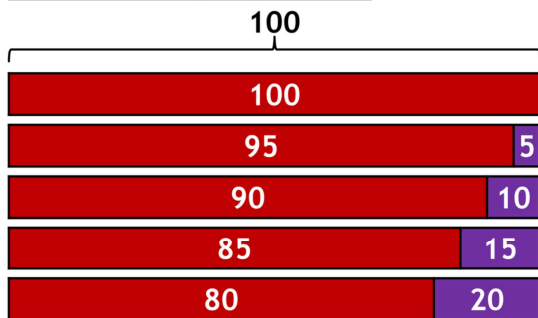
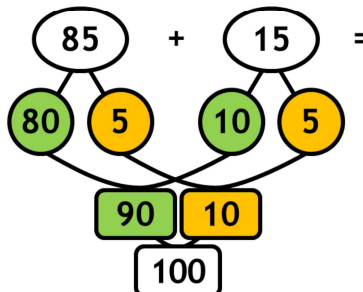


Year 3 - Block 1

+ 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

BLOCK 1

+ 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:

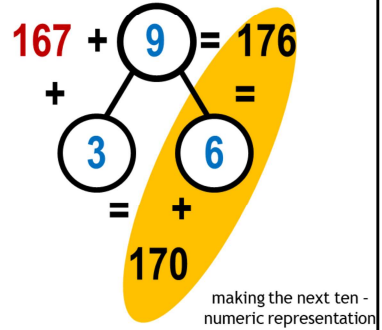
65 + 45 = 110 instead of 100. See notes in lesson.

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

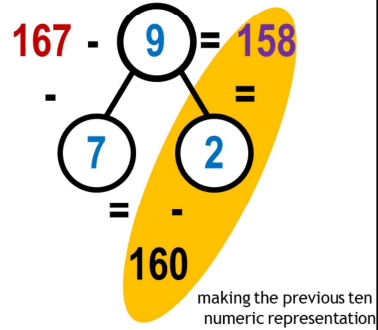
Add a 3-digit number and ones
 Making the next ten, eg:
 $167 + 9 = 170 + 3 + 6.$

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

Subtract ones from a three-digit number

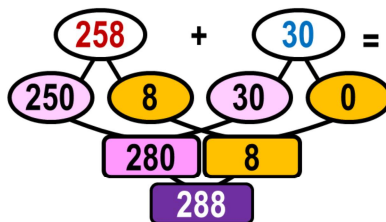
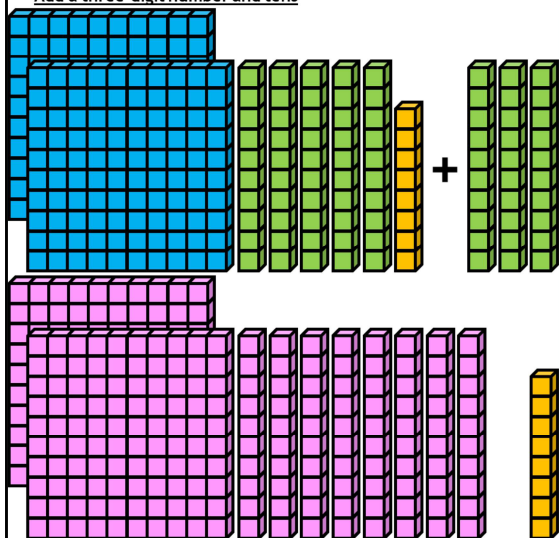
Making the previous ten, eg:

$167 - 9 = 167 - 7 - 2.$

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.

Add a three-digit number and tens

For addition: partition the three-digit number into hundreds and tens and ones, eg:

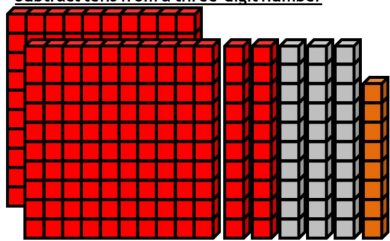
$$258 + 30 = 250 + 8 + 30 = 280 + 8.$$

The point is to create two multiples of ten from both of the addends. One is already a multiple of ten, so we only need to adjust the other. Counting on in tens is also helpful.

