MATHEMATICS

Y6 Geometry
6710
**Visualise, describe and classify
3-D and 2-D shapes**

Equipment

Paper, pencil, ruler

MathSphere

Concepts

Children should be able to use, read and write the following words:

pattern, shape, 2-D, two-dimensional, 3-D, three dimensional, line, side, edge, face, surface, base, point, angle, vertex, vertices, centre, radius, diameter, net, make, build, construct, draw, sketch,
curved, straight, regular, irregular, concave, convex, closed, open, circular, triangular, hexagonal, cylindrical, spherical, square-based, right-angled, congruent, concentric, tangram, circumference, arc.

They should be able to name, classify and describe the following 2-D and 3-D shapes:

circle, semi-circle, triangle, equilateral triangle, isosceles triangle, scalene triangle, quadrilateral, rectangle, oblong, square, parallelogram, rhombus, kite, trapezium, pentagon, hexagon, heptagon, octagon, polygon, cube, cuboid, pyramid, sphere, hemisphere, cylinder, cone, prism, tetrahedron, octahedron, dodecahedron, polyhedron.

Most of these words are included in the MathSphere Dictionary.

Children should be able to describe the properties of 3-D shapes and refer in their descriptions to perpendicular and parallel faces and edges.

In 2-D work, they should be able to classify the different types of quadrilaterals by criteria such as equal angles, equal length sides, parallel sides and lines of symmetry.

They should know the defining properties of the following shapes:

Parallelogram
Rhombus
Rectangle
Square
Trapezium
Kite

They should begin to discover properties concerning the diagonals of quadrilaterals such as the fact that the diagonals of rhombuses bisect at right angles.

Complete the sentences to describe 3-D shapes, using the following words:

**dodecahedron   edges   faces   four   octahedron   parallel
pentagon   perpendicular   pyramid   rectangles   six   square
three   triangles   triangular   twelve   vertex   vertices**

You may use each word more than once if you wish.

a) A cube has six _____. Each face is a _____ .

Opposite faces are _____ .

Faces next to each other are _____. A cube also has twelve

_____ and at each vertex three _____meet.

b) A _____ prism has five faces, two are triangles and three are

_____. The ends are _____to the sides.

c) A shape with eight faces is called an _____The faces are all

_____. At each vertex _____edges meet.

Altogether there are _____ edges and _____

vertices.

d) A square based _____has one _____ face and

four _____faces.

e) A shape with twelve faces is called a _____. Each face is a

_____ and _____ edges meet at each

_____ . In a regular _____ , opposite faces are

_____.
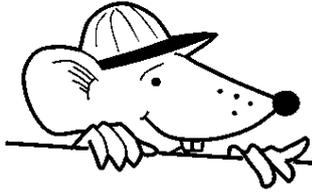
Write in the dotty boxes what you need to do to produce the next shape in the web. One has been done to help you.

