Autumn - Block 2
Addition & Subtraction
### Overview

**Small Steps**

- Add and subtract multiples of 100
- Add and subtract 3-digit and 1-digit numbers - not crossing 10
- Add 3-digit and 1-digit numbers - crossing 10
- Subtract a 1-digit number from a 3-digit number - crossing 10
- Add and subtract 3-digit and 2-digit numbers - not crossing 100
- Add 3-digit and 2-digit numbers - crossing 100
- Subtract a 2-digit number from a 3-digit number - crossing 100
- Add and subtract 100s
- Spot the pattern - making it explicit
- Add and subtract a 2-digit and 3-digit numbers - not crossing 10 or 100
- Add a 2-digit and 3-digit numbers - crossing 10 or 100
- Subtract a 2-digit number from a 3-digit number - crossing 10 or 100
- Add two 3-digit numbers - not crossing 10 or 100
- Add two 3-digit numbers - crossing 10 or 100
- Subtract a 3-digit number from a 3-digit number - no exchange

### NC Objectives

Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds.

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

Estimate the answer to a calculation and use inverse operations to check answers.

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

Small Steps

- Subtract a 3-digit number from a 3-digit number – exchange
- Estimate answers to calculations
- Check

NC Objectives

Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds.

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

Estimate the answer to a calculation and use inverse operations to check answers.

Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
Add & Subtract Multiples of 100

Notes and Guidance

Children are introduced to numbers greater than 100. They will apply their prior knowledge of adding and subtracting ones and tens to adding and subtracting multiples of 100. Using concrete manipulatives and pictorial representations throughout is important so the children can see the value of hundreds.

Varied Fluency

- Complete:
  - 2 ones and 3 ones is equal to ____ ones.
  - 2 tens and 3 tens is equal to ____ tens.
  - 2 hundreds and 3 hundreds is equal to ____ hundreds.

- Complete each box for 400 + 500

<table>
<thead>
<tr>
<th>Draw It</th>
<th>Write It</th>
<th>Part-Whole</th>
<th>Number Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Use the bar model to complete the number sentences.

<table>
<thead>
<tr>
<th>600</th>
<th>200</th>
<th>400</th>
</tr>
</thead>
<tbody>
<tr>
<td>____ + ____ = 600</td>
<td>600 = ____ − ____</td>
<td></td>
</tr>
<tr>
<td>____ + ____ = 600</td>
<td>600 = ____ − ____</td>
<td></td>
</tr>
<tr>
<td>____ − ____ = 400</td>
<td>400 = ____ − ____</td>
<td></td>
</tr>
<tr>
<td>____ − ____ = 200</td>
<td>200 = ____ − ____</td>
<td></td>
</tr>
</tbody>
</table>

Mathematical Talk

What is the same and what is different about 2 ones and 3 ones, 2 tens and 3 tens and 2 hundreds and 3 hundreds?

What is ____ hundreds and ____ hundreds equal to?

How many different ways can you represent 200 + 300?
### Add & Subtract Multiples of 100

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>The answer is 800</th>
<th>Possible answers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many ways can you get to the answer using multiples of 100?</td>
<td>1,000 – 200</td>
</tr>
<tr>
<td></td>
<td>900 – 100</td>
</tr>
<tr>
<td></td>
<td>800 + 0</td>
</tr>
<tr>
<td></td>
<td>Etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write a sensible story for the calculation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 + 400 = 900</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odd One Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which is the odd one out?</td>
</tr>
<tr>
<td>Explain why</td>
</tr>
<tr>
<td><img src="image1.png" alt="Visual Representation 1" /> + <img src="image2.png" alt="Visual Representation 2" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Possible answers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The odd one out could be 300 + 500 = 800 because it does not have the number 200 in the calculation.</td>
</tr>
</tbody>
</table>

| The odd one out could also be 200 + 700 = 900 because the answer is not 800 |
3-digit & 1-digit Numbers

Notes and Guidance

During this small step, children add and subtract ones from a 3-digit number. Children don’t exchange or cross the ten, so they can build number sense. For example, if a child is completing $214 - 3$ and $214 + 3$ they should learn that they can ignore the hundreds and tens at this stage. Therefore, all they need to do is $4 + 3$ and $4 - 3$ respectively. The use of the column method can be used but mental arithmetic is the best strategy.

