

basic education

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Grade 3 Mathematics Mental Starters Assessment Project (MSAP)

Mental Starters: Tasks and Assessments

TEACHER GUIDE: ENGLISH



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INTRODUCTION

This Teacher Guide contains **6 Mental Mathematics Lesson Starter units** for Grade 3 learners. A different **calculation strategy** is in focus in each unit. These calculation strategies are taken from the curriculum. Each unit covers a particular group of connected skills.

The aim is to move learners on from counting in ones on their fingers or with tally marks on paper. Counting in ones is time-consuming and leads to errors. It also becomes very inefficient as the number range increases. The strategies and skills support powerful number sense.

The six calculation strategies and the timeline

The units are covered across the first three terms as follows:

Term I	Bridging through ten	36 + 7 =	+4 +3 36 40 43	= /3
	-			- 40

Term I	Jump strategies	43 – I2 =	-2 -10	= 31
--------	--------------------	-----------	--	------

Term 2	Doubling & halving	Double 29 =	double 29 20 9 \downarrow \downarrow 40 18 58	= 58
--------	-----------------------	-------------	---	------

Term 2	Rounding &	47 + 29 =	+30 -1		
	aajusting		47 76 77	= 76	

Term 3 Re-ordering 26 + 17 + 4 =	26 + 17 + 4 30 = 47
----------------------------------	------------------------

Term 3	Linking addition & subtraction	□ – 30 = 9	30	9	
			30 + 9 =		= 39

The model

Each unit is three weeks long and follows this model:



Each unit begins and ends with a short test for the learners. Marking these tests provides information for you and the learners about how much they have improved in using that particular set of skills during the three weeks.

Within each unit, we focus on three types of calculations:



Working through the Lesson Starters in each unit with your class should lead to improvements in learners' performance from the pre to post-tests. These improvements show progress in mental mathematics skills and number sense.

How to use this guide

This booklet details the Tests and Lesson Starters for each unit. The Lesson Starters are designed to fit into the **10-minute** oral and mental mathematics section at the start of your mathematics lesson.

Each Lesson Starter starts with a **1-minute mental warm-up** focused on important rapid recall skills for that unit. Learners should answer these questions quickly and confidently.

A **Lesson Starter task sequence** follows the warm-up. The task sequence in each lesson starter explains:

- how to teach the strategy (shown on the left) and
- what to write on the board (shown on the right)

After each lesson starter there are **individual tasks** for learners to complete. Learners should mostly try these tasks mentally using the strategy they have just been taught. Tell learners **NOT to count in 1s**. If learners are struggling, ask them to show their working, e.g. on an empty number line, or in a bar diagram. Number line and bar diagram sketches should be 'rough' as the aim is to quickly support mental working.

Ask learners to **explain their thinking** to you and to others. This will allow you to assess whether they are using the strategy taught.

Support Videos: Opposite each lesson starter plan is a link to a short video showing how the strategy works. You can open the link by:

- Pointing your cell phone camera at the square QR code or
- Typing the youtu.be link into a web browser

After Lesson Starter 4 and Lesson Starter 7, there are **individual practice worksheets** that learners can use to practice at home.

Memoranda for the pre- and post-tests and the worksheets are given at the end of this guide.

The Print Masters Book

There is a separate **PRINT MASTERS** booklet that has:

- all the pre-tests and post-tests
- all the take-home worksheets
- all printable teaching support materials

BRIDGING THROUGH TEN

Introduction

The focus in the first four lesson starters is on adding by bridging through ten. In the next four lesson starters, the focus is on subtracting by bridging through ten. Some of the tasks are teacher-led at the board and some are for learners to do independently.

Rapid Recall Skills

There are six rapid recall skills that learners need to learn bridging through ten:

- bonds to 10 and multiples of 10 (e.g. 7 + \Box = 10; 12 + \Box = 20)
- adding to a multiple of ten (e.g. 60 + 3 = 63)
- subtracting from a multiple of ten (e.g. 60 2 = 58)
- jumping to the **next** multiple of ten after a number (e.g. $32 \rightarrow 40$)
- jumping to the multiple of ten **before** a number (e.g. $56 \rightarrow 50$)
- changing the order of the calculation (e.g. 7 + what is ten? What plus 7 is ten?)





1-Minute Mental Warm-Up

Pop-Fizz

The teacher says 'pop' and the learners say 'fizz'; then the teacher says a number, and learners respond with the matching number for the rapid recall skill.

a. Pop-Fizz Make 10

In this version, the learners should respond with the number that would make the sum 10.

\rightarrow	Learners: fizz	
\rightarrow	Learners: 7	
\rightarrow	Learners: fizz	
\rightarrow	Learners: 4	and so on…
	$\begin{array}{c} \rightarrow \\ \rightarrow \\ \rightarrow \\ \rightarrow \end{array}$	$\begin{array}{ll} \rightarrow & \text{Learners: fizz} \\ \rightarrow & \text{Learners: 7} \\ \rightarrow & \text{Learners: fizz} \\ \rightarrow & \text{Learners: 4} \end{array}$

b. Pop-Fizz Make 20 (or another multiple of 10)

In this version, the learners should respond with the number that would make the sum 20 (or any multiple of 10).

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 16	\rightarrow	Learners: 4	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 11	\rightarrow	Learners: 9	and so on

Task Sequence

In this lesson, we use the bridging through ten strategy for addition calculations.

Problem: 36 + 7	
Write '36 + 7 =' on the board.	36 + 7 =
Draw a line and mark a point labelled '36'.	
Teacher: We are adding so we need to jump forwards. What is the next multiple of ten after 36?	
A learner should come and mark '40' on the line.	
Teacher: We have to jump 7 forward from 36. Let's make one jump to the next multiple of ten rather than jumping in 1s. 36 plus what	36 + 7 =
gives 40? Learners: 4	36 40



Individual Tasks

Learners should now try the following examples *mentally*:

48 + 6 63 + 8

Learners should explain their thinking, e.g. "for 48 + 6, I add 2 to 48 to get 50, then add 4, so the answer is 54."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Support Video

Bridging Through Ten 1



https://youtu.be/iJNrdV3P4_s

Bridging Through Ten

Support Video

Bridging Through Ten 2



https://youtu.be/upvlvkC3Yko

1-Minute Mental Warm-Up

- a. Pop-Fizz: Make 10 and/or Make 20 (or any other multiple of ten)
- b. Jumping to the **next** multiple of 10 (e.g. $23 \rightarrow 30$; $56 \rightarrow 60$)

This is not rounding to the nearest ten but jumping to the **next** multiple of ten on the number line.

"What is the next multiple of ten after ...?"

Teacher: 47	\rightarrow	Learners: 50	
Teacher: 32	\rightarrow	Learners: 40	and so on

Task Sequence

In this lesson we use the bridging through ten strategy for addition calculations.

Ask the learners to remember from yesterday: How did we solve 36 + 7?	The final, full image is shown below:
Start by drawing a line and marking the point '36'.	36 + 7 = 43
Teacher: We are adding so we need to jump forward. What is the next multiple of ten after 36?	+ 4 + 3
Learners: 40	
A learner should come and mark the line.	36 40 43
Allow learners to describe the method and how it works, and to show it on the board.	
Then, show on the board how to bridge through ten to solve: 27 + 8	The final, full image is shown below:
Start by drawing a line and marking a point labelled '27' and solve the problem using the bridging through ten strategy.	27 + 8 = 35
	+3 +5 27 30 35

Individual Task

Learners should now try the following example *mentally*: 42 + 9

Learners should explain their thinking, e.g. "for 42 + 9, I add 8 to 42 to get 50, then add 1 to get to 51".

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Bridging Through Ten

Support Video

Bridging Through Ten 3



https://youtu.be/wDEEqU9B_5Q

1-Minute Mental Warm-Up

- a. Jumping to the **next** multiple of ten (e.g. $23 \rightarrow 30$; $56 \rightarrow 60$)
- b. Adding to a multiple of ten

"What is...?"

Teacher: 30 + 6	\rightarrow	Learners: 36	
Teacher: 50 + 2	\rightarrow	Learners: 52	
Teacher: 70 + 5	\rightarrow	Learners: 75	and so on…

Task Sequence

In this lesson we use the bridging through ten strategy for addition calculations.

Show on the board how to bridge through ten to solve: 35 + 8	The final, full image is shown below:
Start by drawing a line and marking a point labelled '35'.	35 + 8 = 43
Solve the problem using the bridging through ten strategy.	+5 +3 35 40 43

Individual Tasks

Learners should now try the following examples mentally:

44 + 8 39 + 7

Learners should explain their thinking, e.g. "for 44 + 8, I add 6 to 44 to get 50, then add 2 to get to 52".

Tell learners NOT to count in 1s.

Give early finishers more to practice:

43 + 8 67 + 6 84 + 7

1-Minute Mental Warm-Up

Bonds to 10: Number sentences from a bar diagram

Teacher: This is a bar diagram and it shows that 7 and 3 make 10.	Write the following on the board:		
Teacher: 7 plus what is 10?	7 3		
Learners: 3	10		
Teacher: Then, 3 plus what is 10?	Prepare the board with these		
Learners: 7	examples:		
Teacher points to each calculation on the board and the class gives the missing number.	2 8 6 4 10 10		
Continue to ask the class, verbally, more examples	2 + 🗌 = 10		
using bonds of ten:	8 + 🔲 = 10		
1 + what is 10? Then 9 + what is 10?	□ +4 = 10		
2 + what is 10? Then 8 + what is 10? 6 + what is 10? Then 4 + what is 10?	4 + 🗌 = 10		

Task Sequence

In this lesson we use the bridging through ten strategy to find the missing number in addition calculations.





Individual Tasks

Learners should try the following examples mentally:

28 + 🗌 = 35 67 + 🗌 = 72

Learners should explain their thinking, e.g. "for the first example, the next multiple of ten is 30, so I plus 2 to get to 30 and then I must plus 5 to get to 35. 2 plus 5 is 7."

Tell learners NOT to count in 1s.

Take-Home Task: Worksheet 1

At the end of today's session give learners Worksheet 1.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Bridging Through Ten 4



https://youtu.be/INITWPDMFKY

Name:





Teacher Notes

Here you can make notes about the lesson and which learners still need help with the bridging through ten strategy. You can also make notes of any other issues that you want to address in the next lesson starter.

1-Minute Mental Warm-Up

a. Jumping to the multiple of ten before	
This is not rounding to the nearest ten but jumping to the multiple	e of ten before on the
number line.	
Teacher 20 \rightarrow Learners 20	
Learner: 53 \rightarrow Learners: 50 and so on	
"What is?"	
Teacher: $30 - 6 \rightarrow$ Learners: 24	
Teacher: $50 - 2 \rightarrow$ Learners: 48	
Teacher: $70 - 5 \rightarrow$ Learners: 65 and so on	
Task Sequence	
In this lesson we use the bridging through ten strategy to solve sub	traction calculations.
Problem: 43 – 7	43 – 7 =
Write $43 - 7 = 0$ on the board.	
Draw a line and mark a point labelled '43'.	
Teacher: We are subtracting so we need to jump	40 43
backwards. What is the multiple of ten	
before 43?	
Learners: 40	
A learner should come and mark the line.	
Teacher: We have to jump 7 backwards. Let's make	43 – 7 =
one jump to the multiple of ten rather than	
counting back in 1s. 43 minus what gives	-3
40?	
Learners: 3	40 43
Teacher: We have subtracted 3. We need to subtract	43 – 7 =
seven. 7 splits into 3 and what?	3 4
Learners: 4	r - 3
Split the 7 in 43 – 7 into 3 and 4.	40 43
Teacher: How many more do we need to subtract?	43 - 7 = 3
Learners: 4	-4 -3
	40 43
Teacher: What is 40 minus 4?	43 – 7 = 36
Learners: 36	3 4
Teacher: So, 43 – 7 = 43 – 3 – 4 = 36.	-4 -3
Record the solution on the number line.	40 43

Individual Tasks

Learners should now try the following examples mentally:

54 - 6 63 - 5

Learners should explain their thinking, e.g. "for 54 - 6, I subtract 4 from 54 to get 50, then subtract 2, so the answer is 48."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Support Video

Bridging Through Ten 5



https://youtu.be/-bQNTOPly7l

Bridging Through Ten

Support Video

Bridging Through Ten 6



https://youtu.be/JvNKtAdrzfM

1-Minute Mental Warm-Up

- a. Jumping to the multiple of ten **before** (e.g. $23 \rightarrow 20$; $56 \rightarrow 50$)
- b. Subtracting from a multiple of ten (e.g. $30 3 \rightarrow 27$; $40 6 \rightarrow 34$)

Task Sequence

In this lesson we use the bridging through ten strategy to solve subtraction calculations.

