Maths and Me: 2nd Class – Short-Term Plan, Unit 16: Data 2 (May: Week 3)

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 ; demonstrate proficiency in using and applying different counting strategies; select, make use of and represent a range of addition and subtraction strategies interpret the meaning of symbols or pictures in number sentences..

Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	**Blocks:** Represents and displays data, using blocks, and interprets results and draws conclusions (C); Compares two data samples involving themselves (A&PS)		D Quick Images L1 D Write-Hide-Show L1 D C Reason & Respond L2–4 C Recording Points L1 D Notice & Wonder L2–4 D Think-Pair-Share L2–4 D Choral Counting L3–4 **Print resources** Pupil's Book pages 101–103 Home/School Links Book page 36	**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 27
2	**Block Graphs:** Represents and displays data, using block graphs, and interprets results and draws conclusions (C); Critically analyses the nature and objectivity of simple data sets (R)			
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)			
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)			
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* Language Overview', individual lesson plans and Unit 16 Maths Language Cards.
Equipment	See '2nd Class *Maths and Me* Equipment Overview' and individual lesson plans.
Inclusive Practices	• See Let's Strengthen and Let's Deepen suggestions throughout lesson plans. • See Unit 16 Let's Strengthen Suggestions for Teachers. (These address the Common misconceptions and difficulties listed below.) • See Unit 16 Let's Strengthen PCM. • See Unit 16 Let's Deepen PCM.
Integration	See individual lesson plans.

Background and rationale

- This unit is a single-week block of content and the second of two Data units in 2nd Class. Unit 4: Data 1 focused primarily on tally charts and pictograms, and this unit will mainly be concerned with block graphs. While the children will have explored both pictograms and block graphs in 1st Class, this is the first time they will encounter data symbols that represent multiple information or values.
- While there are mixed opinions as to whether block graphs should only be used to represent 1:1 relationship, in Lesson 3 of this unit block graphs are used to represent multiple values. They are used both to connect with the children's understanding of representing multiple values on pictograms (Unit 4), and to prepare them for representing multiple values on bar graphs in 3rd Class.
- 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 of the PPDAC cycle (see Data Investigations Using the PPDAC Cycle on page 313) is a very important part of the learning in this unit. It is recommended that the children conduct further data investigations as part of maths and/or other curricular areas (see Integration on page 269).
- This unit continues with the overarching theme of Holidays, which was used in Unit 15: Money.

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

Common misconceptions and difficulties

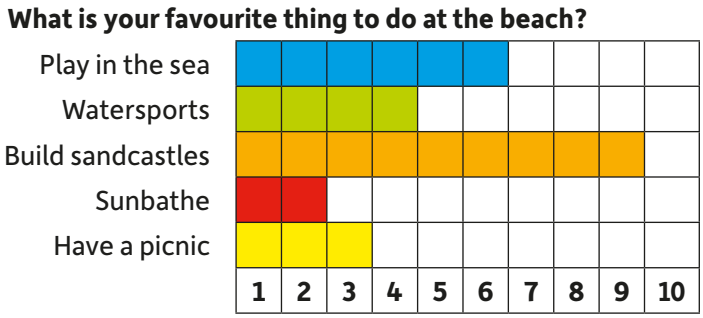
- The children may miscount symbols or tallies (e.g. counting a tally of 5 as 4 because of not counting the oblique mark), or count 2 as 11, 3 as 111, etc. They may benefit from opportunities to further explore tally marks.
- The children may need extra practice at group counting and/or require visual supports such as number lines in 2s, 10s or 5s.
- The children 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 graph title, labels and a key).
- They may incorrectly assume that one symbol always represents one item. (Encourage them 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 may benefit from mini-flashcards or sticky notes displaying these terms, which can then be placed in their Pupil's Book.)

