Year 4 - Mathematics - Learn from home timetable

Big Idea Concept: Combining 2D Shapes

I Can

- combine common two-dimensional shapes, including special quadrilaterals, to form other common shapes or designs
- describe and/or name the shape formed from a combination of common shapes
- follow written or verbal instructions to create a common shape using a specified set of two or more common shapes

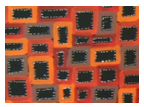
Australian Curriculum Connection: MG 4.6 Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies

Monday	Tuesday	Wednesday	Thursday	Friday
Launch & Tune In 1. Using Shapes Loop Cards cut up into two separate groups, one group shapes the other the description. 2. Play fish (dealing each player, 5 description cards and five shapes cards) This game can be time limited and the person with the most matches after a specified period of them is the winner.	**Launch & Tune In** Using Shapes Loop cards from Monday, play concentration. Matching the description of the card with the shape. This game can be time limited and the person with the most matches after a specified period of them is the winner.	**Launch & Tune In** Shapes 1 Game Create your array of shapes following the directions on the cards. (Resource at bottom of timetable.)	**Launch & Tune In** Challenge question from the Shapes 1 game. Or replay games from Monday, Tuesday or Wednesday.	**Launch & Tune In** Challenge question from the Shapes 1 game. Replay games from Monday, Tuesday or Wednesday.

Vocabulary in Mathematics

shape, two-dimensional shape (2D shape), triangle, quadrilateral, parallelogram, rectangle, rhombus, square, regular, irregular, complex, polygon, trapezium, kite, pentagon, hexagon, octagon, line (axis) of symmetry, reflect (flip), translate (slide), rotate (turn), tessellate, clockwise, anti-clockwise, half-turn, quarter-turn, three-quarter-turn

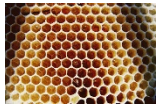
In Stage 1, students referred to the transformations of shapes using the terms 'slide', 'flip' and 'turn'. In Stage 2, they are expected to progress to the use of the terms 'translate', 'reflect' and 'rotate', respectively.

Conceptual Development **Focus – What is a plane shape?**    (Enlarged pictures in resources below) 1. Display Indigenous artefacts and paintings and ask student what kinds of shapes they see. 2. Students choose a typical shape to draw by hand from artwork they have viewed. E.g. circles, triangles.	**Conceptual Development** **Focus – Shapes can be simple or complex** 1 Using the geoboard template draw a triangle. Describe this simple shape with three sides (line segments) as a polygon. This lesson today focuses on the correct use of terms for polygons. 2. Further divide the shape with additional line segments.	**Conceptual Development** **Focus Exploring Tangrams** A tangram is a Chinese puzzle consisting of a square cut into five triangles, a square, and a rhomboid, which can be combined to form a great variety of other figures and shapes. Yesterday we used the pieces of a tangram to make regular, complex and irregular shapes. Today we are going to explore using tangrams to make manufactured shapes and to solve puzzles.	**Conceptual Development** **Focus - Making 2 D Shapes** Review the definition of a 2D shape with students. **Activity – What's my Shape** 1. Hand out a piece of A4 paper. Adult models folding the paper from top down to the bottom (hot dog fold) asking student to do the same. 2. Hold the paper up and ask student what shape has been formed? A rectangle. What are	Conceptual Development **Focus - Using 2D shapes to form other shapes.** 1. Investigate and define quadrilateral, trapezium, parallelogram, rhombus. Make up a definition card for each shape. E.g. Quadrilateral – quad means four, four what? Have you ever heard the term before? What else is in the word to help us? Lateral means sides – so a quadrilateral is a four-sided, closed shape. Write a

3. Choose drawings and ask student to describe the shape with words e.g. curved, angular, flat, natural…
Discuss why the shapes they've drawn and the shapes in the indigenous artefacts do not look like they were manufactured. (geometric)

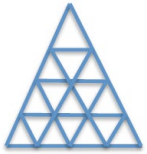
Silas Roberts, first Chairman of the Northern Land Council, described indigenous peoples' relationship with nature as seeing themselves as part of nature. *'We see all things natural as part of us.'*
Discuss how this idea has had an impact on indigenous artwork. (artefacts supplied and other examples can be used to illustrate this.)

5. Natural shapes can be **organic** i.e. based on living things e.g. plants, animals or they can be **inorganic** - i.e. based on non-living things e.g. stones, water, clouds.