Mathematical Talk

Which column do I need to focus on? Do we need to make and use the whole number? Why?

How can you explain your method? Is there another way of checking?

What do we do when there are no ones left?

Can you use $<$ and $>$ to compare Sam and Tim’s team points?

Varied Fluency

Use the place value grid to complete the calculations.

$214 - 3 = \underline{\phantom{0}}$  $214 + 3 = \underline{\phantom{0}}$

Complete for the calculation $546 - 6$

<table>
<thead>
<tr>
<th>Draw It</th>
<th>Write It</th>
<th>Number Sentence</th>
<th>Explain It</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sam has 534 team points and gets four more. Tim has 534 team points and loses four of his. How many team points does each person have? Who has the most?
3-digit & 1-digit Numbers

Reasoning and Problem Solving

Sally has added or subtracted ones to get this answer.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Possible answers
340 + 2
341 + 1
342 + 0
343 − 1
344 − 2
345 − 3
346 − 4
347 − 5
348 − 6
349 − 7
350 − 8

What could her calculation have been?
Her starting numbers are between and include 340 and 350

Did you use a strategy?
Do you see a pattern?

Which image does not represent 339 − 8?

The number lines does not because it starts at 340 not 339

Sara thinks the chart shows 456 − 4
Do you agree?

No, I disagree. Sara has subtracted 4 tens not 4 ones.

When the ones digit in the 3-digit number increases, the ones we subtract decreases.

Explain why.
Add 3-digit & 1-digit Numbers

Notes and Guidance

Children add ones to a 3-digit number, with an exchange. They must understand that when adding ones it can affect the ones column and the tens column. Children must also know that we can only hold single digits in each column, anything over must be exchanged. The use of 0, e.g. 145 – 5 is important so they know to use zero as a place holder.

Varied Fluency

We can use Base 10 to solve 245 + 7

Use this method to calculate:
357 + 8
286 + 5
419 + 1

We can partition our 1-digit number to calculate 379 + 5

Use this method to calculate:
379 + 1 = 380
380 + 4 = 384

We can use a number line to calculate 346 + 7

Use this method to calculate:
46 + 7 = 53
so 346 + 7 = 353

Mathematical Talk

When you add ones to a number does it always, sometimes or never affect the tens column?

What is the largest number you can have in each column? Why?
Add 3-digit & 1-digit Numbers

Reasoning and Problem Solving

Always, sometimes, never.

When 7 and 5 are added together in the ones column, the digit in the ones column of the answer will always be 2.

What other digits would always give a 2 in the ones column? Prove it.

<table>
<thead>
<tr>
<th>Always</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 + 1</td>
<td></td>
</tr>
<tr>
<td>2 + 0</td>
<td></td>
</tr>
<tr>
<td>9 + 3</td>
<td></td>
</tr>
<tr>
<td>8 + 4</td>
<td></td>
</tr>
<tr>
<td>6 + 6</td>
<td></td>
</tr>
<tr>
<td>will also always give a 2 in the ones column.</td>
<td></td>
</tr>
</tbody>
</table>

Which questions are harder to calculate?

- 234 + 3 =
- 506 + 8 =
- 455 + 7 =
- 521 + 6 =

Explain your answer.

The second and third are harder as an exchange needs to be made.
Subtract 1-digit from 3-digits

Notes and Guidance

Children subtract a 1-digit number from a 3-digit number using an exchange.
Children need to be secure in the fact that 321 is 3 hundreds, 2 tens and 1 one but that it is also 3 hundreds, 1 ten and 11 ones.
If children are not secure on regrouping, it is important to revisit this before subtracting.

Mathematical Talk

How can we partition the number 321?

How else could we partition it to make it easier to subtract 4?

