Ready-Ed Publications

Ebook Code: RENZ0013

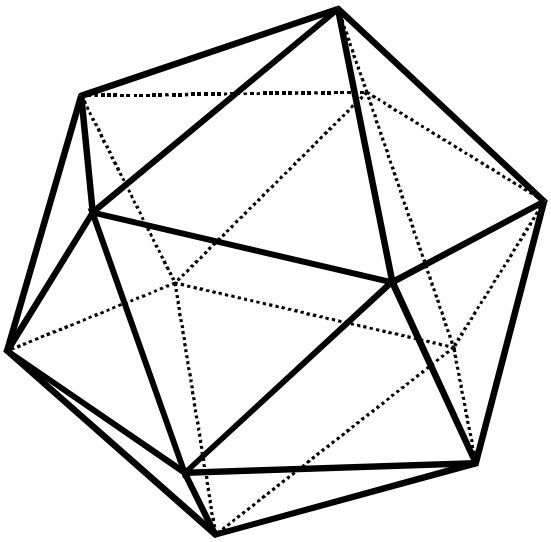
PHOTOCOPY MASTERS

The Shapes & Spaces Series

Book 3 - For 10 Years+

SHAPES AND SPACES

FOR UPPER PRIMARY STUDENTS



Written by Jane Bourke. Illustrated by Melinda Parker. © Ready-Ed Publications - 2009.
PubLished by Ready-Ed Publications (2009) PO Box 276 Greenwood Perth Australia 6024
E-mail: info@readyed.com.au Web Site: www.readyed.com.au

ISBN 1 87397 228 5

CONTENTS

Teachers' Notes 4
Neighbourhood Network 5
Where am I? 6
Networks 7
Traversable Networks 8
Symmetry in 2 D Shapes 1 9
Symmetry in 2 D Shapes 2 10
Symmetry and Regular Polygons 11
Point Symmetry of 2D Shapes 12
Rotational Symmetry 13
Features of 2 D Shapes 14
Patterns in Shapes 15
Tessellating Shapes 16
Tessellations 17
The Tangram 18
Tangram Pictures 19
Prisms 20
Pyramids 21
Cylinders and Cones 22
Spheres 23
Properties of 3D Shapes 24
Cross Sections of Shapes 1 25
Cross Sections of Shapes 2 26
Regular Polyhedrons 27

