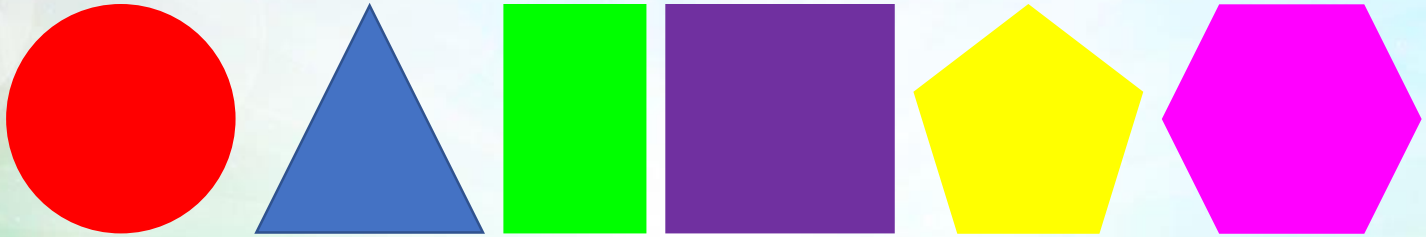
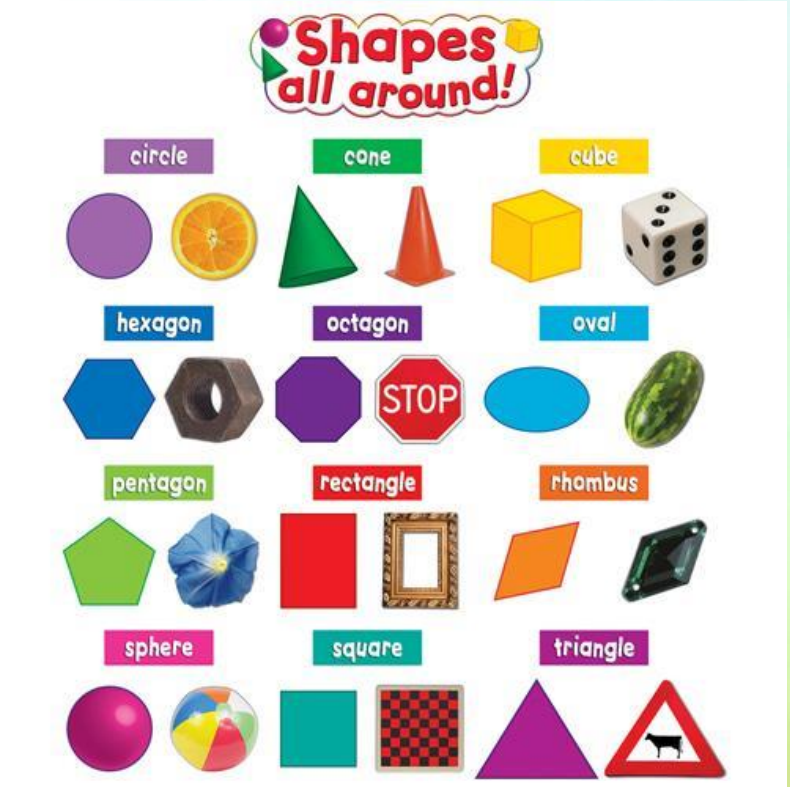


Geometry - Properties of Shape

What do the children need to learn?

By the end of the Foundation Stage

The children explore characteristics of everyday objects and shapes and use mathematical language to describe them.



What do the children need to learn?

National Curriculum Objectives for Year 1

Pupils should be taught to:

- **recognise and name common 2-D and 3-D shapes, including:**
  - **2-D shapes [for example, rectangles (including squares), circles and triangles]**
  - **3-D shapes [for example, cuboids (including cubes), pyramids and spheres].**

What do the children need to learn?

National Curriculum Objectives for Year 2

Pupils should be taught to:

- **identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line**
- **identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces**
- **identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid]**
- **compare and sort common 2-D and 3-D shapes and everyday objects.**

What do the children need to learn?

Objectives for the end of Key Stage One

Working Towards the Expected Standard (WTS)

The pupil can name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres)

Working at the Expected Standard (EXS)

