Maths and Me: 2nd Class – Short-Term Plan, Unit 8: Addition and Subtraction 2 (January Weeks 1&2)

Strand(s) > Strand Unit(s): Number > Sets and Operations; Numeration and Counting. Algebra > Expressions and Equations; Pattern, Rules and Relationships.

Learning Outcome(s): Through appropriately playful and engaging learning experiences children should be able to select, make use of and represent a range of addition and subtraction strategies

Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	**Adding and Subtracting Ones:** Explores addition and subtraction of ones, without renaming, within 100 (U&C); Draws from patterns and properties to derive unknown number facts from core facts (A&PS)		(C) Reason & Respond L1–3 (D) Notice & Wonder L1 (D) Think-Pair-Share L1, 7	**Intuitive Assessment:** responding to emerging misconceptions
2	**Adding and Subtracting Tens:** Explores addition and subtraction of tens, without renaming, within 100 (U&C); Establishes the relationship between numbers and their position in a 100 square (R); Applies the zero property to support calculations and justifies with proof(s) (R)		(D) Write-Hide-Show L1–5, 7 (D) Would This Work? L1–6	
3	**Adding and Subtracting Two Two-digit Numbers:** Explores addition and subtraction of two two-digit numbers (without renaming, within 100) (U&C); Develops strategies for efficient computation of addition and subtraction of two two-digit numbers (R)		(D) Build it; Sketch it; Write it L1–7 (C) Choral Counting L2–3 (G) Game: Ping-pong Number Bonds of 10 L4	**Planned Interactions:** responding to insights gleaned from children's responses to learning experiences
4	**Adding – Making Tens:** Uses 10 (and/or multiples of 10) as a base when adding through ten (U&C); Uses number lines and benchmark numbers to add (A&PS); Draws from patterns and properties to derive unknown number facts from core facts (A&PS)		(D) Number Strings L4–5, 7 (C) I Do, We Do, You Do L5, 7	
5	**Adding with Renaming Ones as Tens:** Explores addition, with renaming ones as tens, within 100 (U&C); Develops strategies for efficient computation of addition of ones (R)		(C) Game: Ping-pong Number Bonds of 100 L6 (D) Concept Cartoon L7	
6	**Adding with Renaming Tens as Hundreds:** Explores addition with renaming tens as hundreds (U&C); Draws from patterns and properties to derive unknown number facts from core facts (A&PS)		**Print resources** Pupil's Book pages 54–60	**Assessment Events:** information gathered from completion of the unit assessment in the Progress Assessment Booklet page 17
7	**Adding Three Numbers:** Applies the associative property to support calculations and justifies with proof(s) (R)		Home/School Links Book page 22 PCM 25	
8	**Review and Reflection:** Reviews and reflects on learning (U&C)			

Key: Elements: (U&C) Understanding and Connecting; (C) Communicating; (R) Reasoning; (A&PS) Applying and Problem-Solving. **CM: Cuntas Míosúil:** please tick when you have completed the focus of learning. **Learning Experiences:** (C) concrete activity; (D) digital activity; (P) activity based on printed materials, followed by lesson numbers.

Additional information for planning

📄 **Progression Continua**	See '2nd Class *Maths and Me* Progression Continua Overview' for a detailed breakdown of how all progression continua are covered.
📄 **Maths Language**	See '2nd Class *Maths and Me* Maths Language Overview', individual lesson plans and Unit 8 Maths Language Cards.
📄 **Equipment**	See '2nd Class *Maths and Me* Maths Equipment Overview' and individual lesson plans.
Inclusive Practices	- See Let's Strengthen and Let's Deepen suggestions throughout lesson plans. - See Unit 8 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.) - See Unit 8 Let's Strengthen PCM. - See Unit 8 Let's Deepen PCM.
Integration	See individual lesson plans.

Background and rationale

- This unit builds on the concepts explored in both Unit 2 (Addition and Subtraction 1) and Unit 7 (Numbers to 200). While most of this unit is concerned with further consolidation and reinforcement of addition and subtraction approaches within 100 (as covered in *Maths and Me* for 1st Class), this is extended to explore addition of numbers up to 200. Subtraction up to 100, and subtraction and addition up to 200 will be explored further in Unit 12 (Addition and Subtraction 3) and Unit 19 (Addition and Subtraction 4).

- Mathematical modeling is very much the focus of this unit. The *MAM* Routines Build it; Sketch it; Write it; and Would This Work? feature strongly in almost every lesson. While it is important that the children develop procedural fluency with such standard algorithms as the column method, it is essential that this is balanced to include other computation methods and models – especially since many of these support the development of mental calculation skills. Ultimately, the goals are to: enable the children to choose their preferred models and approaches; prompt them to consider the efficiency of their strategies; and support them to become less reliant on inefficient strategies (e.g. counting in ones for adding/subtracting numbers more than 10).

- While no specific lessons in this unit are dedicated to estimating numbers and checking calculations, take every available opportunity (throughout all units) to embed these strategies. Regularly ask the children to estimate a reasonable answer (e.g. 'Is it forty-something, fifty-something or sixty-something?') and prompt them to check their answers (e.g. solving the same calculation a different way, using the inverse operation).

> The overarching theme of **The School Concert** is one the children can relate to. Where possible/ appropriate, use examples from your own school's context to explore addition and subtraction, and to create meaningful problem-solving scenarios.

Common misconceptions and difficulties

Many of the common misconceptions and difficulties highlighted in Unit 2 (Addition and Subtraction 1) are also applicable here (see page 42). In addition:

- The children may be overly reliant on less efficient strategies, such as counting all or counting on in ones, which they may also miscount.

- They may only read the = symbol as 'makes' and not appreciate its real meaning, which is that the expression or number on one side of the symbol is equal to or the same value as that on the other side.

- They may only read the – symbol as 'take away', as opposed to 'subtract' or 'minus', and not appreciate that there are other types of subtraction apart from removal/deduction.
- They may struggle to recall addition and/or subtraction facts, or only confidently recall a small number of known facts.
- They may not appreciate how their known facts can be applied to unknown facts to solve them (e.g. If I know that 4 + 5 = 9, then 34 + 5 = 39).
- They may incorrectly use the column method (e.g. place the digits in the wrong column, or incorrectly place subtrahend over minuend, instead of vice versa).
- They may add the digit total for each number, rather than considering the place value of each digit (e.g. for 42 + 12, the child suggests an answer of 63).
- They may incorrectly assume, when adding three numbers, that the numbers have to be added in the order in which they are given.

