**MATHEMATICS STAGE 1**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 6 | STRAND: Measurement and Geometry | **SUB-STRAND:** Mass 2 | **WORKING MATHEMATICALLY:** MA1-1WM MA1-4WM MA1-3WM |
| OUTCOMES: MA-12MG | **Measures, records, compares and estimates the masses of objects using uniform informal units**  |
| **CONTENT:**  | **Compares the masses of objects using balancing scales (ACMMG038)*** Find differences in mass by measuring and comparing, eg 'The pencil has a mass equal to three blocks and a pair of plastic scissors has a mass of six blocks, so the scissors are three blocks heavier than the pencil'
* Solve problems involving mass (Problem Solving)
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Can students accurately compare two or more masses using the same informal units?
* **Has to be the same mass (previous lesson assessment)–** The teacher’s mystery object can be balanced by five blocks. Student’s need to find or make three objects that would have the same mass. (This must be done without hefting, with using an equal arm balance and using blocks as informal units.) Student’s need to record their results and prove their objects are the same mass as the teacher’s. Students record their trials and answers. *This activity can be modified so that the students can find or make objects that are lighter/heavier than the teacher’s object. For extension students can find or make objects that are slightly lighter/heavier and very heavier/lighter than the teacher’s object.*
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| WARM UP / DRILL | * **No more gaps -** Class discussion and prediction the mass of the same quantity of a specific objects in two different structures. For example:
* Does a flat have the same mass as 100 shorts?
* Do ten loose paddlepop sticks have the same mass as a bundle of ten paddlepop sticks?
* Do ten loose interlocking blocks have the same mass as a rectangular prism of ten blocks.

Student’s then measure each quantity to find the mass. |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  |  |
| QUALITY TEACHING ELEMENTS | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge
* Deep understanding
* Problematic knowledge
* Higher-order thinking
* Metalanguage
* Substantive communication
 | * Explicit quality criteria
* Engagement
* High expectations
* Social support
* Students’ self-regulation
* Student direction
 | * Background knowledge
* Cultural knowledge
* Knowledge integration
* Inclusivity
* Connectedness
* Narrative
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| RESOURCES | Metalanguage signage and environmental poster displayItems of different massIdentical bags or containers filled with varying amounts of the same material such as pasta, marbles, crumpled paper, nails, screws or beads.Identical bags or containers filled with different materials such as pasta, marbles, crumpled paper, nails, screws or beads.Equal arm balances.Different units for measuring mass (marbles, paddlepop sticks, pencils, glue sticks, pasta, paper clips) |

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| Explicitly communicate lesson outcomes and work quality.* Explicitly communicate expectations of working in partners / small groups.
* Explicitly communicate expectations of working with equipment.
* Explicitly communicate how findings are to be recorded.
* Teach and Review:
* Introduce the activity as a way to find the difference in the mass of different objects.
* How to choose identical units to measure two different items.
* How to measure the mass of two different items, using an equal arm balance and the same informal units.
* How to estimate the number of units for the second item, based on whether it is heavier or lighter than the first item.
* How to use the measuring results to work out the difference in mass between the two items. Subtract the lighter mass from the heavier mass.
 | LEARNING SEQUENCERemediationEarly S1  | ***Use a pan balance to compare the masses of two objects.**** **Everyone can be a balance**

Students stand with their arms outstretched to simulate equal-arm balances. Teacher holds an object in each hand and asks students to predict and demonstrate what would happen to their arms if the objects were placed in their hands. The teacher places the objects in a student’s hands to test the predictions. Student’s then use an equal arm balance to check they were right.* **What’s your prediction?**

Pairs of students compare three groups of items which have the same number, but different kinds of objects, such as five pencils, five cups and five interlocking blocks or three empty margarine containers, three blocks and three balls. Students predict first, then find which group has the greater mass by using an equal-arm balance. |
| LEARNING SEQUENCES1 | * **Video – Studyladder *What’s the difference in weight?*** <http://www.studyladder.com.au/resources/teacher/mathematics?section=39>

Investigation:* **Which is Heavier** – Working in partners students estimate, and then find which of two bags is heavier (but the students are not allowed to heft them or to put them on the equal arm balance together). Students measure the mass of the first bag using informal units. Record the results. Then remove the bag. Then students measure the mass of the second bag on the equal arm balance using the same type of informal unit. Record the results. Student then compare the results of the two bags to work out the difference in mass between the two bags. Students then repeat this activity with different objects.
* **Two Pencil Cases** – Students work in partners to estimate, and then measure which of two pencil cases are heaviest by measuring the mass of each pencil case with blocks (teddies, marbles etc.) and recording the results. Students need to ensure that the same informal units are selected for measuring each pencil case. Students compare the results to work out the difference in mass of the two pencil cases.
* **Two Mystery Boxes –** Working in pairs,students are given two identical opaque boxes, such as margarine containers, which each hold one item. Student measure the mass of each container using an equal arm balance and informal units and record the mass to work out the difference in mass between the two containers.

**Assessment*** Can students accurately work out the difference in mass between two measured items?
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| LEARNING SEQUENCEExtension Early S2 | * **Compare and order two or more objects by mass measured to the nearest kilogram.**
* **Which is Heavier –** Students complete this activity but instead of measuring with informal units they measure with kilograms. Students compare the difference in kilograms between the two bags.
* **Two Pencil Cases** - Students complete this activity but instead of measuring with informal units they measure with kilograms. Students compare the difference in kilograms between the two pencil cases.
* **Two Mystery Boxes** - Students complete this activity but instead of measuring with informal units they measure with kilograms. Students compare the difference in kilograms between the two containers.
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| **EVALUATION & REFLECTION** | **Student engagement:** **Achievement of Outcomes:****Resources:** **Follow up:** |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.