What calculation is the word problem representing?

What does each number represent in the word problem?

Varied Fluency

Use Base 10 to solve 321 – 4

How could this part-whole model help you solve 132 – 4?
Show me on a number line.

Red team had 672 points this year and won the House Cup.

Blue team finished second with 7 less points than the red team.

How many points did the Blue team finish with?
Subtract 1-digit from 3-digits

Reasoning and Problem Solving

Tom and Freddie use Base 10 to solve 225 – 8

Tom’s method:

Freddie’s method:

Both methods can get the answer of 217 but I would choose Freddie’s because he has already exchanged one of his tens for ten ones.

Write a sensible story for the calculation 852 – 8 = 844

Open ended.
Example answer: 852 people attend a football match. 8 people leave. How many people are left?

Explain how you would solve these calculations:

564 – ___ = 558
___ – 8 = 725
352 = 361 – ___

For 564 - ? = 558, I would count from 58 to 64
For ? - 8 = 725, I would add 8 on to 725
For 352 = 361 - ?, I would count from 352 to 361
3-digit & 2-digit Numbers

Notes and Guidance

Children look at what happens to a 3-digit number when a multiple of 10 is added or subtracted. Different representations such as Base 10, arrow cards, place value charts should be used. The use of the column method is exemplified in this example, but children should explore whether or not this is needed and explain why. Mental methods should be encouraged throughout.

Mathematical Talk

How else can you represent this calculation?

Do we need to make this number?

How is the similar and different to subtracting ones?
What do you notice about the columns that change?

Why don’t we have to calculate for each? Give a reason.

Varied Fluency

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use place value counters to complete the number sentences.

352 + 4 tens = ____
352 − 2 tens = ____

Complete for the calculation 793 subtract 70

<table>
<thead>
<tr>
<th>Draw It</th>
<th>Write It</th>
<th>Number Sentence</th>
<th>Explain It</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complete using <, > or =

773 + 1   0  773 + 10
653 + 10  0  653 − 10
647 + 10  0  657 − 10
721 + 10  0  653 + 10

Do you need to calculate?
3-digit & 2-digit Numbers

Reasoning and Problem Solving

Spot the Mistake

Amir has subtracted 7 ones instead of 7 tens. The answer should be 519

589 – 70 is equal to 582

Amir

Rosie was able to use this fact because 9 tens subtract 2 tens is like doing 9 ones subtract 2 ones. We do not need to subtract any ones or hundreds so those columns will stay the same.

When I calculated 392 subtract 20 I used my known fact that 9 − 2 = 7

Explain Rosie’s method.

Rosie

What should the answer be?

Choose one calculation that can complete all of the statements correct.

Possible answers:
496 − 30
406 + 60
416 + 50

Any calculation with an answer of 466

456 − 10 < ___
466 + 1 > ___
466 + 0 = ___
Add 3-digit & 2-digit Numbers

Notes and Guidance

Children add multiples of 10, to a 3-digit number with an exchange. They will recognise that when adding tens, it can change the tens and hundreds column. The column addition method has not been used within this small step because it is not the most efficient method. Children should be counting in tens. Draw on knowledge of inverse to be able to work out missing number problems.

Mathematical Talk

How many tens do we have?

What can we do with the tens?

If we know how to count in tens, do we always need to use the column method or other methods?

Would it be easier for us to just count up in our heads?

Varied Fluency

Use Base 10 to help complete the bar model.

Miss Wilson has 237 marbles in a box. She adds 6 more bags of 10 marbles. How many marbles does she have now? Write the calculation for this problem.