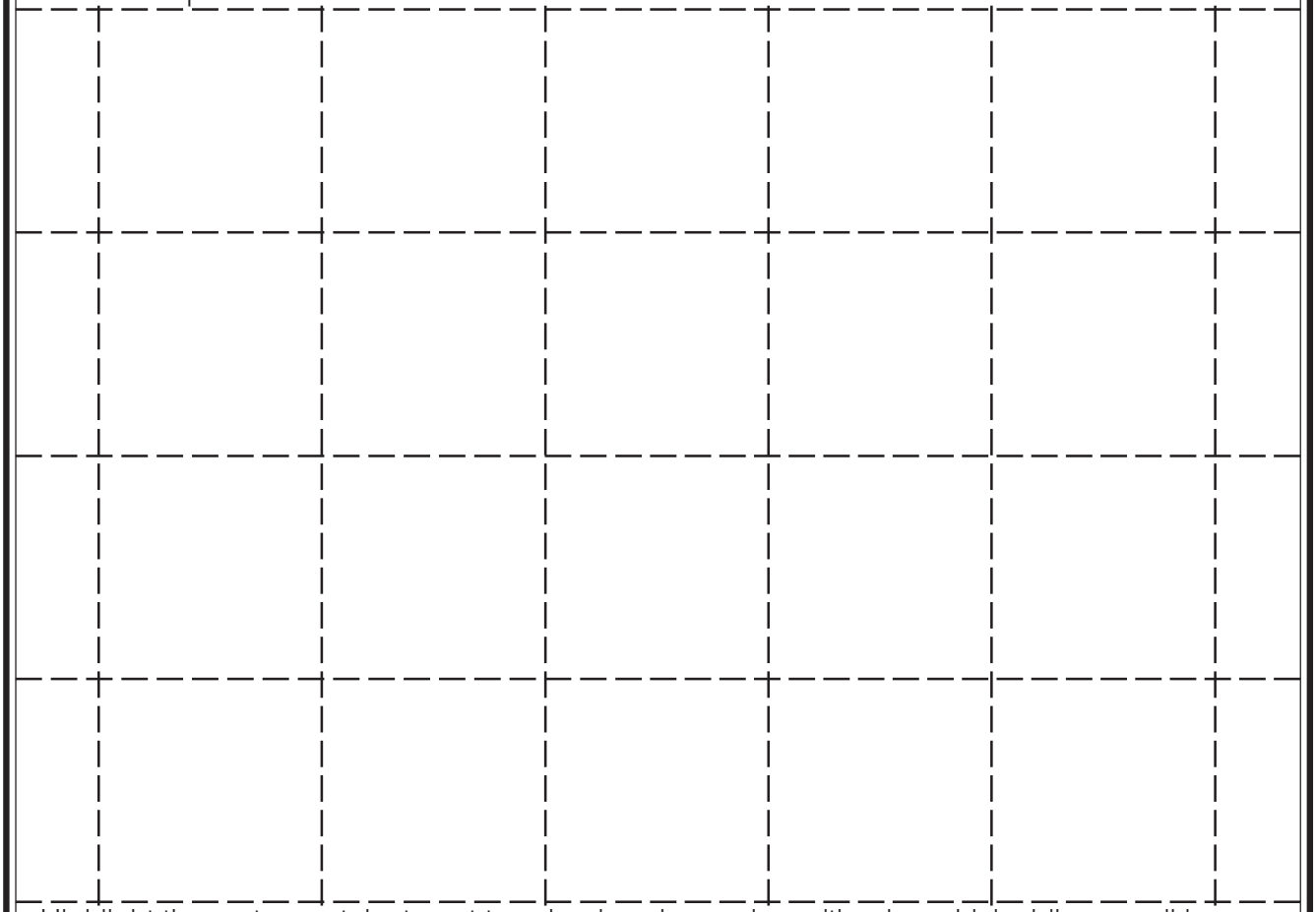
Nets for 3D Models

The Cube 28
The Cube Networks 29
The Tetrahedron 30
The Hexahedron 31
Square Based Pyramid 32
Hexagonal & Octagonal Pyramid 33
Rectangular Based Pyramid 34
Irregular Pyramid 34
Rectangular Prism 35
Triangular Prism 36
Triangular Prism Nets 37
Hexagonal Prism 38
Cylinder and Cone 39
Pentagonal Prism 40
The Octahedron 41
The Dodecahedron 42
The Icosahedron 43
Reflectional Symmetry 44
Rotational Symmetry 45
Answers 46

Neighbourhood Network

❑ Using the grid below, draw a detailed map of where you live in relation to your school. Include roads and other buildings such as friends' houses, shops and parks. Draw your diagram to scale. For example one square could equal 100 metres, or if you live further away, one square could equal one kilometre.

Scale: 1 square = ...



Highlight the route you take to get to school each morning, either by vehicle, bike or walking.

❑ Describe in words the path you would take to get to your friend's house from your school.

.....

.....

.....

.....

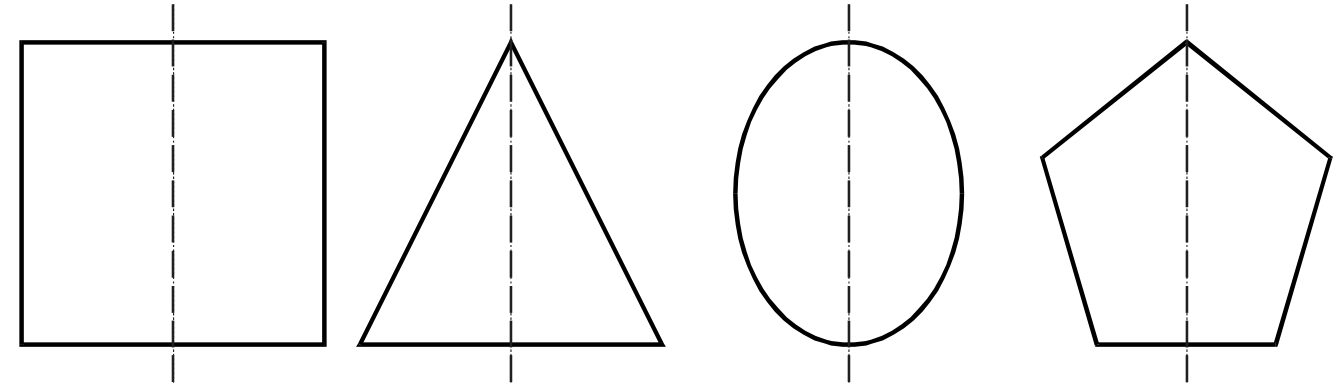
.....

