DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES

Measurement: Mass, volume, and capacity

Level 0 (NE / Year 0)

Teacher Booklet

Task 1	Look at these balloons I have collected. I need you to work out which balloon takes up the most space.
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Compare and order the volume of objects. • Explain volume as the space inside an object/container. • Use measurement language to describe the comparison of volume.
Mathematical language	Space, volume, most, least, same.
Sharing back/Connect	Select students to share who identify that the bigger the balloon, the more space inside it (volume), and that this would take up more space within another container. **Connect:** Use a series of pictures of balls (including bigger, smaller and ones which are the same). Ask the students to discuss which ball has the most volume, the least volume, and the same volume.
Teacher Notes	• During the launch, blow up a balloon and facilitate the students to discuss what is happening with the balloon and the amount of space as it is blown up. • Have students use their hands to show the amount of space taken up inside the balloons. This is supporting them to re-represent the space. Use the word volume explicitly to describe the space taken up. • Students should order the balloons from smallest to largest or vice versa. Monitor for the use of hands to illustrate the space taken up inside. • For the independent task, have a collection of different sized boxes or containers, or pictures of boxes and containers.
Independent Tasks	What box has the most volume? What box has the least volume? Which boxes have the same volume? Can you draw different containers and label which one has the most volume, the least volume, and same volume?

Anticipations	

Task 2	Mele's Dad wants her to pack these tins of food into a box to send to their family in Tonga. She has two boxes. How many can she fit in each box and still shut the top?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. NA1-1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. NA1-2: Know the forward and backward counting sequences of whole numbers to 100.
Learning Outcomes: Students will be able to:	• Compare the volume of a container using non-standard units. • Use non-standard units to measure volume. • Count whole numbers of units to describe the measurement. • Explain the relationship between size of the measurement unit and the measurement count. • Estimate the volume of a container.
Mathematical language	Space, volume, more than, less than, same, measurement unit, measurement count.
Sharing back/Connect	Select students to share who measure the volume of the boxes in a systematic way by layering the bottom first and then filling the rest of the box and ensuring that there are as little spaces as possible. Also focus attention on students who use grouping or counting on solutions to find the measurement unit count. **Connect:** Use a different food packet (bigger or smaller, e.g., cereal boxes, soup packets) with different amounts of the packet. Ask students to discuss how many of each packet would fit in the boxes and compare the number of measurement units for each box. Teacher record the solutions using representation involving numbers and drawing.

Teacher Notes	• During the launch, use three food packets of different sizes. Have children order from biggest to smallest and discuss with the children which takes up the most space (volume). • Have large boxes labelled A and B for the students to work with. Use food packets which are the same size (e.g., cans of soup, cereal boxes) as the measurement unit. • Monitor for students using vocabulary which includes space, volume, and more than, less than and the same as. • Notice students who use grouping or counting on to find the number of measurement units. If these are not used, model how to use them. • Expect students to represent their solutions using drawing and numbers. • Make comparisons between the measurement count and size of the measurement unit. Discuss with the students that the bigger the measurement unit the more space it takes and therefore less would fit in the same size box. • For the independent task, have different sized containers available and sets of blocks, multi-link cubes, and beads to use as the measurement unit.
Independent Tasks	Use the different material to measure the volume of each container. Record the measurement count for each different measurement unit that you used. Draw a picture to show how you measured the different containers and write the numbers to match.
Anticipations	

Task 3	Georgia would like to choose a box to decorate for her treasures. She would like the box with the biggest volume. Can you use the material to work out which box has the biggest volume?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. NA1-1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. NA1-2: Know the forward and backward counting sequences of whole numbers to 100.
Learning Outcomes: Students will be able to:	• Compare the volume of a container using non-standard units. • Use non-standard units to measure volume. • Count whole numbers of units to describe the measurement.
Mathematical language	Space, volume, more than, less than, same, measurement unit, measurement count.
Sharing back/Connect	Select students to share who measure the volume of the boxes in a systematic way by layering the bottom first and then filling the rest of the box and ensuring that there are as little spaces as possible. Also focus attention on students who use grouping or counting on solutions to find the measurement unit count. **Connect:** Model measuring the volume of the box but leave obvious gaps and use two different sizes of cubes. Ask students for suggestions to develop instructions on how to measure volume. Record these and display.
Teacher Notes	• Have small boxes (e.g., shoe boxes or smaller). Provide students with cubes or blocks that are the same size to use as the measurement unit.

