Maths and Me: 1st Class – Short-Term Plan, Unit 13: Measuring 2 (March: Weeks 3&4)

Strand(s)> Strand Unit(s)	Measures > Measuring.
Learning Outcome(s)	Through appropriately playful and engaging learning experiences children should be able to compare, approximate and measure length, weight, capacity and area using appropriate instruments and record using appropriate units of measurement.

Lesson	Focus of Learning (with Elements)	CM	Learning Experiences	Assessment
1	**Comparing and Ordering Weight:** Describes and discriminates between objects using appropriate comparative language (C); Compares and orders objects according to weight by making direct comparisons (U&C)		D Notice & Wonder L1, 4 D C P Think-Pair-Share L1–7 D C P Reason & Respond L1–7 D P Concept Cartoon L2, 7 D Three-Act Task L2, 5 D C P Write-Hide-Show L3, 6 D Would This Work? L4, 5 C Which has the Greater Capacity? L4, 5 **Print resources** Pupil's Book pages 83–88 Home/School Links Book pages 30–31 PCMs 48–49	**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 23–24
2	**Measuring Weight:** Identifies the appropriate measurement instruments and non-standard units for a given situation (U&C); Collects and records measurement data in systematic ways (e.g. using lists, tables) and compares results (C)			
3	**Kilograms:** Identifies commonalities and differences between measurable attributes and the need for standard units to measure weight (U&C); Recognises that units of measurement can simplify communication about measurement (C)			
4	**Comparing and Ordering Capacity:** Describes and discriminates between objects using appropriate comparative language (C); Compares and orders objects according to capacity by making direct comparisons (U&C)			
5	**Measuring Capacity:** Identifies the appropriate measurement instruments and non-standard units for a given situation (U&C); Collects and records measurement data in systematic ways (e.g. using lists, tables) and compares results (C)			
6	**Litres:** Identifies commonalities and differences between measurable attributes and the need for standard units to measure capacity (U&C); Recognises that units of measurement can simplify communication about measurement (C)			
7	**Measuring Investigation:** Identifies the appropriate attribute to measure for a given problem situation (A&PS); Selects and uses appropriate procedures, measures and equipment to measure attributes of length, weight, and capacity (A&PS)			
8	**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 13 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 13 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.) • See Unit 13 Let's Strengthen PCM. • See Unit 13 Let's Deepen PCM.
Integration	See individual lesson plans.

Background and rationale

- This unit continues on from Unit 10 (which explored the attributes of length, including width and height) to focus on the attributes of weight and capacity. As such, it reflects many of the same learning experiences in the progression continua addressed in Measuring 1, as well as extending these in a very integrated way. By Measuring 3, all of the learning experiences in the progression continua pertaining to measuring will have been addressed, at least once.
- Strictly speaking, the term *mass* is more correct than the term *weight* (since mass is measured in kilograms and grams). However, in *Maths and Me*, we use the term *weight*, as that is the term used in the new PMC 2023, as well as being the term most frequently used by the general population.
- As with all measuring activities, it is not enough for the children to look at and talk about measures; they need to engage in lots of practical experiences, where they get to manipulate these measures so as to be able to relate them to themselves.
- As is the practice with all estimation activities, the children estimate one object at a time, and then measure that object, before estimating and measuring the next object (i.e. they do not do all the estimation and then do all the measuring). In this way the children can refine their estimate each time, based on what they learned from the previous object.
- While there is flexibility in the PMC as to when standard units can be introduced in a maths programme, the progression in *Maths and Me* reflects a traditional approach, i.e.
  - 1st Class: kilograms and litres
  - 2nd Class: halves and quarters of kilograms and litres (including fractional notation, i.e. $\frac{1}{2}$, $\frac{1}{4}$)

The theme of this unit is **The Supermarket**. This introduces a meaningful context within which the children can situate their evolving concepts of measuring.

Useful Teacher Questions for Mathematical Investigations

1. Posing an investigative question

- What do you think?
- Record a reasonable estimate (or prediction) on your MWB.
- Record an estimate that is too high.
- Record an estimate that is too low.

2. Planning the investigation

- How could we find out?
- What should we do?
- What equipment is needed?
- How do we make sure our investigation is fair? What needs to be kept the same each time? What will be different?
- How do we make sure our results are reliable and/or accurate? What will we measure? How will we do this?

3. Reflecting on the findings

- What did you find out?
- How did you find this out?
- Was your method accurate? Explain why.
- Was your method efficient (simple and not too long)?
- How did you record/present what you did?
- What was difficult? What was easy?
- Did the results surprise you? Explain why.
- What might you do differently?