.....

Challenge:
Find the location of your house in a street directory and ask your teacher if you can photocopy the page. Highlight the different routes you could take to get to your school.

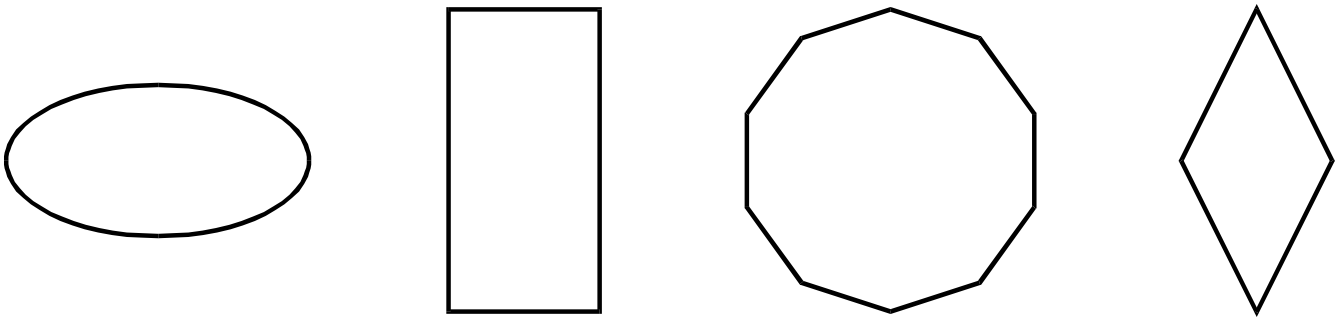
Symmetry in 2 D Shapes 1

A shape has line symmetry if both its parts match when it is folded along a line.
The shapes below have line symmetry.

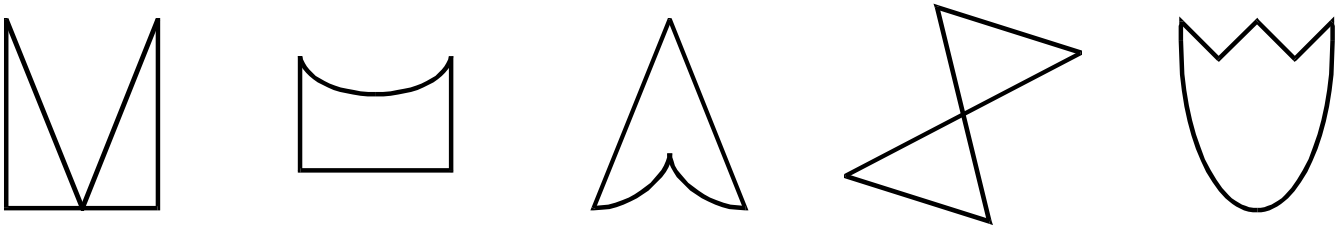


❑ In two of the shapes above, another line of symmetry can be drawn. Mark these lines onto the shapes.

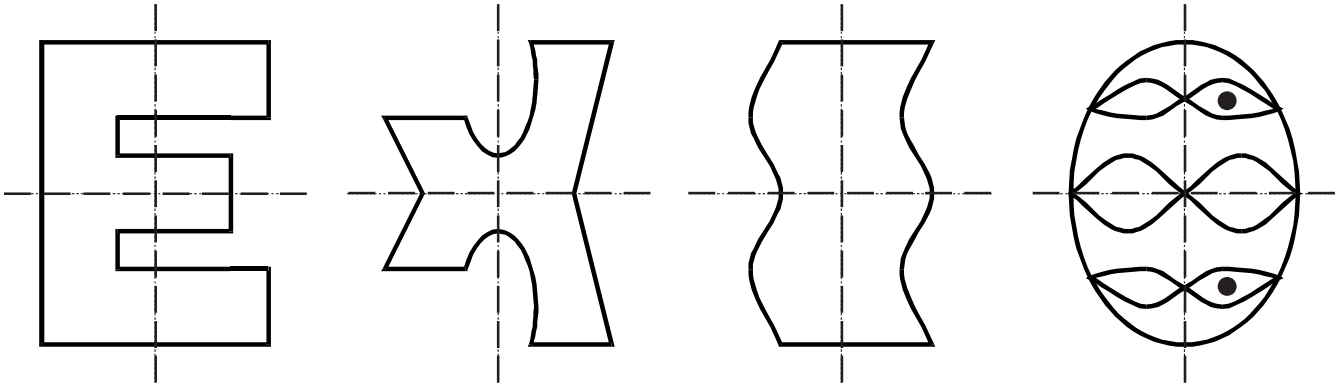
❑ Show all the lines of symmetry on each of the shapes below.