The Unit 8 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.
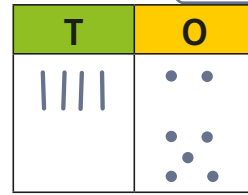
Mathematical models and representations

- Interlocking cubes
- Base ten blocks
- Quick cubes
- 100 square
- Open number lines
- Bar models
- Place value grids
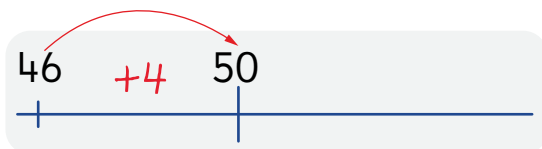- Place value counters
- Column method
- Number sentences

$78 - 7 = \boxed{}$
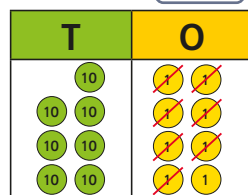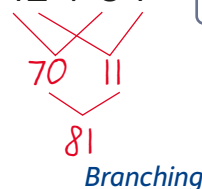

Place value counters

$42 + 5 = \boxed{}$

Quick cubes in a place value grid

$46 + 7 = \boxed{}$

Open number line

$42 + 39 = \boxed{}$

Branching

Column method
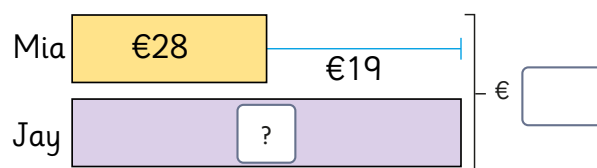
Bar models

Teaching tip

The following manipulative printables are available to support this unit: Base Ten Blocks, 100 Square, Open Number Line, Branching Bond, Bar Model, Place Value Grid (HTO) and Place Value Counters. Click on the resources icon on the *Maths and Me* book cover on **edcolearning.ie**

Day 1, Lesson 1

Adding and Subtracting Ones*

*without renaming, within 100

Focus of learning (with Elements)

- Explores addition and subtraction of ones, without renaming, within 100 (U&C)
- Draws from patterns and properties to derive unknown number facts from core facts (A&PS)

Learning experiences

C Concrete activity: Branching Bonds *MAM Routine: Reason & Respond*

D Digital activity: The School Concert *MAM Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond, with Write-Hide-Show*

D C Digital activity: Stacking Chairs *MAM Routines: Would This Work?, with Build it; Sketch it; Write it*

P Pupil's Book page 54: Adding and Subtracting Ones

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Counting aids, such as 100 squares, number lines

Maths language

- adding, subtracting, +, –, =, add, take away, fact family, branching bond, whole, parts, turnaround facts, inverse, tens, ones, count on/back, column method, branching, related facts, number story, number sentence, in total

Teaching tip

While no specific lessons in this unit are dedicated to estimating numbers and checking calculations, take every available opportunity to embed these strategies. Regularly ask the children to estimate a reasonable answer (e.g. 'Is it forty-something, fifty-something or sixty-something?') and prompt them to check their answers (e.g. solving the same calculation a different way, using the inverse operation).

Teacher note: This lesson only involves adding and subtracting ones (1, 2, 3 ... 9) where renaming is not required.
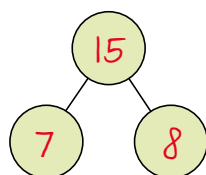
Warm-up

C **Concrete activity: Branching Bonds**
MAM Routine: Reason & Respond

Teaching tip

This activity is an oral review of some of the main concepts covered in Unit 2 (Addition and Subtraction 1).

Write a random branching bond on the board (e.g. 15, 7, 8). Ask/say:

- What is this called? (branching bond or fact family)
- (Point to the bottom parts/circles.) What are these called? (the parts)
- (Point to the top circle/the whole.) What is this called? (the whole)
- Make up a number story for this bond. Tell your partner.
- Can you show me a different way to build, sketch or write that number that nobody has shown me yet?
- How could you check that this bond is correct? (If you add the parts, do you get the whole? If you subtract either part from the whole, do you get the other part?)

- Does this bond belong to a friendly fact group? (near doubles)
- On your MWBs, write the number sentences for this fact family (any of: 7 + 8 = 15, 8 + 7 = 15, 15 = 7 + 8, 15 = 8 + 7, 15 − 8 = 7, 15 − 7 = 8, 7 = 15 − 8, 8 = 15 − 7)

- Which of these number sentences are turnaround facts? (7 + 8 = 15, 8 + 7 = 15)
- Addition and subtraction are the *what* of each other? (inverse/opposite) How do your number sentences show that?

Repeat, if necessary, with other similar bonds.

Main event

D **Digital activity: The School Concert**
MAM Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond, with Write-Hide-Show

Display the poster and, using Think-Pair-Share, click to play or ask:

Assessment Opportunity

- What do you notice?
- What do you wonder?

Record the children's responses to both questions on the board. Allow the children the opportunity to respond to (agree/disagree with or query) others' responses, but do not confirm or reject any of the ideas. Note any 'wonderings' that could become the basis for a subsequent maths investigation.

Then click to play or ask the children the questions below. Ask them to give reasons for their responses.

- Where are the children?
- What are they doing?
- How many pouches of orange juice are there?
- How do you know?
- How many pouches of blackcurrant juice?
- How do you know?
- How many chairs are there?
- How do you know?
- Think of a question to ask about the poster, starting with: 'How many …?'
- Think of a question to ask about the poster, starting with: 'How many more…?'

D **C** **Digital activity: Stacking Chairs**
MAM Routines: Would This Work?, with Build it; Sketch it; Write it

Display the activity, which shows chairs stacked in 3 tens and 9 ones. Begin by saying/asking:

- The caretaker is taking 8 chairs away. How might we represent this number story?
- Build it! Can you use classroom resources to represent this number story? Show us.
- Sketch it! Can you represent this number story as a sketch? Show us.

- Write it! Can you use words, branching bonds or number sentences to represent this number story? Show us.
- Is there more than one way to write this number sentence?

Then, click to reveal the various models and approaches chosen by the characters, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work. Ask:

- How many chairs are now left? How do you know?
- Do the answers and/or approaches look reasonable? Explain why.
- How could we check the answers?
- When using the column method, which column changes? Which column does not change? Explain why.
- Which is the most efficient way to arrive at an answer, in your opinion?

Teaching tip

The characters' solutions should not be presented to the class as the only 'correct' ways to solve questions. If the children come up with their own solutions that arrive at the correct answer, these are just as valid as those presented by the characters, and should be acknowledged as so. If a child uses a strategy that is not already in the Strategy Wall, then this could be added.