	• Monitor for students using vocabulary which includes space, volume, and more than, less than and the same as. • Notice students who use grouping or counting on to find the number of measurement units. If these are not used, model how to use them. • Expect students to represent their solutions using drawing and numbers. • Make comparisons between the measurement count and size of the measurement unit. Discuss with the students that the bigger the measurement unit the more space it takes and therefore less would fit in the same size box. • For the independent task, have a range of small boxes and measuring material available for the students to use.
Independent Tasks	What is the volume of these boxes? If you were going to make yourself a treasure box, which one would you choose and why?
Anticipations	

Task 4	Teremoana has made some donuts. Her little brother wonders which is the biggest donut. What would you tell him?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Compare the volume of objects. • Explain that when an object is subdivided the volume remains the same (conservation).
Mathematical language	Space, volume, more than, less than, same, divide.
Sharing back/Connect	Select students to share solution strategies where they have recognised that the volume of a 3-dimensional object stays the same however they are arranged and rearranged. **Connect:** Give students playdough or modelling clay and ask students to make shapes that take up the same space (volume), more space (volume), or less space (volume).
Teacher Notes	• For the launch, use two identical cakes (e.g, playdough or modelling clay). Cut one of the cakes into pieces and ask the children to talk about if there is more, or less cake, bigger, smaller, same? If needed, put the pieces back together to show that the volume has not changed. • Use pictures of a doughnut or a food relevant to your students. Have the same picture with the whole donut and the same donut cut into halves, quarters, irregular size pieces. • Have playdough available, if needed give students balls to model the donut physically.

	• Monitor for students using vocabulary which includes space, volume, and more than, less than and the same as. • For the independent task, have pictures of different and the same size objects (e.g., cakes, melons, sandcastles).
Independent Tasks	Look at the pictures. Which object has the biggest volume? Which object has the smallest volume? Do any objects have the same volume? Have a look around the classroom. What can you see that has a large volume? What can you see that has a small volume? Does anything have the same volume?
Anticipations	

Task 5	Look at the containers. Which container would hold the greatest volume? Which container would hold the least volume? Now test and prove your idea using water.
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Estimate the volume of a container. • Use non-standard units to measure volume. • Compare the volume of a container using non-standard units.
Mathematical language	Space, capacity, volume, more than, less than, same, estimate.
Sharing back/Connect	Select students to share solution strategies where they have recognised that the volume of water stays the same when poured into different containers. Also focus student attention on the possibility that two containers could be measured and compared by filling one with water and comparing with the level of water used (transitivity). **Connect:** Have pictures of different shaped containers with a marked level of volume of water in one of the containers. Ask students to discuss whether the volume/capacity will change if the water is poured from container to the other.
Teacher Notes	• For the launch, fill a milk bottle about half-fill of water and mark the level. Have a different (either wider, taller, shorter but wider) container and point and ask if them if

	they think that they would have the same volume of water if they poured it into the second container. Pour the water into the second container and ask them if the volume has changed. If needed, pour the water back into the first container to show that the volume has not changed. • Use three containers of different shapes but relatively the same size for each pair/group of students. • Explicitly use the term capacity to describe the volume of the liquid a container holds without overflowing. • For the independent task, have containers of different sizes (labelled with numbers or letters) that can be filled with water.
Independent Tasks	Begin by estimating which container would hold the largest volume. Write down the order from biggest to smallest. Now use water to measure the volume of each container. Check what you have found out against your estimates.
Anticipations	