❑ Mark the lines of symmetry onto the irregular shapes below.

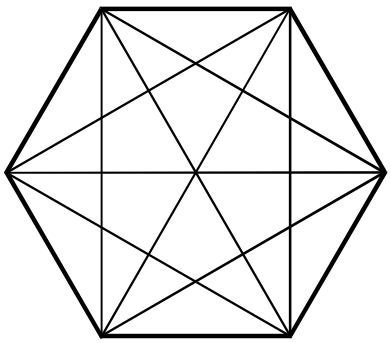


Some lines have been marked on these shapes, yet only one line is the line of symmetry. Trace over the correct line in red.



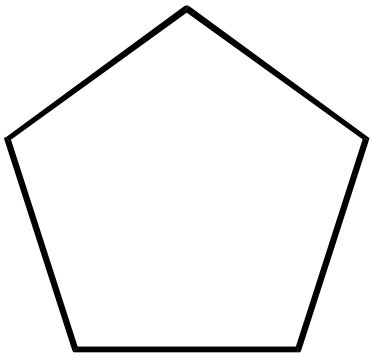
Patterns in Shapes

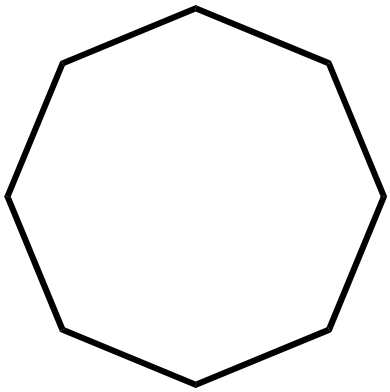
❑ In the hexagon below the pattern has been formed by drawing diagonals from each point to all other points. Identify some of the shapes that can be seen.

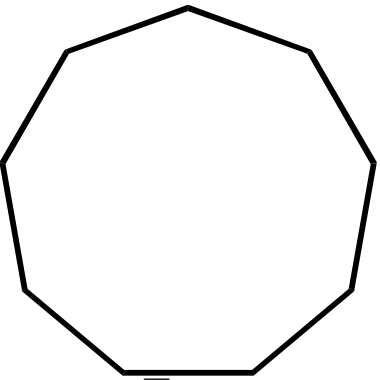


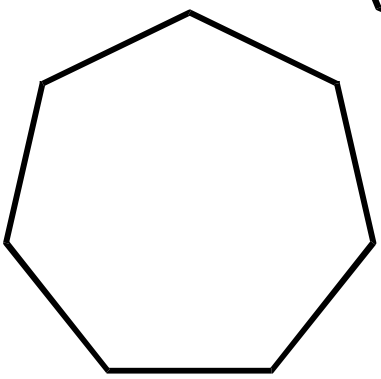
Colour an irregular quadrilateral blue.
Colour a scalene triangle red.
Colour an isosceles triangle green.
Colour a kite shape in yellow.
How many rectangles can you see?
How many diamonds can you find?
How many equilateral triangles can you see?

❑ Draw in the diagonals in the shapes below and then colour in a symmetrical design.



