**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 5.1 | 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*** Create symmetrical patterns, designs, pictures and shapes by translating (sliding), reflecting (flipping) and rotating (turning) one or more common shapes
* Use different types of graph paper to assist in creating symmetrical designs
* Draw the reflection (mirror image) to complete symmetrical pictures and shapes, given a line of symmetry, with and without the use of digital technologies
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | **Pre-Assessment**This is a great game for testing students’ knowledge of flips, turns and slides. This can be used as a whole class activity and then as an independent activity. <http://www.harcourtschool.com/activity/icy_slides_flips_turns/> |
| WARM UP / DRILL | Examine at a variety of pictures that have symmetry. Look for shapes that have been translated, rotated and reflected. Discuss how symmetry might be used, what products are manufactured that require symmetry, and where symmetry is found in nature. |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | If Luke has a capital L and he flips it to the RHS twice, what will it look like? |
| 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
 |
| RESOURCES | shape worksheet, printed symmetry pictures and graph paper,  |

**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,** translating (sliding), reflecting (flipping) and rotating (turning).
* **Film Clip:** This short film clip has students dancing using flips, turns and slides as moves. Although the terminology is based on flip, slip and turn, it is still a good activity to help students remember what a flip, turn and slide is.

<https://www.youtube.com/watch?v=sSsasVyYcdM&feature=youtu.be>* **Video:** This link introduces students to the formal terminology, of translate, rotate and reflect mixed in with a song they know. <https://www.youtube.com/watch?v=NKtJd1hkI9k>
* **Using Graph Paper:** Explicitly explain to students how graph paper can assist in completing an incomplete picture with a line of symmetry.
 | LEARNING SEQUENCERemediationS1 or Early S2 | * Provide students with a page of common shapes drawn down the left hand side. Walk students through translating, reflecting and rotating the shapes.
* Students can then be asked to draw their own shape and have a partner translate, reflect and rotate it. Label their shape with the actions taken.
* Use the notebook file below to introduce translating, reflecting and rotating. <https://interactivemaths.wikispaces.com/file/detail/Motion%20Man.notebook>
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| LEARNING SEQUENCES2 | * **Reflections:** Students complete the mirror image of a given picture. This site provides a variety of templates that can be printed. Alternately, print plain dot paper to create your own designs. <http://artforkidshub.com/10-free-coloring-pages-bug-symmetry/>
* **Transformation Practice:** Print graph paper, with size of your choosing. Instruct students to draw a common shape of teacher’s choice. Students translate, reflect and rotate the shape to create patterns as directed. Compare the end product as a whole class to see who has the correct pattern. This activity can be differentiated to include varying degrees of difficulty. Students should then create their own designs. This site allows you to print your own graph paper. <http://www.printfreegraphpaper.com/>
* **Digital alphabet Symmetry: S**tudents to look at capital letters using the site below and decide if they have vertical or horizontal symmetry. <http://gwydir.demon.co.uk/jo/symmetry/refsym.htm>
* **Investigation:** Students investigate the classroom to find items that have been either translated, rotated or reflected. Compile a class list of things found.
* **Assessment:** Provide students with graph paper and fold it into 4 quarters. Ask them to draw a pattern in one corner (¼ of the graph). Then give to a partner and ask them to flip, rotate and slide to complete the other three corners.
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| LEARNING SEQUENCEExtension Late S2 or Early S3 | * **Symmetry Activity:** Show students the website below and have them recreate a quilt of their own. Use grid paper to assist students to make their own quilt. <http://greatmathsgames.com/Symmetry/quilt/quilt.html>
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| **EVALUATION & REFLECTION** | **Student Engagement:** **Achievement of Outcomes:****Resources:** **Follow Up:** |