Task 6	Look at the containers. Which container would hold the greatest volume? Which container would hold the least volume? Now test and prove your idea using water and the measuring tool.
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C. There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. NA1-1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. NA1-2: Know the forward and backward counting sequences of whole numbers to 100.
Learning Outcomes: Students will be able to:	• Estimate the volume of a container. • Use non-standard units to measure volume. • Compare the volume of a container using non-standard units. • Count whole numbers of units to describe the measurement.
Mathematical language	Space, capacity, volume, more than, less than, same, estimate, measurement unit, measurement count.
Sharing back/Connect	Select students to share who measure the capacity and volume of the containers in a systematic way by filling the container using one of the measurement tools and counting and recording the measurement unit count.

	Connect: Show students measuring containers (spoons, small cups) and large containers. Ask them to describe how they would use the measurement tool to measure the volume. Model a scenario where you measure a container but do not fill it right up and also model filling a container but spilling some of the water from the measuring tool and counting it as a whole measurement. Ask the students to discuss what advice they would give you.
Teacher Notes	• For the launch, show the students two containers that are different sizes (e.g., a bowl and a measuring jug/ measuring spoon). Ask the students to discuss how you would measure the container using the measuring tool. • Have students explore and explain how they measured the capacity of one of the two containers. Compare differences between results. • Expect students to record the results of the count using numbers or drawings. • Facilitate students to understand that repeated pouring measures the capacity of the container and this means that the volume is partitioned into equal units. • Different or inaccurate results can happen through spilling or not filling to the top • For the independent task, have containers of different sizes (labelled with numbers or letters) that can be filled with water and a range of measuring tools (e.g., cups, spoons).
Independent Tasks	Choose a container and a measuring tool. Estimate what the measurement count would be if you use the tool. Write this down. would hold the largest volume. Now use water to measure the volume of each container. Check what you have found out against your estimates.
Anticipations	

Task 7	Choose two containers and pick them up. What do you notice about their volume? Which has the greater volume? What do you notice about their mass? Which is heavier and which is lighter?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Compare and order the mass of objects. • Use measurement language to describe the comparison of mass.
Mathematical language	Mass, same, different, heavier, lighter, less mass, more mass, massive.
Sharing back/Connect	Select students to share using a range of measurement language to describe what they notice. **Connect:** Have variety of pictures of containers with different amounts of matter. Discuss and match which have the same and different volume, and mass.
Teacher Notes	• Have a variety of bottles and containers some which are the same so students can swap and explore these as they work. • Have students hold 2 containers (small bottles, buckets) one of which is full of some matter (soil, sand, beans) and with eyes closed, discuss and make comparisons between the 2 containers describing the mass. • Facilitate students to understand that two containers can have the same volume (take up the same amount of space) but that they have different amounts of matter in them so a different mass. • Make sure that the word mass is used for matter in a container. Expect students to use a range of measurement language to describe the mass. • For the independent task, have a range of containers or objects with different mass for the students to compare.

Independent Tasks	Pick up two objects, one in each hand. Hold them and compare to see which has the greatest mass. Can you put the objects in order from the greatest mass to the smallest mass?
Anticipations	

Task 8	Use the balance scale to weigh the objects Can you find some objects that have the same mass? Can you find some objects that have less mass? Can you find some objects that have more mass?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Compare and order the mass of objects. • Use measurement language to describe the comparison of mass.
Mathematical language	Mass, same, different, heavier, lighter, less mass, more mass, massive.
Sharing back/Connect	Select students to share using a range of measurement language to describe what they notice. **Connect:** Have pictures of different tinned food (e.g., fruit, soup, baked beans). Ask the students to select tins so that the mass would be the same and would balance. Record with the number under the pictures in a number sentence (e.g., 3 = 3). Ask students to find examples that would have greater or less mass on each side. Record as number sentences using < and >
Teacher Notes	• To launch the task show students a picture of an empty seesaw and pictures of different aged children and adults. Ask students to describe how they could be arranged so that the seesaw is balanced, or heavier or lighter on each end. • For the task, use either equal-arm balances (or two plastic bags on two ends of a coat hanger held by a hook. • If students use the term ‘weight’ press them to say mass when talking about the matter inside a container. • Model to students how to represent their ideas such as the mass of 2 books is more than 3 pencils using < > or = • For the independent task, have a range of books and objects with balance scales for the students to use.

