Booragul Public School NSW Syllabus for the Australian Curriculum – Measurement and Geometry

Sub Strand – Mass 1

Outcome	Teaching and Learning Activities	Notes/ Future Directions/Evaluation	Date
Stage 2 A student: › uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM › checks the accuracy of a statement and explains the reasoning used MA2-3WM › measures, records, compares and estimates the masses of objects using kilograms and grams MA2-12MG		Language Students should be able to communicate using the following language: mass, **more than**, **less than**, about the same as, pan balance, (level) balance, measure, estimate, **kilogram**. 'Hefting' is testing the weight of an object by lifting and balancing it. Where possible, students can compare the weights of two objects by using their bodies to balance each object, eg holding one object in each hand. As the terms 'weigh' and 'weight' are common in everyday usage, they can be accepted in student language should they arise. Weight is a force that changes with gravity, while mass remains constant.	
Ignition activities "Bigger is Heavier" (controversial statement). Students discuss statement. Show a golf ball and a tennis ball - which is heavier? Show a container filled with cotton balls and similar container filled with rice: which would be heavier? Students should then use hefting to identify objects that have a mass of 'more than', 'less than' and 'about the same as' one kilogram.			Literacy Critical and creative thinking
Guessing Competition! Students estimate the mass of objects in the room using the kilogram measurement. Record results and then weigh objects using a pan balance. See who can get the closest.			
Pass the Parcel Students sit in a whole-class circle and pass around 4 or 5 closed containers that contain small items, to music. When the music stops, the students holding the containers write their estimate of the mass of the container and its contents on the board. After several estimates for the different objects have been recorded, students weigh the items to determine who had the closest estimate. Access to labelled masses may assist student to estimate the containers, by hefting a known mass and a container. .▯ associate kilogram measures with familiar objects, eg a standard pack of flour has a mass of 1 kg, a litre of milk has a mass of approximately 1 kg .▯ recognise that objects with a mass of one kilogram can be a variety of shapes and sizes			
Explicit Mathematical Teaching Measure, order and compare objects using familiar metric units of mass (ACMMG061) • recognise the need for a formal unit to measure mass • use the kilogram as a unit to measure mass, using a pan balance			

. associate kilogram measures with familiar objects, eg a standard pack of flour has a mass of 1 kg, a litre of milk has a mass of approximately 1 kg (Reasoning) . recognise that objects with a mass of one kilogram can be a variety of shapes and sizes (Reasoning) • record masses using the abbreviation for kilograms (kg) • use hefting to identify objects that have a mass of 'more than', 'less than' and 'about the same as' one kilogram . discuss strategies used to estimate mass, eg by referring to a known mass (Communicating, Problem Solving) • compare and order two or more objects by mass measured to the nearest kilogram • estimate the number of similar objects that have a total mass of one kilogram and check by measuring . explain why two students may obtain different measures for the same mass (Communicating, Reasoning)		
Whole class teaching **What do you think?** Students estimate how many of a given unit it will take to balance an object and then check by measuring. Students record their estimate and measure using their own words and format. **Teaching Measurement – Early Stage 1 and Stage 1** Mass 2.1 pg 130		
Does it balance? Students are given a choice of objects they might use to find the mass of different objects using an equal-arm balance. It is important that students are given tasks that emphasise different volumes can have the same mass and vice versa to differentiate these two concepts.		
Measure using conventional units: measure and record 1 kilogram **Knowledge and strategies** 1. identify masses which are approximately 1 kilogram 2. use a measuring instrument to make a 1 kilogram mass 3. label and record masses using the abbreviation kg **On the case** Organise students into groups and provide each group with a kilogram weight. Students heft the weight to support their concept of a mass of 1 kilogram. Students heft their pencil cases (including contents), and sort the cases from lightest to heaviest. Students discuss which pencil cases would make a combined mass of about 1 kilogram. Weigh the predicted combinations and record the results stating if the mass of the pencil cases was less than 1 kilogram, equal to 1 kilogram or more than 1 kilogram. **Teaching Measurement – Stage 2 and Stage 3 pg 116**		
Make a kilo Students examine a number of small items and estimate how many of each item will measure 1 kilogram. Students are given a limited range of items so that results can be compared and checked easily. Students record their estimates and results using the abbreviation kg. *Note*: the mass of some items that might appear to be the same, may vary. Examples include different brands of DD batteries and wooden *longs*.		