The Unit 16 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

Mathematical models and representations

- Block graphs
- Tally charts



Block graph

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Tally chart

Teaching tip

A Block Graph manipulative printable is available to support this unit. Click on the resources icon on the *Maths and Me* book cover on **edcolearning.ie**

Day 1, Lesson 1

Blocks

Focus of learning (with Elements)

- Represents and displays data, using blocks, and interprets results and draws conclusions (C)
- Compares two data samples involving themselves (A&PS)

Learning experiences

- (D) Digital activity: Tally Marks *MAM* Routines: Quick Images, with Write-Hide-Show
- (C) Game: Recording Points

Equipment

- Any available block-like resources, such as interlocking cubes, wooden blocks and building blocks (e.g. Lego)
- Any required equipment for chosen games

Maths language

- more than, less than, fewer than, total, altogether

Teaching tip

Throughout the unit, remind the children to reflect on the data, to analyse it and explain how it might be used (e.g. to predict trends, or predict the most likely responses from a similar group of respondents).

Warm-up

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

Display the slideshow. Click to briefly reveal and then hide each image. Ask the children to write the number/amount shown on their MWBs and to reveal their proposed answer when called upon. Record all the proposed answers on the board (ensuring you do not give any undue weight to the correct answer) and 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)?

If any unreasonable answers are suggested, ask:

- Are there any answers that are unreasonable/unlikely because they do not make sense?
- Which ones?
- Why do you think this?

Main event

(C) Game: Recording Points

In groups of 4–6, the children play 'Money Estimate' or 'Big Spender' from the Games Bank. Provide each group with blocks (to keep track of the points scored), as well as the required equipment for the chosen game. Explain that each player in each group chooses a different colour, and that as they score points, they will take a block of their chosen colour. (If playing 'Money Estimate', instead of the usual scoring system, the player whose estimate is closest to the actual total takes three blocks; the next closest takes two blocks; and next closest takes one block.)

Assessment Opportunity

After an appropriate amount of time, call, 'Time's up!' Say:

- In a number of minutes, I am going to ask each group to tell us the results of their game – who won, etc. In the meantime, I want you to arrange the blocks in a way that clearly shows the score of each player.

When the children are ready, ask each group in turn to report their results back to the class:

- What can you tell me about your results?
- Can you tell me something about your results, using 'more than ...' and 'less/fewer than ...'?
- Can you tell me something about your results, using 'total' or 'altogether'?
- How did you arrange your blocks to show the results? Why did you do it this way?
- How else might you display the results?

After all groups have provided feedback, ask:

- Did any group arrange their blocks in a way that was better than your way? How?
- If you were to do this again, what might you do differently?
- Does this remind you of anything?
- In your copy, choose a way to display the results.

Allow the children time to work together to plan and display the results in a copy. You could ask early finishers to write questions based on the data.

Do the children make connections between this activity and the activities they completed in Unit 4: Data 1? Do they remember the rules of displaying data (e.g. use symbols of same size and equal spacing; use labels, a title and a key)?

Optional consolidation and extension possibilities

Integration Language: English: theme of holidays, summer. Language: Gaeilge: An téama laethanta saoire/an tsamhraidh. Geography: human environments; travelling and holidaying in Ireland, Europe and other areas.

Understanding of data can also be reinforced in other subjects, where the children can be asked to apply the Data Investigation Cycle (PPDAC) (i.e. Pose the question, Plan, Data, Analysis, Conclusion) to answer a question from an enquiry in any curricular area, but especially in Geography and STEM.

Games Bank Play other point-scoring games from the Games Bank, e.g. 'Who Has More?', 'Win Big', 'Less is Best', 'Roll and Place'. Use blocks to keep track of the points. Ask the children to record the results in their copy.

Data Display Set up a classroom display for Data. This could include examples of various graph and chart types sourced in print media and online, as well as appropriate labels (see Unit 16 Maths Language Cards). The children contribute samples of their own work from this lesson and label them.

Question of the Day Set up a poster or board where a Yes/No question is displayed. The children indicate their response by moving something to the Yes or No side. (They could write their name on a piece of card or 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 and/or the question could be developed in complexity, so that instead of Yes/No questions, you could pose a question with three or four options (see next lesson).

Review and Reflect Use the Prompt Questions Poster.