P **Pupil's Book page 54: Adding and Subtracting Ones**
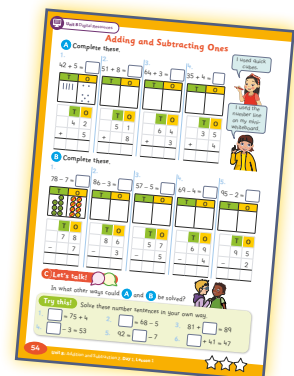
Some children may benefit from being able to access visual counting supports and concrete resources to complete the page.

$\boxed{}$ = 75 + 4 could also be written as $\boxed{}$ = 4 + 75, 75 + 4 = $\boxed{}$ or 4 + 75 = $\boxed{}$

Can the children explain what they have done and why it works?

Let's deepen

Try this! Challenge the children to record the calculations in as many different ways as possible without affecting the answer. For example:

Optional consolidation and extension possibilities

Integration English: Language and vocabulary development using the themes of the school concert, and special school events. Gaeilge: an téama An Scoil.

Number Display Set up (or add to) a classroom Number Display. Include examples of the children's strategies and approaches to calculations, as well as appropriate labels (see Maths Language Cards).

Maths Journals The children use images/words to record what they built, sketched or wrote.

Games Bank Play 'Target 50' or 'Target Zero' (one dice).

Let's Deepen Task A on the Unit 8 Let's Deepen PCM: Addition and Subtraction 2 can be done any time after this lesson.

Story Read Chapter 2 of *Mission: Addition* by Loreen Leedy, which specifically explores adding ones to two-digit numbers, without renaming, using the column method. A reading of the story is available at: edco.ie/mvjk

Strategy Wall Display the strategy poster Add and Subtract 1. Refer to it throughout this and subsequent units. The children could add their own sketches of this strategy to the display and their maths journals.

Estimation Station Fill a transparent container with less than 100 small items of two different colours. Leave a box close by, where children can 'post' their estimated number sentences. After 2 or 3 days, ask a group to count each colour group and identify who had the closest estimate for the two amounts (addends). Then set up the station again with a different number of items.

Let's deepen

Challenge the children to use addition, not counting, to total the two different colour groups.

Review and Reflect Use the Prompt Questions Poster.

Days 2 and 3, Lesson 2

Adding and Subtracting Tens*

*within 100

Focus of learning (with Elements)

- Explores addition and subtraction of tens, without renaming, within 100 (U&C)
- Establishes the relationship between numbers and their position in a 100 square (R)
- Applies the zero property to support calculations and justifies with proof(s) (R)

Learning experiences

- **C** Concrete activity: Filling up the Square
  MAM **Routine: Choral Counting**
- **D** **P** Digital activity: Juice Pouches *MAM* **Routines:**
  Would This Work?, with Build it; Sketch it; Write it
- **C** **P** Concrete activity: Adding and Subtracting Tens on the 100 Square
  MAM **Routines: Reason & Respond, with Write-Hide-Show**
- **C** Concrete activity: Adding and Subtracting Tens, Using Quick Cubes
  MAM **Routines: Reason & Respond, with Write-Hide-Show**
- **P** Pupil's Book page 55: Adding and Subtracting Tens

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Counting aids, such as 100 squares and number lines

Maths language

- more, less, row, column, above, below

Warm-up

C **Concrete activity: Filling up the Square**
MAM **Routine: Choral Counting**

Teaching tip

This activity involves filling in some of the rows and columns of a blank 100 square, but it should not be done in the order of 1–100. It is better to complete a random row or column at a time, and not always from left to right or downwards, and also in the opposite directions.

Say it, then see it: Display a blank 100 square on the board, or an interactive 100 square that reveals the number when each cell is clicked. Ask/say:

(Choose a row, going left to right.)

- What is the first number that goes here? How do you know?
- Can you predict what number will come next? How do you know?
- Say the rest of this row forwards as I write. What patterns do you spot?

(Choose a column, going downwards.)

- What is the first number that goes here? How do you know?
- Can you predict what number will come next? How do you know?
- Say the rest of this column in order as I write. What patterns do you spot?

(Choose a row, going right to left.)

- What is the number that goes at the end of this row? How do you know?
- Can you predict what number will come before it? How do you know?
- Say the rest of this row backwards as I write. What patterns do you spot?

(Choose a column, going upwards.)

- What is the number that goes at the end of this column? How do you know?
- Can you predict what number will come before it? How do you know?
- Say the rest of this column backwards as I write. What patterns do you spot?

Let's strengthen

Some children may need to refer to the 100 square on the inside cover of their Pupil's Book.

Let's deepen

As the children become more confident and competent, challenge them further by asking them to complete a diagonal.

Main event

D P Digital activity: Juice Pouches
MAM **Routines: Would This Work?, with Build it; Sketch it; Write it**

Begin by displaying the activity, which shows 4 boxes of ten blackcurrant juice pouches and 4 ones.

Assessment Opportunity

A box of ten blackcurrant juice pouches is given to the helpers. Ask:

- How might we represent this number story?
- Build it! Can you use classroom resources to represent this number story? Show us.
- Sketch it! Can you represent this number story as a sketch? Show us.
- Write it! Can you use words, branching bonds or number sentences to represent this number story? Show us.
- Is there more than one way to write this number sentence?
- Make a quick, reasonable estimate. Do you think it will be twenty-something, thirty-something, forty-something or fifty-something? Explain why.
- How many blackcurrant juice pouches are now left? How do you know?

Then click to display the various models and approaches chosen by the characters, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work. Ask:

- Is there another way to use a 100 square, other than counting on/back 10 ones? Explain why.
- When using the column method, which column changes? Which column does not change? Explain why.
- What is the most efficient way to arrive at an answer, in your opinion?

Can the children verbalise a more efficient way to use a 100 square to add or subtract tens without counting in ones?

C P Concrete activity: Adding and Subtracting Tens on the 100 Square *MAM* **Routines: Reason & Respond, with Write-Hide-Show**

Direct the children to the 100 square on the inside cover of the Pupil's Book. Pick a random two-digit number (perhaps using an online random number generator), and ask the children to use their finger to locate this number. Using Write-Hide-Show, ask the children to record their responses on their MWBs.

After each response, ask individual children to justify/prove their answer.

