Maths and Me: 2nd Class – Short-Term Plan, Unit 4: Data 1 (October: Weeks 3&4)

Strand(s) > Strand Unit(s)	Data and Chance > Data. Number > Numeration and Counting; Sets and Operations. Algebra > Expressions and Equations.
Learning Outcome(s)	Through appropriately playful and engaging learning experiences children should be able to pose questions of interest, record and use data as evidence to answer those questions and communicate the findings

Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	**Odds and Evens:** Represents and displays data using tally charts, and interprets results and draws conclusions (C); Compares two data values and/or samples involving themselves (A&PS)		(D) Quick Images L1 (D) Write-Hide-Show L1 (D) Three-Act Task L1 (C) Walking Survey L2	**Intuitive Assessment:** responding to emerging misconceptions
2	**Pictograms:** Represents and displays data, using pictograms, and interprets results and draws conclusions (C); Critically analyses the nature and objectivity of simple data sets (R)		(D) Notice & Wonder L2, 3 (D) Reason & Respond L2–4 (D) Choral Counting L3 (D) Think-Pair-Share L2–4 (D) Build it; Sketch it; Write it L4	**Planned Interactions:** responding to insights gleaned from children's responses to learning experiences
3	**Multiple Values:** Recognises and identifies where data symbols represent multiple values (U&C); Designs symbols to represent multiple information or values on a data display (C)		**Print resources** Pupil's Book pages 26–29 Home/School Links Book page 12 PCMs 13, 14	
4	**Data Investigation:** Applies an investigative cycle of problem-posing, planning, data gathering, representation, analysis and conclusion (A&PS); Checks and evaluates the accuracy and reasonableness of own methods of data collection and representations (R); Refines own methods (R)			**Assessment Events:** information gathered from completion of the unit assessment in the Progress Assessment Booklet page 12
5	**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 '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 4 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 4 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.) • See Unit 4 Let's Strengthen PCM. • See Unit 4 Let's Deepen PCM.
Integration	See individual lesson plans.

Background and rationale

- This unit is a single-week block of content and the first of two Data units in 2nd Class. This unit will focus primarily on tally charts and pictograms, while Unit 16: Data 2 will mainly be concerned with block graphs.
- Tally marks should be quite familiar to the children; they will have encountered them as a way to represent numbers since Infant classes. While the children will have explored both pictograms and block graphs in Maths and Me for 1st Class, this is the first time they will encounter data symbols that represent multiple information or values.
- This unit will also revise and reinforce some of the work done previously on addition, subtraction (as comparing/finding difference), group counting in 2s, 10s and 5s, and halving/doubling amounts.
- Applying the Data Investigation Cycle is a very important part of the learning in this unit. As there is a Review and Reflect week immediately following this unit, it is recommended that the children use some of this time to conduct further data investigations.

The theme of this unit is **Food**.

Common misconceptions and difficulties

- The children may miscount symbols or tallies, e.g. counting a tally of 5 as 4 (due to not counting the oblique mark), or count a tally of 2 as 11, 3 as 111, and so on.
- They may need extra practice at group counting and/or require visual supports such as number lines in 2s, 10s or 5s.
- They may struggle with comparing, i.e. identifying how many more/fewer chose x than y, or preferred x to y.
- They may not appreciate the importance of the 'rules' governing the creation of graphs (e.g. accuracy and consistency in organisation and presentation, consistent size and spacing of symbols, and including a title, labels and a key for the graph).
- They may struggle with multiple values and incorrectly assume that one symbol always represents one item. (Encourage the children to always look carefully at the features that tell us about the values in the graph – scale, key, symbols, etc.)

- They may need extra support with the key topic-specific language of: graph, pictogram, symbol, label, title, key, data. Some children will benefit from sorting and matching activities using the maths language cards specific to this unit.

The Unit 4 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

Mathematical models and representations

- Pictograms
- Tally marks
- Representations of various items within pictograms

Symbols

Tally marks

Key: symbol = 2 children

Key

Day 1, Lesson 1

Odds and Evens

Focus of learning (with Elements)

- Represents and displays data using tally charts, and interprets results and draws conclusions (C)
- Compares two data values and/or samples involving themselves (A&PS)

Learning experiences

- **D** Digital activity: Tally Marks
  MAM **Routine: Quick Images, with Write-Hide-Show**
- **D** Digital activity: Odds and Evens *MAM* **Routine: Three-Act Task**
- **P** Pupil's Book page 26: Odds and Evens

Equipment

- 1–6 spinner or dice

Maths language

- tally marks, odd, even, compare

Teaching tip

- Throughout the unit, remind the children to reflect on the data, analyse it and explain how it might be used (e.g. to predict trends, most likely responses from a similar group of respondents, and so on).
- The traditional tally-mark system is an efficient way to track and collect data in real time, as it is happening (e.g. keeping track of scores in a game, asking a survey question of one person at a time). However, it is not an efficient way to record a walking survey (see Lesson 2) or a hands-up survey (e.g. 'Hands up who likes …'). The hands are counted to get a value/total and it is not sensible/efficient to convert this to tally marks, in order to then convert them back to a numeral.
- See the alternative tally-mark systems in the Unit 4 Let's Deepen PCM: Data 1.

