**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 4 | STRAND: MEASUREMENT & GEOMETRY | **SUB-STRAND:** ANGLES 2  | **WORKING MATHEMATICALLY:** MA3-1WM |
| OUTCOMES: MA3-16MG | **Measures and constructs angles, and applies angle relationships to find unknown angles** |
| **CONTENT:**  | **Investigate, with and without the use of digital technologies, angles on a straight line, angles at a point, and vertically opposite angles; use the results to find unknown angles*** use the results established for adjacent angles that form right angles, straight angles and angles of revolution to find the size of unknown angles in diagrams
* explain how the size of an unknown angle in a diagram was calculated (Communicating, Reasoning)
* investigate, with and without the use of digital technologies, vertically opposite angles and establish that they are equal in size
* use the equality of vertically opposite angles to find the size of unknown angles in diagrams
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Ask students to draw and label all the angles that they can on a sheet of paper or in their workbooks.
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| WARM UP / DRILL | * In pairs, one student draws an angle in their workbook and asks their partner to firstly estimate the size of the angle and then measure the angle with a protractor.
* *Extension:* Students replicate angles in the room using geo-strips. They then copy the angles onto paper and estimate and measure the angles.
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| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | * The second hand on a clock makes one revolution per minute. How many degrees in total does the second hand turn in 5 minutes?
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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 | Protractors – 1 per student, copies of any needed worksheets, picture of the harbour bridge or something similar, iPads or video camera,  |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * **Review** concepts related to vertically opposite angles. Ensure students are aware of the fact that vertically opposite angles are always equal in size. View the following website <http://www.mathsisfun.com/geometry/vertically-opposite-angles.html> to help discuss these concepts. Have students draw and label a set of vertically opposite angles in their workbooks.
* **Brainstorm** the different types of angles, making sure right angles, adjacent angles, straight angles and revolution angles are noted. Select student to draw a small diagram next to the name of each angle.
* **Show** students a picture of the harbour bridge or something similar which depicts a range of angles. As a class discuss and highlight the different angles that are represented.
 | LEARNING SEQUENCERemediationS2 or Early S3 | * All students should be able to participate in the activities below. You may need to select a more simplified worksheet for students who require it.
* **Assessment (modified):** Ask students to draw a robot with a range of different angles (i.e. acute, obtuse, reflex etc). Have students identify the different types of angles that were used.
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| LEARNING SEQUENCES3 | **Whole Class Instruction and Modelled Activities*** **Worksheet:** There are a range of worksheets available to support these concepts available at [https://wiki.gosford.spcc.nsw.edu.au/groups/stage3il](https://wiki.gosford.spcc.nsw.edu.au/groups/stage3il/wiki/833f5/attachments/67a52/NSW%20TM%20SB%20Y6%20pp40-43.pdf)and [http://www.google.com.au/angleworksheets](http://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=5&ved=0CD4QFjAE&url=http%3A%2F%2Fwww.cambridge.edu.au%2Fgo%2Fdownload%2F%3Ff%3D7889%26t%3D1617&ei=ExP9U7W2LdK78gWgtoHwCw&usg=AFQjCNGaPGHevYSLIplW4znhMfgrJpfs5w&bvm=bv.74035653,d.dGc)
* **Poster:** In small groups children create a poster that highlights all of the different types of angles. Students use pipe cleaners or something similar to create the angles, glue them on to the poster and write a small description about each angle.
* **Online Game:** The following website allows students to explore a range of concepts related to angles <http://www.taw.org.uk/lic/itp/calc_angle.html>
* **iPad Tutorial:** In pairs or small groups have students create their own video tutorial (similar to what can be found on YouTube) on vertically opposite angles, paying attention to how they are equal in size.
* **Assessment:** Ask students to draw a robot with one set of parallel lines and a range of different angles (i.e. acute, obtuse, reflex etc). Have students identify the different types of angles that were used.
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| LEARNING SEQUENCEExtension Early S4 |  |
| **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.