**MATHEMATICS STAGE 3**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 1 | STRAND: Measurement & Geometry | **SUB-STRAND:** Angles 1 | **WORKING MATHEMATICALLY:** MA3-1WM  |
| OUTCOMES: MA3-16MG | **Measures and constructs angles, and applies angle relationships to find unknown angles.** |
| **CONTENT:**  | **Estimate, measure and compare angles using degrees.*** Identify the arms and vertex of an angle where both arms are invisible, such as for rotations and rebounds
* Recognise the need for a formal unit for the measurement of angles
* Record angle measurements using the symbol for degrees (°)

**Construct angles using a protractor*** Identify that a [right angle](http://syllabus.bos.nsw.edu.au/glossary/mat/right-angle/?ajax" \t "_blank" \o "Click for more information about 'right angle') is 90°, a [straight angle](http://syllabus.bos.nsw.edu.au/glossary/mat/straight-angle/?ajax" \t "_blank" \o "Click for more information about 'straight angle') is 180° and an angle of [revolution](http://syllabus.bos.nsw.edu.au/glossary/mat/revolution/?ajax" \t "_blank" \o "Click for more information about 'revolution') is 360°
* Use the words 'between', 'greater than' and 'less than' to describe angle size in degrees
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | * Children draw, label and describe as many different angles and their properties as they can.
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| WARM UP / DRILL | * In pairs, students use geo-strips to replicate angles in the classroom. Students label each angle and estimate the angles size in degrees. Students make a right angle (using a straw and pipe cleaners or geo-strips). Students use their right-angled straw as a tester and look around the environment for objects that:
* Have right angles
* Have angles where the opening is smaller than a right angle
* Have angles where the opening is larger than a right angle

<http://exchange.smarttech.com/details.html?id=f016276a-8950-476e-b17f-74eb846b4742> |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | A water sprinkler covers 90 degrees of the backyard lawn. How many time will the sprinkler need to be moved n order to cover the fill 360 degrees of the lawn? |
| 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 | Angle flash cards / posters, protractors, geo-strips, straws, pipe cleaners, IWB. Worksheets, |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * **Angle tester**

Follow these steps and construct an angle tester that can make different sized angles.Step 1 - Cut out two identical circles from cardboard.Step 2 - Mark the centre on each cardboard circle.Step 3 - Draw a dotted line from the outside of the circles to the centre.Step 4 - Cut along the dotted line to the centre. This line is called the radius.Step 5 - Slide the cuts together so the circles are interlocked.Once the circles are interlocked, they can be turned to make different sized angles.Turn the circles opposite ways and practice making angles that are:* smaller than a right angle
* larger than a right angle
* a quarter turn
* a half turn
* a three-quarter turn

Relate a quarter turn, a half turn and a three quarter turn to the angle sizes on a clock face. | LEARNING SEQUENCERemediationS2 or Early S3 | * Review names and shapes of different types of angles.
* The three critical features of this similarity are:
	+ two line, the *arms* of the angle
	+ a point where the lines meet, the *vertex*
	+ a degree of openness between the line, the *size* of the angle.
* Review, discuss and label the differences of each angle.
* Find angles in the environment.
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| LEARNING SEQUENCES3 | * **Angle Concentration**

Students create two sets of cards, one with a range of angles drawn on them and the other with different types of angles (right angle, larger than a right angle, smaller than a right angle). They play a game of concentration using the cards.<http://www.schools.nsw.edu.au/learning/7-12assessments/naplan/teachstrategies/yr2011/images/nn_spac_2D_worksheet_s23_1.pdf>* **Classifying Angles**

Students identify, record and classify angles in the environment using the terms ‘right’, ‘acute’, ‘obtuse’, ‘straight’, ‘reflex’ and ‘revolution’. In pairs, students describe the angles they have classified eg the angles are all obtuse because they are greater than 90º but smaller than 180º. Students draw each type of angle and label the vertex and arms. This activity could be extended so that students could estimate the size of each angle in the environment and then check by measuring.Possible questions include:* Were some of your estimations closer than others?
* Why do you think this was?

<http://www.hittingthetarget.com/hittingthetarget.php> |
| LEARNING SEQUENCEExtension Early S4 |  |
| **EVALUATION & REFLECTION** | Is the student able to identify and measure right angles, straight lines & revolutions?Is the student able to identify angles smaller, larger or equal angles? |