Manufactured shapes are often **congruent**, i.e. based on squares, circles and triangles as seen as **regular** shapes.

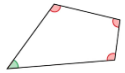
Natural shapes are often **irregular**, (incongruent) with flowing and rhythmical lines.



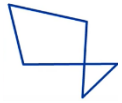
Discuss the effect of further dividing the shape with additional line segments. Which other shapes can this be done with?
3. Repeat steps one and two above to explore simple, irregular and complex polygons in the same way. Which of these polygons is harder or simpler to divide?

Definition – a **regular polygon** is a two-dimensional shape that is made up of straight lines and has equal sides and angles e.g. square, rectangle, octagon, hexagon.
Note: a circle has a curved side and thus is not a  polygon.

An **irregular polygon** is a two-dimensional shape that has straight sides but doesn't have equal sides or angles.

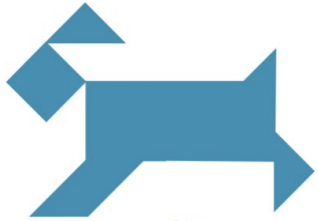


Complex polygon is a polygon whose sides cross over each other one or more times.
e.g.



Using only the 7 shapes from your tangram. Make these shapes.


Cat


Dog

the properties of a rectangle? (It has two short sides and two long sides. It is a regular polygon.)
The edges of this shape are formed by straight lines. The lines form a **closed** shape.
3. Unfold the paper and rotate the paper so that the long edge is at the top.

4. Adult folds the paper top left-hand corner down to meet the bottom edge, correctly aligning the vertices to make a triangle. Trim off the excess rectangle on the right-hand side. Still folded, ask What shape the paper now - Student places one finger on a vertex and rotates the shape 90%. Ask what shape is it now (still a triangle) but what has changed about the shape? Keeping the finger on the same vertex, rotate a further 90% and discuss the effect of the rotation of the shape.

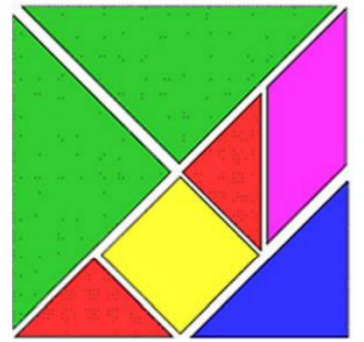
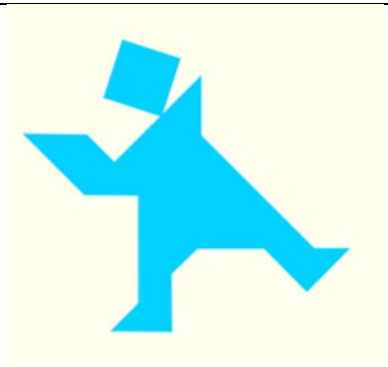
5. Ask the student how the paper can be made into a square? Placing one finger on any vertex, rotate the square 90% - discuss the change in the shape. By rotating the square on its' vertex, when does it become a diamond?

Challenge:
Investigate how I can fold a square so that I make a pentagon.

definition in students' own words and draw and illustration.
Quadrilaterals fit into the broader family of polygons. Record in learning journal.

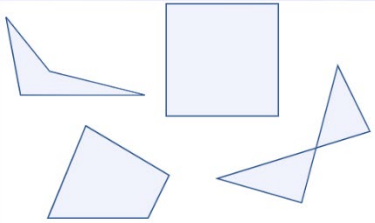
Repeat for trapezium, polygon – regular, irregular and complex (definitions of polygons in Tuesday's lesson) and parallelogram and rhombus.

2. Using tangram shapes can you make a trapezium, parallelogram, rhombus or quadrilateral?

6. Discuss the meaning of the words in bold type as applicable to mathematics and find an example of each term. Go for a shape hunt around your house and take a photo of organic, inorganic and manufactured shapes around your house and yard. 7. Ask student to consider the artwork supplied (or some that the student has found) and look for examples of natural shapes in the artwork.	4. Look at these shapes, can you see the polygons that have been used to make the square?  5. Cut out the shapes from the supplied materials. Can you make simple, complex and irregular shapes using your pieces?			
Learning Journal Make a collage of the pictures you have collected around your home and yard, as you sort them into their categories – organic, inorganic and manufactured. Write a short paragraph about the shapes included in the collage and your learning about the shapes.	**Learning Journal** Glue an example of either a complex or irregular shape you have made using your tangram pieces. E.g. Can you make a rectangle using all the shapes. Describe or name the shape you have created.	**Learning Journal** Make a tangram figure of your own and draw the solution to one of the supplied tangram figures.	**Learning Journal**	**Learning Journal** Record the written definitions of quadrilateral, trapezium, regular polygon, irregular polygon, complex polygon and rhombus from above work.