Step 1 Introduce the lesson as the measurement of mass in kilograms. Discuss what can be bought by the kilogram, and what is measured in kilograms. If possible, display a variety of 1 kg weights and 1 kg packages of food or other materials and allow students to handle these. Explain how the students are going to estimate and then check how many objects (of one kind) have a total mass of one kilogram. Demonstrate how to record the result using the abbreviation kg. Step 2 Have your students work in pairs or small groups to: • estimate how many objects will have a mass of 1 kilogram • record the estimate • check the estimate by finding the mass of the collection and checking it against 1 kilogram • record the results. Step 3 Discuss students' results. Encourage students to report surprising results, or materials that were heavier or lighter than expected. Discuss how the number of items in a kilogram is affected by the mass of each item. **Questioning** *How is mass measured?* *What can we buy by the kilogram?* *What materials or objects are measured in kilograms?* Check that students: • estimate before measuring • use measuring devices accurately • record results correctly. **Discussion** *How did you estimate? Which objects were difficult to estimate?* *How could you explain a mass of 1 kilogram to a friend?* *Why is it that I could have more apple in a kilogram of apples, than I would have rockmelons in a kilogram of rockmelons?* *How many of these books do you estimate would have a mass of 1 kilogram?* *How would I record my answer?* **Teaching Measurement – Stage 2 and Stage 3 pg 116**		
By the cupful Students measure and compare the mass of cupfuls of different materials. Students estimate first by hefting, and then measure the cupfuls to find the heaviest cupful and the lightest cupful. Students order and record their measurements to the nearest kilogram. *Extension*: students graph the results.		

Step 1 Discuss the need for a measure smaller than the kilogram to obtain accurate measurements. Discuss materials or food which are measured in grams. Introduce the task. Students order the mass of cupfuls of different materials by hefting. Students use scales to find the mass of each cupful to the nearest 10 grams and record the results. Discuss the need to handle materials carefully, especially if substances such as rice or flour are used. Step 2 Have your students work in small groups to: • estimate the weight of a cupful of flour or other material • weigh the cupful and record the estimate and actual weight • repeat with a cupful of sugar or other materials • record the results. Step 3 Discuss students' results and the differences between materials. <u>Questioning</u> *When might I want a unit of measure that is smaller than a kilogram?* *What can I buy or measure in grams?* *What is your estimate of the mass of a cupful?* *What else do you need to know before estimating?* Check that students: estimate before weighing the cupfuls • measure accurately to the nearest 10 grams • record measurements accurately. Discussion *What did you find when you weighed the different materials?* *Which material was the heaviest or lightest? How do you know?* **Teaching Measurement – Stage 2 and Stage 3 pg 120**		
<u>Guided Group/Independent Activities</u> **The Kilogram** Students make a kilogram mass using a variety of materials e.g. sand, rice, play dough. Discuss differences in quantity of materials needed to make a kilogram. Use balance scales to find smaller objects that will equal 1 kilogram. Record in a table.		
One kilogram shot Students make a one kilogram shot putt by putting sand in a piece of fabric or old pillow case and tying very firmly with string. Students put the one kilogram shot, estimate and then measure, the distance		

thrown. Having a metre ruler available as a visual support may assist students to estimate distance. (p. 117 *Teaching Measurement Stage 2 and Stage 3*)		
Shopping For A Kilo Students look through catalogues to find objects that come in one kilogram packages. Make a class collage. Are there more of some things to the kilogram than others. Discuss ways to investigate this concept		
Planned Assessment **One kilogram** Students are challenged to find a number of items that will balance one kilogram. In small groups, students demonstrate and explain their work. **Weigh in** Students find an item that has a mass of between one and two kilograms. In small groups, students weigh their item using a set of scales. Items are then placed in order of mass. Students record their task and share with other groups. **Assessment Strategy** The teacher: • observes student group work • analyses student recordings **Assessment Criteria** The student: • recognises that objects with a mass of one kilogram can be a variety of shapes and sizes • discusses the strategy used to estimate a mass heavier than one kilogram • weighs an object accurately in kilograms and grams **Books weigh** in Five books have a total mass of three kilograms. In small groups, students estimate, select and weigh books to see which group can get the closest to the target mass. Students report to the class listing the mass of each of their five books.		