Common misconceptions and difficulties

- The children may not have a sense of how heavy a kilogram is, or how much liquid is in a litre. Therefore, they are unable to use these as benchmarks for estimation. The children need lots of practical experience in manipulating these measures so that they can relate to them.
- The children may struggle with some of the key mathematical language.
- They may not appreciate that, when measuring using multiple non-standard units, the objects being used must be uniform.
- They may not realise that it is most efficient to use smaller units and smaller scales for measuring small items, and bigger units and bigger scales for measuring larger items.
- They may not recognise that, when measuring the same item, as the size of the units being used increases, the count of the units decreases.
- They may incorrectly accept size/and or shape as a reliable indicator of weight or capacity. For example:
  - They may incorrectly assume that bigger objects are always heavy and smaller objects are always light.
  - They may incorrectly assume that objects of the same size should weigh the same.
  - They may struggle to see that containers of different shapes can have the same capacity.
- They may not appreciate the importance of context, e.g. a sofa is heavy when compared to a cushion, but light when compared to an elephant.
- They may misread a balance, i.e. think that the side that is higher holds the heavier item(s).
- They may miscount when counting/measuring the weight/capacity of something using non-standard units.
- They may confuse the amount a container can hold (i.e. its capacity) with the amount currently in the container/how full it is (i.e. its volume).

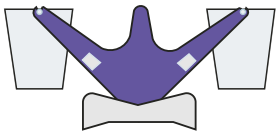
- They may not understand that if A is greater than B and B is greater than C, then A must be greater than C.
- They may struggle to apply proportional reasoning. For example: If 1 jar = 2 cups, and 3 jars = 1 bowl, then 1 bowl = ? cups.
- They may confuse or misinterpret inequality symbols (i.e. <, >) and/or struggle to understand inequality statements using more than two terms (e.g. A > B > C).

The Unit 13 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

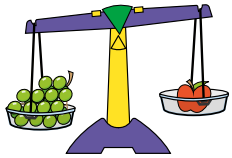
Mathematical models and representations

- Balances (not scales), such as a bucket balance, pan balance, clothes hanger balance (i.e. two bags of uniform size on either side of a wooden clothes hanger)
- Representations of classroom-based resources which could be used as weighing units, such as cubes or blocks
- Representations of various types of containers, of different sizes and capacities, including cups, glasses, bottles, jugs and buckets

Clothes hanger balance



Bucket balance



Pan balance

Teaching tip

A Balance 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

Comparing and Ordering Weight

Focus of learning (with Elements)

- Describes and discriminates between objects using appropriate comparative language (C)
- Compares and orders objects according to weight by making direct comparisons (U&C)

Learning experiences

- (D) Digital activity: The Supermarket ***MAM* Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond**
- (C) Concrete activity: Let's Investigate School Bags ***MAM* Routine: Think-Pair-Share**
- (P) Pupil's Book page 83: Comparing and Ordering Weight

Equipment

- School bags
- Clothes hanger balance (i.e. clothes hanger and two identical bags with handles) per group

Maths language

- weight, weigh, heavy, light, heavier than, lighter than, heaviest, lightest, as heavy as, weighs the same as, balance scales, balanced, compare, estimate, greater than (>), less than (<), is the same as (=)

Warm-up

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

Display the poster again. Click to play or ask children to answer the questions below and to give reasons for their responses. (Some of these questions may have already been answered in the warm-up.)

- What maths words can you use to describe the items in the picture?
- Use these phrases to talk about the picture: *heavy*, *light*.
- Use these phrases to talk about the picture: *is heavier than*, *is lighter than*.
- What do you think is the heaviest item?
- What do you think is the lightest item?
- What do you think should go in the bag first? Explain why.
- What do you think should go in the bag last? Explain why.
- Do you think that the bags are the same weight? Explain why.
- Can you tell if something is heavy or light from a picture?
- Would the balloon be heavier than the apple? Explain why.

(C) **Concrete activity: Let's Investigate School Bags**
***MAM* Routine: Think-Pair-Share**

Assessment Opportunity

Reflecting on the poster and the customers who were carrying the bags, ask:

- Did it look like one bag was heavier than the other? How?
- Have you ever had to carry a heavy bag? When?
- Do you think your school bag is heavy?
- Do you think everybody's bag is the same weight? Explain why.

Ask each group of children to put their own school bags up on the desk. Without allowing the children to hold up the bags, ask:

- Which bag do you think is the heaviest? Explain why.
- Which bag do you think is the lightest? Explain why.
- Record your estimate on your MWBs. (How will you do that?)
- How can you find out?
- How might you order the bags from lightest to heaviest?
- Could we find out an answer without using any special equipment? How? (If necessary, demonstrate how to hand weigh with outstretched arms.)

Allow the children time to work together to hand weigh the bags and to order them. Give each group an opportunity to report back. Prompt the children to explain the weight relationship between two bags, i.e. *'This bag is heavier/lighter than that bag.'*

- What did you find out?
- How did you do it?
- Why is it better to use outstretched hands?
- How else could you check your answer?

If necessary, demonstrate how to use a wooden clothes hanger as a balance scale (school bags are typically too big for classroom scales). Provide each group with their own hanger and allow them time to recheck the weight of the bags.

- How will you know which bag is heavier?
- How will you know which bag is lighter?
- If the balance is level, what does that tell us?

Let's strengthen

The children may need to be shown how to order more than two objects: they compare two first, and then compare one of those with another object, and so on.

Let's strengthen

Children may not understand that if A is greater than B and B is greater than C, then A must be greater than C. (See the Unit 13 Let's Strengthen Suggestions for Teachers.)

Teaching tip

The children could use images and/or words to record how they conducted the school bag investigation.

If time allows, let the children choose other items from the room to weigh by direct comparison, using the same procedure as outlined above:

Look: Estimate which item is heavier by judging its appearance.