Ask the learners to try to remember from yesterday: How did we solve 43 – 7?	The final, full image is shown below:
Start by drawing a line and marking a point labelled '43'.	43 - 7 = 36
Allow learners to describe the method and how it works, and to show it on the board.	
Then, show on the board how to bridge through ten to solve: 27 – 8	The final, full image is shown below:
Start by drawing a line and marking a point labelled '27' and solve the problem using the bridging through ten strategy.	27 - 8 = 19 7 1 19 20 27

Individual Task

Learners should now try the following example *mentally*: 35 – 7

Learners should explain their thinking, e.g. "for 35 - 7, I did 35 - 5 to get 30 and then minus 2 to get 28."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Give early finishers more to practice:

42-8 62-6 84-7

Bridging Through Ten

Support Video

Bridging Through Ten 7



https://youtu.be/npm_pVwiXD4

1-Minute Mental Warm-Up

- a. Jumping to the multiple of ten **before** (e.g. $23 \rightarrow 20$; $56 \rightarrow 50$)
- b. Subtracting from a multiple of ten (e.g. $30 3 \rightarrow 27$; $40 6 \rightarrow 34$)

Task Sequence

In this lesson we use the bridging through ten strategy to solve subtraction calculations.



Individual Tasks

Learners should now try the following examples *mentally*:

25 - 8 36 - 7

Learners should explain their thinking, e.g. "for 25 - 8, I did 25 - 5 to get 20 and then minus 3 to get 17."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Give early finishers more to practice:

73-6 142-8 81-4

Take-Home Task: Worksheet 2

At the end of today's session give learners Worksheet 2.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Name:





Teacher Notes

Here you can make notes about the lesson and which learners still need help with the bridging through ten strategy. You can also make notes of any other issues that you want to address in the next lesson starter.

1-Minute Mental Warm-Up

Bonds to 10: Number sentences from a bar diagram



Task Sequence

In this lesson we use the bridging through ten strategy to find the missing number in subtraction calculations.



```
so: 10 - 6 = 4; 20 - 6 + 14; 30 - 6 = 24; 40 - 6 = 34
                                                                        42 - = 34
etc.
                                                                        .6
Teacher: What is 6 plus 2? (point to the 6 and 2 on
           the diagram)
                                                               34
                                                                            40
                                                                                   42
Learners: 8
Teacher: So, 42 minus what is 34?
                                                                         42 - 8 = 34
Learners: 8
                                                                         -6
                                                                34
                                                                             40
                                                                                    42
```

Individual Tasks

Learners should try the following examples mentally:

35 - - = 28 72 - = 67

Learners should explain their thinking, e.g. "for $35 - \square = 28$, the multiple of ten before 35 is 30, so I minus 5 to get to 30 and then I must minus 2 to get to 28. 5 plus 2 is 7."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Support Video

Bridging Through Ten 8



https://youtu.be/9YSloijDOso





JUMP STRATEGIES

Introduction

The focus in the first four lesson starters is on adding using jump strategies. In the next four lesson starters, the focus is on subtracting using jump strategies. Some of the tasks are teacher-led at the board and some are for learners to do independently.

Rapid Recall Skills

There are six rapid recall skills that learners need to learn jump strategies:

- count on or back in 10s from any number (e.g. 12, 22, 32, or 57, 47, 37, ...)
- add or subtract 10 from any number (e.g. 43 + 10 = 53 or 89 10 = 79)
- add a multiple of ten to any number (e.g. 61 + 20 = 81)
- subtract a multiple of ten from any number (e.g. 46 30 = 16)
- jumping to the next multiple of ten after a number (e.g. $32 \rightarrow 40$)
- jumping to the multiple of ten before a number (e.g. $56 \rightarrow 50$)


Jump Strategies



1-Minute Mental Warm-Up

a. Round the room 10 more (can alternate with whole class answering)

The teacher says a number and learners respond round the room with 10 more than the last number.

Teacher: 16 Learner 1: 26 \rightarrow Learner 2: 36 \rightarrow Learner 3: 46 \rightarrow Learner 4: 56 and so on.

b. Round the room 10 less (can alternate with whole class answering)

The teacher says a number and learners respond round the room with 10 less than the last number.

Teacher: 128 Learner 1: 118 \rightarrow Learner 2: 108 \rightarrow Learner 3: 98 \rightarrow Learner 4: 88 and so on.

Task Sequence

In this lesson we introduce jump strategies to solve addition problems.

Problem: 36 + 13	36 + 13 =
Write '36 + 13 =' on the board.	
Plot 36 near the start of the line (because adding means we will be jumping forwards).	
Teacher: We have to jump 13 forwards. Let's break 13 down into 10 and 3. What is 36 + 10?	36 + 13 =
Learners: 46	+10
Draw the +10 jump, landing on 46.	36 46
Teacher: We still have to jump 3 forward. What is 46 plus 3?	36 + 13 = 49
Learners: 49	10 3
Write on the number line as shown.	+10 +3
Teacher: We follow these steps:	
 We plot the first number We break down the second number that we are adding We jump the tens and then the units We give the answer 	36 46 49 36 + 10 + 3 = 49
Teacher: So 36 + 13 is the same as 36 + 10 + 3 = 49 because we have added 13 by first adding 10, then 3.	
Write the number sentences as shown.	

Jump Strategies

Individual Tasks

Learners should now try the following examples mentally:

64 + 12 24 + 15

Learners should explain their thinking, e.g. "for 64 + 12, I add 10 to 64 to get 74, then I add 2, so the answer is 76."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Support Video

Jump Strategies 1



https://youtu.be/FPTVoIFFd3k

1-Minute Mental Warm-Up

Pop Fizz: 10 more or 10 less

a. The teacher says 'pop', learners say 'fizz'; teacher says a number, learners respond with **10 more** (or a multiple of 10 more):

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 3	\rightarrow	Learners: 13	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 53	\rightarrow	Learners: 63	and so on

b. The teacher says 'pop', learners say 'fizz'; teacher says a number, learners respond with **10 less** (or a multiple of 10 less):

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 49	\rightarrow	Learners: 39	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 78	\rightarrow	Learners: 68	and so on

Task Sequence

In this lesson we use jump strategies to solve addition problems.



Individual Tasks

Learners should now try the following examples *mentally*:

43 + 24 31 + 25

Jump Strategies

Learners should explain their thinking, e.g. "for 43 + 24, I add 20 to get 63, then add 4, so the answer is 67."

Tell learners NOT to count in 1s.

Support Video

Jump Strategies 2



https://youtu.be/6RkP5bSpINQ

Support Video

Jump Strategies 3



https://youtu.be/JAGey218ADw

1-Minute Mental Warm-Up

Pop-Fizz: 10 more and 10 less; 20 more and 20 less

Task Sequence

In this lesson we extend jump strategies to include a bridging through ten step.



Individual Tasks

Learners should now try the following examples mentally:

39 + 23 68 + 35

Learners should explain their thinking, e.g. "for 39 + 23, I add 20 to 39 to get 59, then add 1 to get to 60, and then 2, so the answer is 62."

Tell learners NOT to count in 1s.

Give early finishers more to practice:

36 + 28 47 + 34

1-Minute Mental Warm-Up

Jumping to the **next** multiple of ten

This is not rounding to the nearest ten but jumping to the **next** multiple of ten on the number line.

"What is the next multiple of ten after ...?"

Teacher: 47	\rightarrow	Learners: 50	
Teacher: 55	\rightarrow	Learners: 60	
Teacher: 32	\rightarrow	Learners: 40	and so on

Task Sequence

In this lesson we use jump strategies to solve missing number problems.



Individual Tasks

Learners should now try the following examples mentally:

45 + 🗌 = 67 67 + 🗌 = 81

Learners should explain their thinking, e.g. "for $45 + \square = 67$, I add 20 to 45 to get 65, then add 2 to get 67, so the total jump is 22."

Tell learners NOT to count in 1s.

Give early finishers more to practice:

45 + 🗌 = 68 67 + 🗌 = 83

Teacher Guide: English

Take-home task – Worksheet 1

At the end of today's session give learners Worksheet 1.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Jump Strategies 4



https://youtu.be/A9vFXHWkzUo

Name:

Jump Strategies: Worksheet I



Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Support Video

Jump Strategies 5



https://youtu.be/dFV5gmY68Sc

1-Minute Mental Warm-Up

- a. Round the room 10 more
- b. Round the room 10 less

Task Sequence

In this lesson we use jump strategies to solve subtraction calculations.

Problem: 43 – 12	43 – 12 =
Write '43 - $12 =$ ' on the board.	
Plot '43' near the end of the line (because subtracting means we will be jumping backwards).	43
Teacher: We have to jump 12 backwards. Let's break 12 down into 10 and 2. What is 43 - 10?	43 - 12 =
Learners: 33	-10
Make the –10 jump, landing on 33.	
	33 43
Teacher: We still have to jump 2 backwards. What is 33 minus 2?	43 - 12 = 31
Learners: 31	-2 -10
Write on the number line as shown.	
Teacher: We have subtracted 12 by subtracting 10 and subtracting 2.	31 33 43
 We plot the first number We break down the second number We jump the tens and then the ones (backward jumps because we are subtracting) We give the answer 	
Teacher: So $43 - 12$ is the same as $43 - 10 - 2 = 31$. Write number sentences as shown.	

Individual Tasks

Learners should now try the following examples mentally:

62 - 12 53 - 11

Learners should explain their thinking, e.g., "for 62 - 12, I subtract 10 from 62 to get 52, then subtract 2, so the answer is 50."

Tell learners NOT to count in 1s.

and so on...

JUMP STRATEGIES: LESSON STARTER 6

1-Minute Mental Warm-Up

a. Add 10 (or add a multiple of 10)

Same method as '10 more', but this time the teacher offers an 'add 10' problem.

Teacher: $16 + 10 \rightarrow$ Learners: 26Teacher: $84 + 10 \rightarrow$ Learners: 94Teacher: $96 + 10 \rightarrow$ Learners: 106

b. Subtract 10 (or subtract a multiple of 10)

Same method as '10 less', but this time the teacher offers a 'subtract 10' problem.

Teacher: 56 – 10	\rightarrow	Learners: 46	
Teacher: 84 – 10	\rightarrow	Learners: 74	
Teacher: 95 – 10	\rightarrow	Learners: 85	and so on

Task Sequence

In this lesson we use jump strategies to solve subtraction calculations.

Ask the learners to try to remember from yesterday: How did we solve $43 - 12$?	The final, full image is shown below:
Allow learners to describe the method to their seat partner, and then ask one pair to show it on the board. Remind learners of steps they learnt previously: plot , break down, jump (backwards) and answer .	43 - 12 = 31 $-2 -10$ -10 -31 33 43
Show on the board how to solve: 57 – 24	The final, full image is shown
Plot '57' on the number line.	below:
Break down the 24 into 20 and 4.	57 - 24 = 33
Jump backward 20 and then jump backward 4. Some learners will make two backward jumps of 10 instead of one backward jump of 20 - this is okay.	
Write the answer.	33 37 57
Teacher: So 57 – 24 is the same as 57 – 20 – 4 = 33.	
Write the number sentence as shown.	

Individual Tasks

Learners should now try the following examples *mentally*:

95 - 23 43 - 22

Learners should explain their thinking, e.g., "for 95 - 23, I subtract 20 from 95 to get 75, then subtract 3, so the answer is 72."

Tell learners NOT to count in 1s.

Learners who struggle to do this mentally can draw rough number lines to help them.

Jump Strategies

Support Video

Jump Strategies 6



https://youtu.be/JQq2zL6pwCM

Support Video

Jump Strategies 7



https://youtu.be/uFGzuToKGkA

1-Minute Mental Warm-Up

Jumping to the multiple of ten before

This is not rounding to the nearest ten but jumping to the multiple of ten **before** on the number line.

"Give me the multiple of ten that comes **before**..."

Teacher: 26	\rightarrow	Learners: 20	
Teacher: 53	\rightarrow	Learners: 50	and so on…

Task Sequence

In this lesson we extend jump strategies to include a bridging through ten step.

Show on the board how to bridge through ten to solve: 62 – 17	The final, full image is shown below:
Plot '62' on the empty number line.	62 – 17 = 45
Break down the 17 into 10 and 7.	
Jump backward 10 to reach 52.	2 5
Jump back the remaining 7 by bridging through the multiple of 10 before (this is 50).	
So the 7 needs to be broken down into 2 and 5.	45 50 52 62
Jump backward 2 and 5.	
Write the answer.	
Teacher: So 62 – 17 is the same as:	62 - 10 - 7 = 45
62 – 10 – 7 = 45 or 62 – 10 – 2 – 5 = 45	62 - 10 - 2 - 5 = 45

Individual Tasks

Learners should now try the following examples *mentally*:

75 - 18 93 - 14

Learners should explain their thinking, e.g. "for 75 - 18, I subtract 10 from 75 to get 65, then subtract 5 to get 60, then subtract 3, so the answer is 57".

Tell learners NOT to count in 1s.

If any learners finish these tasks quickly, give them more to practice:

73 - 28 62 - 35

Take-Home Task – Worksheet 2

At the end of today's session give learners Worksheet 2.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Name:

Jump Strategies: Worksheet 2



Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Support Video

Jump Strategies 8



https://youtu.be/BHC9jDIUdRI

1-Minute Mental Warm-Up

a. Jumping to the multiple of ten before

b. Subtract multiples of 10

Task Sequence

In this lesson we use jump strategies to solve missing number problems.