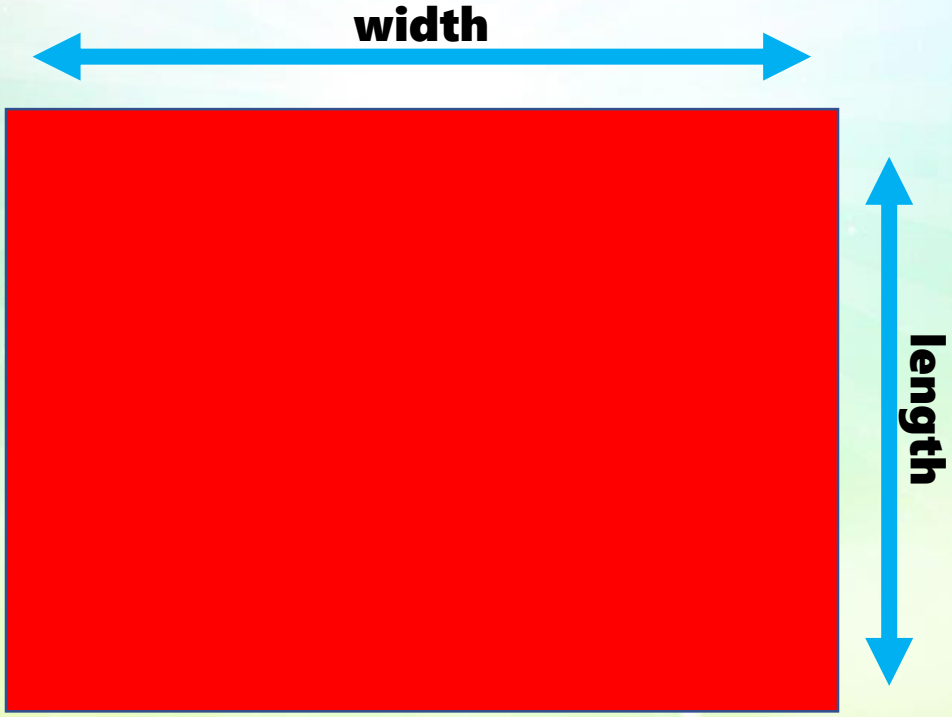
The pupil can name and describe properties of 2-D and 3-D shapes, including number of sides, vertices, edges, faces and lines of symmetry

Working at Greater Depth Within the Expected Standard (GDS)

The pupil can describe similarities and differences of 2-D and 3-D shapes, using their properties (e.g. that two different 2-D shapes both have only one line of symmetry; that a cube and a cuboid have the same number of edges, faces and vertices, but different dimensions)

2D Shapes

- These shapes are flat and can really only be drawn.
- They have two dimensions – length and width.
- We can use them to describe the faces of 3D shapes.



2D Shapes Vocabulary

To describe a 2D shape we use the following vocabulary.

- **Side (straight or curved)**
- **Corner (in Year 2 we also refer to these as a vertex or vertices or angles)**