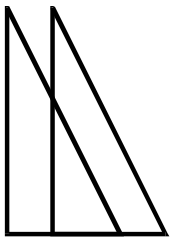


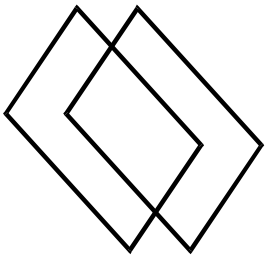




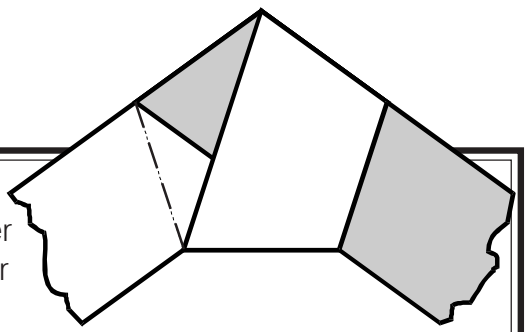
❑ Draw two identical polygons on separate pieces of tracing paper. Place one on top of the other and study the shapes that can be made in the overlap. Try this with three other pairs of polygons.

What did you find?





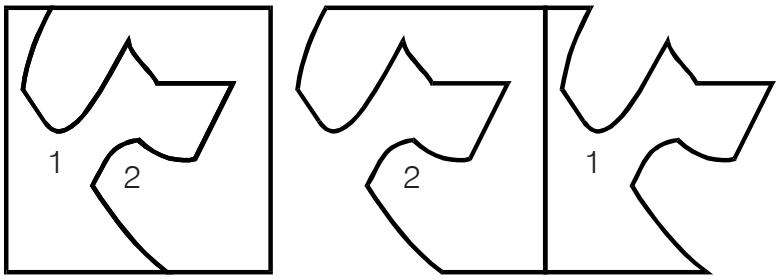
Perfect Pentagon. Construct a regular pentagon by using a strip of ticker tape. Tie a knot loosely in the paper and then tighten and press down flat. Cut off the left over paper and you should be left with a regular pentagon.



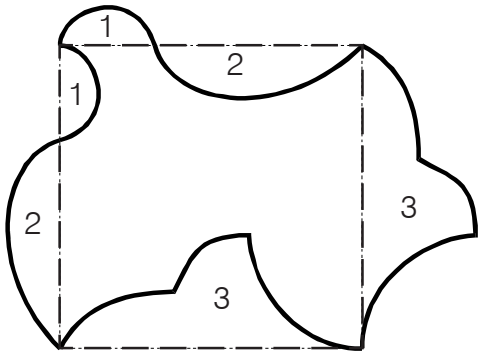
Tessellations

Some irregular polygons will also tessellate.

❑ Make a unique tessellation by designing a shape on a square piece of card. First draw a line of any shape through a square. Cut along this line and then slide one half over the other. Use the shape on the right as a template to make a tessellation on the back of this page.

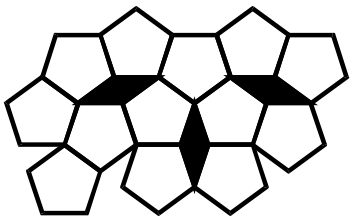


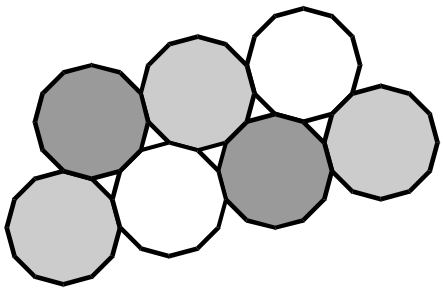
new shape



Challenge: If the original square you used had sides of 5 cm, what will be the area of the new shape you have made?

Some shapes will not tessellate on their own unless additional shapes are used. These are known as semi-regular tessellations.

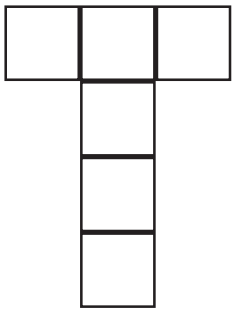


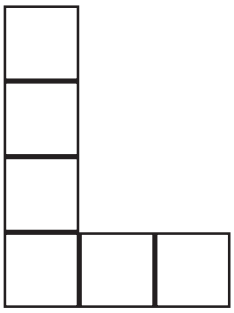


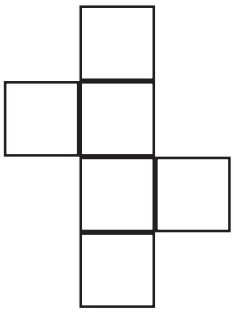
❑ Create a semi-regular tessellation by copying a number of shapes onto card and then tracing around them. Experiment on the back of this page with pairs of shapes and groups of three or more shapes. Create a tiling pattern in the box below and colour the shapes in.