Lift: Lift and hold each item, one by one. Replace and amend estimates, if necessary.

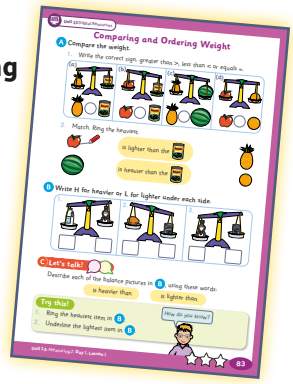
Hand weigh: Compare two items by holding them in outstretched hands. Replace and amend estimates, if necessary.

Balance: Check using a commercial balance or hanger balance (i.e. two identical bags with handles, which can be hung from the end of the clothes hangers are large enough to take most items).

Let's deepen

Challenge the children to not only compare two objects, but to compare and order a number of objects.

P **Pupil's Book page 83: Comparing and Ordering Weight**



Let's strengthen

The children may need to review the meaning of the inequality symbols < and >. (See the Unit 13 Let's Strengthen Suggestions for Teachers.)

Optional consolidation and extension possibilities

Story Read *Equal, Shmequal* by Virginia Kroll, or listen to a reading at: edco.ie/p5qk

Integration Language: English – the theme of the supermarket and shopping. Language: Gaeilge – an téama bia agus/nó an baile mór/ag siopadóireacht. Geography: Environmental awareness and care, measuring waste produced, water conservation, etc.

Measuring Display Set up or add to a Measuring Display. Include heavy and light objects and appropriate labels (e.g. the Maths Language Cards). The children contribute examples of their own work from this lesson and label them.

Guess What? Provide some children with four identical non-transparent containers (e.g. frozen yogurt tubs), which must be filled with items of various weights (e.g. cotton balls, sand, rice, leaves, feathers). Ask other children to identify what they think is in each and to order them. These could become part of the Measuring Display (see left).

Maths Journals The children draw or stick in images of heavy and light objects. They also use images and/or words to record how they conducted the school bag investigation and their findings.

Play Set up a station with various balances and materials where the children can choose to explore weight further over the course of the unit.

Review and Reflect Use the Prompt Questions Poster.

Days 2 and 3, Lesson 2

Measuring Weight

Focus of learning (with Elements)

- Identifies the appropriate measurement instruments and non-standard units for a given situation (U&C)
- Collects and records measurement data in systematic ways (e.g. using lists, tables) and compares results (C)

Learning experiences

- (D) Digital activity: Same Weight or Not? ***MAM* Routines: Concept Cartoon, with Think-Pair-Share; Reason & Respond**
- (D) Video: Chocolate ***MAM* Routine: Three-Act Task**
- (P) Pupil's Book page 84: Measuring Weight

Equipment

- Bucket/pan balances
- Clothes hanger balance
- Various objects to weigh and to use as non-standard units

Maths language

- measure, units

Teaching tip

The children should begin to realise that it is most efficient to use smaller units and smaller scales for measuring small items, and bigger units and bigger scales for measuring larger items. Allow them to practise weighing smaller and larger items to explore and identify the most appropriate measurement instruments and non-standard units for each. The activities will largely depend on available resources.

Smaller items: stationery (scissors, pen, pencil), small toys (animals, cars), small fruit and veg (strawberry, grape, satsuma, baby potato), natural items (chestnuts, acorns, pinecones). These can be measured with a bucket balance or a pan balance using non-standard units of uniform weight (e.g. interlocking cubes, marbles, dice, coins, spools, wooden beads and bears).

Larger items: medium-sized fruit and vegetables (apple, orange, banana, carrot), footballs, beachballs, lunchboxes, books and larger toys. These can be measured with a clothes hanger and two identical bags using non-standard units of uniform weight (wooden blocks, copies of the same textbook/reader, golf balls, tennis balls, sliotars, bean bags).

Teacher note: Ensure that the children estimate one object at a time, and then measure that object, before estimating and measuring the next object. Using this approach, the children can refine their estimate each time, based on what they learned from the previous object.

Warm-up

D Digital activity: Same Weight or Not?
***MAM* Routines: Concept Cartoon, with Think-Pair-Share**

Display the Concept Cartoon and, using Think-Pair-Share, ask:

- What do you think?
- (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?

If appropriate, record the children's responses to these 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. If you have a balance, a golf ball and a beach ball (or similar resources) in the classroom, you could carry out the activity. Ask:

- What did we find out?

Main event

D Digital activity: Same Weight or Not?
***MAM* Routine: Reason & Respond**

Display the Concept Cartoon again. Ask:

- How could I find out the weight of the golf ball only?
- How could I find out the weight of the beach ball only?
- Could I use the clothes hanger balance? How?
- What other balances could be used? How could each be used?
- To find out the weight of the golf ball in cubes, what must be done?
- How will I know what the weight of the golf ball is in cubes? (When the balance is level, both sides are balanced, meaning that they weigh the same.)
- Do the cubes have to be the same? Explain why.
- Other than cubes, what else could you use to measure weight?

D Video: Chocolate
***MAM* Routine: Three-Act Task**

Assessment Opportunity

Act 1: Notice & Wonder

Play the video, which shows a bucket balance, with a chocolate bar on one side and cubes on the other. Using Think-Pair-Share, ask the children:

- 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.