Write number sentence as shown.

Individual Tasks

Learners should now try the following examples mentally:

 $75 - \Box = 62$ 93 – 🗌 = 69

Learners should explain their thinking, e.g. "for 75 –]= 62, I subtract 10 to get 65, then subtract 3 to get 62, so the total jump is 13."

Tell learners NOT to count in 1s.

If any learners finish these tasks quickly, give them more to practice:

94 – 🗌 = 69 75 – 🗌 = 63

Jump Strategies

Name:



Jump Strategies



DOUBLING & HALVING

Introduction

The focus in the first three lesson starters is on the recall of doubles up to double 10 and halves of even numbers up to 20. We link this recall with language and key representations of doubles/halves. In the next five lesson starters, the focus is on using these recalled facts to mentally work out doubles and halves of larger numbers. Some of the tasks are teacher-led at the board and some are for learners to do independently.

Rapid Recall Skills

There are three rapid recall skills that learners need in order to learn doubling and halving:

- doubles up to double 10 (e.g. double 4 is 8 or double 7 is 14);
- halves of even numbers up to 20 (e.g. half of 6 is 3 or half of 18 is 9);
- doubles and halves of 'friendly' numbers (e.g. double 30 is 60 or half of 50 is 25 or double 200 is 400).

Doubling & Halving





DOUBLING & HALVING: LESSON STARTER 1

1-Minute Mental Warm-Up

'I show, you say' (whole class and then a learner paired activity)

a. The teacher shows a 'double' number using fingers on two hands, e.g.



Double 3 is 6. Now tell me the doubles sentence for the fingers I show.' The teacher shows: Double 4 Double 1 Double 3 Double 5 Double

2

Learners say the appropriate sentence, e.g. "Double 4 is 8".

b. Learners working in pairs can extend this activity to show double 6 – double 10 using their fingers:

Teacher: Each pair, show me double 6.

Learner pairs:

Teacher: How many fingers altogether in double 6?

Ask learners to mirror match their full hands and the hands with one finger open. Help learners to see that the answer 12 is made up of two hands with 5 fingers and two hands with 1 finger: 5 + 5 and 1 + 1.

Task Sequence

In this lesson we use basic doubling and halving facts to 20.

Problem: double 6	
Show six dots on one half of the doubles dot card. Open	<u>↓</u>
the card.	
Teacher: Now I have double six. How many dots altogether?	
Learners: 12	Double 6 = 12
Teacher: How do you know double 6 is 12?	Two groups of six is 12
l isten for learners who say that the doubles card shows:	Two times 6 is 12
'6 and 6', 'two groups of 6', 'two times 6', '6 x 2'.	6 x 2 = 12
Problem: half of 12	
Show twelve dots on the doubles dot card. Fold the card in half lengthways.	
Teacher: Now I can see half of the 12 dots and you can see half. So what is half of 12?	
Learners: 6	
	Half of 12 is 6

Teacher: How do you know the answer is 6? Listen for learners who give explanations like: 'half of 12 is 6' or 'twelve divided into two parts is 6' or 'twelve shared between two is six' or ' $12 \div 2 = 6$ '. If no similar offers are made, prompt the class to repeat these sentences after you. Write these different versions on the board.	Twelve divided into 2 equal parts Is 6. Twelve shared between 2 is 6. 12 ÷ 2 = 6 (These examples must remain on the board.)
Repeat with: Double 4 and double 9 dot cards Half of 8 and half of 20 dot cards Ask the class to say different sentences to match each of the double and half dot cards. Encourage learners to see the fives (dark dots) in the dot cards and to use these to find the number of dots quickly. So for double 9 we can see two 5s as 10 and two 4s as 8 so double 9 is 18.	 •••• •••• Double 4 and half of 8 •••• ••• •• ••• •• ••

Individual Tasks

Learners should now try the individual task sheet provided for Lesson Starter 1. Learners should complete the sentences, and write sentences, below each image of the dot cards on the worksheet.

Support Video

Doubling & Halving 1



https://youtu.be/UMmzMVM-SS0

Name:

Doubling & Halving Lesson Starter I: Individual Task

Complete the sentence or write sentences for each picture.

¹ Double 4	² Half of 8
$\begin{array}{ c c c } \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet &$	
Double is	Half of is
Two groups of is	8 divided by 2 is
Two times is	8 shared between 2 is
x 2 =	÷ 2 =
^{3.} Double 9	4 Half of 20
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	
5. Double	^{6.} Half of
Draw the dots for your number:	Draw the dots for your number:

DOUBLING & HALVING: LESSON STARTER 2

1-Minute Mental Warm-Up

Pop-Fizz doubles and halves to ten

a. The teacher says 'pop', learners say 'fizz'; the teacher says a number, learners respond with **doubles** (or a multiple of 10 more):

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 1	\rightarrow	Learners: 2	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 5	\rightarrow	Learners: 10	and so on

Doubles to 10: 1 - 2; 3 - 6; 5 - 10; 4 - 8; 2 - 4.

b. The teacher says 'pop', learners say 'fizz'; the teacher says a number, learners respond with **halves** (or a multiple of 10 less):

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 8	\rightarrow	Learners: 4	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 6	\rightarrow	Learners: 3	and so on…

Halves to 10: 10 - 5; 6 - 3; 4 - 2; 8 - 4; 2 - 1

Task Sequence

In this lesson we practise basic doubling and halving facts to 20.

Note: The double dot cards are available in the Print Master book.



Individual Tasks

Put the double 5, double 7 and double 9 dot cards on the board. Learners should write the double and half number sentences for the cards.

Learners should be encouraged to explain their thinking.

Tell learners NOT to count in 1s.

If any learners finish these tasks quickly, ask them to write number sentences for other dot cards.

Support Video

Doubling & Halving 2



https://youtu.be/8g1unCfK1Lo

Support Video

Doubling & Halving 3



https://youtu.be/L2 MyczJOyU

DOUBLING & HALVING: LESSON STARTER 3

1-Minute Mental Warm-Up

Pop-Fizz doubles and halves to twenty

Doubles to 20: 1 - 2; 3 - 6; 5 - 10; 4 - 8; 2 - 4; 6 - 12; 9 - 18; 7 - 14; 8 - 16; 10 - 20. Halves to 20: 10 - 5; 6 - 3; 4 - 2; 8 - 4; 2 - 1; 12 - 6; 18 - 9; 14 - 7; 16 - 8; 20 - 10.

Task Sequence

In this lesson we practise doubles of multiples of ten.

Note: The dot strips are available in the Print Master book.



Individual Tasks

Learners should now try the following examples mentally:

Double 2	Double 5	Double 7
Double 20	Double 50	Double 70

Tell learners NOT to count in 1s. They should use the connection they have just learned to write the larger doubles quickly.

If any learners finish these tasks quickly, give them more to practice:

Double 3	Double 8	Half of 4	Half of 8
Double 30	Double 80	Half of 40	Half of 80

DOUBLING & HALVING: LESSON STARTER 4

1-Minute Mental Warm-Up

Doubles and halves of friendly numbers

Friendly numbers are numbers that are easy to work with. Often these are multiples of ten.

"What is...?"

Teacher: double 30	\rightarrow	Learners: 60	
Teacher: double 10	\rightarrow	Learners: 20	
Teacher: double 50	\rightarrow	Learners: 100	
Teacher: half of 40	\rightarrow	Learners: 20	
Teacher: half of 50	\rightarrow	Learners: 25	
Teacher: half of 100	\rightarrow	Learners: 50	and so on

Task Sequence

In this lesson we practise doubles of two-digit numbers.

Note: The dot strips are available in the Print Master book.



Problem: 29 x 2	
Repeat the breaking down method for double 29 as shown. Remind the class that multiplying by 2 (or x2) is the same as doubling.	double 29 20 9
Allow the learners to help you to fill in the doubles of the tens and the units.	↓ ↓ 40 18
Some learners may say that 29 x 2 is $60 - 2 = 58$. This approach should also be accepted.	double 29 = 58

Individual Tasks

Learners should now try the following examples:

Double 41 Double 36 Double 47

Learners should write the breaking down and work out the doubles of the tens and units mentally. The idea is to work towards being able to answer these questions mentally.

Learners should explain their thinking, e.g. "double 47 is double 40 (that's 80) and double 7 (that's 14). 80 and 14 is 80, 90, 94."

Tell learners NOT to count in 1s.

Take-home task – Worksheet 1

At the end of today's session give learners Worksheet 1.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Doubling & Halving 4



https://youtu.be/qnSniN-bliU

Name:




Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Support Video

Doubling & Halving 5



https://youtu.be/t2jBnZHnn1Y

DOUBLING & HALVING: LESSON STARTER 5

1-Minute Mental Warm-Up

Doubles and halves of friendly numbers

Task Sequence

In this lesson we practise halving two-digit numbers.

Problem: 62 ÷ 2	
Remind the class that dividing by 2 $(\div 2)$ is the same as working out half.	half of 62
Teacher: How can we work out what half of 62 is?	
Listen for learners who talk about halving 60 to get 30 and halving 2 to get 1, to get the answer of 31.	30 1
Write this 'breaking down' method as shown opposite on the board.	half of 62 = 31
Problem: 76 ÷ 2	half of 76
Repeat the breaking down method for half of 76 as shown. Remind the class that dividing by 2 (or \div 2) is the same as halving.	
Allow the learners to help you to fill in the halves of the tens and the units.	35 3 half of 76 = 38

Individual Tasks

Learners should now try the following examples:

half of 42 $68 \div 2$ $34 \div 2$

Learners should write the breaking down and work out the halves of the tens and units mentally.

Learners should explain their thinking, e.g. " $34 \div 2$ is half of 30 (that's 15) and half of 4 (that's 2). 15 and 2 is 17."

Tell learners NOT to count in 1s.

Support Video

Doubling & Halving 6



https://youtu.be/fxDY11LICsc

DOUBLING & HALVING: LESSON STARTER 6

1-Minute Mental Warm-Up

Say it another way:

Work with different representations of doubling and halving. These can include words like 'double 7' and 'half of 16', or alternatives like 'two groups of 7' or '7 and 7' or '7 + 7' or '16 \div 2' or 'sixteen shared between two'.

This can also include providing an image like the one below:

9	9	
1	8	

Learners should offer ways of saying or writing 'double 9 = 18' e.g. 9 + 9 = 18 18 - 9 = 9 two nines make 18 $9 \times 2 = 18$

Task Sequence

In this lesson we use doubles and halves in a range of ways.

Problem: double 26 Ask learners for different ways of saying what they see in this diagram. For example, double 26 is the same as 26 x 2 or 'two groups of 26'. Another example is that double 26 is 2 more than double 25 because each of the groups has 1 more in it. Add any new ideas from the learners to the diagram. Some learners may offer the subtraction calculation 52 - 26 = 26. Write this on the diagram if it is offered. Linking addition and subtraction is taught as a strategy in the final set of lesson starters.



Individual Tasks

Learners should now draw a web of facts, like the one above, linked to:

double 43 = 86

Learners should explain their thinking, e.g. "I know 43 and 43 is 86" or "double 43 is 86, so, I know double 430 is 860."

If any learners finish this task quickly, ask them to create another web of connected facts starting with any doubling or halving fact they choose.

DOUBLING & HALVING: LESSON STARTER 7

1-Minute Mental Warm-Up

Doubles and halves of multiples of 10, 100, 1000

"What is...?"

Teacher: double 10	\rightarrow	Learners: 20	
Teacher: double 100	\rightarrow	Learners: 200	
Teacher: double 1000	\rightarrow	Learners: 2000	
Teacher: half of 40	\rightarrow	Learners: 20	
Teacher: half of 400	\rightarrow	Learners: 200	
Teacher: half of 4000	\rightarrow	Learners: 2000	and so on…

Task Sequence

In this lesson we practise doubles and halves of multiples of 10.