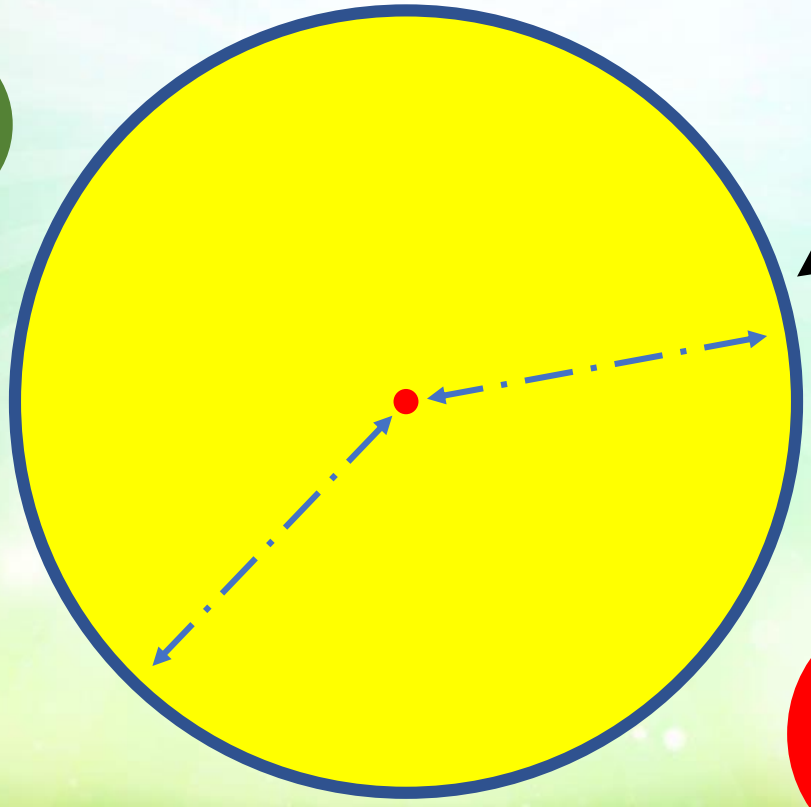
straight side

corner, angle or vertex

curved side

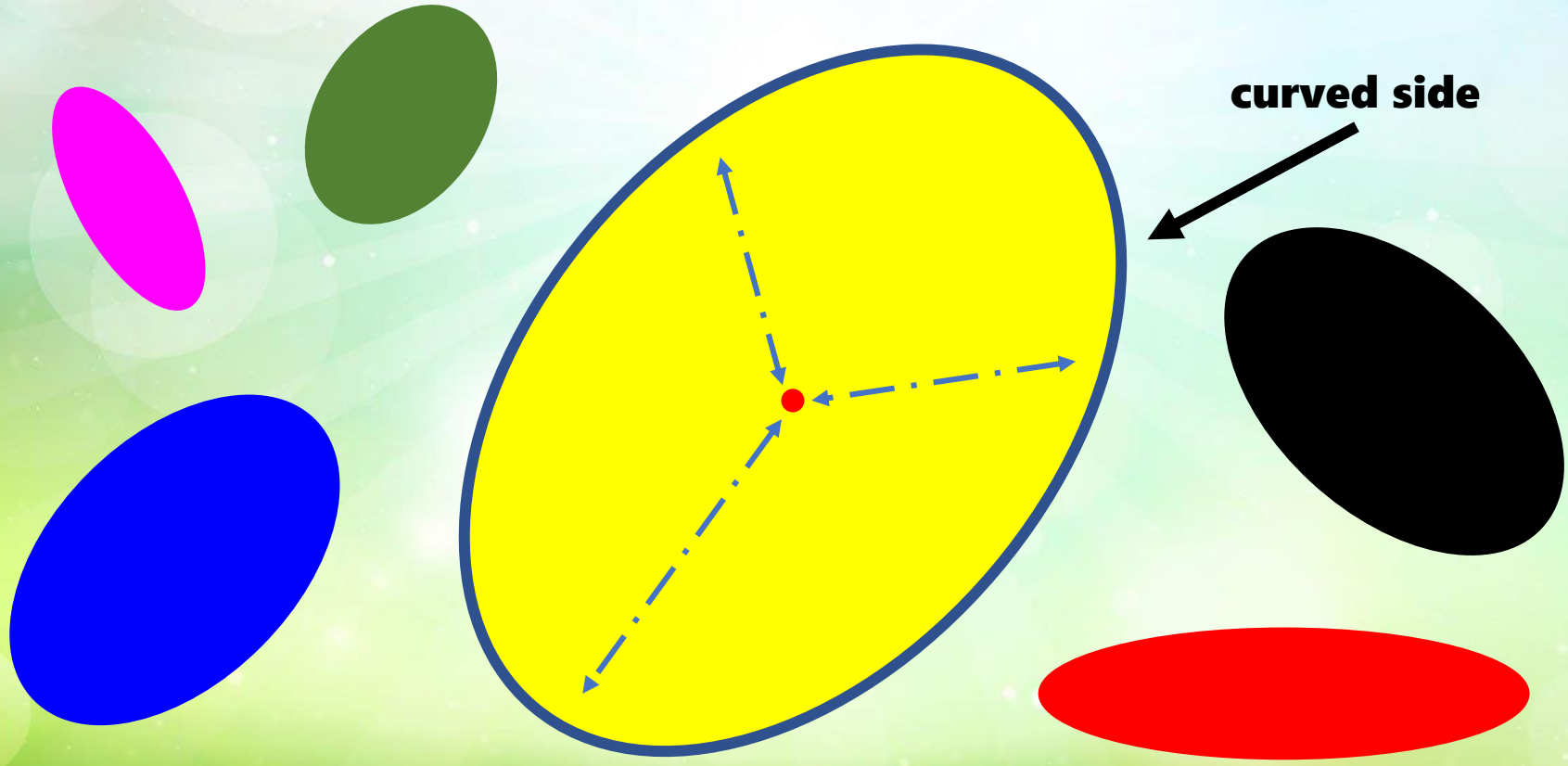
Properties of a Circle

- One curved side
- The distance from the centre to any point on the outside is the same length all the round around.



Properties of an Oval

- One curved side
- The distance from the centre to any point on the outside is not the same length all the way around.



Properties of a Triangle

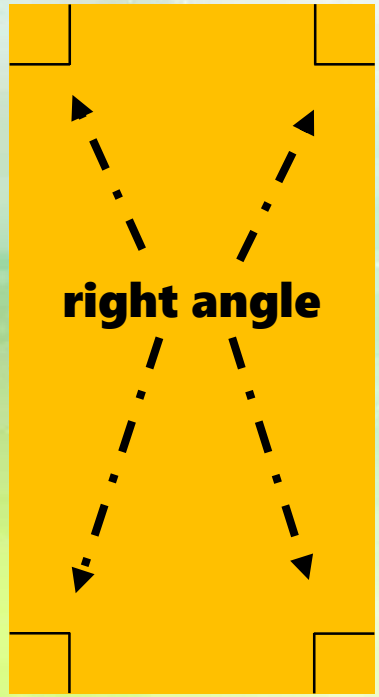
- Three straight sides
- Three corners/vertices/angles
- The sides can be equal or of different lengths