Possible questions:

- What is 10 more than this number? How do you know?
- What is 10 less than this number? How do you know?
- Where is 10 more or less than a number on a 100 square? Is this always the case?
- If using the 100 square to find 10 more or less, what way is more efficient than counting in ones?
- What digit changes when you find 10 more or 10 less than a number? Is this always the case?
- What is 20/30/40 ... more than this number? How do you know?
- What is 20/30/40 ... less than this number? How do you know?

Repeat, as necessary, with other randomly generated two-digit numbers.

Development: Pick a random two-digit number, but instead of looking at the 100 square, the children try to visualise it to help them write down a response. After sharing their proposed answers, they can use the 100 square to check their answer(s).

Let's deepen

Challenge the children to explain which digit does/does not change when adding tens and explain why.

C Concrete activity: Adding and Subtracting Tens, Using Quick Cubes *MAM* **Routines: Reason & Respond, with Write-Hide-Show**

Quick cubes are sketches of lines and dots to represent base ten rods and cubes as tens and ones.

34

Pictorial representation, i.e. P stage of CPA, bridge between concrete and abstract

Pick a random two-digit number (you can use an online random number generator). Ask a child to sketch the number as quick cubes on the board. Using Write-Hide-Show, ask the children to write

numbers (not sketches) on their MWBs to show their response. After each response, ask individual children to justify/prove their answer. Possible questions:

- What is 10 more than this number? How do you know? (Possible answer: Draw another ten and recount.)
- What is 10 less than this number? How do you know? (Possible answer: Remove a ten and recount.)
- What is 20/30/40 … more than this number? How do you know? (Possible answer: Draw more tens and recount.)
- What is 20/30/40 … less than this number? How do you know? (Possible answer: Remove tens and recount.)

Repeat, as necessary, with other randomly generated two-digit numbers.

Development: Pick a random two-digit number, but instead of sketching the number as quick cubes on the board, ask the children to sketch the answer to a follow-up question as quick cubes on their MWBs (e.g. draw 20 more/less than this number).

Let's strengthen

Children may benefit from being able to manipulate actual base ten blocks as opposed to pictorial representations of them.

(P) **Pupil's Book page 55: Adding and Subtracting Tens**

Let's strengthen

Children may need to refer to the 100 square on the inside cover of the Pupil's Book.

Let's deepen

Activity A: Challenge the children to visualise, rather than using or drawing representations to arrive at the answers.

Optional consolidation and extension possibilities

Strategy Wall Add the Calculation Strategy Wall Card for Adding and Subtracting Tens to the class Strategy Wall. Refer to it throughout this and subsequent units. The children could also add their own sketches of these strategies, both to the Strategy Wall and their maths journals.

Let's Deepen Tasks B and C on the Unit 8 Let's Deepen PCM: Addition and Subtraction 2 can be done any time after this lesson.

Maths Journals The children use images/words to record what they built, sketched or wrote.

Games Play these online games: 'Hit the Button', 'Addition within 100 (tens)' and 'Subtraction within 100 (tens)' at edco.ie/ehwc

Games Bank Play 'Four Throws to 100', 'Cross Out Tens Totals' or 'Cross Out Tens Subtraction'.

Estimation Station Remind the children to submit estimates, count the items and/or set up a new station.

Review and Reflect Use the Prompt Questions Poster.

Day 4, Lesson 3

Adding and Subtracting Two Two-digit Numbers*

*without renaming, within 100

Focus of learning (with Elements)

- Explores addition and subtraction of two two-digit numbers (without renaming, within 100) (U&C)
- Develops strategies for efficient computation of addition and subtraction of two two-digit numbers (R)

Learning experiences

C Concrete activity: Counting in 10s *MAM* **Routine: Choral Counting**

D **P** Digital activity: Selling Tickets
MAM **Routines: Would This Work?, with Build it; Sketch it; Write it**

C Concrete activity: Adding and Subtracting Two Two-digit Numbers
MAM **Routines: Reason & Respond, with Write-Hide-Show**

P Pupil's Book page 56: Adding and Subtracting Two Two-digit Numbers

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Open number line
- 100 square

Maths language

- adding/subtracting in chunks, difference

Warm-up

C **Concrete activity: Counting in 10s**
MAM Routine: Choral Counting

See it, then say it! Using a visual support (e.g. a 100 square displayed on the board, or the one on the inside cover of the Pupil's Book), the children practise counting forwards and/or backwards, in unison, in 10s from a random two-digit number. Ask the children if they can spot any patterns. Repeat as required.

Say it, then see it! Ask the children to count forwards and/or backwards in unison, in 10s from a random two-digit number. As they say each number, record it on the board. Stop at regular intervals and ask:

- Can you spot any patterns?
- Can you predict what will come next? How do you know?

Repeat as required.

Tens going up in ones / Units don't change

34   44   54   64   74

+50

84   94   104   114   124
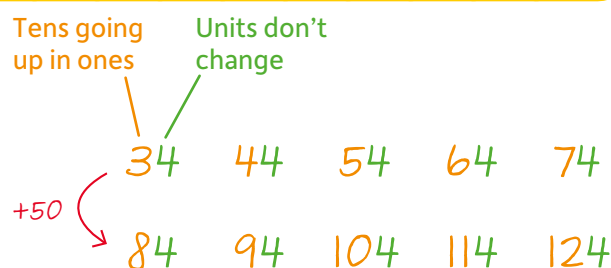
Let's strengthen

Some children may need to refer to the 100 square and/or 101–200 square on the inside cover of the Pupil's Book.

Let's deepen

As the children become more confident and competent, challenge them further by continuing beyond 100.

Main event

D **P** **Digital activity: Selling Tickets**
MAM Routines: Would This Work?, with Build it; Sketch it; Write it

Begin by displaying the activity, which shows a list called 'Tickets sold'. It outlines the numbers of tickets sold by First Class and Second Class. Ask/say:

Assessment Opportunity

- So far, First Class have sold 23 tickets for the concert and Second Class have sold 54 tickets. How might we represent the difference between the number of tickets sold by Second Class and the number sold by First Class?
- Build it! Can you use classroom resources to represent this number story? Show us.
- Sketch it! Can you represent this number story as a sketch? Show us.

- Write it! Can you use words, branching bonds or number sentences to represent this number story? Show us.
- Is there more than one way to write this number sentence?
- Make a quick, reasonable estimate. Do you think it will be twenty-something, thirty-something, forty-something or fifty-something? Explain why.
- How many more tickets have Second Class sold than First Class? How do you know?

Then click to reveal the various models and approaches chosen by the characters, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work. Ask:

- What way is the most efficient way to arrive at an answer, in your opinion?