Problem: double $34 \rightarrow$ double $340 \rightarrow$ double 3400	double 31
Teacher: How can we work out what double 34 is?	
Listen for learners who talk about doubling 30 to get 60 and doubling 4 to get 8, to get 68.	30 4 ↓ ↓
If learners struggle to calculate this mentally, write this 'breaking down' method as shown.	60 8
Teacher: Can we use what we know about double 34 to work out what double 340 will be?	
Listen for learners who say that 340 is 10 times bigger	double 34 = 68
than 34 so double 340 is ten times bigger than 68; that is 680.	double 340 =
Problem: half of 46 \rightarrow half of 460	half of 46
Problem: half of 46 \rightarrow half of 460 Teacher: How can we work out what half of 46 is?	half of 46
Problem: half of $46 \rightarrow$ half of 460 Teacher: How can we work out what half of 46 is? Listen for learners who talk about halving 40 to get 20 and halving 6 to get 3, to get 23.	half of 46 40 6 40 40 20 3
Problem: half of 46 → half of 460 Teacher: How can we work out what half of 46 is? Listen for learners who talk about halving 40 to get 20 and halving 6 to get 3, to get 23. If learners struggle to calculate this mentally, write this 'breaking down' method as shown.	half of 46 40 6 \downarrow \downarrow 20 3 half of 46 = 23
 Problem: half of 46 → half of 460 Teacher: How can we work out what half of 46 is? Listen for learners who talk about halving 40 to get 20 and halving 6 to get 3, to get 23. If learners struggle to calculate this mentally, write this 'breaking down' method as shown. Teacher: Can we use what we know about half of 46 to work out what half of 460 will be? 	half of 46 40 6 \downarrow \downarrow 20 3 half of 46 = 23
 Problem: half of 46 → half of 460 Teacher: How can we work out what half of 46 is? Listen for learners who talk about halving 40 to get 20 and halving 6 to get 3, to get 23. If learners struggle to calculate this mentally, write this 'breaking down' method as shown. Teacher: Can we use what we know about half of 46 to work out what half of 460 will be? Listen for learners who say that 460 is 10 times bigger 	half of 46 40 6 40 6 20 3 half of 46 = 23 half of 46 = 23

Individual Tasks

Learners should now draw a web of facts, like the one above, linked to:

double 45	double 27	half of 82	half of 76
double 450	double 270	half of 820	half of 760

Encourage learners to calculate the first double/half mentally if they can and to use the pattern to answer the subsequent doubles/halves as fast as they can.

Take-Home Task – Worksheet 2

At the end of today's session give learners Worksheet 2.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Doubling & Halving 7



https://youtu.be/JJUPpmMdaAw

Name: Doubling & Halving: Worksheet 2



Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Support Video

Doubling & Halving 8



https://youtu.be/_qp_sjlzqLw

DOUBLING & HALVING: LESSON STARTER 8

1-Minute Mental Warm-Up

Doubles and halves of friendly numbers

Task Sequence

In this lesson we build connected facts related to a given doubling or halving number fact, including near doubles.

Problem: double 17 double $17 = \text{double } 16 + \square$ Ask learners for different ways of saying what they double $170 = \square$ half of $34 = \square$ see in this diagram. For example, 17 + 18 must be 1 more than 17 + 17. double 17 = 34Another example is that double 17 is 2 more than double 16 because each of the groups has 1 more in it. 17 + 18 = 🗌 17 + 16 = 🗌 Add any new ideas from the learners to the diagram. Some learners may offer the subtraction calculation 34 - 17 = 17. Write this on the diagram if it is offered. Linking addition and subtraction is taught as a strategy in the final set of lesson starters.

Individual Tasks

1. Learners should now draw a web of facts, like the one above, linked to:

double 38 = 76

For example, '38 + 38 = 76' or 'half of 760 = 380' or 'half of a half of 76 = 19'

Learners should explain their thinking, e.g. "a quarter of 76 is 19 because I halved and then halved again".

Tell learners NOT to count in 1s.

2. Learners should try to answer these questions:

What is double 99?

Complete this sentence: Double 99 = double $100 - \square$

What is double 49?

If any learners finish these tasks quickly, ask them to create another web of connected facts starting with any doubling or halving fact they choose.





ROUNDING & ADJUSTING

Introduction

The focus in the first three lesson starters is on addition using rounding to a friendly number and adjusting. In the next three lesson starters, the focus is on subtraction using rounding and adjusting. The final two lesson starters focus on calculations where more than one number can be rounded to a friendly number. Friendly numbers are numbers that are easy to work with. Often these are multiples of ten. Some of the tasks are teacher-led at the board and some are for learners to do independently.

Rapid Recall Skills

There are six rapid recall skills that learners need to learn the rounding and adjusting strategy:

- count on or back in 10s from any number (e.g. 12, 22, 32, or 57, 47, 37, ...)
- add or subtract 1, 2 and 3 from any number with and without bridging through ten (e.g. 49 + 1 = 50 or 30 2 = 28; 49 + 2 = 51 or 52 3 = 49).
- add a multiple of ten to any number (e.g. 61 + 20 = 81)
- subtract a multiple of ten from any number (e.g. 46 30 = 16)
- know the closest multiple of ten (e.g. 47 is closest to 50; 39 is closest to 40)
- know how to get to the nearest multiple of 10 (e.g. 43 is 3 away from 40;19 is 1 away from 20).





1-Minute Mental Warm-Up

a. Round the room 10 more

The teacher says a number and learners respond round the room with 10 more than the last number.

Teacher: 16 Learner 1: 26 \rightarrow Learner 2: 36 \rightarrow Learner 3: 46 \rightarrow Learner 4: 56 and so on.

b. Add multiples of 10

"What is...?"

Teacher: 43 + 20	\rightarrow	Learners: 63	
Teacher: 35 + 20	\rightarrow	Learners: 55	
Teacher: 42 + 30	\rightarrow	Learners: 72	and so on

Task Sequence

In this lesson we introduce the rounding and adjusting strategy.

Ask learners to give the answers to the tasks on the	Write on the board:	
board (listed to the right) and then ask learners what they notice.	27 + 9 = 27 + 10 =	
Teacher: What do you notice?	34 + 9 = 34 + 10 =	
Learners: Adding 9 gives the same answer as add 10 less 1.	62 + 9 = 62 + 10 =	
Teacher: Friendly numbers are numbers that are easy to work with. Ten is a friendly number. In this strategy, when adding 9, we round the number 9 to 10 We do this because it is close to 10 and 10 is a friendly number so it is easier to add.	$ \begin{array}{c} 27 + 9 \\ & & & & \\ & & & & \\ & & & & & \\ & & & &$	
Then we add 10 and adjust our answer by taking away the extra 1 we added when rounding.	+10 -1 -1 -1 -1 -1 -1 -1 -1	
Show 27 + 9; 34 + 9 and 62 + 9 with number lines on the board.	62 + 9	
Teacher: We call this strategy Rounding and Adjusting .		
Ask learners to say the words rounding and adjusting aloud and point to the words on the board as they	Write on the board:	
say them.	Rounding and Adjusting	

Individual Tasks

Learners should now try the following examples mentally:

 33 + 9
 48 + 9
 76 + 9
 84 + 9

Learners should explain their thinking, e.g. "for 33 + 9, I round the 9 to 10 and add 10 to 33 to get 43; then I adjust the answer by subtracting 1, so the answer is 42." As you repeat learners' methods emphasise where they rounded and adjusted.

Support Video

Rounding & Adjusting 1



https://youtu.be/jpwwvujejpl

1-Minute Mental Warm-Up

a. Pop-Fizz: Nearest multiple of 10

The teacher says 'pop' and the learners say 'fizz'; then the teacher says a number, and learners respond with another number.

In this version, the learners should respond with the nearest multiple of ten.

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 18	\rightarrow	Learners: 20	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 37	\rightarrow	Learners: 40	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 42	\rightarrow	Learners: 40	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 33	\rightarrow	Learners: 30	and so on

b. Pop-Fizz: How to jump to the nearest multiple of 10

This time learners say what needs to happen to get to the nearest multiple of ten

Teacher: 7	\rightarrow	Learners: +3	
Teacher: 28	\rightarrow	Learners: +2	
Teacher: 19	\rightarrow	Learners: +1	
Teacher: 43	\rightarrow	Learners: -3	
Teacher: 32	\rightarrow	Learners: -2	
Teacher: 11	\rightarrow	Learners: -1	and so on

Task Sequence

In this lesson we introduce the rounding and adjusting strategy for addition.

Ask the learners what they remember about jump strategies.	The final board work is shown below:
Teacher: When we used the jump strategy, how did we calculate 47 + 29?	47 + 29 = 76
Allow learners to describe the method and ask a learner to show it on the board. Remind learners of the steps: plot, break down, jump and answer .	3 ³ +20 +3 +6
Learners: Add 20 to 47 to get 67, then add 3 to get to 70, then add 6 $(3 + 6 = 9)$.	47 67 70 76
Teacher: What friendly number is 29 close to?	47 + 29
Learners: 30	+30
Teacher: If we round 29 to 30 and then jump 30 forwards from 47 where would we be?	47 77
Learners: 77(show this on the board)	
Teacher: Is 77 the final answer or must we adjust ?	

Ask the learners to explain the logic of adjusting the answer: We added an extra one, so we must subtract one from the answer to get 76. Show this on the number line on the board. Tell the learners this round and adjust method works well when one number is very close to a friendly

Individual Task

number.

Learners should now try the following examples mentally:

26 + 19 54 + 39

Learners should explain their thinking, e.g. "for 26 + 19, I round the 19 to 20 and add 20 to 26 to get 46; then I adjust the answer by subtracting 1, so the answer is 45." As you repeat learners' methods emphasise where they rounded and adjusted.

Support Video

Rounding & Adjusting 2



https://youtu.be/fGILndzXfSY



1-Minute Mental Warm-Up

- a. Pop-Fizz: How to jump to the nearest multiple of 10
- b. Quick calculations: Subtract 1, 2 or 3

"What is ...?"

Teacher: 63 – 1	\rightarrow	Learners: 62	
Teacher: 54 – 2	\rightarrow	Learners: 52	
Teacher: 78 – 1	\rightarrow	Learners: 77	
Teacher: 61 – 2	\rightarrow	Learners: 59	
Teacher: 52 – 3	\rightarrow	Learners: 49	and so on

Task Sequence

In this lesson we use the rounding and adjusting strategy for addition.



Individual Tasks

Learners should now try the following examples mentally:

25 + 18 44 + 48 65 + 27

Learners should explain their thinking, e.g. "for 25 + 18, I round the 18 to 20 and add 20 to 25 to get 45; then I adjust the answer by subtracting 2, so the answer is 43." As you repeat learners' methods emphasise where they rounded and adjusted.

Support Video

Rounding & Adjusting 3



https://youtu.be/St5nSH_BdRE

1-Minute Mental Warm-Up

a. Round the room 10 less

The teacher says a number and learners respond round the room with 10 less than the last number.

Teacher: 128 Learner 1: 118 \rightarrow Learner 2: 108 \rightarrow Learner 3: 98 \rightarrow Learner 4: 88 and so on.

b. Subtract multiples of 10

"What is...?"

Teacher: 71 – 20	\rightarrow	Learners: 51	
Teacher: 59 – 30	\rightarrow	Learners: 29	and so on

Task Sequence

In this lesson we use the rounding and adjusting strategy for subtraction.

Teacher:	We can also use the round and adjust strategy for subtracting numbers that are close to friendly numbers.	27 - 9 = 27 - 10 then add 1
	When we do 27 plus 9, we add 10 and then adjust by subtracting one. We can do $27 - 9$ as $27 - 10$ and then adjust by adding 1 because we took away one extra.	17 18 27
Teacher:	Let us do some more calculations using rounding and adjusting for subtracting 9. 34 - 9 is the same as $34 - 10$ (rounding) and add one back (adjusting).	34 – 9 +1 -10
Draw a number line as shown.		24 25 34
Teacher: So 34 – 9 = 25.		62 – 9
Do 62 – 9 as another example in the same way and show the number line on the board.		$\begin{array}{c} +1 \\ 52 \\ 53 \\ 62 \end{array}$

Individual Tasks

Learners should now try the following examples mentally:

23 - 9 48 - 9 76 - 9

Learners should explain their thinking, e.g. "for 23 - 9, I round the 9 to 10 and subtract 10 from 23 to get 13; then I adjust the answer by adding 1, so the answer is 14." As you repeat learners' methods emphasise where they rounded and adjusted.

Take-Home Task: Worksheet 1

At the end of today's session give learners Worksheet 1.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Rounding & Adjusting 4



https://youtu.be/qyCQU1S6M8w

Name:

Rounding & Ad justing: Worksheet I



Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Rounding & Adjusting

Support Video

Rounding & Adjusting 5



https://youtu.be/VQ8va_RuHBQ

1-Minute Mental Warm-Up

- a. Round the room 20 less, 30 less
- b. Pop-Fizz: Nearest multiple of 10

Task Sequence

In this lesson we use the rounding and adjusting strategy for subtraction.



Individual Tasks

Learners should now try the following examples mentally:

28 - 19 54 - 39

Learners should explain their thinking, e.g. "for 28 - 19, I round the 19 to 20 and subtract 20 from 28 to get 8; then I adjust the answer by adding 1, so the answer is 9." As you repeat learners' methods emphasise where they rounded and adjusted.

1-Minute Mental Warm-Up

- a. Pop-Fizz: How to jump to the nearest multiple of 10 (choose numbers with units 7, 8 and 9, e.g. $27 \rightarrow 30$; $58 \rightarrow 60$; $49 \rightarrow 50$)
- b. Quick calculations: Add 1, 2 or 3

```
"What is ...?"
```

Teacher: 61 + 2	\rightarrow	Learners: 63	
Teacher: 52 + 3	\rightarrow	Learners: 55	
Teacher: 77 + 1	\rightarrow	Learners: 78	
Teacher: 69 + 2	\rightarrow	Learners: 71	
Teacher: 58 + 3	\rightarrow	Learners: 61	and so on

Task Sequence

In this lesson we introduce the rounding and adjusting strategy for subtraction.