Day 2, Lesson 2

Block Graphs

Focus of learning (with Elements)

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

Learning experiences

- C Block survey: Favourite Colour ***MAM* Routine: Reason & Respond**
- D Digital activity: Slow-Reveal – Block Graph ***MAM* Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond**
- P Pupil's Book page 101: Block Graphs

Equipment

- Any available block-like resources, such as interlocking cubes, wooden blocks, building blocks (e.g. Lego)

Maths language

- popular, block graph, data, information, more ... than ..., fewer ... than ..., twice, half

Warm-up

C **Block survey: Favourite Colour**
***MAM* Routine: Reason & Respond**

Provide each group with a selection of coloured blocks or interlocking cubes. Ask/say:

- What is your favourite colour? Select a block of that colour to show your response.

When all the children have selected a coloured block, ask the following questions. (Note that not all of these questions may be required, depending on the responses.)

- Hold up your block. What does this tell us?
- Can you suggest a way to organise the blocks so that the information is clearer and easier to understand/see?
- Tell me a sentence about the responses, using 'popular'.
- 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? What might be the least likely response?
- Can we predict for definite that these are the responses we would get? Explain why.
- Who might be interested in this information?

Use Think-Pair-Share to collect feedback. When the feedback has been collected, click to reveal the next part of the image and repeat as above.

Ask probing questions as appropriate, for example:

- After the missing text of sandcastles and sunbathing is revealed, can the children estimate the values for these and justify why they think this?
- After all the blocks have been revealed, do the children think that they know all the values, or do they remember that it cannot be assumed that one symbol equals one response and that further information is required (e.g. a key or numbers given as scale markings)?

Continue until the complete block graph has been revealed.

Teaching tip

Children often tend to use/suggest a vertical arrangement when arranging blocks. If this is the case, prompt them to consider what other arrangement would also work (i.e. horizontal).

Main event

D **Digital activity: Slow-Reveal – Block Graph**
***MAM* Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond**

Display the first slide and ask:

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

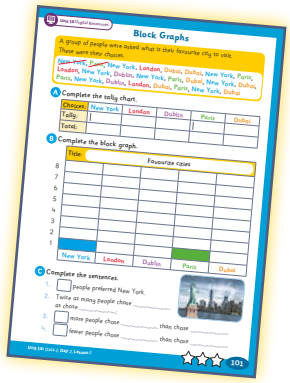
Assessment Opportunity

When the complete block graph has been revealed, ask/say:

- Do you know what this is called?
- Why do you think it is called a block graph?
- What do you notice about the size and spacing of the blocks? (They are the same throughout.)
- This unit is all about data. Do you remember what *data* means?
- Data is a collection of information. What does this data tell us?
- Tell me a sentence about the information in this block graph, using 'more ... than ...'.
- Tell me a sentence about the information in this block graph, using 'fewer ... than ...'.
- Tell me a sentence about the information in this block graph, using 'twice'.
- Tell me a sentence about the information in this block graph, using 'half'.
- How do you think this data might have been collected?
- Who might have been surveyed?

- In this survey, the question was posed to children. Do you think the answers would be the same or different if the question was posed to adults?
- Based on this information, if this question was asked of a child in another class, what do you think would be the most likely response?
- What do you think would be the least likely response?

P Pupil's Book page 101: Block Graphs



Optional consolidation and extension possibilities

Question of the Day Set up a poster or board where a question can be displayed with 3–5 options (e.g. Which read-aloud book should we move on to next?). Each child places a block or cube to indicate their 'vote'.

Survey Pose the following question to the class: *What is your favourite thing to do at the beach?* Collect the class data and compare this with the data in the interactive slideshow. Ask the children to identify what is the same, different and/or interesting.

Story Read *The Best Vacation Ever* by Stuart J. Murphy, or listen to a reading at: edco.ie/afry

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 activity: Skip Counting in 10s (A–C) and 20s
  ***MAM* Routine: Choral Counting**
- D Digital activity: Slow-Reveal – Multiple Values Strategy
  ***MAM* Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond**
- P Pupil's Book page 102: Multiple Values

Equipment

- There is no equipment needed for this lesson.

Maths language

- scale

Teacher note: While there are mixed opinions as to whether block graphs should only be used to represent 1:1 relationship, in this lesson block graphs are used to represent multiple values. They are used both to connect with the children's understanding of representing multiple values on pictograms (see Unit 4: Data 1), and to prepare them for representing multiple values on bar graphs in 3rd Class.

