Maths and Me: 1st Class – Short-Term Plan, Unit 18: Number Sentences (June: Week 1)

Strand(s) > Strand Unit(s)	Algebra > Expressions and Equations. Number > Numeration and Counting; Sets and Operations.
Learning Outcome(s)	Through appropriately playful and engaging learning experiences children should be able to interpret the meaning of symbols or pictures in number sentences; demonstrate proficiency in using and applying different counting strategies; select, make use of and represent a range of addition and subtraction strategies.

Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	**Number Sentences:** Represents situations that involve the addition and subtraction of whole numbers, using objects, pictures and symbols (A&PS); Records the quantitative information provided in a story or problem in pictorial or graphical form (C); Tells the story of simple number sentences or expressions, verbally or using appropriate models (e.g. diagrams or concrete materials) (A&PS)		(D) Reason & Respond L1–2 (D) Think-Pair-Share L1 (D) Notice & Wonder L1 (C) Tell the Number Story L1 (C) Write-Hide-Show L2 (C) Game: Shark and Dolphin Race L2 (D) Build it; Sketch it; Write it L2 **Print resources** Pupil's Book pages 108–109 Home/School Links Book page 38 PCMs 62–66	**Intuitive Assessment:** responding to emerging misconceptions **Planned Interactions:** responding to insights gleaned from children's responses to learning experiences **Assessment Events:** information gathered from completion of the unit assessment in the Progress Assessment Booklet page 29
2	**Subtraction Number Sentences:** Represents situations that involve the addition and subtraction of whole numbers, using objects, pictures and symbols (A&PS); Records the quantitative information provided in a story or problem in pictorial or graphical form (C); Tells the story of simple number sentences or expressions, verbally or using appropriate models (e.g. diagrams or concrete materials) (A&PS)			
3	**Review and Reflect:** 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 '1st Class *Maths and Me* Progression Continua Overview' for a detailed breakdown of how all progression continua are covered.
Maths Language	See '1st Class *Maths and Me* Maths Language Overview', individual lesson plans and Unit 18 Maths Language Cards.
Equipment	See '1st 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 18 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.) • See Unit 18 Let's Strengthen PCM. • See Unit 18 Let's Deepen PCM.
Integration	See individual lesson plans.

Background and rationale

- This unit is a one-week block of content in June when the children have a wealth of 1st Class learning experiences and mathematical knowledge to draw on (e.g. critical thinking and problem-solving).
- The children use numbers and symbols to express and construct number sentences to help solve problems and/or to express concrete ideas. The children draw on their strategies for addition and subtraction, counting methodologies, number sense, estimation skills and their maths language, allowing an opportunity to further assess these areas. They also decide whether addition or subtraction (as take away) is the correct operation. Understanding their choice of symbols is also central to this unit.
- Numberless word problems give the children playful autonomy and provide opportunities to demonstrate understanding of concepts and key language, enabling assessment.
- The use of concrete materials allows the children a deeper understanding of the symbols and their meanings.
- The children learn that number sentences are mathematical statements, written using numerals and symbols (+, –, <, >, = and ≠) and that they include equations (=) and inequalities (<, >).
- The unit reinforces the correct meaning of the symbol = by only translating it as 'equals', 'is equal to' and/or 'is the same as'. Using 'makes' or 'gives' may compound the common misunderstanding that = precedes the answer in all number sentences.
- The children learn that the equals symbol indicates that both sides of the number sentence are equal to one another/the same value/balanced. This is a crucial foundation for algebra.
- This unit uses models (bar models, part-whole, etc.) which allows assessment of understanding and usage.
- This position of this unit allows for review and consolidation of previous units.
- **Estimation and relational thinking:** When students compare both sides of a number sentence, encourage them to examine the numbers closely, and to use estimation, number sense and relational thinking instead of actually doing the calculations. To develop and encourage relational thinking and efficiency, provide examples that discourage calculations, e.g. large numbers, quantities that clearly differ by a large amount and true-or-false activities. (See the Unit 18 Let's Deepen PCM.)
- **Representing word problems and number sentences pictorially and concretely:** The children have also developed these strategies throughout the Senior Infant units (especially Three-Act Tasks, Would This Work? and Build it; Sketch it; Write it). This lesson allows revision of the models covered so far to assess how well they are understood/used. Ensure that the children are using the frame correctly (i.e. to represent the missing/unknown variable) and that they understand what it represents.
- **Numberless word problems:** The absence of numbers means that the children cannot jump to the calculation stage of the problem-solving process, where often they just focus on the numbers and perform what they think is the expected calculation (e.g. the operation that they are currently studying). With numberless word problems, they must first engage in a sense-making process and consider:

- What does it tell you? What is going on in the problem? Can you visualise it (picture it in your head)?
- What could be assumed about the amounts in the problem, and the relationship between them, even though there are no numbers?
- What is, or might be, the question? What is it asking us to do?

- Numberless word problems are best presented as slow-reveal activities in order to control the information provided (see Digital resources for Lesson 4).. This gives the children time and space to reason out quantities and relationships in the problem, make considered estimates and justify the reasonableness of their estimates.

Teacher note: The 'three-reads approach' for word problems echoes this approach to numberless word problems and can be used with any word problem. See the Unit 18 Let's Strengthen Suggestions for Teachers.

The theme of this unit is **On the Beach**.

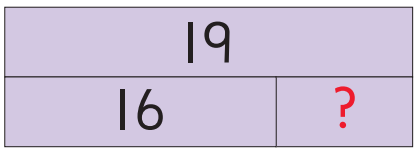
Common misconceptions and difficulties

- The children may incorrectly interpret the equals symbol (=) as 'gives an answer of' or 'makes', seeing it as an action rather than a relationship, and assume that the value of the quantities on either side of the equals symbol are the same.
- They may incorrectly assume that the missing value is the total of the given numbers. For example, they may read 5 + ☐ = 11 as 5 + 11 is 16 instead of 5 and 'how many more' is the same as 11.
- They may incorrectly assume that the last number is the total and the first two–three numbers are addends. For example, they may read ☐ = 5 + 6 as 1 + 5 is 6 instead of how many altogether is 5 and 6 more. Or 5 + 6 = 3 + ☐ as 5 + 6 + 3 is 14 instead of 5 and 6 more is the same as 3 and how many more?
- They may incorrectly assume that the number directly after the = symbol is the answer to the left-hand side of the equation. For example, they may read 5 + 6 = ☐ + 3 as 5 + 6 is 11.
- They may incorrectly translate verbal and/or word problems into written number sentences or expressions (and vice versa).
- They may not understand the word problems and, as a result, randomly select numbers to perform any operation.
- They may write subtraction number sentences incorrectly.

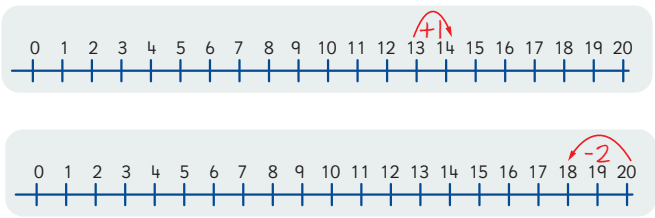
The Unit 18 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

Mathematical models and representations

- Counters, bears (classroom manipulatives) and rekenreks
- Number lines: for adding and subtracting
- Number sentences
- Bar models
- Ten frames
- Part-whole model

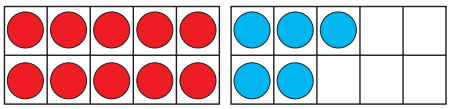


Part-whole model



Number lines for adding and subtracting

Number sentence



Ten frames

Teaching tip

Number Line and Bar Model manipulative printables are available to support this unit. Click on the resources icon on the *Maths and Me* book cover on **edcolearning.ie**

Days 1 and 2, Lesson 1

Number Sentences

Focus of learning (with Elements)

- Represents situations that involve the addition and subtraction of whole numbers, using objects, pictures and symbols (A&PS)
- Records the quantitative information provided in a story or problem in pictorial or graphical form (C)
- Tells the story of simple number sentences or expressions, verbally or using appropriate models (e.g. diagrams or concrete materials) (A&PS)