Teacher: How must we adjust 16?	
Ask the learners to explain the logic of adjusting the	
answer: we subtracted an extra three, so we must add	
the three to the answer to get 19.	
Show this on the number line on the board.	

Individual Task

Learners should now try the following examples *mentally*:

45 - 18 84 - 48 65 - 27

Learners should explain their thinking, e.g. "for 45 - 18, I round the 18 to 20 and subtract 20 from 45 to get 25; then I adjust the answer by adding 2, so the answer is 27." As you repeat learners' methods emphasise where they rounded and adjusted.

Support Video

Rounding & Adjusting 6



https://youtu.be/kG9NCQ9gBPY

1-Minute Mental Warm-Up

a. Pop-Fizz: Nearest multiple of 10

b. Pop-Fizz: How to jump to the nearest multiple of 10

Task Sequence

In this lesson we use the rounding and adjusting strategy in calculations where more than one number can be rounded.

Teacher: We can also use rounding and adjusting when both numbers are close to friendly numbers. e.g. 19 + 39.		19 + 39 (round both)
		= 20 + 40 and adjust – 2
Show learners the method of rounding and adjusting		(– 1 for each)
on the board for 19 + 39.		= 60 - 2
As you write on the board, explain:		= 58
Teacher:	We can round both numbers to 20 and 40 and add them to get 60. We added 1 to each number and so we must adjust by subtracting 2 from 60 to get 58.	
Note: When we are adjusting both numbers, we show this in a written calculation rather than on a number line.		
Teacher: How could you use rounding and adjusting for 28 + 49?		28 + 49 (round both)
		= 30 + 50 and adjust – 3
Show learners the method of rounding and adjusting		(− 2 and − 1)
for this calculation on the board.		= 80 - 3
		= 77
Teacher: How could you use rounding and adjusting for 57 + 59 + 48?		57 + 59 + 48 (round all)
		= 60 + 60 + 50 and adjust – 6
Show learners the method of rounding and adjusting		(-3, -1, -2)
		= 170 – 6
		= 164

Individual Tasks

Learners should now try the following examples *mentally*:

38 + 29 57 + 28 19 + 19 + 19

Learners should explain their thinking, e.g. "for 38 + 29, I round the 38 to 40 and the 29 to 30 and add 40 and 30 to get 70, then I adjust the answer by subtracting 3, so the answer is 67." As you repeat learners' methods emphasise where they rounded and adjusted.

If learners struggle to explain their working, ask them to show you their method in written form (as shown in the board work).

Take-Home Task: Worksheet 2

At the end of today's session give learners Worksheet 2.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Rounding & Adjusting 7



https://youtu.be/0TOGmefwNxQ

Name:





Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

1-Minute Mental Warm-Up

Round the room 20 more, 30 more, 30 less, 40 less

Task Sequence

In this lesson we select the best strategy to use, and use the rounding and adjusting strategy in calculations where this is easiest.

Write four pairs of sums on the board as shown and ask learners to say:	38 + 49
 which they would use the round and adjust strategy for which they would use a different strategy for (like jump strategy, bridging through ten, and 	22 + 36 38 - 13 47 - 29
Ask the learners to give reasons for their choices.	20 + 38 + 30
Note: 99 + 99 done as 100 + 100 – 2 is using rounding, doubling (double 100 is 200) and adjusting.	14 + 24 + 33
Discuss with learners that once they know many strategies, they will be able to choose which strategy is the quickest to use and they can combine strategies.	99 + 99 45 + 45
Ask learners to discuss how they would use rounding and adjusting to solve these:	38 + 49 47 – 29
38 + 49	29 + 38 + 39
47 - 29	
29 + 38 + 39	
Learners should say something like:	
 round 38 to 40 and 49 to 50, add 40 and 50 to get 90, and adjust by subtracting 3 from 90. round 29 to 30, subtract 30 from 47 to get 17, then adjust by adding 1 back to get 18. round 29 to 30 and round both 38 and 39 to 40, then add 30 and 40 and 40 to get 110 and adjust by subtracting 4 to get 106. 	
Ask learners to verbally complete these sentences:	Add 38 gives the same answer
 To add 18 to a number, I add then subtract To subtract 18 from a number I subtract then add 	as: + - - Subtract 49 gives the same answer as: - + - + - + - + - - + - - + - - - + - - - - - - - - - - - - -

Ask learners to fill in the boxes written on the board	Add 99 gives the same answer
as shown.	as:
	+ 🗆 – 🗆
	Subtract 28 gives the same
	answer as:
	- 🗆 + 🗖

Individual Tasks

Learners should now try the following examples *mentally*:

29 + 48 37 - 28 39 + 28 + 49

Learners should explain their thinking, e.g. "for 29 + 48, I round the 29 to 30 and the 48 to 50 and add 50 and 30 to get 80, then I adjust the answer by subtracting 3, so the answer is 57." As you repeat learners' methods emphasise where they rounded and adjusted.

If learners struggle to explain their working, ask them to show you their method in written form.

Support Video

Rounding & Adjusting 8



https://youtu.be/mij d45rw00




RE-ORDERING

Introduction

The lesson starters in this section focus on re-ordering and on different ways in which reordering (changing the order of the numbers in a calculation) can make addition and multiplication calculations easier to work out. Often, this involves finding combinations that make friendly numbers that are easy to calculate with. Friendly numbers are numbers that are easier to work with, and often involve multiples of ten. Some of the tasks are teacherled at the board and some are for learners to do independently.

Rapid Recall Skills

There are two rapid recall skills that learners need to learn the re-ordering strategy:

- recognising combinations of numbers that add, or build up, to make multiples of 10 (e.g. 6 and 4 or 3 and 7, but also 16 and 4 or 32 and 18)
- recognising combinations of numbers that can be multiplied to make multiples of 10 (e.g. 2 × 5, 5 × 4).

Re-Ordering

Name:			
Re-Ordering: Pre-Test			
PART I	2 minutes for this page		
Circle two numbers that add up to 10. 7 4 2 3 9	II. IOO + I4 =		
2. Circle two numbers that add up to 10. 5 4 1 6 8	^{12.} 2 × 5 =		
3. 6 + <u> </u>	_{13.} Circle two numbers that add up to 20. 8 14 12 3 19		
^{4.} 9 + II =	_{14.} Circle two numbers that add up to 20. 15 4 1 16 8		
_{5.} Circle two numbers that add up to 100. 24 50 30 38 70	15. 50 × 2 =		
6. Circle two numbers that add up to 100. 51 17 29 49 60	^{16.} 140 + = 149		
7. 20 = 8 +	Circle two numbers that add up to 30. ^{17.} 18 14 12 7 19		
8 + 3 = 20	_{18.} Circle two numbers that add up to 30. 10 14 9 16 13		
g. 21	I9. 69		
	69 + = 100		
^{0.} 56 + 30 =	^{20.} 22 + I8 =		
Total out of 20			

Re-Ordering



1-Minute Mental Warm-Up

I say/you say: Make 10/Make 20

a. The teacher says a single-digit number and indicates to a learner to respond with the number that adds to this number to make 10.

Teacher: 6	\rightarrow	Learner 1: 4	
Teacher: 3	\rightarrow	Learner 2: 7	
Teacher: 2	\rightarrow	Learner 3: 8	and so on

b. The teacher says a number between 1 and 20 and indicates to a learner to respond with the number that adds to this number to make 20.

Teacher: 12	\rightarrow	Learner 1: 8	
Teacher: 13	\rightarrow	Learner 2: 7	
Teacher: 5	\rightarrow	Learner 3: 15	and so on…

Both of these games can be played in pairs. In later warm-ups this game is extended to make other multiples of ten.

Task Sequence

In this lesson we introduce the re-ordering strategy.

Use your fingers to show 5 + 3 as shown below and	Write on the board:
write 5 + 3 on the board:	5 + 3
M. L.	
Teacher: Here I am showing 5 fingers and 3 more	
Cross your hands over each other (see below):	
Teacher: Now here I have $3 + 5$, but I still have the same number of fingers showing. So we see $5 + 3 = 3 + 5$.	5 +3 = 3 + 5
Write $5 + 3 = 3 + 5$ on the board.	
Do a few more examples using fingers and crossing over your hands, e.g. 4 + 1 = 1 + 4.	
Teacher: So when we are adding numbers, the order that we add them in does not matter.	



Individual Tasks

Which of the calculations below should be re-ordered before calculating? Learners can use a rough number line to help them if they need it.

5+46 86+6 7+68 84+9

Learners should explain their thinking, e.g. "for 5 + 46, I re-order it to say 46 + 5, and then I add 4 to 46 to get 50 and then add 1 to 50 to get 51."

Tell learners NOT to count in 1s.

Support Video

Re-Ordering 1



https://youtu.be/FIIM2einnNo

Support Video

Re-Ordering 2



https://youtu.be/PdZN9ZWaoDQ

1-Minute Mental Warm-Up

Linked calculations (e.g. $8 + 2 \rightarrow 10$; $18 + 2 \rightarrow 20$; $28 + 2 \rightarrow 30$)

The teacher writes an initial calculation on the board:

8 + 2 = 10

The teacher tells the class that we know 8 plus 2 equals 10 and asks for the answer to a linked calculation. Indicate individual learners who should answer.

Teacher: 18 + 2	\rightarrow	Learner 1: 20	
Teacher: 28 + 2	\rightarrow	Learner 2: 30	
Teacher: 38 + 2	\rightarrow	Learner 3: 40	and so on

Task Sequence

In this lesson we use the re-ordering strategy.



Individual Task

Learners should now use number line sketches to do the following calculations. Learners should write the re-ordered calculation, sketch a number line and write the answer:

8 + 63 6 + 97

Learners should explain their thinking, e.g. "for 8 + 63, I re-order it to say 63 + 8, and then I add 7 to 63 to get 70 and then add 1 to 70 to get 71."

Tell learners NOT to count in 1s.

1-Minute Mental Warm-Up

Round the room: Make friendly numbers

The teacher writes three linked number sentences on the board that make friendly numbers, e.g. 7 + 3 = 10 17 + 3 = 20 37 + 3 = 40

Going around the room, ask learners for other number sentences linked to this pattern that make friendly numbers. Record the responses on the board.

Learner 1: 47 + 3 = 50 \rightarrow Learner 2: 87 + 3 = 90 \rightarrow Learner 3: 107 + 3 = 110 \rightarrow etc.

Some learners may say 17 + 13 = 30 or 37 + 23 = 60. These can also be recorded.

Task Sequence

In this lesson we find friendly number combinations to make calculations with three numbers easier.

Problem: 26 + 17 + 4	26 + 17 + 4
Teacher: We could do this calculation in this order, but I see a friendly number combination in the number sentence. Where is the friendly number 'combination?	26 + 17 + 4
Learners: 26 + 4 = 30	30
Teacher: 30 is a friendly number. Now what is 30 + 17?	26 + 17 + 4 = 30 + 17
Learners: 47	= 47
Encourage learners to use mental jump strategies to calculate this answer. Remind learners NOT to count in 1s.	
Problem: 69 + 47 + 3	69 + 47 + 3
Teacher: Find the 'friendly' combination in this calculation.	69 + 47 + 3
Learners: 47 + 3 = 50	
Teacher: 50 is a friendly number. Now what is 69 + 50?	50
Learners: 119	60 + 47 + 3 - 60 + 50
Encourage learners to use mental jump strategies to calculate the answer to 69 + 50. Remind learners NOT to count in 1s.	= 119

Individual Tasks

Learners should now try the following examples by first finding the friendly number combinations and then calculating the answer:

25 + 18 + 5 44 + 38 + 12 3 + 65 + 27

Learners should explain their thinking, e.g. "for 25 + 18 + 5, I first add 5 to 25 to get 30, and then I add 18 to 30 to get 48."

Tell learners NOT to count in 1s.

Support Video

Re-Ordering 3



https://youtu.be/SdnTj8PZX-o

Support Video

Re-Ordering 4



https://youtu.be/F_1UiS4QAQ4

1-Minute Mental Warm-Up

I say/you say: Make 30/Make 50

Task Sequence

In this lesson we practise finding friendly number combinations within calculations.

Problem: 15 + 47 + 5	15 + 47 + 5
Teacher: Today we are going to look for more friendly number combinations. Is there a friendly number combination in the calculation on the board?	20 15 + 47 + 5 = 20 + 47
Learners: Yes, 15 + 5 = 20.	= 67
Teacher: So 20 + 47 = what?	
Learners: 67	
Problem: 38 + 27 + 12	38 + 27 + 12
Teacher: Find the friendly number combination.	
Learners: 38 + 12 = 50.	50
Teacher: So 50 + 27 = what?	38 + 27 + 12 = 50 + 27
Learners: 77	= 77
Teacher: What numbers could go into the box to make a friendly number combination?	38 + 27 + 🗌
Learners should give numbers ending with 2 to combine with 38 to make a friendly number, e.g. 2, 32, 82 etc. They can also give numbers ending in 3 to combine with 27 to make a friendly number, e.g. 3, 13, 53 etc.	38 + 27 + 32 38 + 27 + 13 38 + 27 + 2 38 + 27 + 53

Individual Tasks

Learners should now write down five different numbers that can go in each box to make a friendly number combination.

