**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 14 | STRAND: Number and Algebra | **SUB-STRAND:** Multiplication and Division 2 | **WORKING MATHEMATICALLY:** MA3-1WM, MA3-6NA |
| OUTCOMES: | **Selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation.** |
| **CONTENT:**  | **Explore the use of brackets and the order of operations to write number sentences.*** Apply the order of operations to perform calculations involving mixed operations and grouping symbols, without the use of digital technologies.
* Investigate whether different digital technologies apply the order of operations.
* Recognise when grouping symbols are not necessary, eg 32 + (2 x 4) has the same answer as 32 + 2 x 4
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | Worksheet – Order of Operations pre-test including the use of brackets and integers. |
| WARM UP / DRILL | Revise times tables and number facts.Order of operations millionaire game used in previous lesson.Revise order of operations sequence, BIMDAS. |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | Linda bought 3 notebooks for $1.20 each, a box of pencils for $1.50, and a box of pens for $1.70. How much change does she have left from $10? |
| 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 | Interactive 100s Chart on IWB, Order of operations pre-test created on http://worksheets.theteacherscorner.net/make-your-own/math-worksheets/algebra/order-of-operations-worksheet.php , BIMDAS ppt <http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0CEEQFjAC&url=http%3A%2F%2Fbshs-maths.wikispaces.com%2Ffile%2Fview%2FBIMDAS.ppt&ei=kDd3U5zSKMzokAX50oDwDg&usg=AFQjCNFUnhrLFnEa4nCsK7hoBQt8hdN0uQ&sig2=gmLQ7Tq-CJQcoHINmfQdtQ&bvm=bv.66917471,d.dGI>  |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| ☐ Revise BIMDAS☐ Revise terminology such as indices etc.☐ Revise the process of solving algorithms containing multiple sets of brackets.☐ Revise the fact that grouping symbols are not always necessary. | LEARNING SEQUENCERemediationS2 or Early S3 | ☐ Revise BIMDAS and multiplication and division facts.☐ Use the iPad dice game on a lower difficulty setting.☐ Introduce algorithms with a single set of brackets and no indices. ☐ Work through algorithms that contain multiple operations that require working out in the correct order. Not simply algorithms that can be solved by working left to right. Eg. 2 x ( 5 + 2 ) = |
| LEARNING SEQUENCES3 | ☐ Have students create their own dice game using numbered dice and operation dice. Students have to form their own algorithms using the dice and have a partner solve the algorithm. ☐ Have students roll a larger numbered dice and then have to create an algorithm that will give that result.☐ Worksheet: Students are given various algorithms to solve using order of operations. These algorithms will be used in the following investigation. ☐ **Investigation**: Students are given algorithms that need to be solved using a calculator. Does the calculator use the correct order of operations to solve the algorithm.E.g Students input the following into a calculator, 5 + 10 x 3 – 13 = Does the calculator solve this correctly.* Assessment: Order of Operations Quiz beginning with basic left to right solving of simple algorithms to the more complex algorithms including multiple brackets, multiple operations and indices.
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| LEARNING SEQUENCEExtension Early S4 | ☐ More Complex Newman’s problems that can be found at the following link.<http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&sqi=2&ved=0CCMQFjAB&url=http%3A%2F%2Fwww.mathworksheetsland.com%2Ftopics%2Foperations%2F4step%2Fwordprob.pdf&ei=Xy7eU8fzGtCC8gWM5IHwBw&usg=AFQjCNEas-z0VypmAo30DSMgmkgvN92_sw>  |
| **EVALUATION & REFLECTION** |  **Student engagement Achievement of outcomes** **Resources Follow up** |