Warm-up

D **Digital activity: Tally Marks** *MAM* **Routine: Quick Images, with Write-Hide-Show**

Briefly reveal and then hide the image(s). Ask the children to write the number/amount on their MWBs. Next, ask them to show their answers, and record these on the board. Be careful not to confirm the correct answer. Ask:

- Which answer are you going for?

- What proof do you have?
- Does anybody have different proof?
- Are there any written answers that are actually the same amount (same value, different appearance)?
- Are there any answers that are unreasonable/ unlikely because they don't make sense? Which ones? Why do you think this?

Main event

D **Digital activity: Odds and Evens** *MAM* **Routine: Three-Act Task**

Act 1: Notice & Wonder

Assessment Opportunity

Play the video. Click to play or ask:

- What do you notice? What do you wonder? (Note any 'wonderings' that could become the basis for a subsequent Maths investigation.)

- (Reveal the focus question.) What is the winning score?

Act 2: Productive Struggle

Play the video. Then click to play or ask:

- Write an estimate that is too high on your MWB.
- Write an estimate that is too low.
- Write a reasonable estimate.

The children work in pairs or small groups to answer the focus question. If necessary, prompt them by clicking to play or asking:

- Do you have enough information? What else do you need to know?

Once the children explain that they need to know what numbers each child spun, flip the video to reveal an image showing which numbers each character spun. Click to play or ask:

- What information do you have now?
- To get an answer, what needs to be done?
- What strategies can you use?

Using Build it; Sketch it; Write it, the children choose their preferred way to mathematically model their strategies/solution(s). Ensure that suitable materials are available and accessible.

Act 3: The Big Reveal

The children share and discuss their strategies, solutions and models. Click to play or ask:

- What answer did you get?
- What strategies did you use to get the answer?
- What do you think was the most efficient strategy?

Then flip the image and play the 'big reveal' video, in which the winning score is revealed. Click to play or ask:

- Is this the answer that you expected? Why or why not?
- What 'I wonder' questions did you answer?
- Do you have any new 'I wonder' questions?

Ⓟ Pupil's Book page 26: Odds and Evens

Using their 1–6 spinners, the children play the game they saw in the video. While it is hoped that many of the children will use tally marks to record their scores, they can also choose alternative methods/models. Ask them to reflect on their methods/ models and refine them as required.
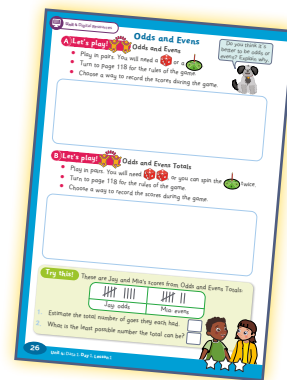
Let's deepen

Challenge some children to justify whether it is better to be odds or evens. There is no clear answer to this: all answers are acceptable, once the child provides suitable supporting reasons. The children will likely justify their opinion based on the numbers that they have spun. Theoretically, there is the same likelihood of spinning an odd or even number, even when totalling two spins. (While there are only five possible odd totals to six possible even totals, there are 18 different combinations that make an even number and 18 different combinations that make an odd number.)

Let's strengthen

Some children may benefit from further opportunities to interpret and represent tally marks and to practise group counting. See the Unit 4 Let's Strengthen Suggestions for Teachers.

Optional consolidation and extension possibilities

Integration As the theme for this unit is Food, there are the same opportunities for cross-curricular integration as in the previous unit. Language, English: The themes of Food/Eating out; Language, Gaeilge: *An téama Bia agus/nó Sa bhaile/Ag siopadóireacht*.

Understanding of data can also be reinforced in other subjects where the children can be asked to apply the Data Investigation Cycle to answer a question arising from enquiry in any curricular area, but especially in Geography, Science, Technology and Engineering.

Rock, Paper, Scissors Play this game repeatedly. Each time a child wins a game, they score 1 point. The children use their MWBs and a tally system to keep track of the scores.

