**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM:  | WEEK: 2 | STRAND: Measurement & Geometry | **SUB-STRAND:** Mass 1 | **WORKING MATHEMATICALLY:** MA3-1WM, MA3-2WM |
| OUTCOMES: MA3-12MG | **Selects and uses the appropriate unit and device to measure the masses of objects, and converts between units of mass.** |
| **CONTENT:**  | **Choose appropriate units of measurement for mass (ACMMG108)*** Distinguish between the ‘gross mass’ and the ‘net mass’ of containers holding substances, eg, cans of soup
* Solves problems involving gross mass and net mass, eg, find the mass of a container given the gross mass and the net mass (Problem Solving)
* Determine the net mass of the contents of a container after measuring the gross mass and the mass of the container (Problem Solving)
 |
| ASSESSMENT FOR LEARNING (Pre-assessment) | Quiz: What is the difference between gross mass and net mass? What is an item that has a gross mass and a net mass? Using your selected item, write an algorithm which involves performing gross mass and net mass calculations. |
| WARM UP / DRILL | * Sorting Flashcard activity: The teacher will show a series of flashcards depicting objects that to find the mass (a) may require distinguishing between the gross mat and ness mass or (b) only involve calculation of net mass. Selected students will be asked to place flashcard (using blu-tack) in correct column of a table drawn up on a piece of cardboard. The class will then work together to define the terms ‘gross’ and ‘net’ mass. Note: both the definitions and table will be hung up on the classroom wall to act as a consolidation tool.
 |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | The mass of a container that holds a dozen eggs is 50 gm. A single egg has a mass of 50gm. What is the gross mass of net mass of a full carton of eggs? What is the net mass? Repeat exercise using a variable number of eggs. What is the most effective strategy of working out the gross and net mass using a variable number of eggs? |
| 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
 |
| RESOURCES | Student workbooks, pens, flashcard activity set, blu-tack, cardboard permanent marker, cardboard strips, whiteboard, whiteboard markers, materials for problem solving investigation 1 (eg, pencil cases, school bags, lunch boxes, chip packets, plastic jars containing dice, protractors, etc.), scales, empty containers, 30 x copies student assessment worksheet, Ingredients for Too Easy Lemon Slice and equipment (gloves, tablespoons x 7, containers x 7, measuring jug x 7, paper towel x 7, recipe instructions x 30, scales x 7) |

|  |
| --- |
| TEACHING AND LEARNING EXPERIENCES |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| Students will through a process of guided discovery, complete a series of problem-solving investigations to construct their own knowledge of concepts being taught (as outlined in Content section above). The teacher’s role will be to act as a facilitator; to explain key definitions/ideas and clarify misconceptions if and only when necessary. Warm up Activity/Drill: Relevant metalanguage/terminology will be discussed and defined including, gross mass and net mass.* **Reflection Discussion of Small Group Problem Solving Investigation:**

Teacher will summarise learning outcomes:* An appropriate device and unit of measurement was used to accurately measure mass of objects eg, grams (g)/kitchen scales.
* Different strategies used to answer problem, eg, Calculate gross mass of object and mass of packaging to find net mass of contents vs. calculation of gross mat of object and net mass of contents to find mass of packaging/container.
* **Reflection Activity: Mass Trivia**
* Students will remain in same groups used to complete Mass P/S Investigation 1 (eg, 6-7 student groups).
* The game will start by the teacher selecting one representative from two of the small groups to answer a trivia question related to learning outcomes.
* The person who correctly answers the question the fastest wins remains in the game. The other student representative is out of the game.
* The ‘winner’ gets to choose the next two student representatives (from any team) to face off against each other and answer the next trivia question. The game continues until one person is left standing.
 | LEARNING SEQUENCERemediationS2 or Early S3 | * Students who struggle to understand concepts being taught may need explicit teaching of:
* definitions of gross and net mass
* demonstration of how to use the appropriate unit and device to measure the masses of objects which involve performing gross mass and net mass calculations.
 |
| LEARNING SEQUENCES3 | * **Mass Problem Solving Investigation 1:**
* Students will be split into groups of four to five. Each student is to locate an object in the classroom that can be used to perform calculations which involve distinguishing between ‘gross’ mass and the ‘net’ mass. Eg, pencil cases, school bags, lunch boxes, chip packets, plastic jars (containing dice, protractors, etc).
* Each student group will be given a set of scales and students will take turns to use the measuring device to ascertain the gross mass of the object (container + net contents) and the net mass of the container and contents inside container. Students will record findings of each group member in their workbooks.
* The class will then reconvene and one nominated member from each student group will discuss the strategy/strategies used to complete problem solving task.
* **Reflection Discussion and Whole-Class Trivia**

The teacher will lead a discussion about key concepts learned through problem solving investigation and clarify any misconceptions (\*\*Refer to notes in Whole Class Instruction /Modelled Activities Section). * **Worksheet Assessment**

Student designed worksheet. Students as part of a homework activity will formulate 3 to 4 questions/answers to problems that involve distinguishing between gross and net mass). The teacher will then select a number of these algorithms to use as an assessment task.**OR*** **Mass Problem Solving Investigation 1:**
* **Reflection Discussion and Whole-Class Trivia**
* **Problem-Solving Assessment: Too easy lemon slice**

[**http://www.kidspot.com.au/food-recipes-recipes-too-easy-lemon-slice+822+50+article.htm**](http://www.kidspot.com.au/food-recipes-recipes-too-easy-lemon-slice%2B822%2B50%2Barticle.htm)* Students will be divided into groups of b/w four and six to complete activity. Each student will be a copy of the recipe and each student group will be given a tablespoon, a set of kitchen scales, one measuring jug, paper towel and a container to put mixture into.
* To ensure exact measurement of ingredients, students must first find mass of containers/utensils used to weigh ingredients and record findings in workbooks. The students must then take into account whilst weighing required net ingredients (eg, contents inside the container/utensil used to find mass). Students will take turns reading the instructions and measuring ingredients. Each step that involves calculating the net mass of ingredients – by deducting mass of container from net ingredients is to be recorded in workbooks by **every** student.

**For example,****Mass of Containers/Utensils Used to Measure of Ingredients:*** Measuring Jug (50g)

**Net Mass of Ingredients*** 400g of condensed milk
1. 400g net content mass (condensed milk) + 50g container (measuring jug) = 450g gross mass
 |
| LEARNING SEQUENCEExtension Early S4 | * Variation: Problem-Solving Assessment: Too easy lemon slice. To extend students have them halve/double the recipe.
 |
| **EVALUATION & REFLECTION** | **Student engagement: Achievement of Outcomes:****Resources: Follow up:** |