24 + 49 + 33 + + 29

Learners should explain their thinking, e.g. "for 24 + 49, I can write a number ending in 1 to combine with 49 or I can write a number ending with 6 to combine with 24."

Take-Home Task: Worksheet 1

At the end of today's session give learners Worksheet 1.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Name:

Re-Ordering: Worksheet |

Circle two numbers that add up 1. 86275	to 10.	". IOO + 57 =
2. Circle two numbers that add up 7 5 4 6 9) to 10.	^{12.} 2 × 6 =
8 + = IO		13. Circle two numbers that add up to 30. 9 16 21 7 12
4. 7 + I3 =		IT 5 13 8 12
5. Circle two numbers that add up 36 59 64 45	o to 100. 73	15. 60 x 2 =
6. Circle two numbers that add up 45 87 37 55	o to 100. 62	^{16.} 120 + = 128
7. 20 = 8 +		Circle two numbers that add up to 20.
8+ 6 = 20		^{18.} Circle two numbers that add up to 20. 15 12 8 4 11
g. 34 20		$\begin{array}{c c} & & & \\ \hline & & \\ 87 \\ 87 + \end{array} = 100 \end{array}$
^{10.} 26 + 12 =		^{20.} 24 + I6 =

Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Support Video

Re-Ordering 5



https://youtu.be/dz79xkmVQy8

1-Minute Mental Warm-Up

Find a friendly number combination

The teacher writes on the board:

23 2 8 25 36 17 21 19 44

The teacher says any number, e.g. 13, and the learners must pick one of the numbers on the board that would make a friendly number when added to the number, e.g. **17** would make the friendly number 30 when added to 13.

Task Sequence

In this lesson we find friendly number combinations when adding many numbers.

Problem: 7 + 5 + 3 + 1 + 8 + 5 + 2	7 + 5 + 3 + 1 + 8 + 5 + 2
Teacher: Find the friendly number combinations?	
Learners: 7 + 3 = 10; 5 + 5 = 10; 8 + 2 = 10	10 10
Mark the combinations on the board as learners say them.	7 + 5 + 3 + 1 + 8 + 5 + 2
Teacher: So 7 + 5 + 3 + 1 + 8 + 5 + 2 is 10 + 10 + 10 + 1 which is 31.	10 =31
Problem: 18 + 4 + 3 + 2 + 17 + 6 + 9	18 + 4 + 3 + 2 + 17 + 6 + 9
Teacher: Find the friendly number combinations?	
Learners: 18 + 2 = 20; 4 + 6 = 10; 3 + 17 = 20	20 20
Mark the combinations on the board as learners say them.	18+4+3+2+17+6+9
Teacher: So 18 + 4 + 3 + 2 + 17 + 6 + 9 is 20 + 20 +10 + 9 which is 59	10 =59

Individual Tasks

Learners should now try the following examples *mentally* by finding the friendly number combinations and then doing the calculation:

6 + 3 + 2 + 4 + 9 + 8 27 + 32 + 16 + 3 + 8

Learners should explain their thinking, e.g. "for the first example, I add 6 to 4 to get 10, and I add 2 to 8 to get 10, and then I add 3 and 9 to get 12 and 10 plus 10 plus 12 is 32."

Tell learners NOT to count in 1s.

1-Minute Mental Warm-Up

Pop-Fizz: Multiply by 5

The teacher says 'pop' and the learners say 'fizz'; then the teacher says a number, and learners respond with that number multiplied by 5.

Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 2	\rightarrow	Learners: 10	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 3	\rightarrow	Learners: 15	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 8	\rightarrow	Learners: 40	
Teacher: pop	\rightarrow	Learners: fizz	
Teacher: 9	\rightarrow	Learners: 45	and so on

This game can be played to practice any multiplication table. The teacher just needs to specify what number the learners must multiply by at the start of the game.

Task Sequence

In this lesson we introduce re-ordering in multiplication.

Note: The dot rows and columns are available in the Print Master book.



Re-Ordering

Stick a piece of paper up with 10 rows of 3.	
Teacher: Let's count how many dots are here in (pointing at the rows).	n total
Learners: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30.	
Teacher: Let's swap the order and count this (pointing at the columns).	s way
Learners: 10, 20, 30	
Teacher: Was it quicker to count all of these (ge down the multiples of 3) or count (gesture across the multiples of 10)?	esture these 24 27
Learners should agree that it is easier and quic do 10, 20, 30.	ker to 10 20 30

Individual Task

Learners should now write two multiplication calculations that can be done to calculate the number of dots in each picture below. Learners should choose which calculation is easier for them to do. These dot arrays are in the Print Master book and can be used on the board.



Support Video

Re-Ordering 7



https://youtu.be/ZMaAhLcdAQo

1-Minute Mental Warm-Up

Pop-Fizz: Multiply by 10

Task Sequence

In this lesson we find friendly number combinations within multiplication calculations with three numbers.

Problem: 2 x 7 x 5	
Teacher: We could do this calculation in this order, but I can see a friendly number combination. Where is the friendly number combination?	2 x 7 x 5 10
Learners: 2 x 5 = 10	
Teacher: 10 is a friendly number. Let's use that to do the calculation.	
Write $2 \times 7 \times 5 = 2 \times 5 \times 7$ on the board.	2 x 7 x 5 = 10 x 7
Teacher: We know 2 x 5 = 10. What is 10 x 7?	= 70
Listen for learners who know this answer, or who can skip count in 10s. Remind learners NOT to count in 1s.	
Learners: 70	

Individual Tasks

Learners should now use friendly number combinations to answer the following problems:

2x6x5 5x8x2 9x2x5

Learners should explain their thinking, e.g. "for $2 \times 6 \times 5$, I know 2 multiplied by 5 is ten, and 10 multiplied by 6 is 60, so the answer is 60."

Note: Learners might also come up with other ways to do these quickly. For example, a learner might do $2 \times 6 \times 5$ by saying $6 \times 5 = 30$ and double 30 is 60. This is also an efficient calculation.

Take-Home Task: Worksheet 2

At the end of today's session give learners Worksheet 2.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Name: Re-Ordering: Worksheet 2



Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

Support Video

Re-Ordering 8



https://youtu.be/Sh0e84cPf2U

1-Minute Mental Warm-Up

Pop-Fizz: Multiply by 5

Pop-Fizz: Multiply by 10

Task Sequence

In this lesson we find friendly number combinations within multiplication calculations.

Problem: 4 x 9 x 5	
Teacher: We could do this calculation in this order, but I can see a friendly number combination. Where is the friendly number combination?	4 x 9 x 5 20
Learners: 4 x 5 = 20	
Teacher: 20 is a friendly number. Let's use that to re- order the calculation.	
Write $4 \times 9 \times 5 = 4 \times 5 \times 9$ on the board.	$4 \times 9 \times 5 = 4 \times 5 \times 9$
Teacher: We can re-order and write this as $4 \times 5 \times 9$. We know $4 \times 5 = 20$. Let's work out 20×9 by counting in 20s.	= 20 x 9 = 180
Learners: 20, 40, 60, 80, 100, 120, 140, 160, 180.	

Individual Tasks

Learners should now use friendly number combinations with re-ordering to answer the following problems:

4 x 3 x 5 4 x 6 x 5 5 x 7 x 4

Learners should explain their thinking, e.g. "for $4 \times 3 \times 5$, I know 4 multiplied by 5 is twenty, and 20 multiplied by 3 is 60, so the answer is 60."

Note: Learners might also come up with other ways to do these quickly. For example, a learner might do $4 \times 3 \times 5$ by saying $4 \times 3 = 12$ and $12 \times 5 = 60$. This is also an efficient calculation.

Name:	
Re-Orderin	g: Post-Test
PART I	2 minutes for this page
Circle two numbers that add up to 10. 7 4 2 3 9	^{II.} 100 + 32 =
2. Circle two numbers that add up to 10. 5 4 1 6 8	^{12.} 2 × 5 =
3. 7 + <u>= 10</u>	_{13.} Circle two numbers that add up to 20. 8 14 12 3 19
^{4.} 9 + II =	_{14.} Circle two numbers that add up to 20. 15 4 1 16 8
5. Circle two numbers that add up to 100. 24 50 30 38 70	15. 50 x 2 =
_{6.} Circle two numbers that add up to 100. 51 17 29 49 60	^{16.} 140 + = 149
7. 20 = 8 +	Circle two numbers that add up to 30. ^{17.} 18 14 12 7 19
8+ 3 = 20	_{18.} Circle two numbers that add up to 30. 10 14 9 16 13
g. 21 30	$19. \frac{1}{69}$ 69 + = 100
^{10.} 56 + 30 =	^{20.} 22 + I8 =
Total out of 20	

Re-Ordering



LINKING

ADDITION & SUBTRACTION

Introduction

The focus in the lesson starters is on the relationship between addition and subtraction. We use this relationship to change calculations from addition to subtraction, and subtraction to addition, as a calculation strategy. This involves understanding the relationship between these two operations and understanding the relationship between the numbers in addition and subtraction number sentences. Some of the tasks are teacher-led at the board and some are for learners to do independently.

Rapid Recall Skills

There are three rapid recall skills that learners need to learn the relationship between addition and subtraction as a calculation strategy:

- adding single digit numbers to double digit numbers, including with bridging through the tens (e.g. 28 + 4; 39 + 2)
- subtracting single digit numbers from double digit numbers, including with bridging through the tens (e.g. 33 5; 52 4)
- working fluently and flexibly with bar diagrams to figure out the easier related calculation to solve.





LINKING ADDITION & SUBTRACTION: LESSON STARTER 1

1-Minute Mental Warm-Up

Quick addition: 1-digit numbers and 2-digit numbers

Choose a 2-digit number and ask learners to add different 1-digit numbers to it.

Teacher: 29 + 4	\rightarrow	Learners: 33	
Teacher: 29 + 2	\rightarrow	Learners: 31	
Teacher: 29 + 5	\rightarrow	Learners: 34	
Teacher: 29 + 7	\rightarrow	Learners: 36	and so on
Teacher: 37 + 5	\rightarrow	Learners: 42	
Teacher: 37 + 9	\rightarrow	Learners: 46	
Teacher: 37 + 6	\rightarrow	Learners: 43	
Teacher: 37 + 3	\rightarrow	Learners: 40	and so on…

Note: Learners may count up and down quickly if adding or subtracting 2, 3, or 4, but should be encouraged to use the bridging through ten strategy for adding and subtracting 5, 6, 7, 8, and 9 using the mental image of a number line.

Task Sequence

In this lesson we use bar diagrams to link addition and subtraction.

Note: The black, grey and white bar diagram is available in the Print Master book.

Teacher: In a family bar diagram, the two small bars together are the same size as the big bar. When we look at the sizes of the different coloured bars (white, grey and black) we see that the length of the 2 small bars together equals the length of the big bar.	Stick the bar diagram below on the board and stick the names (Big, Small, Small) below the diagram.
 Teacher: We name the biggest (black) bar 'Big' (stick the label 'Big' on the black bar), and we name each of the two smaller bars 'Small' (stick the labels 'Small' on the smaller bars). Teacher: The length of 'Big equals Small plus Small' Write the calculation on the board. 	Big Small Small Small Small Big
	Big = Small + Small
 Teacher: Give me other addition and subtraction sentences for the bar diagram? Learners: Big – Small = Small, etc. Write learner offers one at a time, asking the class to accept or reject offers (with reasons). 	Big – Small = Small Small + Small = Big

Teacher: What about 'Small – Big = Small'? (write it)	Small – Big = Small?
Learners say whether that sentence is true or false. Ask learners to give reasons.	
Draw a line through the sentences the class agrees are false (or incorrect). Write 'false' next to them.	Small – Big = Small false
Do the same with 'Small + Big = Small'	Small + Big = Small false

Individual Tasks

Learners should now try the individual task sheet provided for Lesson Starter 1.

Support Video

Linking Addition & Subtraction 1



https://youtu.be/nha592FZEAc

Linking Addition and Subtraction Lesson Starter 1: Individual Task

Write the words Big, Small and Small next to the correct bars in the diagram below:



Place a tick (\checkmark) next to number sentences that are true/correct, and a cross next to number sentences that are false/incorrect (X):

3 + 6 = 9	6 - 3 = 9
9 = 6 + 3	9 – 3 = 6
6 + 9 = 3	3 = 9 - 6
6 + 3 = 9	9-6=3
3 + 9 = 6	3-6=9

LINKING ADDITION & SUBTRACTION: LESSON STARTER 2

1-Minute Mental Warm-Up

Quick subtraction: 1-digit numbers from 2-digit numbers

Choose a 2-digit number and ask learners to subtract different 1-digit numbers from it.