Story Read *Tally Cat Keeps Track* by Trudy Harris. A reading of the story is available at: edco.ie/5fu7

Data Display The display could include examples of various graph and chart types sourced in print media and online, as well as appropriate labels (use the Unit 4 Maths Language Cards). The children could contribute samples of their own work from this lesson and label them.

Review and Reflect Use the Prompt Questions Poster.

Day 2, Lesson 2

Pictograms

Focus of learning (with Elements)

- Represents and displays data using pictograms, and interprets results and draws conclusions (C)
- Critically analyses the nature and objectivity of simple data sets (R)

Learning experiences

C Concrete activity: Walking Survey
MAM Routine: Reason & Respond

D Digital activity: Slow-Reveal Graph (1)
MAM Routine: Notice & Wonder, with Think-Pair-Share

D Digital activity: Favourite Pizza Toppings
MAM Routine: Reason & Respond

P Pupil's Book page 27: Pictograms

Equipment

- PCM 13

Maths language

- pictogram, symbol, data, information, more than, fewer than, most likely, least likely

Warm-up

C Concrete activity: Walking Survey
MAM Routine: Reason & Respond

You will need one copy of PCM 13: Yes or No Flashcards. Cut out the flashcards and place them in different/opposite locations in the classroom. (Alternatively, use two MWBs, with 'Yes ✔' on one, and 'No ✗' on the other. Ask/say:

- Do you like apples? (You could choose another food.) Walk to the correct sign to show your response.

When the children have all walked to one or other of the signs, ask the following questions. (Responses may not be required for all questions.):

- What do your responses tell us?
- Compare the numbers of Yes and No responses.
- Tell me a sentence about the responses, using 'more … than …'.
- Tell me a sentence about the responses, using 'fewer … than …'.
- Based on our responses, if I asked this question of a child in another class, what do you think would be the most likely response?

If time allows, repeat the activity, using other 'Do you like …?' questions. Individual children could also be asked to pose a question.

Main event

D Digital activity: Slow-Reveal Graph (1)
MAM Routine: Notice & Wonder, with Think-Pair-Share

Display the first slide in the slideshow. Ask:

- What do you notice? What do you wonder?

Assessment Opportunity

Use Think-Pair-Share to collect feedback. When all feedback has been collected, click to reveal the next slide and repeat as above, until all of the pictogram has been revealed at the final slide.

D Digital activity: Favourite Pizza Toppings
MAM Routine: Reason & Respond

Display the complete pictogram. Click to play or ask:

- Do you know what this type of graph is called?
- Why do you think it is called a pictogram?
- What do you notice about the size and spacing of the symbols? (same throughout)
- How do you think this data or information might have been collected?

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- What information has been collected in this pictogram?
- What pizzas are not listed here? Why is that?
- Who might be interested in this information?
- How might this information be of use to someone? (For example, what if the teacher was organising a pizza party for this class?)
- Based on this information, if someone was asked their favourite pizza, what would be the most likely response?
- What do you think would be the least likely response?

P Pupil's Book page 27: Pictograms

Let's deepen

Ask the children to tell you sentences about the information in this pictogram, using phrases/words such as 'more ... than ...', 'fewer ... than ...', 'twice' and 'half'. Can they make up their own question about the information in this pictogram?

Let's strengthen

See Pupil's Book p.27, Try this! Some children may benefit from extra supports, such as using number rods and/or drawing bar models to represent the relationship.

Optional consolidation and extension possibilities

Question of the Day Set up a poster or board where a Yes/No question can be displayed (similar to those in Walking Survey in the Warm-up section). The children indicate their response by moving something to the Yes or No side. (Each child could write their name on a sticky note attached to a clothes peg.) This could become part of their morning routine when they first arrive in the classroom. Over time, a child could come up with the question for tomorrow. The question could also be more complex so that, instead of a Yes/No question, the question has three or four options on which the children can 'vote' (e.g. Which of these read-aloud books should we move on to next?).

Story Read *Which Would You Rather Be?* by William Steig. This could be the basis for Question of the Day (see above) or the Walking Survey. A reading of the story is available at: edco.ie/yxsx

Home/School Links Book Complete p.12.

Games Bank Play any of the games that need a tally of points/scores.

Review and Reflect Use the Prompt Questions Poster.

