**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: | WEEK: 5 | STRAND: MEASUREMENT & GEOMETRY | **SUB-STRAND: VOLUME AND CAPACITY 2** | **WORKING MATHEMATICALLY:**  **MA3-1WM, MA3-2WM & MA3-3WM** |
| OUTCOMES: MA3-11MG | | **Selects and uses the appropriate unit to estimate, measure and calculate volumes and capacities, and converts between units of capacity.** | | |
| **CONTENT:** | | **Calculate the volumes of rectangular prisms.**   * Use repeated addition to find the volumes of rectangular prisms e.g. ‘My rectangle has 3 layers of 6 cubes, so the total number of cubes is 6 plus 6 plus 6, or 18’ * Establish the relationship between the number of cubes in one layer, the number of layers, and the volume of a rectangular prism * Explain that the volume of a rectangular prism can be found by finding the number of cubes in one layer and multiplying the number of layers * Record, using words, the method for finding the volumes of rectangular prisms, e.g. ‘Volume of rectangular prism = number of cubes in one layer x number of layers’ * Calculate the volumes of rectangular prisms in cubic centimetres and cubic metres * Record calculations used to find the volumes of rectangular prisms | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | * Using both discussion and **worksheet**, revise knowledge of how to find the area of a 2D shape e.g. Length x Width = Area. | | |
| WARM UP / DRILL | | * **Speed Tables-** using three-digits to multiply e.g. 4x4x4= * **Connect knowledge** and skill of number facts to volume calculation. | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | * Jeremy built a house from blocks. He used 616 blocks. The length was 7 blocks and the width was 8 blocks. How high was the block house? | | |
| 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 | | Butchers paper, sets of centicubes | | |

**TEACHING AND LEARNING EXPERIENCES**

|  |  |  |
| --- | --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| * **Explicitly communicate lesson outcomes and work quality.** * **Define and reinforce metalanguage used in the unit** e.g. volume, three-dimensional shape, prisms, cube, rectangular prism, full, space, cubic-centimetre, cubic-metre, container, centicubes, regular shape, irregular shape, edge, layers, width, breadth, length, height, formula. * **Teach and review** the types of three-dimensional shapes and their properties. * **Introduce** the meaning of volume and the measurement involved. * **Discuss:** The square centimetre is turned into a cubic centimetre, where each dimension is a centimetre long. * **Discuss:** These units have three dimensions, so we can measure all three dimensions of an object – the amount of space it takes up. * **Explain** that we measure large volumes in cubic metres and smaller volumes in cubic centimetres. | LEARNING SEQUENCERemediationS2 or Early S3 | * **Review** what students know about three-dimensional shapes. * **Discuss** three-dimensional shapes with a friend – list what you know about them. Students share with the class and properties are written on the board. * **Revise** volume. What is volume? Volume is the amount of space an object takes up. Volume uses three dimensions: length, width and height (use centicubes to explain and broaden discussion). |
| LEARNING SEQUENCES3 | * **The Mission 2110 Roboidz:** <http://www.bbc.co.uk/bitesize/ks2/maths/shape_space/3d_shapes/play/> students match names and properties to 3D shapes. * Students break up into small groups and construct a series of rectangular prisms using centicubes. For example: students create five rectangular prisms with measurements of 8 cubes by 5 cubes by 4 cubes. Student’s work out how many cubes have been used in total, using: repeated addition, calculating the blocks in one layer and multiplying it by the number of layers and working towards using the formula. Students record answers and working-out in their workbooks. * Students play the following game as a class, calculating the volumes of rectangular prisms in cubic centimetres and cubic metres. Students record their calculations in their workbooks.  <http://www.ixl.com/math/grade-5/volume-of-cubes-and-rectangular-prisms> * **Design some chocolate boxes** that can hold 36 chocolates, each of which is a rectangular prism. |
| LEARNING SEQUENCEExtensionLate S3 | * Using centicubes, build 3D objects of the same volume changing the dimensions e.g. 8 by 4 by 10 Discuss the outcome. * Volume can take different shape depending on its dimensions. Create five different models with two differing groups of dimensions. |
| **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.