Can you think of three different ways to work out 364 + 90

Column addition, count in tens mentally, add 100 then subtract 10
## Add 3-digit & 2-digit Numbers

### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Write a sensible number story to represent this bar model.</th>
</tr>
</thead>
<tbody>
<tr>
<td>324 sandwiches are ordered for a school trip. 254 are eaten. How many are left? Etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Which is the odd one out? Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>336 + 80</td>
</tr>
<tr>
<td>453 + 60</td>
</tr>
<tr>
<td>347 + 70</td>
</tr>
<tr>
<td>285 + 80</td>
</tr>
</tbody>
</table>

| 285 + 80 is the odd one out because in all the others the tens columns add up to 11 tens. |

<table>
<thead>
<tr>
<th>Sort these calculations into two groups. Justify your answer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>257 + 60           70 + 637        40 + 234          20 + 391</td>
</tr>
</tbody>
</table>

| Possible ways to sort: Odds and evens Over and under 500 Exchanging and not exchanging |

<table>
<thead>
<tr>
<th>Compare your groups with a friend. Are they the same?</th>
</tr>
</thead>
</table>
**Subtract 2-digits from 3-digits**

**Notes and Guidance**

Children subtract multiples of 10 from a 3-digit number, with an exchange. The examples show different ways this concept could be taught using number lines and part-whole models. The column method could be used, however, it is not the most efficient method. Counting backwards in tens or using 100 to help will support mental strategies.

**Mathematical Talk**

How can we use the number line?

Why are the numbers 23 and 57 shown on the part-whole model? Is there another question we can use to test this strategy?

**Varied Fluency**

- Count back in tens to solve the calculation $240 - 70$

  - $240 - 70 = 170$

- You can solve $425 - 90$ by subtracting 100 and then adding 10

  - $425 - 100 = 325$
  - $325 + 10 = 335$

Use this method to solve:

- $386 - 90$
- $574 - 90$
- $212 - 90$

- How can the part-whole model help you solve five hundred and twenty-three subtract eighty?
### Subtract 2-digits from 3-digits

#### Reasoning and Problem Solving

Find the missing numbers and explain how you found them.

<table>
<thead>
<tr>
<th>13_ – 50 = 85</th>
</tr>
</thead>
<tbody>
<tr>
<td>334 – ___ = 294</td>
</tr>
<tr>
<td>545 = ___ - 70</td>
</tr>
</tbody>
</table>

| 135 |
| 40  |
| 615 |

How many different methods could you use to solve 837 – 90?

Share your methods with a partner.

Possible methods:
- \(837 - 100 = 737\)
- \(737 + 10 = 747\)
- \(90 = 37\) and \(53\) (could show in part-whole model)
- \(837 - 37 = 800\)
- \(800 - 53 = 747\)

Ben thinks the rule for the function machine is subtract 60

Is he correct? Explain why.

<table>
<thead>
<tr>
<th>Input</th>
<th>Rule</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>567</td>
<td>?</td>
<td>497</td>
</tr>
</tbody>
</table>

He is wrong because 567 subtract 60 is 507

The rule is subtract 70

Expanded or formal written methods.
Add & Subtract 100s

Notes and Guidance

Children build on their knowledge of adding 100s together, e.g. 300 + 500 by adding ones and tens to solve calculations such as 234 + 500

It is important to build ‘number sense’ and ask the children why the column method isn't the most effective method to solve questions like the ones modelled. We can ‘bypass’ the tens and ones column because of the zeros in 500

Mathematical Talk

What do you notice when we add and subtract 100s from a 3-digit number?

What is the calculation that matches the word problem? What does each number in your calculation represent?

Is there more than one way to complete the questions?

Varied Fluency

Use the place value grid and Base 10 to help you calculate two hundred and thirty-four add three hundred.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Harriet has saved £675
She saved £200 more than Tom.
How much has Tom saved?

Complete the missing boxes with a calculation that either adds or subtracts 100s.

401 + 300

961 – 200

Smallest

Greatest

105 + 100

393 – 200

Smallest

Greatest
Add & Subtract 100s

Reasoning and Problem Solving

Alex

306 + 300 = 906 - 300

She is correct because both give an answer of 606

Is she correct? Explain how you know.

Terry starts with the number 356
He adds a multiple of 100
His new number is greater than 500 but less than 800
Complete the table.