- (Reveal the focus question.) What is the weight of the larger chocolate bar in cubes?

Act 2: Productive Struggle

Using Think-Pair-Share and Write-Hide-Show, click to play or say:

- 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 asking:

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

Once the children explain that they need to know the weight of the chocolate bar, play the next part of the video and 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).

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 best strategy?

Play the final part of the video, in which cubes are counted and then placed into the bucket balance to show the weight of each chocolate bar in cubes. 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?

Teaching tip

If all balance types are available, it would be more appropriate to use the pan/bucket balances for Tasks 1 and 2 (smaller objects) and the clothes hanger balance for Task 3 (larger objects). After the children have done Tasks 1 and 2, pause and ask:

- What other units (instead of cubes) could have been used? Explain why.
- Would cubes work for larger objects? Explain why.
- What units might work better? Explain why.

Using the available resources in the class, the children choose what unit might be most appropriate for their chosen objects.

Let's strengthen

The children may need to be reminded that the units chosen must be uniform.

Let's deepen

Challenge the children to suggest how best to justify the heaviest and lightest objects using their chosen units of measurement only. What if they have chosen to use different units? How does this affect the reliability of their results?

P **Pupil's Book page 84: Measuring Weight**

Optional consolidation and extension possibilities

Games Bank Play the variation 'Weight Estimate!' from 'Estimate!'.

Let's Strengthen Task A on the Unit 13 Let's Strengthen PCM can be completed at any stage after this lesson.

Let's Deepen Task A on the Unit 13 let's Deepen PCM can be completed at any stage after this lesson.

Story Read *The Dragon's Scales* by Sarah Willson, or listen to a reading at: edco.ie/b87k

Review and Reflect Use the Prompt Questions Poster.

Day 4, Lesson 3

Kilograms

Focus of learning (with Elements)

- Identifies commonalities and differences between measurable attributes and the need for standard units to measure weight (U&C)
- Recognises that units of measurement can simplify communication about measurement (C)

Learning experiences

- (D) Digital activity: Same But Different (5)
  ***MAM* Routines: Reason & Respond, with Think-Pair-Share**
- (D) Video: The Kilogram
  ***MAM* Routines: Reason & Respond, with Write-Hide-Show**
- (C) Concrete activity: More Than, Less Than or the Same as a Kilogram? ***MAM* Routine: Reason & Respond**
- (C) Concrete activity: How Many in a Kilogram?
  ***MAM* Routines: Reason & Respond, with Write-Hide-Show**
- (P) Pupil's Book page 85: Kilograms

Equipment

- Bucket/pan balances
- Clothes hanger balance
- Items that are 1 kg in weight (e.g. sugar, flour, pasta)
- Multiple identical maths books and maths copies
- A selection of different books
- Unit 13 Maths Language Cards

Maths language

- kilograms (kg), about

Warm-up

(D) **Digital activity: Same But Different (5)**
***MAM* Routines: Reason & Respond, with Think-Pair-Share**

Play the slideshow and, using Think-Pair-Share, ask the children to propose reasons for why the images are the same and why they are different.

Main event

(D) **Video: The Kilogram *MAM* Routines: Reason & Respond, with Write-Hide-Show**

Before playing the video, ask the children to reflect on the previous lesson. Ask/say:

- What was used to measure the chocolate bars?
- What if cubes were used that were not all the same? Would this be a good idea? Explain why.
- If it was a bag of carrots or potatoes, would it be a good idea to use cubes? Explain why.
- The metre is the standard unit for length. What is the standard unit for weight?

Play the video and allow the children time to respond to the questions and to give reasons for their answers.

(C) **Concrete activity: More Than, Less Than or the Same as a Kilogram? *MAM* Routine: Reason & Respond**

Provide each group with something that weighs 1 kg. Ask them to find items around the room that they think weigh *greater than*, *less than* or *the same as* a kilogram. Initially, only allow the children to hand-weigh the items. When appropriate, use a bucket balance or pan balance to check. Ask the children to use Pupil's Book page 85 to record.

Teaching tip

Use the Unit 13 Maths Language Cards for 'greater than', 'less than' and 'the same as' to display the items found by the children, and to describe their relationship to one another.

(C) **Concrete activity: How Many in 1 Kilogram?**
***MAM* Routines: Reason & Respond, with Write-Hide-Show**

Assessment Opportunity

You will need multiple identical maths books. Holding up one of these, ask the children:

- Estimate: Is this heavier or lighter than 1 kilogram?
- How can you prove it?
- How many books are about the same weight as 1 kilogram? Estimate.

Use Write-Hide-Show to collect estimates and record the most frequently occurring answers or range of answers on the board. Then ask the children to work in small groups or pairs. Allow them to weigh, using the clothes hanger balance and 1 kilogram weight.

- What was the actual number?

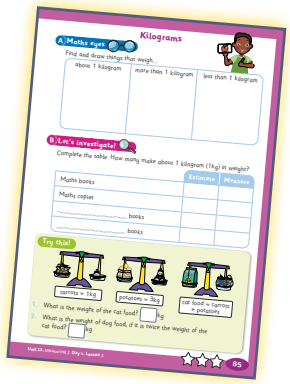
Repeat using maths copies and other books or available resources. Use page 85 of the Pupil's Book

to record. Each time, collect estimates before weighing.