Definitions Glossary:

Quadrilaterals



Quadrilateral just means "four sides" (*quad* means four, *lateral* means side).

A Quadrilateral has four-sides, it is **2-dimensional** (a flat shape), **closed** (the lines join up), and has **straight** sides.

Definition of

Parallelogram

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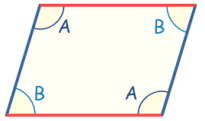
A flat shape with 4 straight sides where **opposite sides are parallel**.



Also:

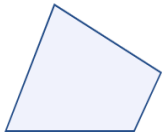
- opposite sides are equal in length, and
- opposite angles are equal (angles "A" are the same, and angles "B" are the same)

NOTE: Squares, Rectangles and Rhombuses are all Parallelograms!

Definition of

Trapezium

more ...



A flat shape with 4 straight sides NONE of which are parallel.

(Called a trapezoid in the UK. Both US and UK definitions of trapezium and trapezoid are swapped over.)

Definition of

Rhombus

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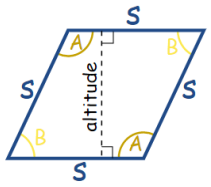
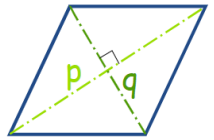
A flat shape with 4 straight sides that are all equal length.

Also opposite sides are parallel and opposite angles are equal.

It is a type of parallelogram.

