for addition</u> ○ Making the next hundred ○ Near doubles Children's knowledge of the making the next hundred is applied to calculations such as 2,700 + 800 = 2,700 + 300 + 500 They use near doubles to solve calculations like 6.3 + 6.5, eg: 6.3 + 6.3 + 0.2 <u>Methods for subtraction</u> ○ Making the previous thousand ○ Counting on ○ Compensation ○ Partitioning the minuend Children are now very familiar with the methods above. They use them to solve calculations like: 2,500 – 800 = 2,500 – 500 – 300 (making previous thousand); 25,102 – 875 (counting on); 8,500 – 700 = 8,500 – 1,000 + 300 (compensation); 5.26 – 1.75 = 2 – 1.75 + 3.26 (partitioning the minuend).	<u>Calculating amounts of money</u> Children continue to practise calculating with money, supported by representations of coins. <u>Adding decimal numbers</u> Children add two decimal numbers with up to two decimal places. This includes adding numbers with different numbers of decimal places, eg: 25.76 + 2.9. The column method is the core strategy used; other methods are also encouraged. <u>Subtracting decimal numbers</u> Children subtract two decimal numbers with up to two decimal places. This includes subtracting numbers with different numbers of decimal places, eg: 25.06 + 4.9. Counting on using an empty number line is the core strategy used; other methods are also encouraged.

Year 5			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	Work on subtraction also involves empty number lines, for counting on, and revisits the strategy of partitioning the minuend. <u>Add numbers with more than four digits</u> (with exchanging) Column addition is now extended to numbers with more than four digits. Teaching revisits using compensation alongside the column method so children can evaluate the relative merits of each. <u>Subtract numbers with more than four digits</u> (with exchanging) Column subtraction is extended to numbers with up to five digits. Other methods are encountered (partitioning the minuend) and children are encouraged to reflect on the appropriate method for a given calculation.	<u>Addition of related fractions</u> Children learn that when the denominators are not the same, they need to be made the same before adding the fractions. They then use learning from Year 4 (when the denominators are the same, we add the numerators). Visual representations also support the making the next whole method, eg: $1\frac{9}{10}+\frac{4}{5}=1\frac{9}{10}+\frac{8}{10}=$ $1\frac{9}{10}+\frac{1}{10}+\frac{7}{10}=2\frac{7}{10}$ <u>Subtraction of related fractions</u> Methods mirror the methods used for addition: converting to improper fractions and subtracting; making the previous one.	

CALCULATION POLICY FOR ADDITION AND SUBTRACTION

YEAR 6

Year 6			
	Block 1	Block 2	Block 3
Calculation content	ADDITION AND SUBTRACTION (UNIT 1) *Optional revision* *Number facts and calculation strategies* • Facts for one hundred • Friendly numbers • Facts for one and ten • Single digit number facts • Making the next/previous ten • Partitioning the minuend *Column method* • Add numbers with up to 7 digits (with exchanging) • Subtract numbers from numbers with up to 7 digits (with exchanging)	MONEY AND DECIMALS (UNIT 1) n/a ADDITION AND SUBTRACTION (UNIT 2) • Adding numbers that form a sequence • Adding and subtracting decimals and associated problems (tenths, hundredths and thousandths) FRACTIONS (UNIT 2) • Addition of fractions with unrelated denominators • Subtraction of fractions with unrelated denominators	CALCULATION UNIT n/a MONEY (UNIT 2) n/a

Year 6			
	Block 1	**Block 2**	**Block 3**
Strategies/ methods	*Optional revision* *Number facts and calculation strategies* • Facts for one hundred • Friendly numbers • Facts for one and ten • Single digit number facts • Making the next/previous ten • Partitioning the minuend There are no new methods. It is helpful for teachers to use the optional revision lessons so they become familiar with children's proficiency in the various methods. Add numbers with up to 7 digits (with exchanging) Children consolidate their understanding of the column method, interpreting calculations presented in varied ways, eg: 549,893 + 5,662 = _____ _____ = 38,265 + 153,827 _____ - 357,247 = 999,888 467,889 + 77,862 + 5,997,459 = _____	Adding numbers that form a sequence Teaching explores what happens when a series of numbers to be added form a sequence, eg: 30 + 40 + 50 = 40 × 3. Adding and subtracting decimals (tenths, hundredths and thousandths) Children learnt about complements for one thousand in Year 5. (Addition and subtraction Unit 1.) They are now encouraged to use scaling to convert facts like *0.001 + 0.999 = 1* to *1 + 999 = 1,000*. Scaling is also encouraged for examples where the number of decimal places is not the same, eg: 1.005 + 0.5 becomes 1,500 + 500 = 1,505; 1.005 + 0.05 becomes 1,005 + 50 = 1,055; 1.005 + 0.005 becomes 1,005 + 5 = 1,010.	

Year 6			
	Block 1	**Block 2**	**Block 3**

Strategies/ methods	<u>Subtract numbers from numbers with up to 7 digits (with exchanging)</u>
	Children consolidate their understanding of the column method, interpreting calculations presented in varied ways. They distinguish whether addition or subtraction is required, eg:
	943,642 – 288,988 = _____ (subtraction);
	_____ + 289,999 = 3,154.863 (subtraction);
	_____ - 652,347 = 989,899 (addition);
	_____ = 284,000 – 49,568 (subtraction).
		<u>Addition of fractions with unrelated denominators</u> (eg 1/2 + 3/7)
		In Year 5 children subtracted fractions with related denominators, so only one fraction needed to be changed for the denominators to be the same. In Year 6 children need to find a common denominator. They then use learning from Year 4 (when the denominators are the same, we add the numerators). Visual representations also support the making the next whole method
		
		<u>Subtraction of fractions with unrelated denominators</u>
		Children use methods from earlier year groups:
		• using improper fractions;
		• making the previous one.
		
		They also use their ability to partition the minuend.	