Teacher: 71 – 1	\rightarrow	Learners: 70	
Teacher: 71 – 3	\rightarrow	Learners: 68	
Teacher: 71 – 5	\rightarrow	Learners: 66	
Teacher: 71 – 7	\rightarrow	Learners: 64	and so on…
Teacher: 42 – 2	\rightarrow	Learners: 40	
Teacher: 42 – 4	\rightarrow	Learners: 38	
Teacher: 42 – 6	\rightarrow	Learners: 36	
Teacher [.] 42 – 9		Loornoroy 22	and as an

Task Sequence

In this lesson we show the addition and subtraction relationships between numbers in a number family.

Teacher: Can you think of how the numbers 4, 6 and 10 can be linked?	Write 4, 6 and 10 on the board.			
Learners can suggest relationships like 'four and six is ten', or 'if we take four from ten we get six', or '4 + 6 = 10' or '10 - 4 = 6'.	4 6 10 four and six makes ten			
Write learner offers one at a time, asking the class to say whether the suggestions are true/correct or false/incorrect (with reasons). Rub out incorrect offers.	ten minus six equais four 4 + 6 = 10 6 + 4 = 10 10 - 6 = 4			
Teacher: The numbers 4, 6 and 10 are linked when we add and subtract. They can be thought of as a number family. In a number family bar diagram, the two small numbers together are the same size as the big number. Here, the length of 4 + 6 (the two smalls in the family) is equal to the length of 10 (the big one in the family).	10 - 4 = 6 4 10 10 10			
Draw the bar diagram.				
 Teacher: Three other numbers that are linked when we add and subtract are 8, 3 and 5. These numbers are also a number family. How are these numbers linked in a bar diagram? Draw a blank bar diagram as shown. 	Write 8, 3 and 5 on the board. 8 3 5			

Learners suggest links between 8, 3 and 5 and where each number must go in the bar diagram.		
Write learner offers as before. Record accepted offers on the board in two columns. You may need to help learners with the last 2 in each column by		
using frames like:	+	—
	calculations	calculations
8 = [] + []; 3 = [] - []; 5 = [] - []	5 + 3 = 8	8-3=5
Teacher: For every number family we can make 4		
addition and 4 subtraction number	3 + 5 = 8	8 – 5 = 3
sentences. Let's go back to our previous	8 = 5 + 3	5 = 8 - 3
example and see if we left any out.	8 = 3 + 5	3 = 8 - 5
Record number sentences for 8, 3 and 5 that were		
left out.		

Individual Task

Learners should work with a partner and draw the bar diagram for the number family 7, 9 and 16. Then they should write 4 addition and 4 subtraction calculations for the number family

Walk around observing the pairs' work and assist where needed.

Support Video

Linking Addition & Subtraction 2



https://youtu.be/fKPfCfF0w11

LINKING ADDITION & SUBTRACTION: LESSON STARTER 3

1-Minute Mental Warm-Up

- a. Quick addition: 1-digit numbers and 2-digit numbers
- b. Quick subtraction: 1-digit numbers from 2-digit numbers

Task Sequence

In this lesson we practise linking addition and subtraction using bar diagrams.

Teacher: The numbers 17, 5 and 22 are linked when we add and subtract. They are a number family.	Write 17, 5 and 22 on the board.
Draw a blank bar diagram as shown.	
Learners suggest links between 17, 5 and 22 and where each number must go in the bar diagram.	
Write learner offers as before in two columns of addition and subtraction calculations. Rub out incorrect offers. You may need to help learners with the last 2 in each column by using frames like:	+ _
22 = 🗌 + 🛄 ; 5 = 🔲 – 🔲 ; 17 = 🗌 – 🔲	calculationscalculations
Teacher: For every number family we can make 4 addition and 4 subtraction number sentences. Let's see if we left any out.	5 + 17 = 22 $22 - 17 = 517 + 5 = 22$ $22 - 5 = 1722 = 5 + 17$ $5 = 22 - 17$
Record number sentences for 17, 5 and 22 that were left out.	22 = 0.117 + 5 = 22 = 17 $22 = 17 + 5 = 17 = 22 - 5$

Individual Tasks

Learners should now use the individual task sheet provided for Lesson Starter 3.

Learners should enter the number families into the correct bar diagram. They should match the sizes of the two small numbers with the sizes of the small bars.

Support Video

Linking Addition & Subtraction 3



https://youtu.be/r02iTWJMfP0

Name:

Linking Addition and Subtraction Lesson Starter 3: Individual Task

Write the following number families into the correct bar diagram below.

Then write four addition and four subtraction number sentences for each number family.

Start with 5 + 5 = 10. Which diagram matches 5 + 5?

Notice that 5 + 5 = 10 only has two addition and two subtraction number sentences.


Linking Addition & Subtraction

Support Video

Linking Addition & Subtraction 4



https://youtu.be/KPsfH209EEM

1-Minute Mental Warm-Up

Draw a bar diagram for any combination of 3 numbers in the range of 1-20. Two examples are given below. Draw the bar diagrams to be visually proportional to the numbers.





Now ask learners to give you different addition and subtraction number sentences that work for the bar diagram. As learners suggest the possible number sentences, point to the numbers on the bar diagram

Make sure that learners suggest both addition and subtraction number sentences:

Encourage learners to also suggest number sentences where the 'answer' comes first, e.g. 10 = 7 + 3 10 = 3 + 7 3 = 10 - 7 7 = 10 - 3

Note: There are always 8 possible number sentences like the 8 above that work for each bar diagram. Learners do not have to suggest all 8 possible number sentences, but it is good to encourage them to suggest a variety of these.

Task Sequence

In this lesson we use the link between addition and subtraction to write different calculations with the same set of numbers.



Note: You number f learners d numbers. class abo learnt abo	a don't need to get all 8 sentences for this family. All you want is to see whether understand the relationship between the If any 'false' offers are made remind the put the true and false sentences that they but previously,	
e.g. Sma	II Big = Small false	
Problem:	25 – 22	25 – 22 =
Teacher:	If we try to do this calculation by 22 backward counts from 25 that will take a long time. But we can draw a bar diagram of this number family to find an easier way to get the missing number. 25 is the Big and 22 is one of the Smalls.	22 25
Draw the	bar diagram and fill in 22 and 25.	
Teacher:	This bar is so small because 22 and 25 (point on diagram) are so close together. So it would be easier to ask '22 plus what equals 25?' (point to the diagram as you say this; write the sentence) or '25 minus what equals 22?' (point to the diagram; write the sentence). I can find the answer quickly by counting up from 22, or by counting down from 25.	Write the calculations: $22 + \square = 25$ $25 - \square = 22$ Leave diagram and sentences on the board.
Calculate the missing number with the learners.		
Write '3' i the numbe	nto the small bar into the empty boxes in er sentences.	
Teacher:	Once we have the missing number we can see all the addition and subtraction sentences that can be made with this number family.	
Remind learners of some of the sentences that can be made as you point to the bars.		
Teacher: (pointing to the original problem) We made 3 counts to get the answer rather than 22 counts. We can look at the bar diagram to find the easiest calculation.		

Individual Tasks

Learners should now try the following examples by first copying the bar diagram and filing in the numbers given. Learners must write the quicker calculation they used to find the answer.





Learners should name the Big and the Small in the questions to explain their thinking. E.g. "For 21 – 17, I change the calculation to count up from 17 to 21 by working out 17 + \Box = 21" or "I can change the calculation for 21 – 17 to count down from 21 to 17 by working out 21 – \Box = 17."

Take-Home Task: Worksheet 1

At the end of today's session give learners Worksheet 1.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Name:





Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

1-Minute Mental Warm-Up

Working with bar diagrams

Task Sequence

In this lesson we find easier related calculations for addition calculations where one of the numbers added is missing.

Problems: 6 + = 25 + 3 = 28	Write the calculations and empty
Teacher: In the last lesson we saw that we can	bar diagrams as shown:
change the calculation to an easier linked	6 + 🗌 = 25 🗌 + 3 = 28
a missing number. Look at these	
calculations on the board.	
Draw the empty bar diagrams shown and work with the learners to build the bar diagrams for the calculations	
Teacher: Help me to finish the bar diagrams for these calculations.	6 3 25 28
Ask learners to instruct you on where to draw the lines into the top bars, and where to write each number.	25 - 6 = 28 - 3 =
Teacher: It is easier to answer 25 minus 6 (point to the numbers on the bar) or 28 minus 3 (point to the numbers on the bar).	6 19 25 3 25 28
Work out these calculations with the learners, using bridging though ten where needed (e.g. $25 - 5$ is 20 and $20 - 1$ is 19, so $25 - 6 = 19$).	25 - 6 = 19 28 - 3 = 25
Write the answers in the empty bars and empty boxes as shown. Then fill in the original number sentences.	↓ ↓ ↓ $6 + 19 = 25$ 25 + 3 = 28
Teacher: We found it easier to solve the addition calculations by changing them to subtraction calculations.	
Teacher: We have seen that when we have difficult	Can I change?
addition or subtraction calculations we can see if there is a way to change them	6 + = 25 into $- 6 = 25$
to make them easier. But we cannot just change them into any calculation.	
Teacher: Can I change 6+ 🗌 =25 into 🔲 – 6 =25?	6 + 🗌 = 25 true
Write the calculations on the board. Tell learners that number sentences must link logically to the Big, Small, Small idea in the bar diagram.	Small Small Big



Individual Tasks

Learners should now try the following examples. For each they should draw a bar diagram and then rewrite the number sentence as an easier calculation to find the missing number. If learners struggle, encourage them to label the bars as Big, Small and Small.

7 + 🗌 = 32 🔤 + 3 = 104

Support Video

Linking Addition & Subtraction 5



https://youtu.be/bkmaf0ArzuY

1-Minute Mental Warm-Up

Working with bar diagrams

Task Sequence

In this lesson we use the relationship between addition and subtraction to make subtraction calculations easier.

Problems: 30 = 9 30 = 9	Write the calculations and empty
Teacher: In the last lesson we saw that we can change the calculation to a different addition or subtraction calculation to find a missing number. Look at these calculations on the board.	bar diagrams as shown: $\square - 30 = 9$ $30 - \square = 9$
Draw the empty bar diagrams shown and work with the learners to build the bar diagrams for the calculations.	
Teacher: Help me to finish the bar diagrams for these calculations. Will the bar diagrams be the same or different?	
Learners should indicate that they are different.	
In the first example (\Box – 30 = 9), the unknown is the Big and 30 and 9 are the Smalls.	
In the second example $(30 - \Box = 9)$, 30 is the Big and the unknown and 9 are the Smalls.	
Ask learners to instruct you on where to draw the lines into the top bars, and where to write each number. If learners struggle, encourage them to label bars in the bar diagram as Big, Small and Small.	30 9 9 30 30
Keep asking the learners to notice what is the same and what is different in the two bar diagrams.	30 9 9
Write the following calculations under the correct bar diagram as shown:	
30 + 9 = 30 - = 9	30 + 9 = 30 - = 9



Individual Tasks

Learners should now try the following examples by drawing a bar diagram and then rewriting the number sentence as an easier calculation to find the missing number:

25 – 🗌 = 9 🔤 – 25 = 9

Learners should explain their thinking, e.g. "for $25 - \square = 9$, I can change the calculation to 25 - 9. When I subtract 9 from 25, I get 16 because 25 - 5 is 20 and 20 - 4 = 16. This means that $25 - \overline{16} = 9$."

Support Video

Linking Addition & Subtraction 6



https://youtu.be/OnF8U7aBPOc

1-Minute Mental Warm-Up

- a. Quick addition: 1-digit numbers and 2-digit numbers (use some large numbers that will give answers just over 100 and 200, e.g. 99 + 2; 99 + 4; 198 + 4; 199 + 3)
- b. Quick subtraction: 1-digit numbers from 2-digit numbers (use some numbers just over 100 and 200, e.g. 101 2; 103 4; 203 4; 201 3)

Task Sequence

In this lesson we link addition and subtraction to easily solve addition and subtraction calculations with large numbers.



Individual Tasks

Learners should now try the following examples by deciding which number is Big and which are the Smalls, drawing the bar diagram and then solving for the missing number.

115 – 🗌 = 90 🔤 + 3 = 210

Learners should explain their thinking.

Take-Home Task: Worksheet 2

At the end of today's session give learners Worksheet 2.

You do not need to time learners as they do this worksheet. The aim is to give learners some written practice of the work they have done mentally.

Support Video

Linking Addition & Subtraction 7



https://youtu.be/vIFAjz8cKMQ

Name:

Linking Addition & Subtraction: Worksheet 2



Teacher Notes

Here you can make notes about the lesson and which learners still need help with different strategies. You can also make notes of any other issues that you want to address in the next lesson starter.

1-Minute Mental Warm-Up

- a. Quick addition: 1-digit numbers and 2-digit numbers
- b. Quick subtraction: 1-digit numbers from 2-digit numbers

Task Sequence

In this lesson we use the link between addition and subtraction to solve problems without a bar diagram.