C **Concrete activity: Adding and Subtracting Two Two-digit Numbers** *MAM* **Routines: Reason & Respond, with Write-Hide-Show**

Look at the calculations opposite. Write one on the board and ask the children to record the answer only on their MWBs, using Write-Hide-Show. Emphasise that during the 'hide' stage, they should consider their strategy and other strategies that might work. Record all the children's answers on the board, being careful not to give away the correct answer. Ask:

- Are there any answers that are unreasonable/unlikely because they don't make sense? Which ones? Why do you think this? (e.g. Is the answer too big or too small because the incorrect operation was used?)
- Which answer do you agree with? Explain the strategy you used to get your answer.
- Did anybody use a different strategy?
- Models that reflect, rather than direct, children's thinking: Use concrete materials and/or pictorial representations to model the approaches and strategies shared, so as to make them more visible to all of the class.

Repeat the activity as required, ensuring that there is a mix of operations.

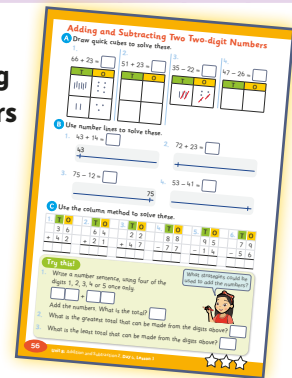| Suggestions:	
17 + 22	56 − 24
33 + 54	68 − 15
25 + 41	96 − 56
72 + 12	87 − 32
16 + 63	79 − 49

Teaching tip

The children use the open number line on the reverse of their MWBs to model adding/subtracting in chunks.

P **Pupil's Book page 56: Adding and Subtracting Two Two-digit Numbers**

Optional consolidation and extension possibilities

Strategy Wall Add the Strategy Wall Cards for Adding and Subtracting Using Partitioning and Adding and Subtracting in Chunks to the class Strategy Wall. Refer to them throughout this and subsequent units. The children could also add their own sketches of these strategies, both to the Strategy Wall on the wall and in their maths journals.

Maths Journals The children use images/words to record what they built, sketched or wrote.

Estimation Station Remind the children to submit estimates, count the items and/or set up a new station.

Review and Reflect Use the Prompt Questions Poster.

Day 5, Lesson 4

Adding – Making Tens

Focus of learning (with Elements)

- Uses 10 (and/or multiples of 10) as a base when adding through ten (U&C)
- Uses number lines and benchmark numbers to add (A&PS)
- Draws from patterns and properties to derive unknown number facts from core facts (A&PS)

Learning experiences

C Game: Ping-pong Number Bonds of 10

D C Digital activity: Setting Out Chairs *MAM Routines: Would This Work?, with Build it; Sketch it; Write it*

D Digital activity: Adding – Making Tens (1) *MAM Routines: Number Strings, with Write-Hide-Show*

P Pupil's Book page 57: Adding – Making Tens

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Counting aids, such as 100 squares and number lines

Maths language

- There is no new maths language for this lesson.

Teaching tip

Manipulating numbers to make them into ten, or a multiple of ten, makes mental computation easier and more efficient. This strategy can also be referred to as making benchmark/landmark or friendly numbers.

Warm-up

C Game: Ping-pong Number Bonds of 10

Play an imaginary game of tennis or ping-pong! Mime the first serve and call out a number within 10 (e.g. 3). The children mime the return, and call out the number needed to make 10 (7). Then 'bat back' with another number the children respond to.

Let's deepen

Call out a number from a different number range (e.g. 10 to 19; 20 to 29; 30 to 39). The children respond with the number needed to make this number up to the next multiple of 10.

Main event

D C Digital activity: Setting Out Chairs
MAM Routines: Would This Work?, with Build it; Sketch it; Write it

Begin by displaying the activity, which shows chairs being set out in three rows of ten, with five and seven other chairs stacked to the side. Ask:

Assessment Opportunity

- How might we represent the number of chairs in total?
- Build it! Can you use classroom resources to represent this number story? Show us.
- Sketch it! Can you represent this number story as a sketch? Show us.
- Write it! Can you use words, branching bonds or number sentences to represent this number story? Show us.
- Is there more than one way to write this number sentence?
- Make a quick, reasonable estimate. (Do you think it will be twenty-something, thirty-something, forty-something or fifty-something? Explain why.)
- How many chairs are there in total? How do you know?

Then, click to reveal the various models and approaches chosen by the characters, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work. Ask:

- Do the answers and/or approaches look reasonable? Explain why.
- How could we check the answers?
- Which is the most efficient way to arrive at an answer, in your opinion?
- What if there were 17 chairs stacked to the side? Make a quick, reasonable estimate. How might we represent this? Show us.
- What if there were 27 chairs stacked to the side? Make a quick, reasonable estimate. How might we represent this? Show us.

Teaching tip

Estimates should always be given as a quick response with a 'ballpark' figure. To be efficient, they should not take nearly as long to work out as the actual answer.

Let's strengthen

Some children may benefit from reviewing how to make tens from two one-digit numbers, using concrete materials (e.g. ten frames and counters, interlocking cubes). See also the Unit 8 Let's Strengthen Suggestions for Teachers.

(D) Digital activity: Adding – Making Tens (1)
MAM Routines: Number Strings, with Write-Hide-Show

This PowerPoint presentation contains two number strings. Each slide builds up a number string, with one part revealed per click.

Using Write-Hide-Show, ask the children to record their proposed answer only on their MWBs. Emphasise that during the 'hide' stage, they should consider their strategy and other strategies that might work. Record all the children's answers on the board, being careful not to give away the correct answer. Ask:

- Are there any answers that are unreasonable/ unlikely because they don't make sense? Which ones? Why do you think this? (e.g. Is the answer too big or too small because the incorrect operation was used?)
- Which answer do you agree with? Explain the strategy you used to get your answer.
- Did anybody use a different strategy?

Models that reflect, rather than direct, children's thinking: Use concrete materials and/or pictorial representations to model the approaches and strategies shared, so as to make them more visible to all of the class.

Repeat, with the next number string.

Let's strengthen

Some children may need to be reminded to look at the bigger number and to consider how much needs to be added to that number to make it up to a friendly (multiple of) ten.

(P) Pupil's Book page 57: Adding – Making Tens
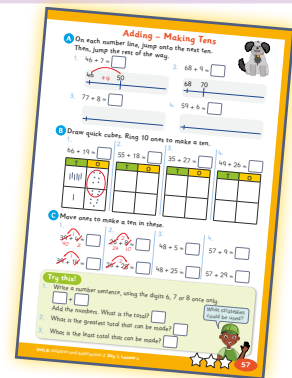
Let's strengthen

Some children might benefit from using the Unit 8 Let's Strengthen PCM instead (i.e. same question types but with simplified numbers).