Learning experiences

- (D) Digital activity: Match *MAM* Routines: Reason & Respond, with Think-Pair-Share
- (D) Digital activity: Beachcombing *MAM* Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond
- (C) Concrete activity: Tell the Number Story
- (P) Pupil's Book page 108: Number Sentences

Equipment

- Classroom manipulatives, such as counters and bears (in different colours/sizes)
- Ten frames
- Rekenreks
- PCM 62
- PCM 63

Maths language

- how many? altogether, strategy, plus, add (+), take away, subtract (–), the same, is equal to/equal(s) (=), number sentence, compare, more, less, is not equal to (≠), column, estimate, reasonable, unreasonable, count, tens, ones, rename, greater than (>), fewer/less than (<), first, second, pattern, number story, symbol, answer

Warm-up

(D) Digital activity: Match *MAM* Routines: Reason & Respond, with Think-Pair-Share

Display the image and, using Think-Pair-Share, ask/say:

- Match two or more words and symbols.
- Why did you choose those words and symbols?
- What words and symbols do not match? Why?
- Can you think of any other words or symbols that could also be used?
- Give an example of how a word/symbol might be used. Tell us, write it on your MWB or show us using manipulatives.

Multiple answers are possible.

(D) Digital activity: Beachcombing *MAM* Routines: Notice & Wonder, with Think-Pair-Share

Display the poster and, using Think-Pair-Share, ask:

- 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.

Main event

(D) Digital activity: Beachcombing *MAM* Routine: Reason & Respond

Display the poster again. Zoom in on Jay making two towers with stones: 10 in one tower and 8 in the other (10 + 8 = 18). Click to play or ask the following questions. Ask the children to give reasons for their responses.

- How many stones altogether? What strategy did you use to find out?

- Tell me about the stone towers using words like: *plus*, *add*, *take away*, *subtract*, *equals* and/or *is the same*.
- Is this number sentence true or false: 18 = 10 + 8?
- Compare the two towers by writing a number sentence using > or <.
- Write a number sentence for the stones which is not true. Use the symbol ≠.

Zoom in on Mia and the coins she found: 14 coins have one colour, nine coins have two colours (14 + 9 = 23). Click to play or ask:

- How many coins altogether?
- What strategy/model did you use to find out?
- Why did you choose that strategy/model?
- Is this number sentence true or false: 23 = 9 + 14?
- Can you write that using the column method?

C Concrete activity: Sea Glass Patterns

Distribute PCM 62: Lexi's Sea Glass Pattern to each child.

- Lexi has finished one pattern using grey and white pieces of sea glass. Estimate the number of pieces of sea glass altogether. Give a reasonable/unreasonable estimate.
- Count. How many pieces of sea glass are in each colour? How did you count? Could you count in a different way?
- How many altogether?
- Can you write that as a number sentence? What symbols did you use? Why did you use that symbol?
- How did you find out how many altogether? Why did you choose that way? Did you rename ones as a ten? Why?
- Can you write that using the column method?
- Is this number sentence true or false? 43 = 24 + 19?
- If Lexi had one more grey glass piece/one more white glass piece, how would you show that? What would change?
- Compare the number of pieces of grey glass with the number of pieces of white glass using 'greater than' or 'less than'. Write the number sentence using < or >.
- Write a number sentence that is not true for the pieces of glass. Use ≠. Build or sketch a model: Lexi has a few more big pieces of glass than little ones or Jay has a few more little stones than big ones.
- What numbers did you use? How do you know that the first number is just a few more/less than the second number?
- Make a pattern using 30 manipulatives in two colours. Ask your partner to show it using numbers and symbols.
- Choose a different model to show your work (e.g. a bar model, a ten frame and/or a part-whole model).

C Concrete activity: Tell the Number Story

Ask the children to work in pairs. Distribute PCM 63: Tell the Number Story (one page per child). Ask the children to look at each picture. Say/ask:

- What number story is the picture telling?
- Discuss with your partner.