After ask the children:

- What did you notice?
- Were the answers different each time? Explain why.
- If the books used were heavier, did it take more or less of them to weigh about a kilogram than when lighter books were used?

P Pupil's Book page 85: Kilograms



Let's deepen

Challenge the children to explain why the answers are less when heavier objects are used.

Let's strengthen

To grasp the proportional reasoning required in the *Try this!* activity, the children may need to use concrete resources to model the scenario. (See the Unit 13 Let's Strengthen Suggestions for Teachers for more about proportional reasoning.)

Optional consolidation and extension possibilities

Games Bank Play 'Weight Estimate'.

Home/School Links Book Page 30 can be completed at any stage after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 5, Lesson 4

Comparing and Ordering Capacity

Focus of learning (with Elements)

- Describes and discriminates between objects using appropriate comparative language (C)
- Compares and orders objects according to capacity by making direct comparisons (U&C)

Learning experiences

- D Digital activity: The Supermarket Café
  ***MAM* Routines: Notice & Wonder, with Think-Pair-Share; Reason & Respond**
- D Digital activity: Greater Capacity
  ***MAM* Routine: Would This Work?**
- C Concrete activity: Which has the Greater Capacity?
- P Pupil's Book page 86: Comparing and Ordering Capacity

Equipment

- Water tray/tough tray
- Various types of containers, of different sizes and capacities, including containers of different shapes but the same capacity (e.g. plastic cups, bottles, bowls, jugs, small measuring cups)
- Materials to pour into containers (e.g. water, sand, rice, cereal hoops)

Maths language

- more than, less than, most, least, full, empty, half full, quarter full

Teaching tip

'Dry' materials (such as sand, rice and cereal hoops) can support the development of this concept just as much as water. Dry materials are less messy and prevent the safety hazard of wet floors.

Warm-up

D Digital activity: The Supermarket Café
***MAM* Routines: Notice & Wonder, with Think-Pair-Share**

Display the poster. Zoom in on the image of the glasses of juice (A–D) from the supermarket café 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: The Supermarket Café
***MAM* Routine: Reason & Respond**

Display the poster again. Click to play or ask the children to answer the questions below and to give reasons for their responses (some of these questions may have already been answered in the warm-up).

Assessment Opportunity

- Use these phrases to talk about the picture: *full*, *empty*, *half full*, *quarter full*.
- How might you describe the glasses in the picture?
- Which glass has the most?
- Compare Glass A and Glass B. Which has more? Which has less?
- On your MWB, use a symbol to show the relationship between Glass A and Glass B.
- On your MWB, use a symbol to show the relationship between Glass C and Glass D.
- Mia says: 'I would like less than a half glass.' Which glass could she get?
- Write the glasses in order, starting with the least.
- True or false: A < D < C < B? Explain why.
- Mia's Dad says: 'Glass B is not really full.' Explain why.

D Digital activity: Greater Capacity
***MAM* Routine: Would This Work?**

Display the image of the two bottles. Ask:

- How could I find out which has the greater capacity – which holds the most when full?
- Is there more than one way to do this?
- Would this work? (Click on to reveal the images.)

Display the various models and approaches, allowing the children time to comment on each, and justify if the methods/opinions work.

C Concrete activity: Which has the Greater Capacity?

With the children working in pairs or small groups, provide a selection of various containers, bottles, etc. from which each pair/group selects two. Ask:

- Which of your containers has the greater capacity, do you think? Label them A and B and record your prediction.
- How might you find out?
- What might you need?
- How will you know which bottle has the greater capacity?

Explain that today we are going to investigate this in the way that Mia and Jay did in the activity 'Greater Capacity'. Replay that part of the activity, if necessary. Allow the children time to investigate. Give each group an opportunity to report back. Prompt the children to explain the capacity relationship between the two bottles. For example: 'This bottle has a greater capacity/holds less.'

- What did you find out?
- How did you do it?
- Which way was better, do you think?
- How else could you check your answer?

Teaching tip

In their Maths Journals, the children use images and/or words to record how they conducted the investigation and their findings.

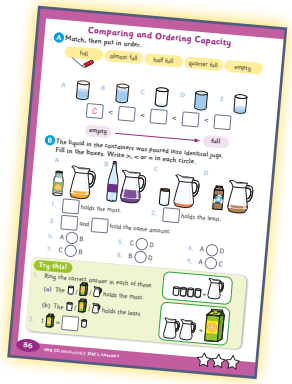
Let's strengthen

The children may benefit from a carefully selected range of containers, which include containers of different shapes but the same capacity.

Let's deepen

Challenge the children to compare three or more containers/bottles, and to predict their findings, if ordered from greatest to least capacity. Once they have recorded a prediction, they investigate it to check. Challenge them also to record this relationship using inequalities: 'A > B > C', 'A is greater than B and B is greater than C', etc.