Warm-up

D **Digital activity: Skip Counting in 10s (A–C) and 20s *MAM* Routine: Choral Counting**

Choose one of the resources to display on the board. Play the slideshow. The children count aloud as the images are revealed. Afterwards, ask the children to count in jumps of the chosen multiple without any visual supports.

Repeat using the other resource, if you wish.

Main event

D **Digital activity: Slow-Reveal – Multiple Values Strategy *MAM* Routines: Notice & Wonder, with Think-Pair-Share**

Display the first slide and ask:

Assessment Opportunity

- 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,

Ask probing questions as appropriate, for example:

- Can the children estimate names for the missing counties and justify their estimates based on their experience and/or knowledge?
- Before the values are revealed, can the children estimate what they think the values will be while also knowing that it cannot be assumed that one block equals one response and that further information is required (e.g. a key or numbers given as scale markings)?

Continue until the complete block graph has been revealed.

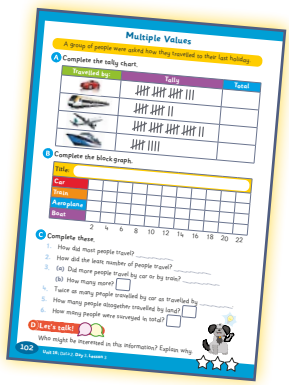
When the complete block graph has been revealed, ask/say:

- What is this type of graph called?
- How is this block graph the same as yesterday's block graph?
- How is this block graph different?
- The numbers along the graph are referred to as what? (the scale)
- What does this scale tell us?
- What are the 'rules' for drawing block graphs? (Use blocks 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?
- Tell me a sentence about the data, using 'most/least popular'.
- Tell me a sentence about the data, using 'total'.
- Tell me a sentence about the data, using 'more ... than ...'.
- Tell me a sentence about the data, using 'less ... than ...'.
- Make up a question about this data.
- How might this data be of use to someone?
- Based on this information, if this question was asked of a child in another class, what do you think would be the most likely response?
- What do you think would be the least likely response?
- Lexi thinks that this might not be a fair survey. Explain why.

Teaching tip

Critical thinking: Ask the children to consider how they think the data was collected (e.g. Who collected it? Why? What questions did they ask?). Perhaps the respondents were only given five counties to choose from. Would that be fair?

P **Pupil's Book page 102: Multiple Values**



Let's strengthen

Anticipate misconceptions: The children might 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). The children might also benefit from additional practice with group counting. Consult the Unit 16 Let's Strengthen Suggestions for Teachers.

Let's deepen

Challenge the children to identify or suggest where block graphs could be used in real-life situations.

Optional consolidation and extension possibilities

My Maths Fact File Page 128 can be competed at any stage after this lesson.

Home/School Links Book Page 36 can be completed at any stage after this lesson.

Question of the Day Update the poster/board with today's Question of the Day.

Story Read *The Great Graph Contest* by Loreen Leedy, or listen to a reading at: edco.ie/epdt

Games Bank Play any of the games that require keeping a tally of points/scores. Ask the children to display the results of the game concretely or pictorially.

Review and Reflect Use the Prompt Questions Poster.

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: Skip Counting in 10s (A–C) and 20s
  ***MAM* Routines: Choral Counting**
- D Digital activity: Most Popular Holiday Type
  ***MAM* Routines: Notice & Wonder, with Think-Pair-Share**
- D Digital activity: Data Investigation Cycle
  ***MAM* Routine: Reason & Respond**
- P Pupil's Book page 103: Data Investigation

Equipment

- School's own digital devices (optional)

Maths language

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

Warm-up

D Digital activity: Skip Counting in 10s (A–C) and 20s *MAM* Routine: Choral Counting

Choose one of the available Skip Counting resources for this unit, as appropriate to the needs of the children, to display on the board. Play the slideshow.

The children count aloud as the images are revealed. Afterwards, ask the children to count in jumps of the chosen multiple without any visual supports.

Repeat using the other resource, if you wish.