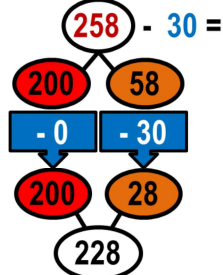
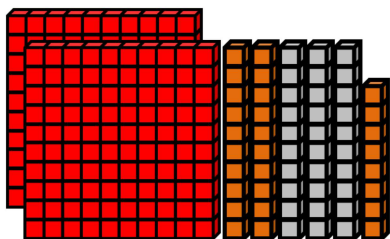
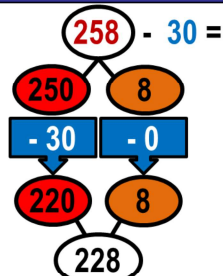
Year 3 - Block 1

$258 - 30 = 228$

Subtract tens from a three-digit number



partitioning the minuend



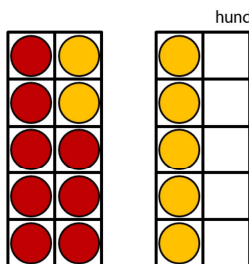
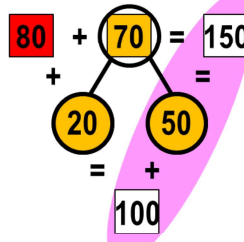
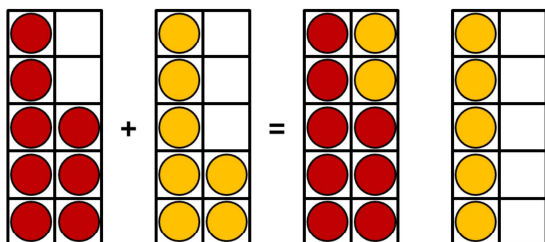
Subtract tens from a three-digit number

For subtraction: partition the minuend, eg:

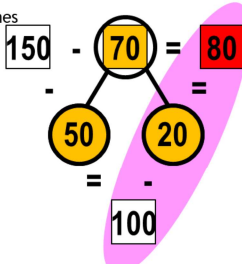
$258 - 30 = 58 - 30 + 200$ (the second example above).

The examples above illustrate taking the subtrahend from different parts of the partitioned minuend.

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



hundreds frames



numeric representations

● = 10

Adding multiples of ten

Making the next hundred, eg:

$80 + 60 = 80 + 20 + 40.$

If children are not confident with making the next/previous ten, consider focusing on securing this rather than making the next/previous hundred. The ability to bridge through ten is fundamental to securing effective calculation ability.

CALCULATION POLICY FOR ADDITION AND SUBTRACTION **YEAR 3**

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

partitioning the second addend -
100 square representation

49

column method
supported by base ten

Add numbers with up to three-digits
(three-digit + two-digit)

Two methods:

- partitioning the second addend;
- column method.

NB In Year 2 children added 2 two-digit numbers. The next step here is to add a three-digit number to a two-digit. In Block 2 they will add 2 three-digit numbers.

Language for the compact column method

The use of accurate language is essential to ensure conceptual understanding of the column method.

Avoid terms like ‘units’ and ‘carry’.

Link to children’s understanding of how base 10 works, perhaps revisiting the trading games played in Y2 place value unit 1.

Say:

Add the ones.

6 ones and 5 ones makes 11 ones.

11 ones is the same as 1 ten and 1 one.

Add the tens.

4 tens and 3 tens and 1 ten makes 8 tens.

As you say the above, write:

$$4\underline{0} + 3\underline{0} + 1\underline{0} = 8\underline{0}$$

$$8\underline{0} = 80$$

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

$$8 \text{ tens} = 8\underline{0}$$

Add the hundreds.

2 hundreds and no hundreds makes 2 hundreds.