Independent Tasks	A book is on one side of the balance scale and two objects are on the other side so the scale is level. What might the two objects be? Can you find different solutions using the scale?
Anticipations	

Task 9	Have a look at this set of objects. Can you find pairs of objects that have the same mass but different volume? Can you find pairs of objects that have the same volume but different mass?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Compare the mass of objects. • Compare the volume of objects. • Use measurement language to describe the comparison of mass and volume.
Mathematical language	Mass, same, different, heavier, lighter, less mass, more mass, massive.
Sharing back/Connect	Select students to share using a range of measurement language to describe what they notice. **Connect:** Select two of the same objects that have a large volume but small mass for one side of the balance. Ask students to find two objects that have a small volume but large mass to make it balance. Select two of the same objects that have a small volume but large mass for one side of the balance. Ask students to find two objects that have a large volume but small mass to make it balance.
Teacher Notes	• For the launch of the task, have students predict and discuss whether a large feather or very small stone would reach the floor first when dropped from the same height. Model this scenario for the students and discuss why. • For the task, have sets of objects that have approximately the same mass but different volume or vice versa (e.g., bags of marbles and plastic bricks, wooden bricks and foam shapes). • Facilitate students to use the term mass and ensure that they understand that mass means the matter inside. Make links to the mass of bodies in terms of an adult body and a

	child body for humans or animals. Use the term massive in place of bigger mass. • Support students to notice that balancing mass is the same as how a seesaw works. • Build on opportunities for students to use grouping or subitising to count groups of objects to make comparisons of mass. • Expect students to represent their ideas using numbers and symbols (<, >, =). • For the independent task, have sets and bags of objects which would have a different number to balance (e.g., marbles, blocks, foam shapes, teddies, beads) and the balance scale. You could have digit cards and <, >, = for students to model their number sentence and then to write it.
Independent Tasks	Use the balance scale to see which objects have the same mass or different. Record number sentences to represent what you find out.
Anticipations	

Task 10	Tasi has two loaves of bread that have the same mass. Her Dad cuts one of the loaves into two pieces. She thinks the loaf cut into two pieces will have a greater mass. Do you agree with Tasi? Cut one of your loaves of bread and use your balance scales to see if the mass stays the same or changes. Try cutting the loaves in different ways and see if the mass changes or if it always stays the same. What do you notice?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.
Learning Outcomes: Students will be able to:	• Compare the mass of objects. • Explain that when an object is subdivided the mass remains the same (conservation).
Mathematical language	Mass, same, different, heavier, lighter, less mass, more mass, massive.
Sharing back/Connect	Select students to share who notice that the mass of an object stays the same even when it is subdivided into pieces. **Connect:** Have sets of pictures of different shaped cakes with one cut into pieces and the other remaining whole. Have students match the picture sets that would have the same mass.

Teacher Notes	• Before launching the task, ask students to give examples of animals that would have a large mass, and animals that would have a small mass. • For the task, give students two pieces of playdough or modelling clay shaped into a loaf which have the same mass. • Facilitate the students to experiment with subdividing one of the loaves in different ways to illustrate conservation.
Independent Tasks	What things can you find that are heavy but small? What things can you find that are light but large?
Anticipations	