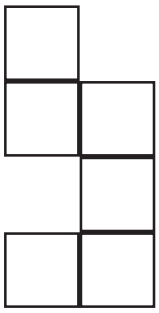
The Cube Networks

❑ Which of these nets can be made into cubes? Tick the ones that work.

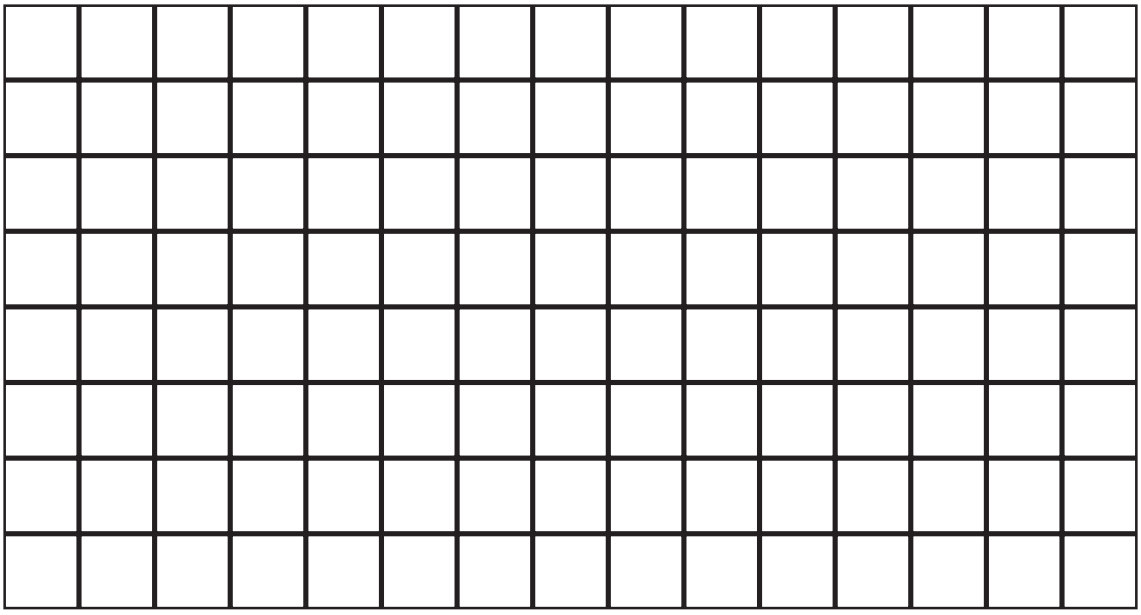
a. 

b. 

c. 

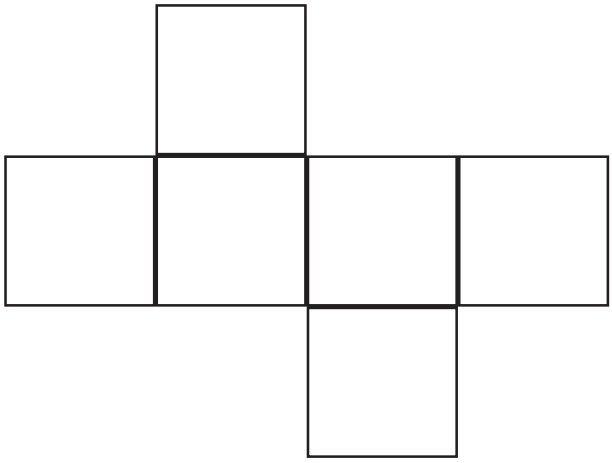
d. 

❑ Design five nets of your own that can be made to form a cube.



Look at the sides of your cube. What do you notice about each of the faces?

❑ Make a different sized cube by cutting out the net below. Use sticky tape to hold it together.



Compare this cube with the larger cube. Are the two cubes congruent or similar?

.....

Explain whether the cubes would be described as congruent or similar.

.....

.....

Extra! Sometimes shapes are known as regular polyhedra as their faces are congruent. If a shape has faces that are not congruent, it is known as an irregular shape.

Is there such a thing as an irregular cube? .....

What is another name for a cube? H ..... .