<table>
<thead>
<tr>
<th>Numbers he couldn't have added</th>
<th>Numbers he could have added</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

He couldn't have added 100, 500 or 600 but he could have added 200, 300 or 400

Write a more than and less than word problem to describe the calculation 725 - 300

Example answers:

More than:
Tim has raised £725. He has raised £300 more than his target.
What was his target?

Less than:
Amy spent £725 on a laptop. Tina spent £300 on a laptop. How much more did Amy spend?
Pattern Spotting

Notes and Guidance

Children consolidate adding ones, tens and hundreds to 3-digit numbers. It is important in this step that children don’t end up with the misconception that adding and subtracting ones only affects the ones column, because they need to identify it can affect the tens column too.

Mathematical Talk

What do you notice? Which strategy can we use to add these numbers?

Do we need to write a zero in the hundreds column when there are no hundreds left?

Do we always need to work out each calculation or can we use what we already know?

Varied Fluency

What has happened to each starting number? How do you know?

Before

<table>
<thead>
<tr>
<th>100</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

Three hundred and forty

After

<table>
<thead>
<tr>
<th>100</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

Three hundred and seventy

Work out:

253 + 2  253 + 20  253 + 200

253 − 2  253 − 20  253 − 200

What is the same and what is different about each calculation?

Fill in the missing numbers.

433 − ____ = 133

____ = 40 + 473
### Pattern Spotting

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Steve uses column addition to solve 251 + 4</th>
<th>The best strategy is to complete 1 + 4, which is 5 and the 2 hundreds and 5 tens stay the same.</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="2 5 1 + 4 = 2 5 5" /></td>
<td>When adding 40 it is the tens column which Steve needs to look at because 40 is 4 tens.</td>
</tr>
<tr>
<td>Is this the most efficient method?</td>
<td>When adding 400, he needs to look at the hundreds column because 400 is 4 hundreds.</td>
</tr>
<tr>
<td>Explain what Steve could have done.</td>
<td>Investigate</td>
</tr>
<tr>
<td>Tell Steve how he can use your strategy to solve 241 + 40 and 241 + 400</td>
<td>No, the ones can change the ones column and any column to the left e.g. 123 + 9 and 402 – 4</td>
</tr>
<tr>
<td></td>
<td>Does adding and subtracting tens to a 3-digit number only affect the tens column?</td>
</tr>
<tr>
<td></td>
<td>The tens column can change itself and the hundreds column e.g. 456 + 50 and 456 – 60</td>
</tr>
<tr>
<td></td>
<td>When adding and subtracting from any column, it can only affect its own column and columns to the left.</td>
</tr>
</tbody>
</table>
2-digit & 3-digit Numbers

Notes and Guidance

Children focus on the position of numbers and place value to add and subtract 2-digit and 3-digit numbers.

The use of concrete equipment will support understanding at this stage.

Mathematical Talk

Where would these digits go on the place value chart? Why?

When we subtract, why do we not make both numbers? Why do we make both numbers when we add?

Can you represent using the equipment?

Varied Fluency

Match the calculation to the correct representation and solve.

<table>
<thead>
<tr>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 + 461</td>
<td></td>
<td></td>
</tr>
<tr>
<td>553 − 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>544 + 22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Represent the calculations using Base 10 and solve.

<table>
<thead>
<tr>
<th>H</th>
<th>T</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>388 − 44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>167 + 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>265 − 43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2-digit & 3-digit Numbers

Reasoning and Problem Solving

Emma has 169 sweets in a jar. She gives 37 sweets to Ben. Which model represents this problem?

a) \[
\begin{array}{c}
\text{132} \\
37 \\ 169
\end{array}
\]

b) 

\[
\begin{array}{c}
\text{169} \\
\text{132} \\
\text{37}
\end{array}
\]

c) 

\[
\begin{array}{c}
\text{169} \\
37 \\ 132
\end{array}
\]

d) 

\[
\begin{array}{c}
\text{132} \\
37 \\
\text{169}
\end{array}
\]

C is correct because 
\[37 + 132 = 169\]

37 is a part, 132 is a part and 169 is the whole.