Task 11	Choose a set of the objects to measure. Now use the teddies to measure the mass. Record what you have found out. Now use the cubes to measure the mass. Record what you have found out. Put the set of objects in order from the smallest mass to the greatest mass.
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C. There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. NA1-1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. NA1-2: Know the forward and backward counting sequences of whole numbers to 100.
Learning Outcomes: Students will be able to:	• Use non-standard units to measure mass on a balance scale. • Compare the mass of an object using non-standard units. • Count whole numbers of units to describe the measurement.
Mathematical language	Mass, same, different, heavier, lighter, less mass, more mass, massive.
Sharing back/Connect	Select students to share using a range of measurement language to describe what they notice. Also focus student attention on the

	possibility that the set of objects can be ordered and compared by using the non-standard units and comparing the count with those (transitivity). **Connect:** Ask students to use the mass measures of their classmates to order the objects that have been weighed from greatest mass to least mass.
Teacher Notes	• To launch the task, have a set of objects and ask the students to put them in order from least massive to the most massive • For the task, have two sets of objects that the students can use for measuring mass (e.g., wooden cubes and little teddies). Have sets of objects that the students can weigh or ask students to get a set from around the classroom. • Facilitate students to notice that the mass measures of one object can be used to compare other objects without using direct comparison. • Expect students to represent their results using numbers and drawings. • Facilitate students to notice that the bigger the mass of an object, the more the mass measure of the lighter object is needed.
Independent Tasks	What can you find that is bigger than a potato but heavier than it? What can you find that is lighter than a pen?
Anticipations	

Task 12	The post office needs your help to work out the mass of the parcels. Can you use the cubes to work out the mass of each parcel?
Big ideas	There are a range of attributes that we can measure including length, mass, time, area, angle, and volume. When we measure, we use comparison, specifically, we compare like properties to see which is greater. We can make comparisons using standard or non-standard units of measure and we use mathematical language to describe these. Conceptual understanding of measurement requires understanding of conservation and transitivity. Conservation requires understanding that when moved or subdivided, an object will retain its size. Transitivity involves understanding that the measures of two objects can be compared to a third object. For example, if object A weighs more than object B, and object B weighs more than object C, then object A will weigh more than object C. There are key principles related to measurement including that the size of the measurement unit remains the same (including identical units or subdivisions), units are repeated with no gaps or overlaps (iteration), the unit is part of a whole and the measurement is expressed as the total number of units used.
Curriculum links	GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. GM2-2: Partition and/or combine like measures and communicate them, using numbers and units. NA1-1: Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. NA1-2: Know the forward and backward counting sequences of whole numbers to 100.
Learning Outcomes: Students will be able to:	• Use units to measure mass on a balance scale. • Compare the mass of an object using grams. • Combine like measures of grams to find the mass. • Count whole numbers of units to describe the measurement.
Mathematical language	Mass, same, different, heavier, lighter, less mass, more mass, massive.
Sharing back/Connect	Select students to share who have been able to combine the measurement units to find out the mass of the parcels.

	Connect: Ask students to use the mass measures of their classmates to order the parcels that have been weighed from greatest mass to least mass. Focus attention on how the measurement units can be combined as tens and ones.
Teacher Notes	• To launch the task, ask students if they have heard the word 'gram' and what they think it means. Introduce the centi-cube and tell the students that it weighs one gram. Let the students hold it. Then introduce a stick of ten centicubes and establish that it weighs ten grams. • For the task, have wrapped up boxes to represent packages for the post office. Have balance scales available for students to measure. • Expect the students to use representations (e.g., drawing and numbers). Model how to record the numbers and how to count in tens. • Facilitate students to notice that the unit can be combined to make ten units.
Independent Tasks	Select one or more of the following assessment tasks (attached at the end of the document) as the independent activity: M3: Find the volume of boxes. M3A: Find the mass of books in grams.
Anticipations	

DMIC
DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES
ASSESSMENT TASK

MEASUREMENT – MASS, VOLUME, CAPACITY: LEVEL 1 Task M3

Which one of these boxes is the biggest? Which one is the smallest? Describe how you measured it and how you know.

(Teacher notes: Give students 3 small boxes and centi-cubes or multi-link. Take photos of students' way of measuring)

DMIC
DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES
ASSESSMENT TASK

MEASUREMENT – MASS, VOLUME, CAPACITY: LEVEL 1 Task M3A

Malia wants to post one of these books to her friend. Find the mass of each book and record it in grams.

(Teacher notes: Provide students with a balance scale, centi-cubes and books to measure).