Optional consolidation and extension possibilities

Games Bank Play 'Make 10'.

Strategy Wall Add the Strategy Wall Card for Number Bonds of 10 and Add using 10 as a friendly number to the class Strategy Wall. Refer to it throughout this and subsequent units. The children could also add their own sketches of this strategy, both to the Strategy Wall and in their maths journals.

Maths Journals The children use images/words to record what they built, sketched or wrote.

Estimation Station Remind the children to submit estimates, count the items and/or set up a new station.

Review and Reflect Use the Prompt Questions Poster.

Days 6 and 7, Lesson 5

Adding with Renaming Ones as Tens

Focus of learning (with Elements)

- Explores addition, with renaming ones as tens, within 100 (U&C)
- Develops strategies for efficient computation of addition of ones (R)

Learning experiences

- **D** Digital activity: Adding – Making Tens (2)
  MAM Routines: Number Strings, with Write-Hide-Show
- **D** **C** Digital activity: More Tickets *MAM* Routines: Would This Work? with Build it; Sketch it; Write it
- **C** Concrete activity: Column Method
  MAM Routine: I Do, We Do, You Do
- **P** Pupil's Book page 58: Adding with Renaming Ones as Tens

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Counting aids, such as 100 squares and number lines

Maths language

- renaming, column method

Teaching tip

While, strictly speaking, the children have already been renaming in the previous lesson by making tens, 'renaming' in addition typically refers to composing or exchanging ten ones for one ten, and is typically associated with written calculations, using the column method.

Warm-up

D **Digital activity: Adding – Making Tens**
MAM **Routines: Number Strings, with Write-Hide-Show**

This PowerPoint presentation contains two number strings. Each slide builds up a number string, with one part revealed per click.

Using Write-Hide-Show, ask the children to record their proposed answer only on their MWBs. Emphasise that during the 'hide' stage they should consider their strategy and other strategies that might work. Record all the children's answers on the board, being careful not to give away the correct answer. Ask:

- Are there any answers that are unreasonable/unlikely because they don't make sense? Which

ones? Why do you think this? (e.g. Is the answer too big or too small because the incorrect operation was used?)

- Which answer do you agree with? Explain the strategy you used to get your answer.
- Did anybody use a different strategy?

Models that reflect, rather than direct, children's thinking: Use concrete materials and/or pictorial representations to model the approaches and strategies shared, so as to make them more visible to all of the class.

Repeat, with the second number string.

Main event

D **C** **Digital activity: More Tickets**
MAM **Routines: Would This Work?, with Build it; Sketch it; Write it**

Begin by displaying the activity, which shows a list titled 'Tickets sold', and the number of tickets sold by First Class (23) and Second Class (54).

Assessment Opportunity

Ask/say:

- Second Class have now sold nine more tickets. How might we represent the number of tickets that Second Class have sold in total?
- Build it! Can you use classroom resources to represent this number story? Show us.

- Sketch it! Can you represent this number story as a sketch? Show us.
- Write it! Can you use words, branching bonds or numbers to represent this number story? Show us.
- Make a quick, reasonable estimate. (Do you think it will be forty-something, fifty-something, sixty-something or seventy-something? Explain why.)

Next, click to reveal the various models and approaches chosen by the characters, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work. Ask:

- Do the answers and/or approaches look reasonable? Explain why.
- How could we check the answers?
- Which is the most efficient way to arrive at an answer, in your opinion?
- What if Second Class had sold 19 more tickets? How might we represent the number of tickets that Second Class sold in total?
- What if Second Class had sold 29 more tickets? How might we represent the number of tickets that Second Class sold in total?

Let's strengthen

Some children may benefit from initially being introduced to the column method as two separate vertical calculations. (See the Unit 8 Let's Strengthen Suggestions for Teachers.)
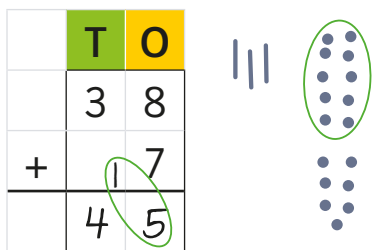
C **Concrete activity: Column Method**
MAM Routine: I Do, We Do, You Do

Teaching tip

Be mindful of the language used and emphasise the value of each digit as tens or ones (e.g. 8 ones and 7 ones is 15 ones, which is also 1 ten and 5 ones; move the ten over to the tens side; 3 tens and 1 ten is 4 tens).

Demonstrate to the children how to use the column method, using I Do, We Do, You Do with randomly generated numbers or those on page 58 of the Pupil's Book. For example:

I Do: Model the approach. Use both the column method and sketches of quick cubes as a visual support. Explain your thinking processes (think aloud) and explain why you are doing each step of the process.

We Do: Ask the children to complete similar calculations in pairs or small groups. They can turn their MWBs to landscape orientation and use the same approach as that modeled on the board.

You Do: When ready, ask the children to undertake similar questions independently. These can be/ include those on page 58 of the Pupil's Book.

When ready, repeat this process, using two two-digit numbers, where the total does not exceed 99.

Let's strengthen

Some children will benefit more from using concrete resources, rather than sketching, and from using interlocking cubes that they can physically compose into tens, as opposed to base ten blocks where a 'swap' has to occur.

P **Pupil's Book page 58: Adding with Renaming Ones as Tens**
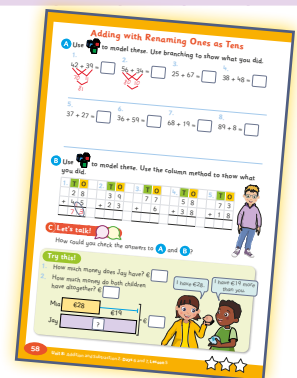
Optional consolidation and extension possibilities

Games Bank Play 'Pig' and/or 'Chance Calculations – Adding Ones'.

Strategy Wall Add the Strategy Wall Cards for Adding Using the Column Method, and Adding and Subtracting 9 to the class Strategy Wall. Refer to them throughout this and subsequent units. The children could also add their own sketches of these strategies, both to the Strategy Wall and in their maths journals.

Estimation Station Remind the children to submit estimates, count the items and/or set up a new station.

Story Read *Coyotes All Around* by Stuart J. Murphy, which explores adding one- and two-digit numbers, with renaming, using the column method, and estimating totals using rounding to the nearest 10. A reading of the story is available at: edco.ie/3cs5

Let's Deepen Task D on the Unit 8 Let's Deepen PCM: Addition and Subtraction 2 can be done any time after this lesson.

