**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 5.2 | STRAND: Measurement & Geometry | **SUB-STRAND:** **:** 2D Space 2 | **WORKING MATHEMATICALLY:**MA2-1WM & MA2-2WM |
| OUTCOMES: MA2-15MG | **Manipulates, identifies and sketches two-dimensional shapes including special quadrilaterals and describes their features** |
| **CONTENT:**  | **Create symmetrical patterns, pictures and shapes, with and without the use of digital technologies*** Use digital technologies to create designs by copying, pasting, reflecting, translating and rotating common shapes
* Apply and describe the amounts of rotation, in both clockwise and anti-clockwise directions, including half turns, quarter turns and three quarter turns, when creating designs
* Describe the rotation of symmetrical designs using the terms reflect, translate and rotate
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| ASSESSMENT FOR LEARNING | **Pre-Assessment**Students complete a worksheet to assess their understanding of reflections, translation and rotation. (File attached below.)  |
| WARM UP / DRILL | Play Simon Says with either the teacher or a student leading the class.E.g. Simon says rotate ¼ of a turn clockwise etc. |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | If I draw a capital L on the top left hand side of my page, rotated it half a turn clockwise, reflected it downwards and then translated it half a page to the right, what would my shape look like and where on the page would it be?Students may need paper/ books /whiteboard to complete this activity. |
| 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 | Worksheet, whiteboard, computers, iPad and camera |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES |
| * **Explicitly communicate lesson outcomes and expectations of work quality.**
* **Define and reinforce metalanguage used in the unit: ,** shape, two-dimensional shape (2D shape), circle, triangle, quadrilateral, parallelogram, rectangle, rhombus, square, trapezium,kite, pentagon, hexagon, octagon,regular shape, irregular shape, orientation, features, properties, side, parallel, pair of parallel sides, opposite, length, vertex (vertices), angle, rightangle, symmetry,line (axis) ofsymmetry and rigid, flip, slide, turn, rotate, translate, transform, reflection.
* Use the site below to initiate a discussion about lesson terminology and consolidate existing knowledge.

[**http://www.shodor.org/interactivate/discussions/TranslationsReflecti/**](http://www.shodor.org/interactivate/discussions/TranslationsReflecti/)* **Introduce/review** clockwise and anti-clockwise.
* **Review previous lesson:** Remind students what has been learned in previous lessons that will be pertinent to this lesson and/or have them begin to think about the words and ideas of this lesson:
* Can someone tell me where you might see a reflection in everyday life? Students may point out that we see our reflection in a mirror or in a still pond.
* Can anyone tell me what it means to rotate an object? Students may describe this as turning an object.
* Can anyone guess what it might mean to translate an object? Students may not have an answer to this question, in which case you may let them know that they will learn what it means to translate an object in today's lesson
 | LEARNING SEQUENCERemediationS1 or Early S2 | * **Which transformation has been used?** Students identify which shapes have been rotated, translated or reflected.

<http://www.sheppardsoftware.com/mathgames/geometry/shapeshoot/TranslateShapesShoot.htm> |
| LEARNING SEQUENCES2 | * **Directional Transformations:** Students complete the activity modelled in whole class instruction on their own.

<http://www.bbc.co.uk/bitesize/ks2/maths/shape_space/transformation/play/>* **Digital Rotations:** In pairs, students open up Microsoft Word and complete the activity modelled in whole class instruction and type in how the shape has been rotated.
* **Kinaesthetic Activity:** In groups, students can create their own dance using the video on a camera or iPad. They could either copy this example or try to create their own.

 <https://www.youtube.com/watch?v=sSsasVyYcdM> * **Investigation:** Students place a shape anywhere on a full page grid (drawn up as a 3cmx3cm grid) and trace its position. The shape is then placed in a different positon on the grid and traced. Students investigate what combinations of transformations could be used to move the original shape to the second location drawn on the grid.
* **Assessment:** Students create a movie or slide show to demonstrate their learning: Student use an iPad or PowerPoint etc. to demonstrate their knowledge of rotation, translation and reflection. *You could provide students with marking criteria for the assessment task.*
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| LEARNING SEQUENCEExtension Late S2 or Early S3 | * **Transform shapes around a Cartesian Plane:** Students translate, rotate or reflect shapes to move them to a designated position. To do this, they need to identify the type of transformation, direction and number of grid spaces to be moved.

<http://www.mathplayground.com/ShapeMods/ShapeMods.html> |
| **EVALUATION & REFLECTION** | **Student Engagement:** **Achievement of Outcomes:*** **Resources:** **Follow Up:**
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| * **Directional Transformations:** Incorporate reflection, translations and rotating with clockwise and anti-clockwise using:

<http://www.bbc.co.uk/bitesize/ks2/maths/shape_space/transformation/play/>Digital Rotations: Explicitly teach students how to use the Microsoft Word to rotate shapes. Open Microsoft Word and use the insert shape tool to put a shape on the page. Demonstrate how to rotate the shape clockwise and anti-clockwise Cutting and Pasting and using the rotate tools. Discuss if the shape has been rotated half a turn, quarter turn etc. Have students draw the given shape in various locations a directed using correct terminology.Discuss vertical, horizontal and diagonal reflections using the attached PowerPoint file. |  |  |