P Pupil's Book page 86: Comparing and Ordering Capacity



Let's strengthen

The children may need to draw horizontal lines across the level of liquid and neighbouring containers for ease of comparison. In A, children may be put off by the inequality symbols, e.g. ☐ < ☐ < ☐. These can be ignored, and instead the children can focus on ordering from empty to full.

Optional consolidation and extension possibilities

Games Bank Play 'Overflow'.

Story Read *More for Me!* by Sydnie Meltzer Kleinhenz.

Maths Journals The children use images and/or words to record how they conducted the investigation and their findings.

Play Set up a station(s) where the children can choose to explore capacity further over the course of the unit, for example water play, sand play, or a station where the children can fill containers with rice or cereal hoops.

Measuring Display Add to the Measuring Display in the classroom. This could include containers, bottles and appropriate labels (e.g. the Unit 13 Maths Language Cards). The children could contribute examples of their own work/constructions from this lesson and label them.

Review and Reflect Use the Prompt Questions Poster.

Days 6 and 7, Lesson 5

Measuring Capacity

Focus of learning (with Elements)

- Identifies the appropriate measurement instruments and non-standard units for a given situation (U&C)
- Collects and records measurement data in systematic ways (e.g. using lists, tables) and compares results (C)

Learning experiences

- D Digital activity: Same But Different (6)
  ***MAM* Routines: Reason & Respond, with Think-Pair-Share**
- D Video: How Many for Juice? ***MAM* Routine: Three-Act Task**
- D Digital activity: Greater Capacity ***MAM* Routine: Would This Work?**
- C P Concrete activity: Which has the Greater Capacity?
- P Pupil's Book page 87: Measuring Capacity

Equipment

- Multiple cups of uniform size and shape
- Scoops
- Funnels
- Resources from Lesson 4 (e.g. plastic cups, bottles, bowls, jugs, small measuring cups, etc.)

Maths language

- greatest capacity (i.e. holds the most), least capacity (i.e. holds the least), cups

Teaching tip

In the previous lesson, the children had explored how to compare capacity by height (i.e. if liquid was poured into identical containers, the height could be compared visually). In this lesson, the children will be measuring capacity as a count of non-standard units (e.g. cups, scoops). Initially, this should involve filling multiple cups from a larger container, as demonstrated in 'Three-Act Task' and 'Would this Work?' (below). When the children can see actual reiterations of the same unit, they can appreciate how the total number of cups equals the capacity of the larger container. When they are ready, ask the children to suggest how they might count the units with only one cup/scoop and, if necessary, demonstrate how the unit (cup/scoop) can be filled, counted, emptied into the larger container, and repeated until the larger container is full.

Teacher note: Ensure the children estimate one object at a time, and then measure that object, before estimating and measuring the next object. Using this approach, the children can refine their estimate each time, based on what they learned from the previous object.

Warm-up

D **Digital activity: Same But Different (6)**
***MAM* Routines: Reason & Respond, with Think-Pair-Share**

Play the slideshow and, using Think-Pair-Share, ask the children to propose reasons for why the images are the same and why they are different.

Main event

D **Video: How Many for Juice?**
***MAM* Routine: Three-Act Task**

Act 1: Notice & Wonder

Play the video, which shows a teacher pouring orange juice from a jug into a cup. Using Think-Pair-Share, ask the children:

- 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.

- (Reveal the focus question.) How many cups can be filled from the jug?

Act 2: Productive Struggle

Using Think-Pair-Share and Write-Hide-Show, click to play or say:

- 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 consider the focus question. If necessary, prompt them by asking:

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

Once the children explain that they need to see more glasses of juice being poured to help them estimate a more accurate answer, play the next part of the video and 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 the options of Build it; Sketch it; Write it, the children choose their preferred way to mathematically model their strategies/solution(s).

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 best strategy?

Play the final part of the video, which shows the teacher pouring juice from the jug into all of the cups. 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?

D Digital activity: Greater Capacity

***MAM* Routine: Would This Work?**

(Use the same resource from Lesson 4.) Display the image of the two bottles again. Ask:

- Do you remember the strategies the characters suggested?
- Which ones were reasonable/made sense?
- Which ones were not reasonable/did not make sense?
- Could we use the cups method that was used in the video?
- Can you think of another way to do this?
- If using cups to measure, to have accurate findings, what should be kept the same? (The size of the cups, and they should be filled to the same level.)

C P Concrete activity: Measuring Capacity

Ask the children to work in pairs or small groups. Provide them with a selection of various containers, bottles, etc. Each pair/group selects three (these need to be different containers from those used in the previous lesson). Ask:

- Which of your containers has the greater capacity, do you think?
- Label them A, B, C and record your estimate for how many cups each one holds in your Pupil's Book page 87.
- How can you find out? What do you need?
- How will you know which bottle has the greatest capacity?

Explain that today we are going to investigate this using the cups method that was used in the 'How Many for Juice?' video. Replay that part of the activity, if necessary. Allow the children time to investigate. Give each group an opportunity to report back. Prompt the children to explain the capacity relationship among the containers (e.g. 'This container holds the most.') and to justify with a measure of the number of cups it contained.

Teaching tip

In their Maths Journals, the children use images and/or words to record how they conducted the investigation and their findings.