Write the calculations shown on the board. Leave a space below each calculation to write the related addition or subtraction calculation.		□ + 3 = 28 □ - 37 = 6 202 - 198 = □
each calcu diagram b	ulation. If they struggle you can draw a bar elow the calculation.	2 + 🗌 = 51 22 - 🔲 = 3
Examples three calc	are given below of how you can do the first ulations.	
Teacher:	This task can be read as: What plus 3 is equal to 28? How would you change this calculation to make it easier to find the missing number?	☐ + 3 = 28
Learners:	28 – 3	28 – 3 =
Record th	is calculation under the original.	
Teacher: S	So what is the answer?	
Learners: 25		
Learners may count down if not known (27, 26, 25, so; the answer is 25).		
Teacher: This task can be read as: What minus 37 is equal to 6? How would you change this calculation to make it easier to find the missing number?		□ – 37 = 6
Learners:	6 + 37 (or 37 + 6)	6 + 37 = 🗌 or 37 + 6 = 🗌
Record this calculation under the original.		
Teacher: So what is the answer?		
Learners: 43		
Learners may count up from 37 (38, 39, 40, 41, 42, 43, so the answer is 43). Some may bridge through ten $(37 + 3 = 40 \text{ and } 40 + 3 = 43)$.		
Teacher: This task asks you to solve 202 minus 198. How would you change this calculation to make it easier to find the answer?		202 – 198 =

Linking Addition & Subtraction

Learners: $198 + \square = 202$ $198 + \square = 202$ Record this calculation under the original. $198 + \square = 202$ Teacher: So what is the answer? $198 + \square = 202$ Learners: 4 $198 + \square = 202$ Learners may count up from 198 (199, 200, 201, 202so; the answer is 4). Some may bridge through ten(198 + 2 = 200; 200 + 2 = 202, so the answer is 4).

Individual Tasks

Learners should now use the strategy of changing addition calculations to subtraction, and subtraction calculations to addition, when these changes make it easier to find the missing numbers.

41 – 36 = 🗌

Support Video

Linking Addition & Subtraction 8



https://youtu.be/nYoOex4bibl





Bridging Through Ten: Memoranda				
Pre-Test Worksheet 1 Worksheet 2 Post-Test				
PART ONE	1. 10	1. 53	PART ONE	
1. 10	2. 10	2. 48	1. 10	
2. 10	3. 3	3. 8	2. 10	
3. 3	4. 7	4.8	3. 3	
4. 2	5. 9	5. 1	4. 2	
5. 8	6. 10	6. 3	5. 8	
6. 10	7.5	7. 29	6. 10	
7.5	8. 2	8. 7	7.5	
8.6	9. 10	9. 3; 44	8. 7	
9. 10	10. 6	10. 53; 5	9. 10	
10. 0	11.2		10. 0	
11. 56	12. 5		11. 57	
12. 63	13. 56		12. 63	
13. 33	14. 54		13. 33	
14. 48	15. 22		14. 48	
15. 50	16. 1		15. 50	
16. 127	17. 26		16. 127	
17. 30	18. 44		17. 30	
18. 43	19. 56		18. 42	
19. 3	20. 53		19. 3	
20. 7	21.40		20. 7	
PART TWO	22. 20		PART TWO	
1. 64	23. 6		1. 74	
2. 79	24. 33		2. 78	
3. 86			3. 86	
4.6			4.6	
5. 75			5. 75	
6. 2			6. 2	
7.6			7.6	
8. 54			8. 54	
9.8			9. 8	
10. 38			10. 38	

Jump Strategies: Memoranda				
Pre-Test Worksheet 1 Worksheet 2 Post-Test				
PART ONE	1. 65	1. 76	PART ONE	
1. 54	2. 33	2. 53	1. 52	
2. 39	3. 47	3. 39	2. 39	
3. 36	4. 3	4. 53	3. 36	
4. 47	5. 60	5. 24	4. 47	
5. 17	6. 16	6. 15	5. 17	
6. 53	7. 32	7.20	6. 53	
7.44	8. 59	8. 30	7.44	
8.4	9.86	9. 20	8. 3	
9. 31	10. 40	10. 29	9. 31	
10. 11	11. 64		10. 11	
11.60	12. 46		11. 50	
12. 48	13. 46		12. 48	
13. 54	14.60		13. 54	
14. 46	15. 53		14. 46	
15. 40	16. 63		15. 40	
16. 39	17. 54		16. 39	
17. 20	18. 75		17. 20	
18. 89	19. 30		18. 84	
19. 40	20. 37		19. 40	
20. 46			20. 46	
PART TWO			PART TWO	
1. 59			1. 69	
2.60			2.60	
3. 30			3. 30	
4. 20			4. 20	
5. 83			5. 83	
6. 59			6. 59	
7. 22			7. 22	
8. 15			8. 15	
9. 30			9. 30	
10. 25			10. 25	

Doubling & Halving: Memoranda						
Pre-Test	Pre-Test Lesson Starter 1 Worksheet 1 Worksheet 2 Post-Test					
PART ONE	1. Double 4 is 8	1. 12	1. 64	PART ONE		
1. 12	Two groups of 4 is 8	2.6	2. 52	1. 14		
2.6	Two times 4 is 8	3. 18	3. 21	2.7		
3. 18	4 x 2 = 8	4. 14	4. 55	3. 18		
4. 16		5. 8	5. 46	4. 16		
5.6	2. Half of 8 is 4	6. 9	6. 18	5. 7		
6. 8	8 divided by 2 is 4	7. 20	7. 62	6.8		
7. 20	8 shared between 2 is 4	8. 3	8. 31	7.20		
8. 7	8 ÷ 2 = 4	9. 6	9. 63	8.6		
9. 5		10. 7	10. 2	9.5		
10. 9	3. Double 9 is 18	11. 16	11. 88	10. 9		
11. 30	Two groups of 9 is 18	12. 22	12. 76	11. 28		
12. 14	Two times 9 is 18	13. 16	13. 43	12. 14		
13. 14	9 x 2 = 18	14. 60	14. 52	13. 14		
14. 200		15. 100	15. 78	14. 200		
15. 40	4. Half of 20 is 10	16. 7	16. 24	15. 40		
16. 80	20 divided by 2 is 10	17. 20	17. 98	16. 80		
17. 25	20 shared by 2 is 10	18. 5	18. 49	17. 25		
18. 8	20 ÷ 2 = 10	19. 35	19. 97	18. 9		
19. 15		20. 140	20. 2	19. 15		
20. 120	5. Learner's choice			20. 120		
PART TWO	6. Learner's choice			PART TWO		
1. 84				1. 84		
2. 72				2.72		
3. 32				3. 32		
4. 51				4. 51		
5. 94				5.94		
6. 19				6. 19		
7. 104				7. 104		
8. 39				8.39		
9. 77				9. 77		
10. 2				10. 2		

Rounding & Adjusting: Memoranda				
Pre-Test Worksheet 1 Worksheet 2 Post-Test				
PART ONE	1. 86	1. 85	PART ONE	
1. 53	2. 47	2. 16	1. 54	
2. 39	3. 29	3. 82	2. 39	
3. 47	4. 69	4. 226	3. 47	
4.49	5. 97	5. 144	4. 49	
5. 117	6. 40	6.9	5. 148	
6. 83	7.2	7.2	6. 83	
7.30	8. 1	8. 30	7. 30	
8.3	9. 400	9.40	8. 3	
9.3	10. first number line	10. 80 – 40 + 1	9. 3	
10. 2	11. 18		10. 2	
11. 71	12. 31		11. 31	
12. 78	13. 56		12. 78	
13. 41	14. 165		13. 41	
14. 175	15. 40		14. 175	
15. 37	16. 20		15. 37	
16. 50	17. 2		16. 50	
17. 1	18. 1		17. 1	
18. 100	19. 3		18. 100	
19. 200	20. second number		19. 200	
20. 2	line		20. 2	
PART TWO			PART TWO	
1. 63			1. 53	
2. 45			2. 25	
3. 125			3. 125	
4. 135			4. 135	
5. 294			5. 294	
6.9			6. 9	
7.2			7.2	
8. 30			8. 30	
9.40			9.40	
10. 80 – 60 + 1			10. 60 – 30 + 1	

Re-Ordering: Memoranda				
Pre-TestWorksheet 1Worksheet 2Post-Test				
PART ONE	1. 8 and 2	1. 102	PART ONE	
1. 7 and 3	2. 4 and 6	2. 57	1. 7 and 3	
2. 4 and 6	3. 2	3. 300	2. 4 and 6	
3. 4	4. 20	4. 83	3. 3	
4. 20	5. 36 and 64	5. 196	4. 20	
5. 30 and 70	6. 45 and 55	6.90	5. 30 and 70	
6. 51 and 49	7. 12	7.3	6. 51 and 49	
7. 12	8. 14	8.9	7. 12	
8. 17	9.6	9. 37	8. 17	
9.9	10. 38	10. 4	9.9	
10. 86	11. 157	11. 74 and 26	10. 86	
11. 114	12. 12	12. 2 and 5	11.132	
12. 10	13. 9 and 21		12. 10	
13. 8 and 12	14. 17 and 13		13. 8 and 12	
14. 4 and 16	15. 120		14. 4 and 16	
15. 100	16. 8		15. 100	
16. 9	17. 14 and 6		16. 9	
17. 18 and 12	18. 12 and 8		17. 18 and 12	
18. 14 and 16	19. 13		18. 14 and 16	
19. 31	20. 40		19. 31	
20. 40			20. 40	
PART TWO			PART TWO	
1. 104			1. 105	
2. 78			2. 98	
3. 300			3. 300	
4. 106			4. 106	
5. 178			5. 178	
6. 70			6. 70	
7.6			7.8	
8. 58			8. 58	
9. 3			9. 3	
10. 88 and 12			10. 36 and 14	

Linking Addition & Subtraction: Memoranda				
Pre-Test Worksheet 1 Worksheet 2 Post-Test				
1.4	1. 5	1.5	1.6	
2. 38	2. 48	2. 299	2. 38	
3. 91	3. 85	3. 69	3. 91	
4.6	4. 8	4.6	4.6	
5. 2	5. 3	5.4	5. 2	
6. 2 and 9	6. 5 and 8 (order	6.5	6. 2 and 9	
7. 11	correct) and 13 in the bottom block	7.34	7. 11	
8. 297	7 198	8. 25	8. 297	
9. 5	8.6	9. 130 – 52 = 78*	9.5	
10. 2	9.3	10. 130 – 78 = 52*	10. 2	
11. 20 – 5 = 15	10.5	*Responses can be	11. 20 – 4 = 16	
12. 15 + 5 = 20	10.0 11.20 - 3 = 17	interchanged.	12. 16 + 4 = 20	
13. 20 – 15 =5	$12 \ 17 + 3 = 20$		13. 20 – 16 = 4	
14. 5 + 15 = 20	12.17 + 3 = 20 13.20 - 17 = 3		14.4 + 16 = 20	
15. 3	13.20 - 17 - 3		15. 3	
16. 2	15 /		16. 2	
17. 43	16 3		17.43	
18. 8	17 54		18. 8	
19. 5	18.8		19. 5	
20. 7	10.5		20. 7	
PART TWO	20.7		PART TWO	
1.4	20.7		1.5	
2. 398			2. 297	
3. 87			3. 87	
4.7			4.7	
5. 2			5.2	
6. 3			6. 3	
7. 27			7.27	
8. 18			8. 18	
9. 120–37 = 83*			9. 120 – 53 = 67*	
10. 120 – 83 = 37*			10. 120 – 67 = 53*	
*Responses can be interchanged.			*Responses can be interchanged.	

	Linking A	ddition and	Subtraction	Lesson Starter	1: Indiv	vidual Task
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3 + 6 = 9 ✓	6-3=9 X
$9 = 6 + 3 \checkmark$	9-3=6 ✓
6 + 9 = 3 X	3 = 9 − 6 ✓
6 + 3 = 9 √	9-6=3 ✓
3 + 9 = 6 X	3-6=9 X

Linking Addition and Subtraction Lesson Starter 3: Individual Task

Write the following number families into the correct bar diagram below. Then write addition and subtraction number sentences for each number family. 5 + 5 = 103 + 4 = 711 + 1 = 122 + 7 = 92 7 1 5 5 11 3 4 10 9 12 7 Addition: Addition: Addition: Addition: 2 + 7 = 911 + 1 = 12 5 + 5 = 103 + 4 = 710 = 5 + 57 + 2 = 91 + 11 = 124 + 3 = 79 = 2 + 712 = 1 + 11Subtraction: 7 = 3 + 49 = 7 + 212 = 11 + 110 - 5 = 57 = 4 + 35 = 10 - 5Subtraction: Subtraction: Subtraction: 9 - 2 = 712 - 1 = 117 - 4 = 39 - 7 = 212 - 11 = 17 - 3 = 47 = 9 - 211 = 12 - 14 = 7 - 32 = 9 - 71 = 12 - 113 = 7 - 4