**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM: 1 | WEEK: 1 | STRAND: Whole Number | **SUB-STRAND:** Addition and Subtraction 1 | **WORKING MATHEMATICALLY:** MA3-1WM, MA3-2WM, MA3-3WM |
| OUTCOMES: MA3-5NA | **Selects and applies appropriate strategies for addition and subtraction with counting numbers of any size.**  |
| **CONTENT:**  | **Use efficient mental and written strategies and apply appropriate digital technologies to solve problems (ACMZA291)**\* Check solutions to problems, including by using the inverse operation |
| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | **Verbal discussion** of examples of checking problem solving strategies using inverse operations. When do we use inverse operations? What is an inverse operation? (an operation that reverses the effect of the original operation subtraction/addition and multiplication/division) – see slideshow attached as introduction <http://www.primaryresources.co.uk/maths/mathsC1b.htm> **Work sample:** Students must also demonstrate how to solve using inverse operations to check work. – Use a chosen worksheet as a work sample (resources).  |
| WARM UP / DRILL | **Students use a deck of cards to mentally add and subtract numbers** (ACE is 1, Jack is 11, Queen is 12 and King is 13) In pairs students take turns to place down cards. One student begins by adding the next card placing one down for their partner to subtract. Students will swap after 1 min. Example: 11 + 3 is 14 – 6 is 8 + 9 is 17. **Students roll a dice.** In pairs or as a class in a circle, start at 50 and students roll a dice, e.g.: student rolls a 6. First student must add that number to 50 and the next student’s subtract that dice number from the new number – continue to take turns (proves the point of using inverse operations and the relationship between addition and subtraction.) This can also be done with a calculator to use larger numbers.  |
| QUALITY TEACHING ELEMENTS | **INTELLECTUALQUALITY** | **QUALITY LEARNINGENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge
* Deep understanding
* Problematic knowledge
* Higher-order thinking
* Metalanguage
* Substantivecommunication
 | * Explicit quality criteria
* Engagement
* High expectations
* Social support
* Students’ self-regulation
* Student direction
 | * Background knowledge
* Cultural knowledge
* Knowledge integration
* Inclusivity
* Connectedness
* Narrative
 |
| RESOURCES (Included) | 7 inverse operations beginners sheets (use with larger numbers)-<http://www.modernchalkboard.com/addition.html> (interactive addition and subtraction questions) and <http://www.primaryresources.co.uk/maths/mathsC1b.htm> (worksheets and demonstration slideshow) |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * **Explicitly communicate lesson outcomes and work quality.**

Teacher demonstration of solving worded problems: Together as a class the teacher and students work through a series of worded problems. Students use mental strategies, estimation and algorithms. Terminology also referred to here ‘sum’ and ‘difference’ etc. http://www.primaryresources.co.uk/maths/pdfs/MC\_addition\_word\_probs.pdf * **Teacher will revise** the relationship between addition and subtraction and introduce the idea of inverse operations <http://www.primaryresources.co.uk/maths/mathsC1b.htm> (slide show attached)
* **IWB game-** Teacher and students will create number sentences to demonstrate inverse operations. Teacher can create own written sentence our use <http://www.modernchalkboard.com/addition.html> (advanced addition and subtraction)

eg: 1234 + 6721= 79557955- 1234= 6721* **Find the friend game-** Teacher will divide students into two groups. One side of the room is given addition number sentences and the other is given subtraction number sentences. Students are given a set amount of time to find their corresponding sentence using inverse operations. Observation assessment
 | LEARNING SEQUENCERemediationS2 | **Recognise and explain the connection between addition and subtraction (ACMNA054)*** Demonstrate how addition and subtraction are inverse operations
* Explain and check solutions to problems, including the use of inverse operations

*Use smaller numbers and visually supporting strategies and concrete materials to show* |
| LEARNING SEQUENCES3 | * **Worksheet-** Students work through a series of written worded problems independently **(See appendix).** These will require students to use various written strategies to solve both addition and subtraction questions using various numbers. At the end of completing the worksheet and marking as a class-the teacher will demonstrate how we can check these answers using inverse operations. *To extend students use larger numbers here.*(Various sheets to choose from based on students understanding- see attached) Use these sheets as beginner option to introduce’ inverse operations’ and start to use larger numbers as understandings develop
* **Written algorithms-** A series of written algorithms will be placed on the IWB. Students must write the corresponding algorithm using the inverse operation showing the relationship between addition and subtraction, for example: *To extend students use larger numbers here.*

 7932 6511- 6511 + 1421 1421 7932* **Partner sharing-** Students create 3 worded problems- they swap their worded problems with a partner to solve. Upon the partner returning the answers- the students who created the 3 questions will check their partner’s answers using the inverse operation. *To extend students use larger numbers here.*
* **You be the teacher game-** Students will be organised into small groups. Each group is given 5 flashcards with addition and subtraction questions that have been answered incorrectly. Students must together answer these questions correctly and justify their answers by using the inverse operation.
* **Assessment :** Students are given a worded problem and must also solve/ check using the inverse operation and submit. Students could also be asked to write their own worded problem and solve. They must also solve/ check using the inverse operation and submit. (open-ended/ working mathematically extension question) May need to be differentiated based on abilities and understandings.
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| LEARNING SEQUENCEExtension Early S4 | \* Use the following activities using fractions, decimals and larger numbers to demonstrate inverse operations and their relationships.  |
| **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. (use assessments to measure understanding of outcome)