Maths Journals The children use images/words to record what they built, sketched or wrote.

Games 'Thinking Blocks Junior' is a simpler version of the original 'Thinking Blocks' game for addition and subtraction. It is an ideal way to start using bar models to model word problems and computation. edco.ie/8hk5

Home/School Links Book Page 22 can be done any time after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 8, Lesson 6

Adding with Renaming Tens as Hundreds

Focus of learning (with Elements)

- Explores addition with renaming tens as hundreds (U&C)
- Draws from patterns and properties to derive unknown number facts from core facts (A&PS)

Learning experiences

- **C** Game: Ping-pong Number Bonds of 100
- **D** **C** Digital activity: Adults and Children *MAM* Routines: **Would This Work?, with Build it; Sketch it; Write it**
- **P** Pupil's Book page 59: Adding with Renaming Tens as Hundreds

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Counting aids, such as 100 squares and number lines

Maths language

- There is no new maths language for this lesson.

Warm-up

C **Game: Ping-pong Number Bonds of 100**

Play an imaginary game of tennis or ping-pong! Mime the first serve and call out a multiple of 10 within 100 (e.g. 30). The children mime the return and call out the number needed to make 100 (70). Then 'bat back' with another number the children respond to.

Main event

D **C** **Digital activity: Adults and Children**
MAM **Routines: Would This Work?, with Build it; Sketch it; Write it**

Begin by displaying the activity, and say/ask:

Assessment Opportunity

- On the first night, 80 adults and 47 children attended the concert. How might we represent the total number of people who attended that night?
- Build it! Can you use classroom resources to represent this number story? Show us.
- Sketch it! Can you represent this number story as a sketch? Show us.
- Write it! Can you use words, branching bonds or numbers to represent this number story? Show us.
- Make a quick, reasonable estimate. Explain how you thought of this estimate.

Then click to reveal the various models and approaches chosen by the characters, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work. Ask:

- Do the answers and/or approaches look reasonable? Explain why.
- How could we check the answers?
- Which is the most efficient way to arrive at an answer, in your opinion?
- On the second night, 92 adults and 55 children attended the concert. How might we represent the total number of people who attended that night?
- Build it! Can you use classroom resources to represent this number story? Show us.
- Sketch it! Can you represent this number story as a sketch? Show us.

- Write it! Can you use words, branching bonds or numbers to represent this number story? Show us.
- How many people attended on the second night in total? How do you know?

Repeat using other similar figures.

Let's strengthen

Some children may benefit from using the place value arrow cards to represent and then partition the numbers into their tens part and their ones part.

P Pupil's Book page 59: Adding with Renaming Tens as Hundreds
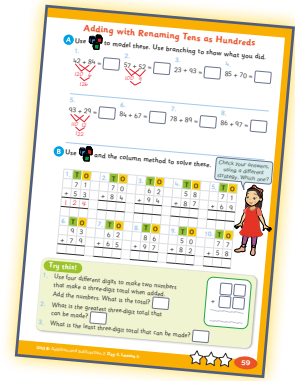
Optional consolidation and extension possibilities

Games Bank Play 'Target 200 (Tens)'.

Strategy Wall Add the Strategy Wall Card for Adding Using the Column Method to the class Strategy Wall. Refer to it throughout this and subsequent units. The children could also add their own sketches of this strategy, both to the Strategy Wall and in their maths journals.

Games Play 'Maths Frame – Maths Invaders' online. Shoot the spaceship with the correct answer and dodge the incoming fire. (Select 'Play game' and then 'Addition' or 'Subtraction'.) edco.ie/g47x

Maths Journals The children use images/words to record what they built, sketched or wrote.

Estimation Station Remind the children to submit estimates, count the items and/or set up a new station.

Review and Reflect Use the Prompt Questions Poster.

Day 9, Lesson 7

Adding Three Numbers

Focus of learning (with Elements)

- Applies the associative property to support calculations and justifies with proof(s) (R)

Learning experiences

D Digital activities: Adding Three Numbers (A) & (B)
MAM **Routines: Number Strings, with Write-Hide-Show**

D C Digital activity: What to Add First? *MAM* **Routines: Concept Cartoon, with Think-Pair-Share; Build it; Sketch it; Write it**

C Concrete activity: Adding Three Numbers
MAM **Routine: Build it; Sketch it; Write it**

C Concrete activity: Column Method
MAM **Routine: I Do, We Do, You Do**

P Pupil's Book page 60: Adding Three Numbers

Equipment

- Countable resources, such as interlocking cubes, place value grids, base ten blocks
- Counting aids, such as 100 squares and number lines

Maths language

- There is no new maths language for this lesson.

Warm-up

D **Digital activities: Adding Three Numbers (A) & (B)** *MAM Routines: Number Strings, with Write-Hide-Show*

These two PowerPoint presentations show a set of number strings. In PowerPoint (A), the number strings are adding three one-digit numbers. Each slide builds up a number string, with one part revealed per click.

In PowerPoint (B), the number strings are adding three numbers in multiples of ten, up to 100.

Using Write-Hide-Show, ask the children to record their proposed answer only on their MWBs. Emphasise that during the 'hide' stage they should consider their strategy and other strategies that might work. Record all the children's answers on the board, being careful not to give away the correct answer.

Ask:

● Are there any answers that are unreasonable/ unlikely because they don't make sense? Which ones? Why do you think this? (e.g. Is the answer too big or too small because the incorrect operation was used?)

● Which answer do you agree with? Explain the strategy you used to get your answer.

● Did anybody use a different strategy?

Models that reflect, rather than direct, children's thinking: Use concrete materials and/or pictorial representations to model the approaches and strategies shared, so as to make them more visible to all of the class.

Repeat, with the next number string.

Main event

D **C** **Digital activity: What to Add First?** *MAM Routines: Concept Cartoon, with Think-Pair-Share; Build it; Sketch it; Write it*

Display the Concept Cartoon, in which the characters are discussing what numbers to add first. Click to hear each character's thoughts. Then using Think-Pair-Share, ask:

● What do you think? Explain why.

● (Point to a specific character.) Do you agree with their idea? Explain why.

● Do you think something different? What do you think? Why do you think this?

● How can we find out whose thinking is correct?

● Make a quick, reasonable estimate. Do you think it will be sixty-something, seventy-something, eighty-something or ninety-something? Explain why.

Using Build it; Sketch it; Write it (with materials, sketches and/or number sentences), encourage the children to investigate which of the proposed approaches work and which might be better/more efficient. Say/ask:

● Monty suggests that the column method doesn't have to be used. What other ways can you think to do this?