Make the other two sides parallel
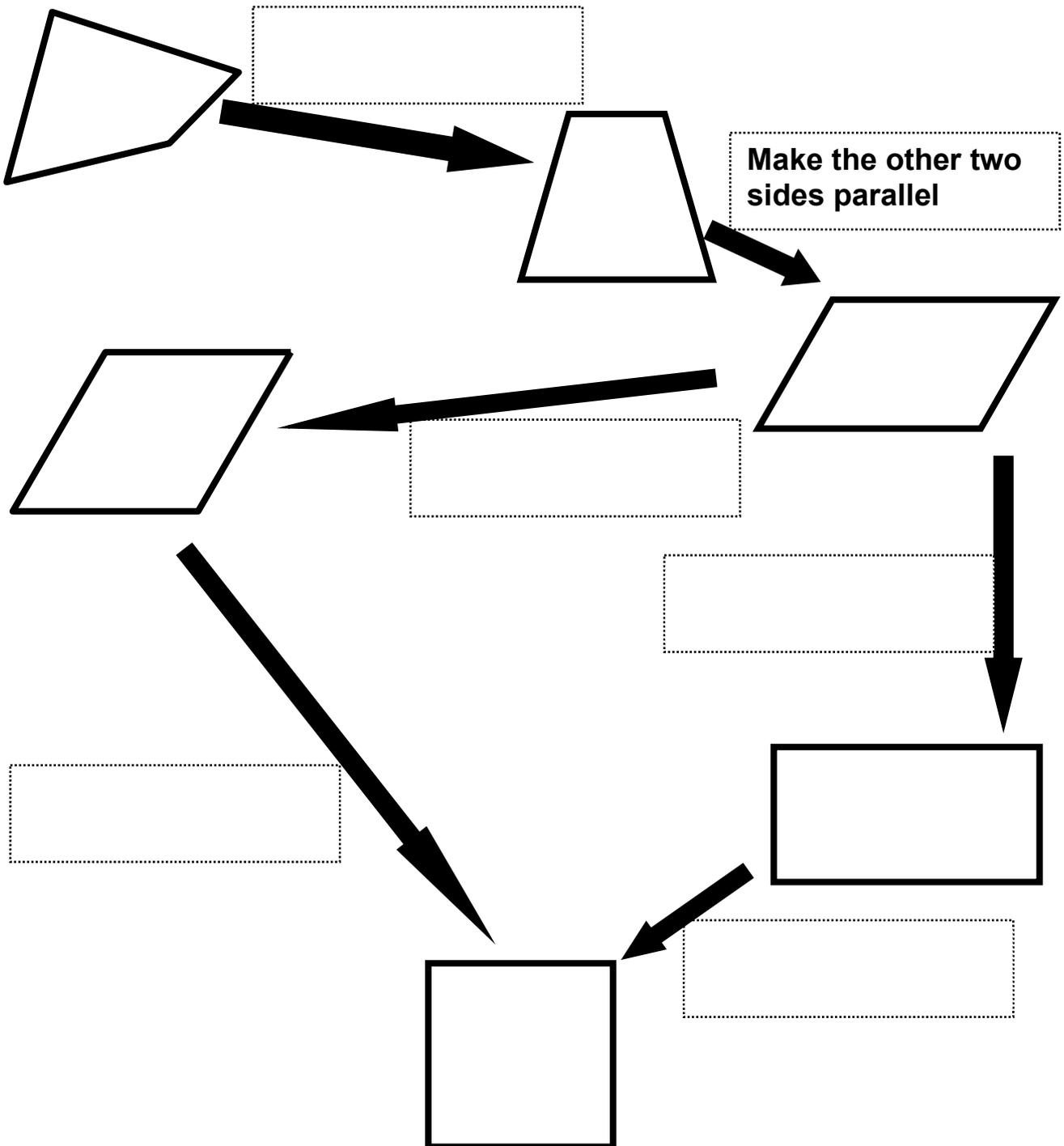
Here are some amazing quadrilaterals.

Astounding, great shapes!!!!!
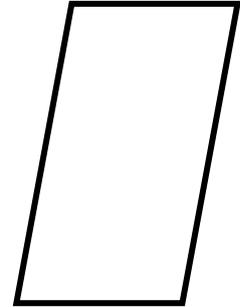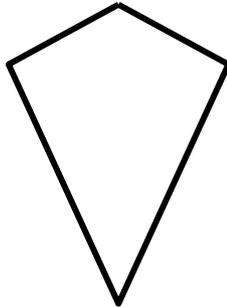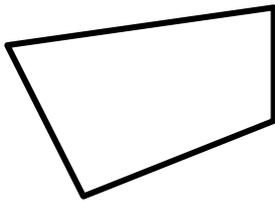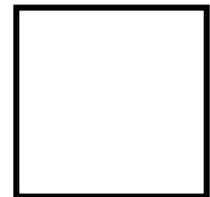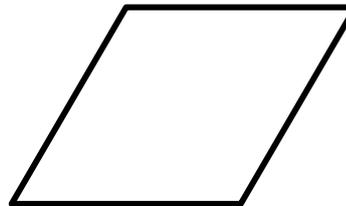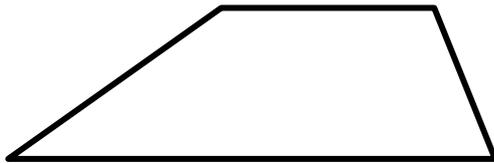
Write the names of the shapes under each one and then answer these questions.

Which shapes have the following properties. Give the correct names of the shapes:

a) Four straight sides.

b) Diagonals cross at right angles.

c) Diagonals bisect each other (cut each other in half).

d) Two or more parallel sides.

e) Diagonals of equal length.

**f)** Adjacent sides are equal.

g) Four right angles.

Two games to play

1) Take as many different 2-D shapes as you need and see if you can make tessellating patterns from them. A tessellating pattern is one in which the shapes are fitted together over and over again with no gaps so that, if you had enough shapes, they would go on forever.