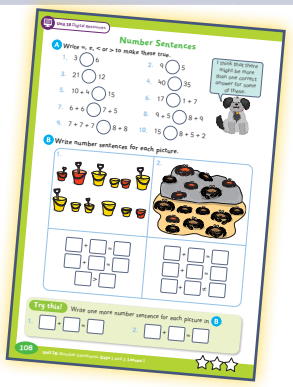
Use classroom manipulatives to recreate the story.

- Why did you choose that number story?
- What symbols did you use?
- Why did you use those symbols?
- Can your partner think of a different number story?
- Record your number stories in the answer boxes.

Teaching tip

Make flashcards showing the number sentences: 18 = 10 + 8; 43 = 24 + 19; 23 = 9 + 14; and 76 = 36 + 40 to use during the main event. Reinforce the correct meaning for the symbol = by only translating it as 'equals', 'is equal to' and/or 'is the same as'.

P Pupil's Book page 108: Number Sentences



Optional consolidation and extension possibilities

Number Sentence Display On the display table, leave some addition number sentence cards of varying challenge levels. Use PCM 64: Number Sentence Cards. The children arrange classroom manipulatives to 'tell' a story for each card.

Number Sentence Doodle Have a large page on display each day for the children, showing 'Number of the Day'. The children 'doodle' addition number sentences for which the number of the day is the answer.

STEM Beach science: Google 'salt water density experiment', which requires only water, salt and an egg.

Review and Reflect Use the Prompt Questions Poster.

Home/School Links Book Page 38 can be completed at any stage after this lesson.

Games Bank Play 'Domino Draw Number Sentences' from the games bank.

Days 3 and 4, Lesson 2

Subtraction Number Sentences

Focus of learning (with Elements)

- Represents situations that involve the addition and subtraction of whole numbers using objects, pictures and symbols (A&PS)
- Records the quantitative information provided in a story or problem in pictorial or graphical form (C)
- Tells the story of simple number sentences or expressions, verbally or using appropriate models (e.g. diagrams or concrete materials) (A&PS)

Learning experiences

- C Concrete activity: What's the Number Sentence? ***MAM* Routine: Write-Hide-Show**
- D Digital activity: Before and After ***MAM* Routine: Reason & Respond, with Build it; Sketch it; Write it**
- C Game: Shark and Dolphin Race
- P Pupil's Book page 109: Subtraction Number Sentences

Equipment

- Classroom manipulatives, such as counters and bears (in different colours/sizes)
- PCM 65

Maths language

- There is no new maths language in this lesson.

Warm-up

C Concrete activity: What's the Number Sentence? *MAM* Routine: Write-Hide-Show

Model this activity first. Example: The answer is 14. Using Write-Hide-Show, the children think of a number sentence for which the answer is 14 and record their answer on their MWBs. Encourage them to tell a story for their number sentence. Multiple answers are possible. Record some or all of the answers on the IWB. Ask:

- Are there any answers which are unreasonable/ do not make sense?
- Is the correct symbol used? What do these symbols tell us? –, +, =
- Which answers do you think are correct?
- Can you tell a story for one of the correct answers?

When ready, allow the children to play in small groups or pairs.

Teaching tip

Give the children a range for the answer when playing 'What's the Number Sentence?' For example: Tell them to choose an answer between 10 and 20. Reinforce the correct meaning for the symbol = by only translating it as 'equals', 'is equal to' and/or 'is the same as'.

Let's strengthen

Provide the Unit 18 Let's Strengthen PCM: What's the Number Sentence? Some children can complete the cards in advance with the SEN.

Let's deepen

Challenge some children to think of a number story with three addends.

Main event

D **Digital activity: Before and After**

***MAM* Routine: Reason & Respond, with Build it; Sketch it; Write it**

Card 1 (front): Dara's sandcastle wall

- Estimate. How many sandcastles altogether?
- Count. How did you count?

Card 1 (back)

- Estimate. How many sandcastles are there now?
- Count. How did you count?
- What do you think happened to the rest of the sandcastles?
- Have the sandcastles on the front been added to or subtracted from?
- Say a number sentence for that. (The number sentence is 15–10=5.)

