Year ⑤

Small Steps Guidance and Examples

Block 2: Addition and Subtraction

White Rose Maths

Overview

Small Steps

- Add whole numbers with more than 4-digits (column method)
- Subtract whole numbers with more than 4-digits (column method)
- Round to estimate and approximate
- Inverse operations (addition and subtraction)
- Multi-step addition and subtraction problems

NC Objectives

Add and subtract numbers mentally with increasingly large numbers.

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

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

Add more than 4-digits

Notes and Guidance

Children will build upon previous learning of column addition. They will now look at numbers with more than four digits and use their place value knowledge to line the numbers up accurately.

Children will learn that when there are more than ten thousands in the thousands column these can be exchanged for ten thousands.

Mathematical Talk

Will you have to exchange? How do you know which columns will be affected?

Does it matter that the two numbers don't have the same amount of digits?

Which number goes on top in the calculation? Does it affect the answer?

Varied Fluency

1 Solve:

$$4,434 + 3,325$$

_____ + _____ = _____   _____ + _____ = _____

Can you give the other 3 fact family questions that relate to this question? (Inverse operation link)

2 Answer:

$$32\ 461 + 4\ 352$$ $$48\ 276 + 5\ 613$$

Can you think of a sensible story to represent this question?

3 Using the column method, answer:

54,311 + 425 + 3,501

35,622 + 24,316 + 7,43

3,942 + 14,356 + 88

Add more than 4-digits

Reasoning and Problem Solving

Sam is discovering numbers on a Gattegno board.

He makes this number:

Sam moves one counter three spaces on a horizontal line to create a new number.

When he adds this to his original number he gets 131,130

Which counter did he move?

He moved the counter from 4,000 to 7,000

$64,065 + 67,065 = 131,130$

Work out the missing numbers.

$54,937 + 23,592 = 78,529$

Subtract more than 4-digits

Notes and Guidance

Building on Year 4, children use their knowledge of subtracting using the formal column method to subtract more than four digit numbers. Children will be focusing on exchange and will be concentrating on the correct place value.

It is important that children know when an exchange is and isn't needed. Children need to experience '0' as a place holder.

Mathematical Talk

Why is it important that we start subtracting the ones first? What could happen if we didn't?

Does it matter which number goes on top? Why? Will you have to exchange? How do you know which columns will be affected?

Does it matter that the two numbers don't have the same amount of digits?

Varied Fluency

1. A plane is flying at 29,456 feet. During the flight the plane descends 8,896. It then descends another 989 feet. What height is the plane now flying at?

2. Using column subtraction answer the following: Adam earns £37,506 pounds a year.
Sarah earns £22,819 a year.
How much more money does Adam earn than Sarah?

3. Work out:

4,648 – 2,347   45,536 – 8,426

Subtract more than 4-digits

Reasoning and Problem Solving

Gina makes a 5-digit number.
Mike makes a 4-digit number.

The difference between their numbers is 4,365

What could their numbers be?

Possible answers:

9,658 and 14,023
12,654 and 8,289
5,635 and 10,000

Holly is completes this subtraction incorrectly

$$
\begin{array}{r}
28701 \\
-7621 \\
\hline
21180
\end{array}
$$

Explain the mistake to Holly and correct it for her.

Holly did not write down the exchange she made when she exchanged 1 hundred for 10 tens. This means she still had 7 hundreds subtract 6 hundreds when she should have 6 hundreds subtract 6 hundreds.

The correct answer is 21,080

Estimate and Approximate

Notes and Guidance

Children build on their understanding of estimating and rounding to estimate answers for calculations and problems. The term approximate is used throughout.

Mathematical Talk

Which numbers shall I round to?

Why should I round to this number? Why should an

estimate be quick?

When, in real life, would we use an estimate?

Varied Fluency

1. Which is the best question to estimate the following addition: 22223 + 5687

22220 + 5690
22230 + 5690
22220 + 5680

2. The children from West Pool Junior School all go on a whole school trip to a museum. There are 30 children in each year group and all 4 year groups go. The cost for each child is as follows:

Cost of ticket	£9.95
Cost of coach	£7.63
Cost of lunch	£3.32

What is the approximate cost for each individual child?
Approx. £10.00 + £7.50 + £3.30 = £20.80
Here are the total costs for the whole school trip:

Total cost of tickets	£1194
Total cost of coach	£915.60
Total cost of lunches	£398.40

What is the total approximate cost for the whole trip?
Approx. £1200 + £900 + £400 = £2500

Estimate and Approximate

Reasoning and Problem Solving

True or false?

$49{,}999 - 19{,}999 = 50{,}000 - 20{,}000$

I did not need to use a written method to work this out.

Lea

How could Lea have worked this out?

True because both have a difference of 3,000

Lea has used her related number facts. Both numbers on the right have decreased by 1 therefore whatever the difference is, it will remain the same as the left hand side.