Main event

D Digital activity: Most Popular Holiday Type
***MAM* Routines: Notice & Wonder, with Think-Pair-Share**

Teaching tip

You could read *The Best Vacation Ever* by Stuart J. Murphy in advance of this activity. A reading is also available at: edco.ie/afry

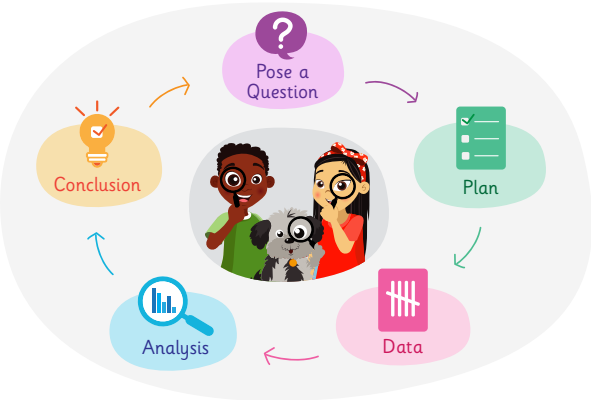
Use the slide that most suits the needs of your class. The first slide simply asks:

- What is your favourite type of holiday?

The second slide asks the same question, and also provides suggestions for types of holidays with supporting images. Use Think-Pair-Share to collect feedback.

D **Digital activity: Data Investigation Cycle**
***MAM* Routine: Reason & Respond**

Teaching tip



The purpose of this lesson is for the children to apply the Data Investigation Cycle (PPDAC) (see Data Investigations Using the PPDAC Cycle on page 313 for more information) in surveying the class to identify their favourite types of holiday.

Display the slideshow and use the questions on each slide questions to structure the steps of the Data Investigation Cycle (PPDAC) (i.e. Pose a question, Plan, Data, Analysis, Conclusion).

Assessment Opportunity

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 type of holiday, the children record it on page 103 of the Pupil's Book. Alternatively, display page 103 of the e-book version of the Pupil's 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 the children to move around the classroom to collect responses from individuals. Ask them to suggest how they can ensure they do this systematically (i.e. 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.

Teaching tip

Depending on the choices that the children make in this lesson, the investigation may require more than one lesson to complete. You could use part or most of Day 5 for this.

P **Pupil's Book page 103: Data Investigation**

Optional consolidation and extension possibilities

Data Investigation Conduct another Data Investigation. The children choose a question to investigate from PCM 49: Data Investigation Sample Questions, or they can investigate a question of their own choosing. The Unit 16 Let's Strengthen PCM can be used to support any investigation.

Maths Journals Using images and/or words, the children 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.

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

Story Read *Sorting Fur, Feather, Tails, and Scales* by Marcie Aboff. This book uses animals on the African savannah to explore how sorting can help us to organise and understand information. It features sets, Venn diagrams and bar graphs. Choose to leave out certain sections as appropriate to the ability level of the class.

Review and Reflect Use the Prompt Questions Poster.

Day 5, Lesson 5

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!

Use Think-Pair-Share alongside the prompt questions to review the unit.

The children could record what they know in their Maths Journals (e.g. using a concept map).

Individual children could present examples of their own drawings/work to the class, and talk about what they have learned.

Let's investigate!

Ask the children to conduct another survey, either as a class, in groups/pairs or individually.

Let's strengthen

The children may benefit from extra supports to plan and record: see the Unit 16 Let's Strengthen PCM.

Let's deepen

Challenge the children to conduct their survey individually or in pairs, and to display their data without the support of the Unit 16 Let's Strengthen PCM. Ask them to consider the 'rules' for drawing block graphs as they complete the task. Could they use a digital device or online tools to help?

Maths language

Use the Unit 16 Maths Language Cards to revise the key terms.

For example: if the image and text are cut apart, can the children match them?

Ask: What are the 'rules' for drawing block graphs? (Use blocks of the same size and spacing. Use labels, a title and a scale.)

Maths strategies and models

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, write?

Progress Assessment Booklet	Maths eyes
Complete Questions 61–62 on page 27. 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 (e.g. newspapers, magazines) and/or online sources. These may include examples that the children have not encountered formally yet (e.g. pie charts). Ask the children to suggest how they are similar/ different to 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. Use the Unit 16 Let's Strengthen PCM. Consult the Unit 16 Let's Strengthen Suggestions for Teachers.	Use the Unit 16 Let's Deepen PCM. Display the task on the board. Encourage the children to work together in groups.