Let's strengthen

Assessment Opportunity

As mentioned previously, many children will need to see actual reiterations of the same unit to appreciate how the total number of cups equals the capacity. Some may need to be reminded that the cups (units) chosen must be uniform and must be filled to the same level (not necessarily to the top, but the level of each must be the same).

Let's deepen

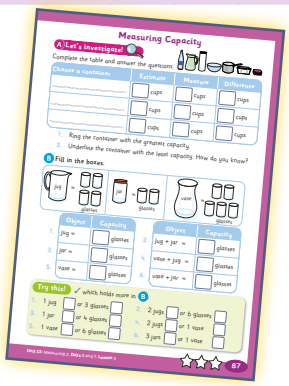
Challenge the children to:

- Record their findings using inequalities (e.g. A > B > C).
- Suggest how they might measure capacity in cups using only one cup.
- Suggest how best to record the number of cups when they are not all full.
- What if the measure is four and a bit?
- What can we do about the bit?
- What fraction of the unit is being considered?
- How could this be justified and how could it be recorded?

Let's strengthen

The children may need to use concrete resources to model the scenario (see the Unit 13 Let's Strengthen Suggestions for Teachers for more about proportional reasoning).

P Pupil's Book page 87: Measuring Capacity



Optional consolidation and extension possibilities

Story Read *A Beach for Albert* by Eleanor May, or listen to a reading at: edco.ie/cde5

Let's Strengthen Task B on the Unit 13 Let's Strengthen PCM can be completed at any stage after this lesson.

Games Bank Play 'Capacity Estimate'.

Let's Deepen Task C on the Unit 13 Let's Deepen PCM can be completed at any stage after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 8, Lesson 6

Litres

Focus of learning (with Elements)

- Identifies commonalities and differences between measurable attributes and the need for standard units to measure capacity (U&C)
- Recognises that units of measurement can simplify communication about measurement (C)

Learning experiences

- (D) Digital activity: Same But Different (7) ***MAM* Routines: Reason & Respond, with Think-Pair-Share**
- (D) Video: The Litre ***MAM* Routines: Reason & Respond, with Write-Hide-Show**
- (C) Concrete activity: More Than, Less Than or the Same as a Litre? ***MAM* Routine: Reason & Respond**
- (C) (P) Concrete activity: How Many in a Litre? ***MAM* Routines: Reason & Respond, with Write-Hide-Show**
- (P) Pupil's Book page 88: Litres

Equipment

- Resources from Lessons 4 and 5 (e.g. plastic cups, bottles, bowls, jugs, small measuring cups, etc.)
- Containers with a capacity of 1 litre, 2 litres, etc.

Maths language

- litre (1l)

Warm-up

(D) **Digital activity: Same But Different (7)**
***MAM* Routines: Reason & Respond with Think-Pair-Share**

Play the slideshow and, using Think-Pair-Share, ask the children to propose reasons for why the images are the same and why they are different.

Main event

(D) **Video: The Litre *MAM* Routines: Reason & Respond, with Write-Hide-Show**

Before playing the video, ask the children to reflect on the previous lesson. Ask/say:

- How was the capacity of the containers measured?
- What if cups were used that were not all the same, or that were filled to different levels? Would this be a good idea? Explain why.
- If it was a big bucket, bin or bath, would it be a good idea to use cups to fill it? Explain why.
- What is the standard unit for weight?
- What is the standard unit for capacity?

Play the video and allow the children time to respond to the questions and to give reasons for their answers.

(C) **Concrete activity: More Than, Less Than or the Same as 1 Litre?**
***MAM* Routine: Reason & Respond**

Provide each group with a container that has a capacity of 1l and, using the collection of containers and/or other items in the classroom, the children identify the ones that they think hold more/less than a litre. If possible, use containers on which the capacity is not given. Ask:

- Why do you think this one holds more/less than 1 litre?
- How could we find out?

Allow the children to discuss the suggested strategies and evaluate them for efficiency. If the children do not suggest it, offer the simplest solution: For containers less than 1 litre, fill the container with water, then pour

the water into the 1 litre container, which it should not fill. For containers more than 1 litre, do as before (it should overflow) or pour a known 1 litre measure into the container, which it should hold comfortably.

Allow the children time to carry out this part of the investigation. Ask:

- Were you correct?
- How do you know?

If you identify containers that hold 1 litre, ask:

- How are these the same?
- How are they different?
- Were you surprised by any of them?

Teaching tip

Use the Unit 13 Maths Language Cards for 'greater than', 'less than' and 'the same as' to display the items found by the children, and to describe and their relationship to one another.

C P **Concrete activity: How Many in 1 Litre?**
***MAM* Routines: Reason & Respond, with Write-Hide-Show**

You will need multiple identical cups. Holding up one of these, ask the children:

Assessment Opportunity

- Estimate: How many cups in 1 litre?
- How can you prove it?

Use Write-Hide-Show to collect estimates. Record the most frequently occurring answers or range of answers on the board. Then, working in small groups or pairs, allow the children to investigate the actual number.

Instruct the children to repeat using bottles (choose from those bottles that were already identified as holding less than a litre) and then scoops. Use page 88 of the Pupil's Book to record. Each time, collect estimates before investigating.