Use Build it; Sketch it; Write it to show the story. Use any models, including your own.

As they work, conference with the children to check for key concepts and language:

- Is this an addition or subtraction story?
- How do you know?
- How have you shown that with your model?
- What number sentence did you write?
- What symbols did you use? Why?

Repeat the process, adjusting the questions as necessary for Card 2 (43–19=24) and Card 3 (10–8=2).

Let's strengthen

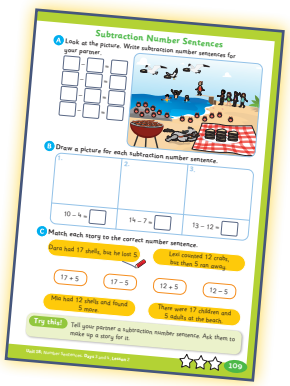
Some children may benefit from choosing rather than devising a number sentence. Alternatively, during the MAM routine 'Build it; Sketch it; Write it', some children may benefit from working within 20 (i.e. using only 20 manipulatives).

C **Game: Sharks and Dolphins**

The children play in pairs. Give PCM 65: Shark and Dolphin Race to each pair. Child A is the shark, and Child B is the dolphin. They write subtraction sentences to keep track of their progress in the race.

Assessment Opportunity

P **Pupil's Book page 109: Subtraction Number Sentences**



Optional consolidation and extension possibilities

Number Sentence Display On the display table, leave some addition number sentence cards of varying challenge levels. Use PCM 64: Number Sentence Cards. The children arrange classroom manipulatives to 'tell' a story for each card.

Number Sentence Doodle Have a large page on display each day for the children, showing 'Number of the Day'. The children 'doodle' addition and/or subtraction number sentences for which the number of the day is the answer.

Story Read *Shark Swimathon* by Stuart J. Murphy, or listen to a reading at: edco.ie/4anr

Games Bank Play 'Difference Snap', 'Cards and Counters' or 'Number Line Subtraction' from the games bank.

Maths Journal Ask the children to record their own beachcombing activity with words, pictures and number sentences (e.g. 'First I found..., then I found..., altogether I have...' or 'I found..., then I gave my friend..., now I have...').

Review and Reflect Use the Prompt Questions Poster.

Home/School Links Book Page 38 can be completed at any stage after this lesson.

Day 5, Lesson 3

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!
Review and Reflect Poster: Use Think-Pair-Share alongside the prompt questions to review the unit.	Provide the children with classroom manipulatives including beads, blocks, etc. Working in pairs or small groups they create a 'storyboard' (see PCM 66: Storyboard Template). Each 'scene' in the storyboard will have a matching number sentence. Some children will be comfortable creating one scene; others will create multiple scenes. It may be helpful to give the children a theme (e.g. The Birthday Party).
Maths language	**Maths strategies and models**
Ask the children to explain the following terms, perhaps using examples or drawings on MWBs: symbol, add, subtract, equal to, not equal to, take away, answer, number sentence. Use the Unit 18 Maths Language Cards to revise the key terms. For example: If the image and text are cut apart, can the children match them? If not completed already, complete the My Maths Fact File on page 123 of the Pupil's Book.	Ask the children to give examples of the strategies of subtraction they used in this unit (doubles, near doubles, renaming tens and ones, renaming, number bonds of 10, count back). Models: bar model, part-whole model, ten frames, their own models. Which strategies and models did they prefer and why?
Progress Assessment Booklet	**Maths eyes**
Complete Questions 67–69 on page 29. Alternatively, these can be left to do as part of a bigger review during the next review week.	Take the children on a 'story trail' inside or outside the classroom. Ask them to search for stories they can tell using numbers added or subtracted. Give an upper limit, such as 20 (e.g. classroom furniture, the clock, coins, flowers, trees, windows, rooms, etc).
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 18 Let's Strengthen Suggestions for Teachers and/or use the Unit 18 Let's Strengthen PCM.	Use the Unit 18 Let's Deepen PCM.

Notes