Here are some tessellating patterns, can you make others?
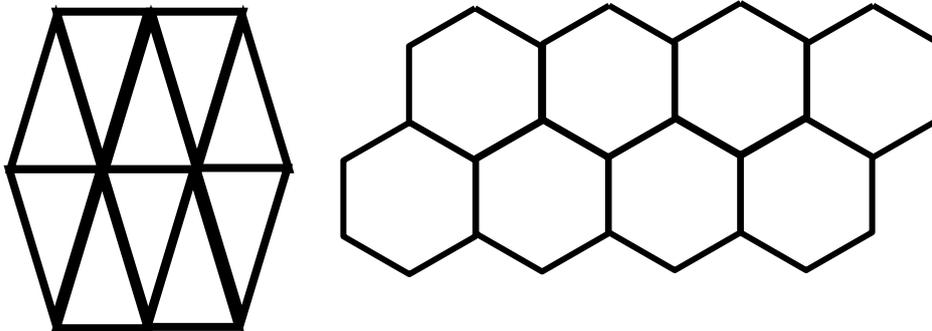
2) Several people each have a pinboard and use elastic bands to make any shapes they like around the pins. They can have as many shapes on pinboard at the same time as they like.

A 'quiz master' thinks of a property of a shape such as 'must have four sides' or 'must be symmetrical' or 'must have at least one right angle'. The quiz master tells the people with the pinboards which shapes conform to the rule and which do not.

The people with the pinboards have to guess the rule. They may change the shapes as much as they want and the quiz master continues to tell them which conform to the rule and which do not until someone guesses the rule. That person then becomes the quiz master and invents a different rule.

Sounds like fun, guys!

Answers

Page 3

a) A cube has six **faces**. Each face is a **square.** Opposite faces are **parallel.** Faces next to each other are **perpendicular.** A cube also has twelve **vertices** and at each vertex three **edges** meet.

b) A **triangular** prism has five faces, two are triangles and three are **rectangles**. The ends are **perpendicular** to the sides.

c) A shape with eight faces is called an **octahedron**. The faces are all **triangles.** At each vertex **four** edges meet**.** Altogether there are **twelve** edges and **six** vertices**.**

d) A square based **pyramid** has one **square** face and four **triangular** faces**.**

e) A shape with twelve faces is called a **dodecahedron**. Each face is a **pentagon** and **three** edges meet at each **vertex**. In a regular **dodecahedron**, opposite faces are **parallel**.

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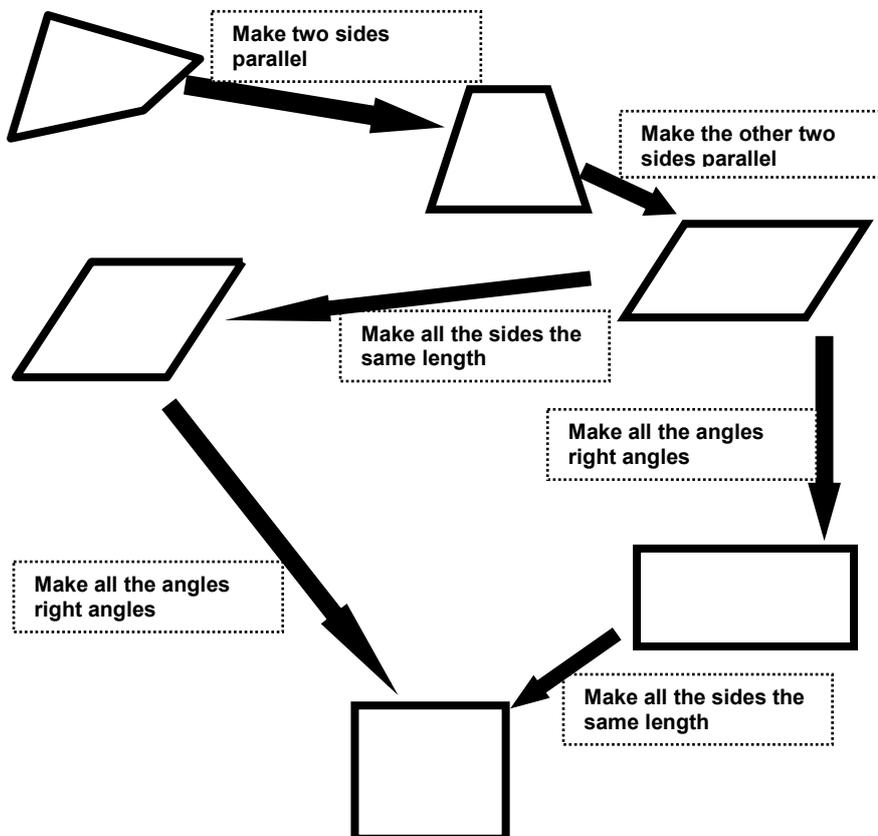
Answers

Page 5

a) All the shapes
b) Kite, rhombus, square
c) Kite, rectangle, parallelogram, rhombus, square
d) Rectangle, parallelogram, trapezium, rhombus, square
e) Rectangle, square
f) Kite, rhombus, square
g) Rectangle, square