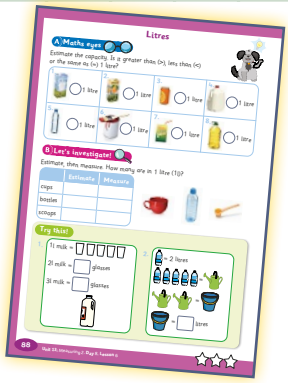
Afterwards, ask the children:

- What did you notice?
- Were the answers different each time? Explain why.
- If the containers were smaller, would it take more or less of them to equal a litre than when larger containers were used?

Let's deepen

Challenge the children to explain why the answers are less when larger containers are used.

P **Pupil's Book page 88: Litres**



Optional consolidation and extension possibilities

Games Bank Play 'Capacity Estimate'.

Home/School Links Book Page 31 can be completed at any stage after this lesson.

Review and Reflect Use the Prompt Questions Poster.

Day 9, Lesson 7

Measuring Investigation

Focus of learning (with Elements)

- Identifies the appropriate attribute to measure for a given problem situation (A&PS)
- Selects and uses appropriate procedures, measures and equipment to measure attributes of length, weight, and capacity (A&PS)

Learning experiences

(D) Digital activity: Same But Different (8)
***MAM* Routines: Reason & Respond, with Think-Pair-Share**

(D) (P) (C) Digital activity: Ramp It Up! ***MAM* Routines: Concept Cartoon, with Think-Pair-Share**

Equipment

- Two toy cars and a ramp per group
- Equipment as required for the other chosen investigation
- PCM 48
- PCM 49

Maths language

- smaller, larger, heavier, lighter, further, distance, height and/or maths language as appropriate for chosen investigation

Teaching tip

STEM: This lesson enables the children to work scientifically as they apply their knowledge and skills to one or more measuring investigations. The Concept Cartoon (below) introduces one possible problem that could be investigated. However, you and/or the children may choose an investigation from the many other possibilities available on PCM 48: Measuring Investigations.

Warm-up

(D) **Digital activity: Same But Different (8)**
***MAM* Routines: Reason & Respond, with Think-Pair-Share**

Play the slideshow and, using Think-Pair-Share, ask the children to propose reasons for why the images are the same and why they are different.

Main event

(D) (P) (C) **Digital activity: Ramp It Up!**
***MAM* Routines: Concept Cartoon, with Think-Pair-Share**

Display the Concept Cartoon and, using Think-Pair-Share, ask:

Assessment Opportunity

- What do you think?
- Record your prediction on your MWBs.
- (Pointing at 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?

If appropriate, record the children's responses to these 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. Ask:

- How could we find out?
- What should we do?
- What equipment is needed?
- How do we make sure our investigation is fair? What needs to be kept the same each time? What will be different?
- How do we make sure our results are reliable and/or accurate?
- What will we measure? How will we do this?

Allow the groups time to discuss and/or start to fill in PCM 49: Investigations Planning Sheet, before carrying out the investigation. Afterwards, give each group an opportunity to report back. Ask:

- What did you find out?
- How did you find this out?
- How did you record/present what you did?
- What was difficult? What was easy?
- Did the results surprise you? Explain why.

See also PCM 48: Measuring Investigations (1 of 2) and (2 of 2) for other suggestions.

Teaching tip

It is important that the children investigate using their own suggested strategies, even if there are other more obvious and/or efficient approaches. Through investigating, they may realise that another approach was preferable and should be encouraged to refine their methods and then to repeat.

Optional consolidation and extension possibilities

Games Bank Play 'Length Estimate!', 'Weight Estimate!' or 'Capacity Estimate!'.

Maths Journals The children use images and/or words to record how they conducted the investigation and their findings.

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!
Classroom poster: Review and Reflect. Use Think-Pair-Share alongside the prompt questions to review the unit.	Play 'Weight Estimate!', 'Capacity Estimate!' or 'Overflow' from the Games Bank.
Maths language	**Maths strategies and models**
Ask the children to explain the following terms (perhaps using examples or drawings on their MWBs): weight, weigh, heavy, light, heavier than, lighter than, heaviest, compare, estimate, capacity, greater than (>), less than (<), is equal to/equals (=). Use the Maths Unit 13 Language Cards to revise the key terms. For example: If the image and text are cut apart, can the children match them? Complete the top part of the My Maths Fact File on page 125 of the Pupil's Book.	Ask the children to give examples of the strategies they used in this unit, e.g. how to hand weigh, how to use the various balances, how to measure capacity using visual comparisons, how to use cups, and the importance of using uniform units. Ask the children to give examples of the models they used in this unit. For example: How did they record their findings for the various problem tasks and investigations? Did they use tables? Did they draw multiple glasses? Did they count? Did they use counting aids?
Progress Assessment Booklet	**Maths eyes**
Complete Questions 50–52 on pages 23–24. Alternatively, these can be left to do as part of a bigger review during the next review week.	If appropriate, take a trip to a local supermarket, looking for examples of weight and capacity. How are they similar to/different from those looked at during this unit? Take photos to display or compile in a digital slideshow for 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 13 Let's Strengthen PCM. Consult the Unit 13 Let's Strengthen Suggestions for Teachers.	Use the Unit 13 Let's Deepen PCM.

Notes