CALCULATION POLICY FOR ADDITION AND SUBTRACTION **YEAR 3**

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
-	1	2
	4	9
1	8	3

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

column method supported by base ten blocks in the lessons

partitioning the subtrahend - 100 square representation 50

Subtract numbers with up to three-digits
(three-digit - two-digit)

Three methods:

- using hundred square;
- counting back on empty number line;
- column method.

Language for the compact column method

As for addition, accurate use of language is essential to ensure conceptual understanding of the column method.

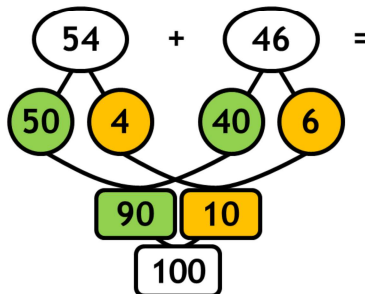
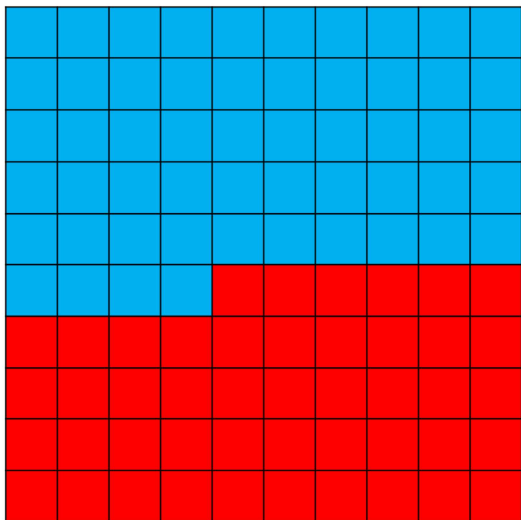
Do not use the term 'borrow'.

There are not enough ones in the situation *2 ones take away 9 ones*. So we need some more ones. Let's exchange/swap 1 ten for 10 ones. Now we have 12 ones. 12 ones take away 9 ones equals 3 ones.

Similarly, there are not enough tens in the situation *2 tens take away 4 tens*. We need more tens. Let's exchange/swap 1 hundred for 10 tens. Now we have 12 tens.

12 tens take away 8 tens equals 4 tens.

+ and - facts for 100 and related facts



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

BLOCK 2

+ and - facts for 100 and related facts

For addition:

- partitioning both addends into ten and ones and combining parts, eg:
 $73 + 27 = 70 + 3 + 20 + 7 = 90 + 10$.

Year 3 - Block 2

$100 - 46 = 54$

+ and - facts for 100 and related facts

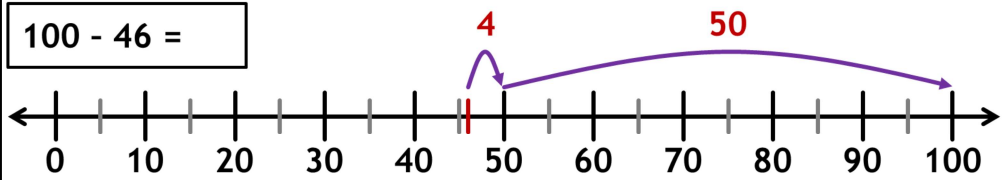
$$100 - 46 =$$

$$100 - 40 - 6 =$$

$$60 - 6 = 54$$

partitioning the subtrahend

$100 - 46 =$



counting on -
number line representation

+ and - facts for 100 and related facts

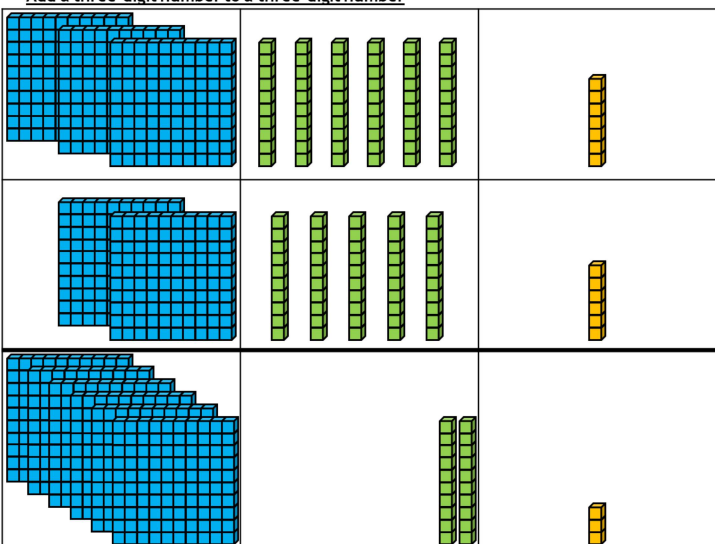
For subtraction:

