 Mathematical creativity

Driving question –How can mathematics be used to be creative?

Task 1 – Researching the mathematics used in art

1. Research three artworks that use symmetry in their designs. Display and annotate the examples in each case to highlight where symmetry is used and what type of symmetry is used.
2. Congruent figures are embedded in a variety of designs, eg tapa cloth, Aboriginal designs, Indonesian ikat designs, Islamic designs, designs used in ancient Egypt and Persia, window lattice, woven mats and baskets. Find three of these examples and describe the mathematics that is featured in each design. This might include using words such as, symmetry, congruence, tessellations or patterns.

Task 2 – Researching the mathematics used in interior design

* Explore the internet or your household for examples of tessellations in tiling designs for bathrooms and kitchens. Find three of these examples and label the shapes used in each using the most correct name for each. Your chosen examples should use a variety of shapes across them.
* Go to <https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Tessellation-Creator/> or use the shapes tool in Microsoft Word to design your own tessellation. Label the shapes used in your design using the most correct name for each.

Task 3 – Design a new logo for your school

* Design a logo for your school using the shapes explored in Stage 4 – Area.
* Your logo should include 5 – 8 different shapes from the topic and use the design principles you have researched in tasks 1 and 2. A repeated shape is not a different shape.
* Your outline of your logo must form a composite shape and it should have an area that is no less than 250cm2 in total but no more than 500cm2. You will need to calculate the area of this composite shape, showing all working out to verify that you have worked within the parameters.
* You must break down the logo into the 5 – 8 different shapes you have chosen and find the area of each one. Be sure to show all working out in your calculations.

Task 4 – How can mathematics be used to be creative?

* Use your research and your experience with the design components of this assignment to write a paragraph to reflect on the driving question, “How can mathematics be used to be creative?”

What to submit:

* An electronic or paper portfolio including:
  + your annotated artworks and designs for tasks 1 and 2
  + your logo design in task 3 on a separate page
  + all relevant calculations for task 3 to demonstrate that it meets the parameters of the assignment
  + Your reflection on the driving question, “How can mathematics be used to be creative?”

Outcomes:

* Use formulas to calculate the areas of quadrilaterals and circles, and convert between units of area MA4-13MG
* classifies, describes and uses the properties of triangles and quadrilaterals, and determines congruent triangles to find unknown side lengths and angles MA4 17MG
* communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols MA4 1WM
* Apply appropriate mathematical techniques to solve problems MA4-2WM
* recognises and explains mathematical relationships using reasoning MA4 3WM

All outcomes referred to in this unit come from [Mathematics K-10 Syllabus](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/mathematics-k-10) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012