Which estimate is inaccurate?

a)

25,000

0   100,000

b)

25,000

10,000   90,000

c)

25,000
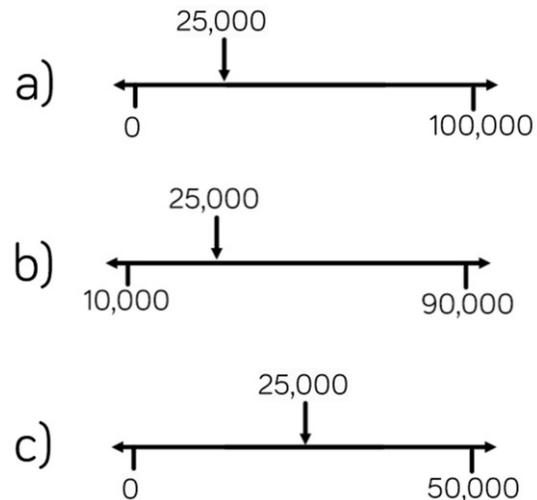
0   50,000

Explain how you know.

B is inaccurate.

The arrow is about a quarter way on the line. If 50,000 is half way between 10,000 and 90,000 then half way between 10,000 and 50,000 would be 30,000.

Inverse Operations

Notes and Guidance

In this small step, children will use their knowledge of addition and subtraction to check their workings to ensure accuracy.

They use the commutative law to see that addition can be done in any order but subtraction cannot.

Mathematical Talk

How can you tell if your answer is sensible?

What is the inverse of addition?

What is the inverse of subtraction?

Varied Fluency

1 When calculating 17,468 – 8,947, which answer gives the corresponding addition question?

- $8,947 + 8,631 = 17,468$
- $8,947 + 8,521 = 17,468$
- $8,251 + 8,947 = 17,468$

2 I'm thinking of a number. After I add 5,241 and subtract 352, my number is 9485. What was my original number?

3 Amy and Matthew are playing their favourite computer game. Amy's current high score is 8,524. Matthew's high score is bigger than Amy's and when you add them together their combined total is 19,384. What is Matthew's high score?

Inverse Operations

Reasoning and Problem Solving

Complete the pyramid using addition and subtraction.
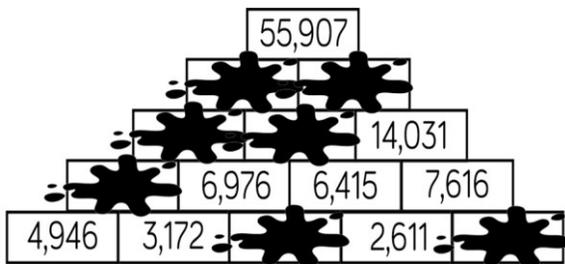
From L – R

Bottom row:
3,804, 5,005

Second row:
8,118

Third row:
15,094, 13,391

Fourth row:
28,485, 27,422

Arvind, Betty, Charlie and Freddie collect marbles.
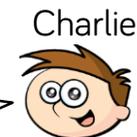
Arvind

I have 1,648 marbles.

Betty

I have double the amount of marbles Arvind has.

I have half the amount of marbles Arvind has.

Charlie

In total, they have 8,524 between them.

How many marbles does Freddie have?

Arvind = 1,648
Betty = 3,296
Charlie = 824
Freddie = 2,756

Multi-step Problems

Notes and Guidance

In this small step children will be using their knowledge of addition and subtraction to solve multi step problems. The problems will appear in different contexts and in different forms, i.e. bar models and word problems.

Mathematical Talk

What is the key vocabulary in the question?

What are the key bits of information?

Can we put this information in to a model?

Which operations do we need to use?

Varied Fluency

1 When Claire opened her book, she saw two numbered pages.
The sum of these two pages was 317.
What would the next page number be?

2 Adam is twice as old as Barry.
Charlie is 3 years younger than Barry.
The sum of all their ages is 53.
How old is Barry?

3 Solve the following. Find two examples for each bar model.

8547	
?	?

4869		
?	?	?

8547		
?	?	?

8547			
?	?	?	?

4000   1217   1387   1892
430
1482   350   714
519   155   439   925
3000   944   1760   2000

Multi-step Problems

Reasoning and Problem Solving

A milkman has 250 bottles of milk.

He collects another 160 from the dairy and delivers 375 during the day.

How many does he have left?

This is my method:

375 − 250 = 125

125 + 160 = 285

Sam

Do you agree with Sam's answer?

Explain why.

No.
Sam has used the wrong numbers to subtract.
He should have added 160 and 250 because these are the bottles he has to sell (410). He should then have subtracted 375 from 410 to leave 35

On Monday, Dupree was paid £114

On Tuesday, he was paid £27 more than Monday.

On Wednesday, he was paid £27 less than Monday.

How much was Dupree paid in total?

How many calculations did you do?

Was there a more efficient way?

£342

Children may do:
£114 + £27 = £141
£114 - £27 = £87
£114 + £141 + £87 = £342

Encourage children to see how +27 and -27 cancel each other out and you can do £114 ×3