Explain the mistake Joey has made.

\[
\begin{array}{c}
H \\
T \\
O
\end{array}
\]

\[
\begin{array}{c}
2 \\
3 \\
1
\end{array}
\]

\[
+ \quad 6 \quad 3
\]

\[
\begin{array}{c}
\text{HTO} \\
\text{231} \\
\text{+ 63}
\end{array}
\]

Joey has put 63 in the wrong place value columns.

Monica and Rachel have some sweets. Monica has 77 and Rachel has 121. They want to know how many sweets there are in total, but they have written the calculation differently.

Monica
\[
\begin{array}{c}
1 \\
2 \\
1
\end{array}
\]

Rachel
\[
\begin{array}{c}
7 \\
7
\end{array}
\]

\[
+ \quad 7 \quad 7
\]

\[
+ \quad 1 \quad 2 \quad 1
\]

Who is correct?

Both are correct because addition is commutative and can be added either way round.
Add 2-digit & 3-digit Numbers

Notes and Guidance

Children add 3 and 2 digit numbers that cross both the 10 and 100 barrier. They build upon the previous small steps and the concept of ‘exchange’ is explored. They focus on the position of numbers and place value. The placement of numbers is also key, i.e. ‘Does it matter which number goes on top?’ The use of concrete equipment will support understanding at this stage.

Mathematical Talk

What happens when we have 10 ones? Can we exchange them for anything? Why?

Where does this ten go? How does that help us?

What happens when we have 10 tens? Can we exchange them for anything? Why?

Where does this hundred go? How does that help us?

Varied Fluency

Solve 46 + 367 using Base 10

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+ 3 6 7

Use column addition to calculate.

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| 254 | 68 |

| ? |

Use column addition to solve.

248 + 37

476 + 59

556 + 77
Add 2-digit & 3-digit Numbers

Reasoning and Problem Solving

**Eva**

Here is her working out:

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Is she correct? Explain why.

Eva is incorrect because she has not exchanged ten ones for one ten or ten tens for one hundred.

The answer should be 352.

**Dora, Jack and Amir are working out**

374 + 37

**Dora**

I started at 374 on a number line.

**Jack**

I used column method.

**Amir**

I added 40 and subtracted 3

Which method do you prefer?
Are there any other ways to work this out?

Children choose their preferred method and explain why.
**Subtract 2-digits from 3-digits**

**Notes and Guidance**

Children focus on the position of numbers and place value to subtract 2-digits from 3-digits using the column method. The term 'exchange' will be key and understanding of place value will help children to recognise when they should be exchanging.

**Mathematical Talk**

What happens when we are subtracting more ones than we have?

Can we exchange anything? (1 ten for 10 ones)
Where do the 10 ones go?
How does this help us solve the problem?

What happens if there are ones remaining after exchanging for 1 ten?

**Varied Fluency**

- Represent 235 – 29 using Base 10 and solve.

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- Use column subtraction to calculate.

  - Use <, > or = to make the statements correct.

  $215 - 47 \bigcirc 234 - 57$

  $452 - 84 \bigcirc 411 - 43$

  $332 - 89 \bigcirc 406 - 28$
Subtract 2-digits from 3-digits

Reasoning and Problem Solving

Maria thinks $352 - 89 = 337$

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Is she correct?

Explain why.

Maria is incorrect because she has just found the difference between the ones rather than making an exchange. She has done the same with the tens.

The answer should be 263

Alex, Teddy and Dora are trying to work out $300 - 57$

Who has the most efficient way of working it out? Explain how you know.

I know that take away means difference, so I can do 299 take away 56 and get the right answer.

Alex

I can count on from 57 to 100, and then count on to 300

Teddy

I can use the column method to work it out and exchange when I need to.

Dora

Accept different answers as long as they are justified. Children might even suggest subtracting 60 and then adding 3.
Add Two 3-digit Numbers (1)

Notes and Guidance

Children add two 3-digit numbers with no exchange. Use of place value counters builds on children’s understanding of Base 10 equipment, as the individual units can no longer be seen.