- partitioning the subtrahend, eg:
 $100 - 68 = 100 - 60 - 8$;
- counting on with number line.

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

Add a three-digit number to a three-digit number
 Column method (exchanging ones to tens and tens to hundreds).

Language for the compact column method

The use of accurate language is essential to ensure conceptual understanding of the column method.

Avoid terms like ‘units’ and ‘carry’.

Say:

Add the ones.

7 ones and 6 ones makes 13 ones.

13 ones is the same as 1 ten and 3 ones.

Add the tens.

6 tens and 5 tens and 1 ten makes 12 tens.

As you say the above, write:

$60 + 50 + 10 = 120$

$120 = 120$

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

$120 = 120$

Add the hundreds.

3 hundreds and 2 hundreds and 1 hundred makes 6 hundreds.

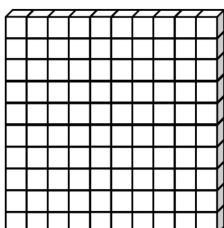
As you say the above, write:

$$\underline{300} + \underline{200} + \underline{100} = \underline{600}$$

Year 3 - Block 2

$341 - 187 = 154$

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



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

Subtract the ones.

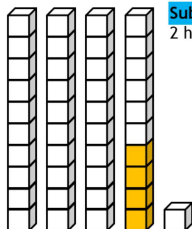
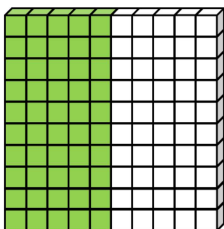
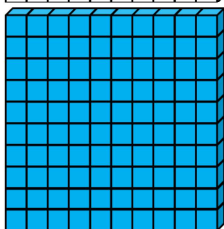
There are not enough ones. Let's exchange.
Exchange 1 ten for 10 ones.
Subtract the ones.
11 ones - 7 ones = 4 ones

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

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

Column method (exchanging hundreds to tens and tens to ones).

Language for the compact column method

As for addition, accurate use of language is essential to ensure conceptual understanding of the column method.

Do not use the term 'borrow'.

There are not enough ones in the situation *1 one take away 7 ones*. So we need some more ones. Let's exchange/swap 1 ten for 10 ones. Now we have 11 ones. 11 ones take away 7 ones equals 4 ones.

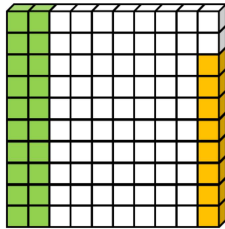
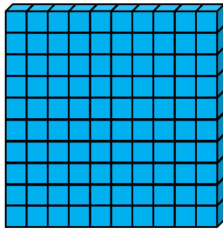
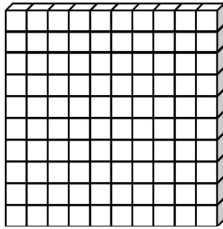
Similarly, there are not enough tens in the situation *3 tens take away 8 tens*. We need more tens. Let's exchange/swap 1 hundred for 10 tens. Now we have 13 tens.

13 tens take away 8 tens equals 5 tens.

Year 3 - Block 2

$303 - 175 = 128$

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



	H	T	O
		9	
	2	10	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

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


Column method (exchanging hundreds to tens and tens to ones).

In this example there is an initial exchange from hundreds to tens, then tens to ones.

