**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM:  | WEEK: 4.2 | STRAND: Measurement & Geometry | **SUB-STRAND:** 2D Space 2 | **WORKING MATHEMATICALLY:**MA3-1WM & MA3-2WM |
| OUTCOMES: MA2-15MG | **Manipulates, identifies and sketches two dimensional shapes, including special quadrilaterals, and describes their features** |
| **CONTENT:**  | **Compare and describe two-dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies.*** Split a given shape into two or more common shapes and describe the result, e.g. ‘I split the parallelogram into a rectangle and two equal sized triangles’.
* Compare the area of the given shape with the area of the shapes it is split into, e.g. if a pentagon is split into five equal triangles, describe the area of……
* Record the arrangement of common shapes used to create other shapes, and the arrangement of shapes formed after splitting a shape, in diagrammatic form, with and without the use of digital technologies.
* Record different combinations of common shapes that can be used to form a particular regular polygon, e.g. a hexagon can be created from or split into, many different arrangements such as……
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| ASSESSMENT FOR LEARNING(PRE-ASSESSMENT) | Pre-AssessmentProvide students with a set of shapes that they can draw on. Ask students to draw lines to split the starting shape into new shapes. See what shapes they come up with. |
| WARM UP / DRILL | Provide groups of students with pattern blocks and ask them to make new shapes using the pattern blocks. |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION  | If Sandra has a 5cm square, how many triangles can it be divided into? |
| 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 | Tangram puzzles, puzzle sheets, pattern blocks, computer and whiteboard |

**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, 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 ,angle, rightangle, symmetry,line (axis) ofsymmetry and rigid.* **Explicitly teach students how to divide an existing shape into smaller shapes**. Students need to understand how to evaluate that the area of the smaller shapes is the same when combined to form the bigger shape.
* **Use Digital Geoboard** to construct a shape that can be divided into smaller shapes. <http://www.curriculumsupport.education.nsw.gov.au/countmein/children_geoboard.html>
* Provide students with the terminology required to discuss splitting and joining shapes to create other shapes. You may want to start with a square and divide it into triangles of varying sizes.
* Discuss with students how the area the shapes cover has not changed even though it has been cut it up.
 | LEARNING SEQUENCERemediationS1 or Early S2 | * **Provide students with a tangram puzzle and ask them the following questions:**
1. Can you make a square using one piece?
2. Can you make a square using two pieces?
3. Can you make a square using three pieces?
4. Can you make a square using four pieces?
5. Can you make a square using five pieces?
6. Can you make a square using six pieces? (Note that this cannot be done)
7. Can you make a square using all the pieces?

*This activity can be done individually, in pairs or in small groups.*Discuss with students how joining two or more shapes together can make new shapes. |
| LEARNING SEQUENCES2 | * **Area of Split Shapes:** Provide students with two paper copies of the same shape. Students then cut up one shape into other common shapes. They then overlay them onto the whole shape allowing them to see that the area has not changed. E.g. provide two rectangles of the same size. Students cut up the rectangle into a square and two triangles, then overlay. Differentiate this activity by providing more difficult shapes.
* **Create Shapes within Shapes:** Provide an iPad/Computer with digital geoboard and have students create their own shape. Then insert lines to dissect the original shape and create smaller shapes inside. Have students explain to a partner what shapes they have created and how the area is equal to that of the original shape.
* **Assessment: Joining Shapes** Provide students with a variety of shapes and set the task described below:

Use the set of shapes to create as many different shapes as you can. Explain what shapes you have made by using the following statement:I have created…….. e.g. A pentagon by joining together 5 equal triangles. |
| LEARNING SEQUENCEExtension Late S2 or Early S3 | * **Shape Cutter:** Students use the online activity below to draw a shape of their choice .They then draw lines on their shape to make other shapes. When they have completed this, they chose the cut button and then try to put it back together. To make this activity more difficult, allow the program to flip, turn and rotate the shapes once they are cut up. <http://illuminations.nctm.org/Activity.aspx?id=4206>
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| **EVALUATION & REFLECTION** | **Student Engagement:** **Achievement of Outcomes:****Resources:** **Follow Up:** |