Mathematical Talk

Where would these digits go on the place value chart? Why? Why do we make both numbers when we add? Can you represent ___ using the equipment? Can you draw a picture to represent this? Why is it important to put the digits in the correct column?

Varied Fluency

Complete the calculations.

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___ + ___ = ___

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___ + ___ = ___

Use the column method to calculate:

- Three hundred and forty-five add two hundred and thirty-six.
- Five hundred and sixteen plus three hundred and sixty-two.
- The total of two hundred and forty-seven and four hundred and two.
Add Two 3-digit Numbers (1)

Reasoning and Problem Solving

Josh is calculating 506 + 243
Here is his working out.

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Can you spot Josh’s mistake? Work out the correct answer.

Josh hasn’t used zero as a place holder in the tens column. The correct answer should be 749

Here are three digit cards.

2 3 4

Alex and Teddy making 3-digit numbers using each card once.

I have made the greatest possible number.

Alex

I have made the smallest possible number.

Teddy

Work out the total of their two numbers.

Alex’s number is 432
Teddy’s number is 234

The total is 666
Add Two 3-digit Numbers (2)

Notes and Guidance

Children continue to add two 3-digit numbers, this time where an exchange is required.

Use of place value counters builds on children's understanding of Base 10 equipment, as the individual units can no longer be seen.

Mathematical Talk

Where would these digits go on the place value chart? Why?
Why do we make both numbers when we add?
Can you represent ___ using the equipment?
Can you draw a picture to represent this?
Why is it important to put the digits in the correct column?

Varied Fluency

Use place value counters to calculate 455 + 466

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Use place value counters and column addition to calculate:

457 + 187

178 + 349

Joan and Fred play a game. Fred scores 354 and Joan scores 478. What is the total of their scores?

Car A drives 248 miles, car B drives 40 miles more than car A. How many miles do they drive altogether?
Add Two 3-digit Numbers (2)

Reasoning and Problem Solving

Roll a 1 – 6 die.
Fill in a box each time you roll.

\[ \square \square \square + \square \square \square = \]

Can you make the total:

- An odd number
- An even number
- A multiple of 5
- The greatest possible number
- The smallest possible number

Discuss the rules with the children and what they would need to roll to get them e.g. to get an odd number. Only one of the ones should be odd because if both ones have an odd number, it will make an even.

Complete the statements to make them correct.

\[
487 + 368 \quad \square \quad 487 + 468
\]

\[
326 + 258 \quad \square \quad 325 + 259
\]

\[
391 + 600 \quad = \quad 401 + \underline{\square}
\]

Explain why you do not have to work out the answers to compare them.

In the first one we start with the same number, so the one we add more to will be greater. In the second 325 is one less than 326 and 259 is one more than 258, so the total will be the same. In the last one 401 is 10 more than 391, so we need to add 10 less than 600.
Subtract 3-digits from 3-digits (1)

Notes and Guidance

It is important for the children to understand that there are different methods of subtraction. They need to explore efficient strategies for subtraction, including:
- counting on (number lines)
- near subtraction
- number bonds

They then move on to setting out formal column subtraction supported by practical equipment.

Mathematical Talk

Which strategy would you use and why?

How could you check your answer is correct?

Does it matter which number is at the top of the calculation?

Varied Fluency

We can count on using a number line to find the missing value on the bar model. E.g.

Use this method to find the missing values.

There are 246 children on a school bus. 215 of them are girls. How many are boys?
Use a place value grid to help you work out the answer.

Start with

Now subtract 142

Copy and complete the column subtraction.
Subtract 3-digits from 3-digits (1)

Reasoning and Problem Solving

The value of the counters altogether is 566, but the splat is covering some.

566 – 434 = 132
Possible answer: One 100, three 10s and two 1s.
Thirteen 10s and two 1s.
132 ones etc.

How many different ways can you make the missing amount?

Use the digit cards to complete the calculation.

