Catholic Education Services
Diocese of Cairns
Learning with Faith and Vision

2D Shapes (**ACMMG088**) MAG 4.4.6

Draft-This is a work in progress. MAG writing project 2013

Australian Curriculum YR 4

ACMMG088 *Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies*

Key Ideas

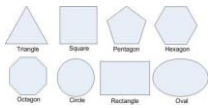
- Manipulates, identifies and sketches two-dimensional shapes, including special quadrilaterals, and describes their features.
- Manipulate, compare and describe features of two-dimensional shapes, including the special quadrilaterals: parallelograms, rectangles, rhombuses, squares, trapeziums and kites.

Resources

- FISH problem solving kit
- Coloured Square
- Copy of triangle template-see activity
- Tangrams Template-see activity
- Origami Instructions

Introductory Activity Process

1) Create a class definition of what '2D means' (two dimensional) in relation to shapes.
2) Brainstorm and list as many 2D shapes the students can name or describe.
3) Discuss the difference between a 'regular' shape and an 'irregular' shape.
- Regular shape = Has all sides and all angles equal

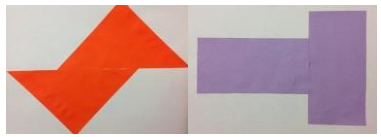


- Irregular shapes = Not all sides and angles are equal;

4) Look around the classroom or take a walk around the school grounds to find other shapes that may have not been listed and find examples of regular and irregular shapes.
5) Investigate and give reasons why a particular quadrilateral has a given name e.g. 'It is a parallelogram because it has four sides and the opposite sides are parallel.
6) Identify regular and irregular shapes into groups. Revise the geometric properties of shapes and how we can classify them - sides, acute/obtuse/right angles, lines of symmetry, parallel lines, straight/curved lines,
7) Draw representations of regular and irregular two dimensional shapes in different orientations.
8) Create a class poster of common 2D shapes and their geometric properties.

Activity Process-Creating shapes

9) Give each student in the class 2 squares of coloured paper. Ask them to describe the properties of the square. What can they see? (regular polygon) Can this square represent anything else?
10) Ask the students to fold the square diagonally in half? What do they see? (2 triangles) Ask the students to fold the square in half vertically? What do they see? (2 rectangles).
11) Instruct the students to cut along the folded lines of their squares and manipulate and glue the two pieces to create a new 2D shape.
12) The students describe the properties of the new shapes and compare these properties to the original properties of the square.

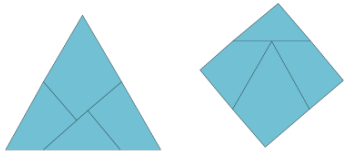


They label their design as a square can be reshaped?
Ask students to consider if the new shape is larger in area or smaller? Is it still a polygon? What kind of polygon is it? (irregular)

13) Discuss that 2D shapes can be broken (split) up into other common shapes and can also be combined to create new shapes and design. Ask students to think of a 2D shapes which is not a polygon. Can they identify why they are not.

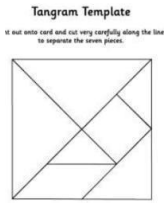
Definition of a polygon: A 2D closed shape with straight lines.

14) Give the students a copy of the triangle that they need to cut out and arrange/transform into a square (Turn a Triangle into a Square)



*www.cutoutfoldup.com/109-**turn**-an-equilateral-**triangle-into**-a-**square**.php*

15) Explain and introduce 'Tangrams' (A Chinese geometric puzzle consisting of a square cut into pieces that can be arranged to make various other shapes).
16) Print out the 'Tangram' templates - either in colour or black and white. Students cut out very carefully along the lines. Now use the seven pieces to make "pictures" - either inventing their own or using the examples from the website below.
*www.**activity**village.co.uk/**tangram_puzzles**.htm*



17) Using a square piece of paper, students draw straight sided polygons to create their own tangram. Students cut out

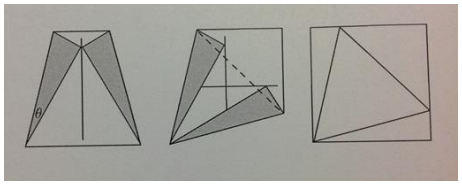
the shapes and give it to a partner to put back together.
Alternative: Experiment creating their own pictures or designs using these pieces.

Extensions and Variations

Folding Equilateral Triangles in a Square Investigation

Students are asked to find a way to fold an equilateral triangle from a square piece of paper. Then the challenge of finding the largest possible equilateral triangle that can be folded from a square is given. Of course, students need to prove that their conjectured triangle is the largest possible.

*www.pbs.org/newshour/extra/teachers/lessonplans/.../equi**triangles**.pdf*

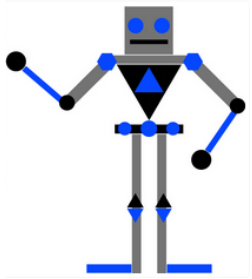


Students insert a photo from an ipad or camera to create their own jigsaw puzzle. Print out and glue image onto cardboard. The students then draw lines onto the image to cut it up into shapes or pieces. Students swap and solve each other's puzzle.

Polygon Robot

Design a robot out of various polygons.

http://eisforexplore.blogspot.com.au/2012/08/frac-geo-bot.html



Has the designer only used polygons?

Read Shel Silverstein's poem "Shapes" aloud to students. As they listen, have them follow along at their desk with a set of paper shape cutouts (rectangle, square, triangle, circle, as well as a couple of other shapes not included in the poem). Afterwards, have them retell key details from the poem in order, using their cutouts to help guide them. (What fell from the sky? Who went to the hospital? Who rolled him there? etc.)

Ask students to identify any shapes that are not regular polygons.

Ask learners to create their own shape poem (make a collaborative list of the poems format. Eg has 9 lines, shapes names are coloured, is about 4 shapes etc) involving any four shapes they'd like. Encourage them to choose at least one shape that wasn't in Silverstein's poem.

Adapted from
http://eisforexplore.blogspot.com.au/2013/01/keerplunk.html

Assessment

foci could include:

Mathematics Learning Journal work Nature and quality of written work	
Changing and manipulating a common shape into various forms. Mathematical skills	
Ability to classify and describe properties of various regular and irregular shapes. Explanation of mathematical thinking	
Use of generalisation	
Re-creating an chosen picture using the tangram templates. Use of problem solving strategies	
Organisation	
Involvement in class discussions, group activities and pair tasks.Interaction with others	
Use of time	
Engagement	
Persistence	
Confidence	
Other	

Background

It is important for students to have experiences with a variety of shapes in order to develop flexible mental images. Students need to be able to recognise shapes presented in different orientations.

Links to other MAGs