Day 3, Lesson 3

Multiple Values

Focus of learning (with Elements)

- Recognises and identifies where data symbols represent multiple values (U&C)
- Designs symbols to represent multiple information or values on a data display (C)

Learning experiences

D Digital activities: Skip Counting in 2s, 10s and 5s (A–C)
MAM Routine: Choral Counting

D Digital activity: Slow-Reveal Graph (2)
MAM Routines: Notice & Wonder, with Think-Pair-Share

D Digital activity: Favourite Ice-Cream Flavours *MAM* Routine: Reason & Respond

P Pupil's Book page 28: Multiple Values

Equipment

- There is no equipment needed for this lesson.

Maths language
● graph, most popular, least popular, total, key

Warm-up

D Digital activities: Skip Counting in 2s, 10s and 5s (A–C) *MAM* **Routine: Choral Counting**

Depending on the needs of your class, you might wish to reinforce 2s, 10s and/or 5s. Play your chosen presentation(s). The children count aloud along with the text/images.

Main event

D Digital activity: Slow-Reveal Graph (2) *MAM* **Routine: Notice & Wonder, with Think-Pair-Share**

Display the first slide and click to play or ask:

● What do you notice?

● What do you wonder?

Use Think-Pair-Share to collect feedback. When all feedback has been collected, click to reveal the next part of the image and repeat as above, until the complete pictogram has been revealed at the final slide.

When the half-ice-creams are revealed, do the children recognise that each whole icon must represent a value worth more than one – and that it must also be even, since it can be halved? Can they suggest possible values that suit those criteria?

Assessment Opportunity

D Digital activity: Favourite Ice-Cream Flavours *MAM* **Routine: Reason & Respond**

Display the complete pictogram. Click to play or ask:

● What is this type of graph called?

● How is this pictogram the same as the pizza toppings pictogram in Lesson 2?

● How is this pictogram different?

● What are the 'rules' for drawing pictograms? (Use symbols of the same size and equal spacing. Use labels, a title and a key.)

● How do you think this data might have been collected?

● What does this data tell us?

● Who might be interested in this information? How could it be used?

● Based on this information, if someone was asked their favourite ice-cream flavour, what do you think would be the most likely response?

● What do you think would be the least likely response?

● Do you think the data collected would be similar if this class was asked? How could we find out?

You can also ask the following question:

● Is your favourite ice-cream flavour here?

Let's deepen

Ask the children to tell you sentences about the information in this pictogram, using phrases/words such as 'more ... than ...', 'fewer/less ... than ...', 'most/least popular' and 'total'. Can they make up their own question about the information in this pictogram?

P Pupil's Book page 28: Multiple Values
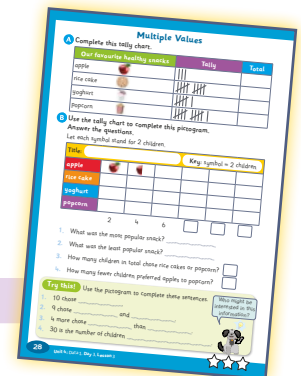
Let's strengthen

Anticipate misconceptions, e.g. some children may assume that graphs always use 1:1 correspondence. Ask them to identify clues that the symbols used may represent more than one item (e.g. a key, half symbols, scale markings). Ask them also to suggest other times when one item represents a multiple value (e.g. money: 2c, 5c, 10c, €2 coins; €5, €10 notes).

Some children may also benefit from additional practice with counting in groups of 2s, 5s and 10s. See the Unit 4 Let's Strengthen Suggestions for Teachers.

Let's deepen

Challenge some children to identify or suggest where pictograms could be used in real-life situations.

Day 4, Lesson 4

Data Investigation

Focus of learning (with Elements)

- Applies an investigative cycle of problem-posing, planning, data gathering, representation, analysis and conclusion (A&PS)
- Checks and evaluates the accuracy and reasonableness of own methods of data collection and representations (R)
- Refines own methods (R)

Learning experiences

- **D** Digital activity: Let's Investigate! (Drinks)
  MAM Routine: Reason and Respond, with Think-Pair-Share
- **D** **P** Digital activity: Data Investigation Cycle *MAM* Routine: Reason and Respond, with Build it; Sketch it; Write it
- **P** Pupil's Book page 29: Data Investigation

Equipment

- Scissors
- Glue

Maths language

- To be used by the teacher: pose the question, plan, data, analysis, conclusion

Warm-up

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

Main event

D **Digital activity: Let's Investigate! (Drinks)**
MAM **Routine: Reason and Respond, with Think-Pair-Share**

Teaching tip

The purpose of this lesson is for the children to apply the Data Investigation Cycle (PPDAC) in surveying the class to identify their favourite drinks, as a means to answer the Fermi question posed in the slideshow: *What drink should the principal buy?* Alternatively, you could pose a different question and/or the children could pose a question of interest to them.