Year 3 - Block 3

$3 + 2 = 5$ • $30 + 20 = 50$

Scaling additive facts by ten

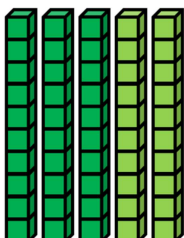
$3 + 2 =$


3 ones + 2 ones =

5

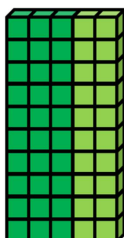

base ten supports understanding of scaling

$30 + 20 =$



3 tens + 2 tens =
 $\underline{30} + \underline{20} =$

50



5 tens
 $\underline{50}$

Scaling additive facts by ten

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

Say:

$6 \text{ tens} + 8 \text{ tens} = 14 \text{ tens}$

$14 \text{ tens} = \text{one hundred and forty}$

Write as you say:

$\underline{60} + \underline{80} = \underline{140}$

$\underline{140} = 140$

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

$6 \text{ tens} = 6\underline{0}$

BLOCK 3

Scaling additive facts by ten

Use known facts, eg:

$3 + 2 = 5$ so $3 \text{ tens} + 2 \text{ tens} = 5 \text{ tens} = 50$

Year 3 - Block 3

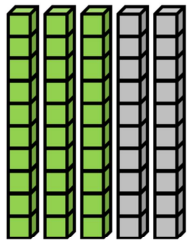
 $5 - 2 = 3$ • $50 - 20 = 30$ Scaling additive facts by ten

$$5 - 2 = 3$$



$$5 \text{ ones} - 2 \text{ ones} = 3 \text{ ones}$$

$$50 - 20 = 30$$



$$5 \text{ tens} - 2 \text{ tens} = 3 \text{ tens}$$

$$\begin{array}{r} 50 \\ - 20 \\ \hline \end{array} = \begin{array}{r} 30 \\ \hline \end{array}$$

base ten supports understanding of scaling

Scaling additive facts by ten

Use known facts, eg:

 $5 - 2 = 3$ so $5 \text{ tens} - 2 \text{ tens} = 3 \text{ tens}$.

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
	504

partitioning both addends

$$375 + 129 =$$

$$400 + 129 =$$

$$629 - 25 = 504$$

compensation



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

Three methods:

- partitioning to expand second addend;
- partitioning both addends;
- compensation.

CALCULATION POLICY FOR ADDITION AND SUBTRACTION YEAR 3

Year 3 - Block 3 $608 - 489 = 119$

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

$608 - 489 =$ <div style="text-align: center;"> $\downarrow - 8$ </div> $600 - 489 = 111$ <div style="text-align: center;"> $\downarrow + 8$ </div> 119	<p style="font-size: small;">compensation</p> $608 - 489 =$ <div style="text-align: center;"> $\downarrow + 11$ </div> $608 - 500 = 108$ <div style="text-align: center;"> $\downarrow + 11$ </div> 119
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EFFECTIVE MATHS

EFFECTIVE MATHS

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

Two methods:

- counting on using empty number line;
- compensation.

Compensation is a powerful strategy that children should be introduced to. It is a sophisticated strategy, and in subtraction children may over generalise and make errors.

Over time, teaching needs to help children see that:

- if the minuend is increased the difference will need to be decreased by the same amount;
- if the minuend is decreased the difference will need to be increased by the same amount;
- if the subtrahend is increased the difference will need to be increased by the same amount;
- if the subtrahend is decreased the difference will need to be decreased by the same amount.

These are not rules to be learnt by rote. Teaching needs to ensure children have the conceptual understanding to support why the rules work.

For example, in the first example above the minuend was **decreased**. So the resulting difference is not big enough because we have subtracted 489 from a smaller minuend: 600 instead of 608. We need to **increase** the difference by 8.

In the second example, the subtrahend is **increased**. So we have taken away more than we need to: 500 instead of 489. The initial difference (108) is therefore too small and needs to be **increased**.

We want children to be fluent with most methods. All children should be exposed to using compensation for subtraction; some children may be usefully encouraged to focus on number line methods, partitioning the subtrahend, partitioning the minuend and column method.