● Which way do you think is most efficient?

Let's deepen

Challenge the children to identify friendly facts and to identify the fact group(s) to which they belong (e.g. doubles: 6 + 6, 2 tens + 2 tens; bonds of 10: 4 + 6; near doubles 2 +3).

C **Concrete activity: Adding Three Numbers** *MAM Routine: Build it; Sketch it; Write it*

Look at the calculations opposite. Write one on the board and ask:

● How might we represent this number sentence?

● What number story could we create?

● Build it! Can you use classroom resources to represent this number sentence? Show us.

● Sketch it! Can you represent this number sentence as a sketch? Show us.

● Write it! Can you use branching or numbers in a different way to represent this number sentence? Show us.

● Make a quick, reasonable estimate. Explain how you thought of this estimate.

Share and discuss the various models and approaches, allowing the children time to comment on each (e.g. What is the same/different about each?) and to justify if the methods/opinions work.

Ask:
- What answer did you get?
- Which is the most efficient way to arrive at an answer, in your opinion?

Repeat with other number sentences as necessary.

Renaming not required:	
30 + 17 + 22	14 + 72 + 12
33 + 21 + 54	16 + 63 + 20
25 + 30 + 41	
Renaming of ones required:	
56 + 24 + 15	27 + 47 + 32
68 + 15 + 12	29 + 49 + 21
26 + 56 + 7	
Renaming of tens required:	
45 + 30 + 41	30 + 97 + 22
64 + 72 + 12	33 + 71 + 54
86 + 63 + 20	

Let's strengthen

Some children may benefit from reviewing how to add three one-digit numbers, using concrete materials (e.g. ten frames and counters, interlocking cubes, etc.) (See the Unit 8 Let's Strengthen Suggestions for Teachers.)

C **Concrete activity: Column Method**
MAM **Routine: I Do, We Do, You Do**

If it is not suggested as a way to solve the calculations, demonstrate to the children how to use the column method to add three numbers, both without and with renaming. Use I Do, We Do, You Do with randomly generated numbers or those on page 60 of the Pupil's Book.

Assessment Opportunity

For example:

I Do: Model the approach. Use both the column method and sketches of quick cubes as a visual support. Explain your thinking processes (think aloud) and explain why you are doing each step of the process.

We Do: Ask the children to complete similar calculations in pairs or small groups. They can turn their MWBs to landscape and use the same approach as that modeled on the board.

You Do: When ready, ask the children to undertake similar questions independently. These can be/ include those on page 60 of the Pupil's Book.

Let's strengthen

Some children may benefit from extended and prolonged access to concrete materials to further explore the concept of adding three numbers. (See also the Unit 8 Let's Strengthen Suggestions for Teachers.)

P **Pupil's Book page 60: Adding Three Numbers**
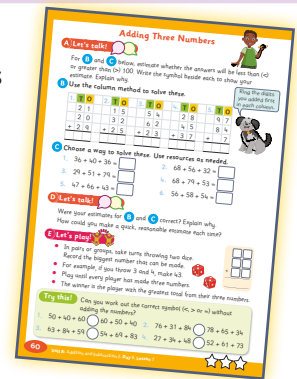
Activities A and B:
Ask the children to share how they estimated whether each answer was above or below 100. If not suggested, encourage them to use front-end estimation, where they look specifically at the greatest place value (i.e. in this case, tens) as a means to generate a 'ballpark' estimate.

Optional consolidation and extension possibilities

Games Bank 'Play Target 50 (or 100)' or 'Over 100' using two dice; and/or 'Domino Draw', taking two dominoes each time.

Strategy Wall Revise the Strategy Wall Cards for friendly numbers (e.g. bonds of 10, doubles, near doubles, in-between doubles) already on the class Strategy Wall. Refer to them as relevant.

Estimation Station Remind the children to submit estimates, count the items and/or set up a new station.

Story Read Chapters 3 and 6 of *Mission: Addition* by Loreen Leedy, and/or *Mall Mania* by Stuart J. Murphy, which specifically explores adding more than two one-digit numbers, and looking for friendly numbers that combine more efficiently. A reading of the story is available at: edco.ie/rgpa

Review and Reflect Use the Prompt Questions Poster.

Day 10, Lesson 8

Review and Reflect

Focus of learning (with Elements)

- Reviews and reflects on learning (U&C)

Warm-up

Carry out a warm-up activity of your choice from one of the lessons in this unit.

Main event

Use this menu of activity ideas to choose how best to structure this last lesson of the unit to suit your needs and the needs of your class.

Let's talk!	Let's play!
Use Think-Pair-Share to review the unit. The children record what they know in their maths journals (e.g. using a concept map).	Play any of the games listed under Optional Consolidation and Extension Possibilities.
Maths language	**Maths strategies and models**
Ask the children to explain the following terms (perhaps using examples or drawings on their MWBs): adding, subtracting, +, −, =, fact family, branching bond, whole, parts, turnaround facts, inverse, tens, ones, count on/back, column method, branching, related facts, number story, number sentence, in total. Use the Maths Language Cards for this unit to revise the key terms. For example: If the image and text are cut apart, can the children match them?	Ask the children to give examples of the strategies they used in this unit (e.g. how to add/subtract ones, tens, without and with renaming, adding three numbers, using friendly numbers). Ask the children to give examples of the models they used in this unit (e.g. concrete materials such as interlocking cubes, place value grids, base ten blocks, their own fingers, 100 square), pictorial representations (e.g. quick cubes, number lines), and abstract models (branching, number sentences, column method). Which strategies and models did they prefer and why?
Progress Assessment Booklet	**Maths eyes**
Complete Questions 32–36 on page 17. Alternatively, these can be left to do as part of a bigger review during the next review week.	Ask the children to identify situations in the classroom or school where they could use their addition and subtraction skills (e.g. total number of children in certain rooms, comparing the numbers of children in classes). Explore brochures and flyers. Similar to a Headline Story, ask the children to create maths questions and then to model and solve them.
Let's strengthen	**Let's deepen**
Identify children who might benefit from extra practice with some of the key concepts or skills in this unit. Consult the Unit 8 Let's Strengthen Suggestions for Teachers and/or use the Unit 8 Let's Strengthen PCM.	Select one of the Cognitively Challenging Tasks on the Unit 8 Let's Deepen PCM (this could be displayed on the class board) and encourage the children to work together in groups to model solutions for the task. Alternatively, each group could choose their own preferred task to solve.

Notes