Open the slideshow and choose the most appropriate slide to display to the class. Read through the slide

and use Think-Pair-Share to collect feedback. As estimating and refining estimates are the main aims of a Fermi question, ask the children to estimate initially (perhaps using their MWBs to record) and at all stages of the subsequent data investigation, and to refine their estimates accordingly as the data is collected.

D **P** **Digital activity: Data Investigation Cycle**
MAM **Routine: Reason and Respond with Build it; Sketch it; Write it**

Open the slideshow and ask the accompanying questions to structure the steps of the Data Investigation Cycle (i.e. Problem, Plan, Data, Analysis, Conclusion).

Teaching tip

When collecting data using a tally chart, remember that its purpose is to track and collect data from one source at a time. For example, as one child at a time tells the class their favourite drink, the children should record it on p.29 of the Pupil's Book. Alternatively, display p.29 of the Pupil's e-Book on the IWB, and ask the children to come up in turn to mark their response on the tally chart.

Let's deepen

Challenge some children to move around the classroom to collect responses from individuals. Ask them to suggest how they can ensure that they do this systematically (collect a response from everyone, once only).

Using Build it; Sketch it; Write it, challenge the children to come up with alternative ways to represent the data. Ask them to critically evaluate the suitability of the different models.

Assessment Opportunity

As part of the conclusion, return to the original question: *What drink should the principal buy?* What advice would the children now give the principal?

Let's deepen

Challenge some children to suggest how many bottles of each drink should be bought for all of the 2nd Classes/Junior Classes/the school (depending on the range of student numbers in your school).

Teaching tip

Strictly speaking, an investigation like this would require two cycles: first cycle to eliminate the least popular dink; second cycle to allow those who chose the least popular drink to choose a second time from the final choices. However, this is not necessary at this class level. Rather, the purpose is for the children to collect data, analyse it and draw conclusions about the approximate number of drinks that should be bought as interpreted from the data.

P **Pupil's Book page 29: Data Investigation**

Teaching tip

Depending on the choices the children make, it might take more than one lesson to complete the investigation. Part or most of Day 5 could be used for this.

Optional consolidation and extension possibilities

Data Investigation Use PCM 14: Data Investigation to support the children in investigating a question of their own choosing.

Maths Journals In their maths journals, the children could use images/words to record how they conducted the investigation, as well as their findings. They could design their own questions based on the investigation and then swap with another group/child.

Let's Deepen Create maths questions for the Headline Story (see Unit 4 Let's Deepen PCM: Data 1).

Data Display The children could contribute samples of their own work from this lesson and label them.

Review and Reflect Use the Prompt Questions Poster.

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

Choose from this menu of activity ideas, or choose your own way to best structure this last lesson to suit your needs and the needs of your class.

Let's talk!	Let's investigate!
Use Think-Pair-Share to review the unit. Individual children could present examples of their own drawings/work/constructions to the class, and talk about what they have learned.	Ask the children to conduct another survey, either as a class, in groups/pairs or individually. **Let's strengthen** Some children may benefit from extra supports to plan and record, such as PCM 14: Data Investigation. **Let's deepen** Challenge some children to conduct their survey individually or in pairs, and to display their data without the support of the Unit 4 Let's Deepen PCM. Ask them to consider the 'rules' for drawing pictograms as they complete the task. Could they use a digital device or online tools to help?

Maths language	Maths strategies and models
Ask the children to explain the following terms, perhaps using examples or drawings on their MWBs: *data*, *graph*, *tally marks*, *pictogram*, *symbol*, *most likely*, *least*, *most popular*, *least popular*, *total*, *key*, *title*. Ask: ● What are the 'rules' for drawing pictograms? (Use symbols of the same size and equal spacing. Use labels, a title and a key.) 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. group counting, comparing to identify how many more/fewer, tally charts, the Data Investigation Cycle and its importance). Ask the children to give examples of the models they used in this unit. For the various tasks and investigations, how did they record and present their findings? What did they build, sketch or write?

Progress Assessment Booklet	Maths eyes
Complete Questions 14–18 on page 12. Alternatively, these can be left to do as part of a bigger review during the next review week.	Ask the children to collect representations of various examples of data charts in print media (newspapers, magazines, etc.) and/or online sources. These may include examples the children have not encountered formally yet (e.g. pie charts). Ask the children to suggest how they are similar to/different from those looked at during this unit. Create a display of these in the classroom.
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 4 Let's Strengthen Suggestions for Teachers.	Select one of the cognitively challenging tasks on the Unit 4 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