

# **Small Steps Guidance and Examples**

(Block 2: Addition and Subtraction)



# Overview Small Steps

Year 5	Year 6
Add whole numbers with more than 4-digits (column method)	Add and subtract whole numbers
Subtract whole numbers with more than 4-digits (column method)	
Round to estimate and approximate	Mental calculations and estimation
Inverse operations (addition and subtraction)	
Multi-step addition and subtraction problems	

## 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



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

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32 461	48 276

<u>+ 4 352</u> <u>+ 5 613</u>

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

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:

1	2	3	4	$\bigcirc$	6	7	8	9
10	20	30	40	50	$\bigcirc$	70	80	90
100	200	300	400	500	600	700	800	900
1000	2000	3000	$\bigcirc$	5000	6000	7000	8000	9000
10000	20000	30000	40000	50000	$\bigcirc$	70000	80000	90000

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



#### Year 6 | Autumn Term | Teaching Guidance

Week 4 to 5 – Number: Addition and Subtraction

#### Add & Subtract Integers

#### Notes and Guidance

Children consolidate their knowledge of column addition and subtraction.

They use these skills to solve multi step problems in a range of contexts.

#### Mathematical Talk

- What happens when there is more than 10 in a place value column?
- Can you make an exchange between columns? How can we find the missing digits? Can we use the inverse?
- Is column method always the best method?
- When should we use our mental methods?

## Varied Fluency

1	Calculate	
	34621 +25734	4761325 - 938052
	 67,832 + 5,258 = 834,501 - 193,642	2=



A four-bedroom house costs £450,000 A three-bedroom house costs £199,000 less. How much does the three-bedroom house cost? What method did you use to find the answer?



All the missing digits are the same. Find the missing digits



## Add & Subtract Integers

## Reasoning and Problem Solving



Here is a bar model. B 631,255

A is an odd number which rounds to 100,000 to the nearest ten thousand. It has a digit total of 30

B is an even number which rounds to 500,000 to the nearest hundred thousand. It has a digit total of 10

A and B are both multiples of 5 but end in different digits.

Possible answer:

99,255 + 532,000 = 631,255

#### Year 5 | Autumn Term | Teaching Guidance

#### 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

- 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?
- 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?
  - Work out:

4,648 - 2,347

45,536 - 8,426

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## 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

28701 -<u>7621</u> 21180

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

#### Year 5 | Autumn Term | Teaching Guidance

#### **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

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.  $\pounds 10.00 + \pounds 7.50 + \pounds 3.30 = \pounds 20.80$ 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
Total cost of lunches	£398.40

What is the total approximate cost for the whole trip? Approx.  $\pounds1200 + \pounds900 + \pounds400 = \pounds2500$ 

## **Estimate and Approximate**

#### **Reasoning and Problem Solving**



#### **Mental Calculations**

#### Notes and Guidance

We have included this small step separately to ensure that teachers give emphasis to this important skill. Discussions around efficient mental calculations and sensible estimations need to run through all steps.

Sometimes children are too quick to move to computational methods, when changing the order leads to quick mental methods and solutions.

#### Mathematical Talk

Is there an easy and quick way to do this?

Can you use known facts to answer the problem?

Can you use rounding?

Does the solution need an exact answer?

How does knowing the approximate answer help with the calculation?

## Varied Fluency

How could you change the order of these calculations to be able to perform them mentally?

50 x 16 x 2 = 30 x 12 x 2 = 25 x 17 x 4 =

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Jamie buys a t shirt for £9.99, socks for £1.49 and a belt for £8.99 He was charged £23.47

How could he quickly check if he was overcharged?





What do you estimate that B represents when: A = 0 and C = 1,000 A = 30 and C = 150 A = -7 and C = 17 A = 0 and C = 5,000A = 1,000 and C = 100,000

# **Mental Calculations**

## **Reasoning and Problem Solving**



#### Year 5 | Autumn Term | Teaching Guidance

#### **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

When calculating 17,468 – 8,947, which answergives the corresponding addition question?

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

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- 2 I'm thinking of a number. After I add 5,241 and subtract 352, my number is 9485. What was my original number?
  - 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	Arvind, Betty marbles.
Bottom row: 3,804, 5,005 Second row: 8,118	I have ?
Third row: 15,094, 13,391 Fourth row:	Betty
28,485,27,422	I have hal of marble
	In total, they
	How many I

Arvind, Betty, Charlie and Freddie collect marbles.

Arvind 1,648 marbles.

Arvind = 1,648

Betty = 3,296

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I have double the
amount of marbles
Arvind has.
If the amount
es Arvind has.
```

In total, they have 8,524 between them.

How many marbles does Freddie have?

## 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

- 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?
- 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

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

8547						
?	?					

8547							
?????							
8547							
?	?	?	?				



## 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

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  $\pounds 27$  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:  $\pounds 114 + \pounds 27 = \pounds 141$   $\pounds 114 - \pounds 27 = \pounds 87$   $\pounds 114 + \pounds 141 + \pounds 87 =$  $\pounds 342$ 

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