**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| 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
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| 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.
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| WARM UP / DRILL | * **Speed Tables-** using three-digits to multiply e.g. 4x4x4=
* **Connect knowledge** and skill of number facts to volume calculation.
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| 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?
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| 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 | Butchers paper, sets of centicubes |

**TEACHING AND LEARNING EXPERIENCES**

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| 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).
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| 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.
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| LEARNING SEQUENCEExtension Late S3 | * Using centicubes, build 3D objects of the same volume changing the dimensions e.g. 8 $cm^{3}$ by 4 $cm^{3}$ by 10 $cm^{3}. $Discuss the outcome.
* Volume can take different shape depending on its dimensions. Create five different models with two differing groups of dimensions.
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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.