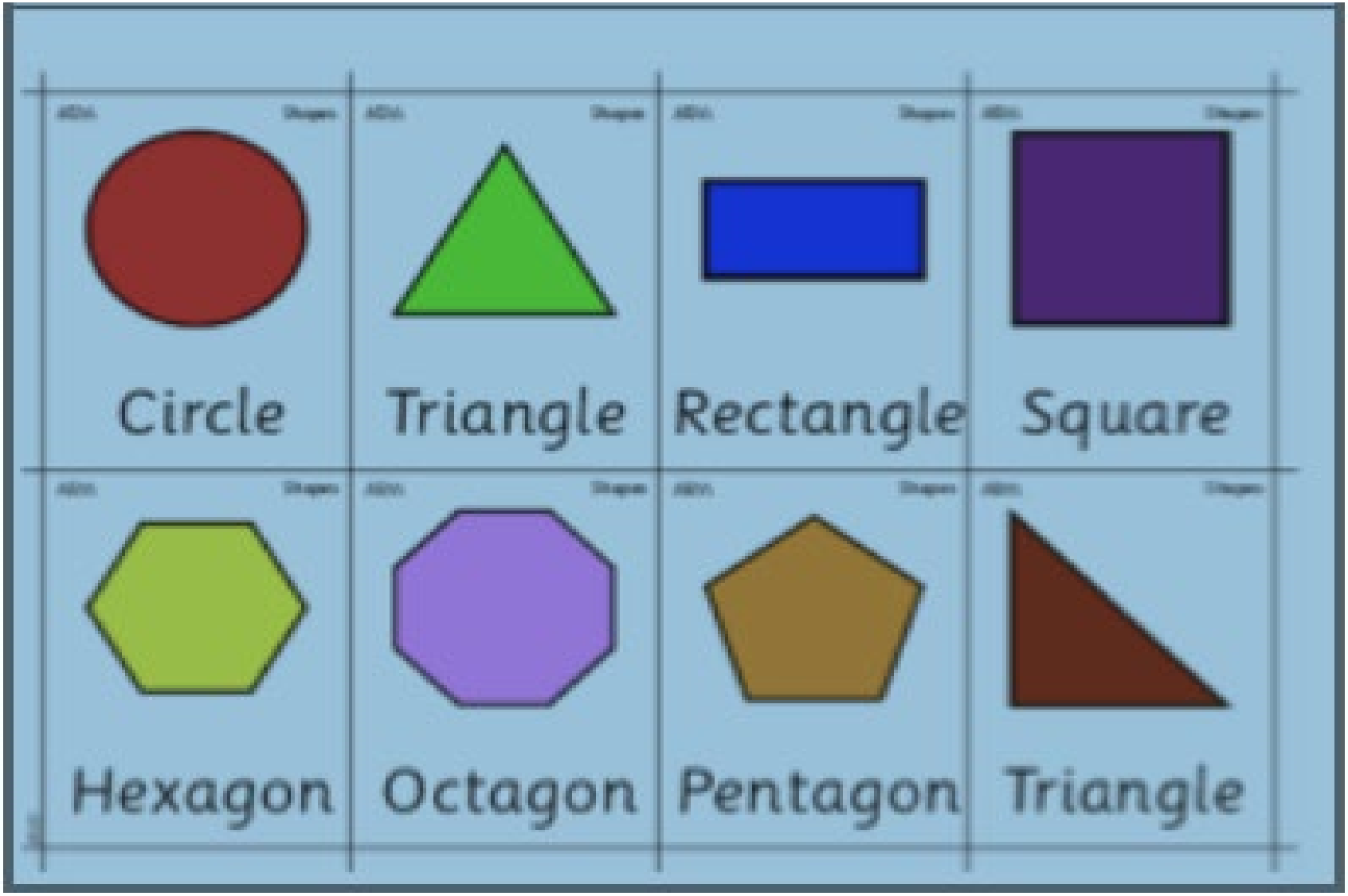




Shapes 1 Game

Instructions:

Cut the shapes into separate squares. Student then assembles shapes according to directions. These may be written or spoken.



Directions for Shapes 1 Game

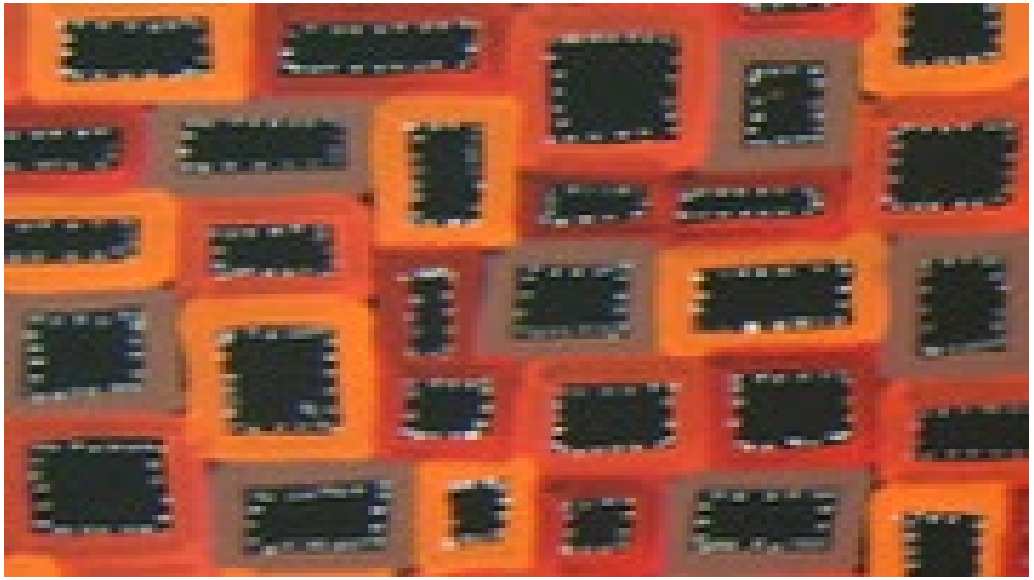
These may be given as a second set of cards for the student to follow independently or may be read to the student for assembly.

Shapes 1 Direction Cards You will need 8 direction cards and 8 shapes cards cut up into individual pieces.	1. You will need the 8 shapes cards	2. Arrange the shapes cards into a square with a space in the middle. (3 cards across the top and bottom and 3 cards down each side.)	3. The three-sided shapes are in the top corners
4. The four-sided shapes are in the bottom corners	5. The hexagon is to the right of the triangle with the three equal sides.	6. The pentagon is to the left of the shape with the four equal sides.	7. The circle is above the square
8. The octagon is opposite the circle.			

Challenge: Can you write a new direction to add to/ or replace a card in the above set?

Resources for Printing via download

Geoboard (multiple copies of the geoboard will be required)



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