Possible answers:
987 – 647 = 340
879 – 473 = 406

The digits in the shaded boxes are odd.
Is there more than one answer?
Subtract 3-digits from 3-digits (2)

Notes and Guidance

Children explore column subtraction using concrete manipulatives. It is important to show the column method alongside so that children make the connection to the abstract and understand what is happening.

Mathematical Talk

Which method would you use for this calculation and why?

What happens when you can’t subtract 9 from 7? 50 from 30 etc.

How would you teach somebody else to use column subtraction with exchange?

Why do we exchange? When do we exchange?

Varied Fluency

Complete the calculations using place value counters.

372 − 165

629 − 483

Complete the column subtractions showing any exchanges.

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**Subtract 3-digits from 3-digits (2)**

**Reasoning and Problem Solving**

Work out the missing digits.

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533 − 218 = 315

504 − 258 = 246

Kassie is working out 406 − 289

Here is her working out:

\[
\begin{array}{c}
3016 \\
-289 \\
\hline
217
\end{array}
\]

Kassie has exchanged from the hundred column to the ones so there are 106 ones in the ones column. She should have exchanged 1 hundred for 10 tens and then 1 ten for 10 ones.

406 − 289 = 117

Explain her mistake.

What should the answer be?
Estimate Answers

Notes and Guidance

Children check how reasonable their answers are. While rounding is not formally introduced until Year 4, it is helpful that children can refer to ‘near numbers’ to see whether an estimate is sensible.

Varied Fluency

Estimate the position of arrows A and B on the number line.

Which is a sensible estimate of the number of sweets in the jar?

- 602
- 597
- 600

Match each number to its ‘near number’.

- 497 -> 500
- 304 -> 300
- 684 -> 700
- 217 -> 200

Mathematical Talk

What would you estimate this to be? Why did you choose this number?

Why isn’t this a sensible estimation to an answer?

How did they work out this answer?

Could you do it in a different/better way?
Estimate Answers

Reasoning and Problem Solving

I estimate $143 - 95$ will be 50 because I will subtract 100 from 150.

Is this a good estimate? Why?

Are there any other ways he could have estimated?

Yes, because he found two numbers close to the original numbers.

He could have rounded to the nearest 10 and calculated.

$140 - 100 (= 40)$

Use the number cards to make different calculations with an estimated answer of 70.

Possible answers:

- $121 - 48$  
  $(120 - 50)$
- $41 + 33$  
  $(40 + 30)$
- $398 - 328$  
  $(400 - 330)$
Check Answers

Notes and Guidance

Children explore ways of checking to see if an answer is reasonable.

Checking using inverse is to be encouraged so that children are using a different method and not just potentially repeating an error, for example, if they add in a different order.

Varied Fluency

34 + 45 = 79

Use a subtraction to check the answer to the addition.

Hannah has baked 45 cakes for a bun sale. She sells 18 cakes. How many does she have left?

Show your answer using a bar model and check your answer using an addition.

Mathematical Talk

How can you tell if your answer is sensible?

Does knowing if a number is close to a multiple of 100 help when adding and subtracting 3-digit numbers? How does it help?

Does it help to check your answer if you spot which numbers are near to multiples of 10? How does counting 10s, 50s and 100s help?
Check Answers

Reasoning and Problem Solving

Mo

If I add two numbers together, I can check my answer by using a subtraction of the same numbers after e.g. to check $23 + 14$, I can do $14 - 23$

Do you agree? Explain why.

No, because you cannot have part subtract part.
You need to find the whole and this needs to be at the start of the subtraction then you subtract a part to check the remaining part.

I completed an addition and then used the inverse to check my calculation.
When I checked my calculation, the answer was 250.
One of the other numbers was 355.
What could the calculation be?

$$\_\_ + \_\_ = \_\_$$

$$\_\_ - \_\_ = 250$$

Possible answers:
$355 - 105 = 250$
$605 - 355 = 250$
So the calculation could have been:
$250 + 105 = 355$
$250 + 355 = 605$