## Years 5/6

## Small Steps Guidance and Examples

## Block 2: Addition and Subtraction

## White RøseMaths

## Overview

## Small Steps

## Year 5 <br> 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
$\square$
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

1

> | Solve: |
| :--- |
| 4,434 |
| $+3,325$ |

$\qquad$ $+$ $\qquad$ $=$ $\qquad$ $-$ $\qquad$ $+$ $\qquad$ $=$ $\qquad$ -
Can you give the other 3 fact family questions that relate to this question? (Inverse operation link)
(2) Answer:

$$
\begin{array}{r}
32461 \\
+48276 \\
+4352 \\
\hline
\end{array}
$$

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

3 Using the column method, answer:

$$
\begin{aligned}
& 54,311+425+3,501 \\
& 35,622+24,316+7,43 \\
& 3,942+14,356+88
\end{aligned}
$$

## 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 | 0 | 6 | 7 | 8 | 9 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 10 | 20 | 30 | 40 | 50 | 0 | 70 | 80 | 90 |
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| 1000 | 2000 | 3000 |  | 5000 | 6000 | 7000 | 8000 | 9000 |
| 10000 | 20000 | 30000 | 40000 | 50000 | 0 | 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
$64,065+67,065$
$=131,130$

Work out the missing numbers.


78529
$54,937+23,592=$ 78,529

## 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

$$
\begin{array}{r}
34621 \quad 471325 \\
+25734 \\
\hline
\end{array}
$$

$$
\begin{aligned}
& 67,832+5,258= \\
& 834,501-193,642=
\end{aligned}
$$

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

$$
\begin{array}{r}
522470 \\
+305904 \\
900302
\end{array}
$$

## Add \& Subtract Integers

## Reasoning and Problem Solving



$A$ 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:
$99,255+532,000$
$=631,255$

## 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 exchangeis and isn't needed. Children need to experience ' $O$ ' as a place holder.

## Mathematical Talk

Why is it important that we start subtracting the onesfirst? 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 thanSarah?
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 | 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 thefollowing addition: $22223+5687$

$$
\begin{aligned}
& 22220+5690 \\
& 22230+5690 \\
& 22220+5680
\end{aligned}
$$

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? | True because both <br> have a difference of <br> 3,000 |
| :--- | :--- |
| 49,999-19,999=50,000-20,000 | Lea has used her <br> related number facts. <br> Both numbers on the <br> right have decreased <br> by 1 therefore <br> whatever the <br> difference is, it will <br> remain the same as <br> the left hand side. |
| I did not need to use <br> written method to work Lea have worked this out? <br> this out. |  |



## 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

1 How could you change the order of these calculations to be able to perform them mentally?
$50 \times 16 \times 2=$
$30 \times 12 \times 2=$
$25 \times 17 \times 4=$
2 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?


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

## Mental Calculations

## Reasoning and Problem Solving



## 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?
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



## 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 thequestion?

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 |  |  |  |
| :--- | :--- | :--- | :--- |
| $?$ | $?$ | $?$ | $?$ |

## Multi-step Problems

## Reasoning and Problem Solving


\(\left.$$
\begin{array}{|l|l|}\hline \text { On Monday, Dupree was paid £114 } & £ 342 \\
\begin{array}{ll}\text { On Tuesday, he was paid £27 more } \\
\text { than Monday. }\end{array} & \begin{array}{l}\text { Children may do: } \\
£ 114+£ 27=£ 141\end{array} \\
\begin{array}{l}\text { On Wednesday, he was paid £27 less } \\
\text { than Monday. } \\
\text { How much was Dupree paid in total? } \\
\text { How many calculations did you do? } \\
\text { Was there a more efficient way? }\end{array} & \begin{array}{l}£ 114+£ 141+£ 87 \\
\text { W342 }\end{array} \\
& \begin{array}{l}\text { Encourage children } \\
\text { to see how }+27 \text { and }\end{array}
$$ <br>
-27 cancel each <br>
other out and you <br>

can do £ 114 \times 3\end{array}\right]\)|  |
| :--- |