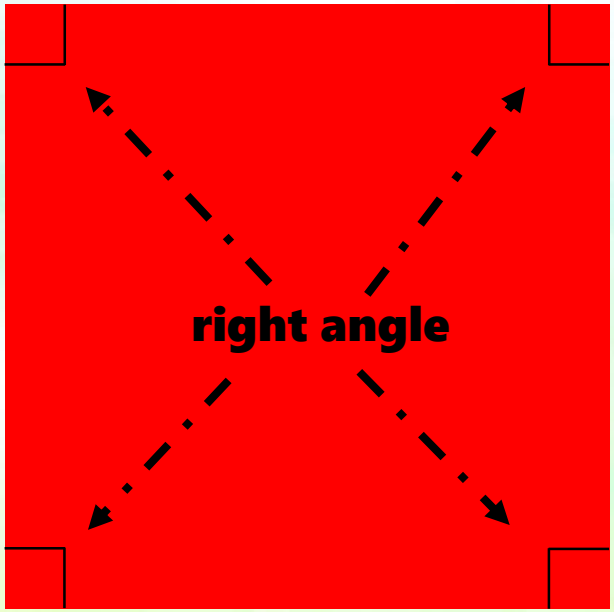
Properties of a Rectangle

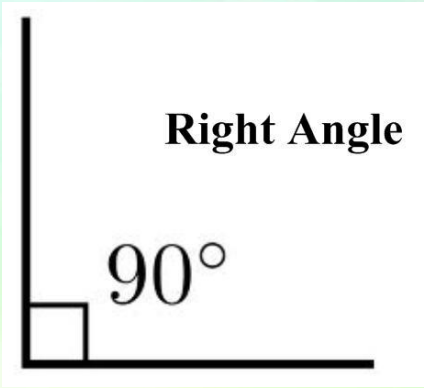
- Four straight sides
- Four corners/vertices/angles
- Two pairs of parallel sides (the distance between each opposite side is the same length)
- Four internal right angles

What is a right angle?

A right angle is where two lines meet to form an angle at 90°. A rectangle has four internal right angles.

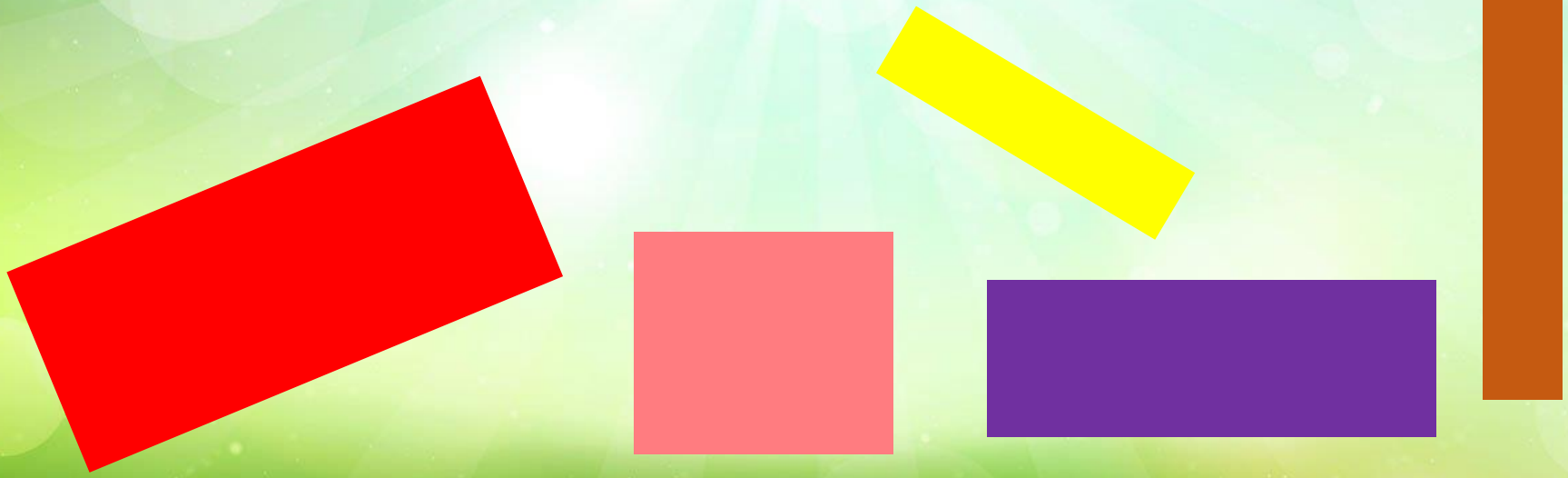






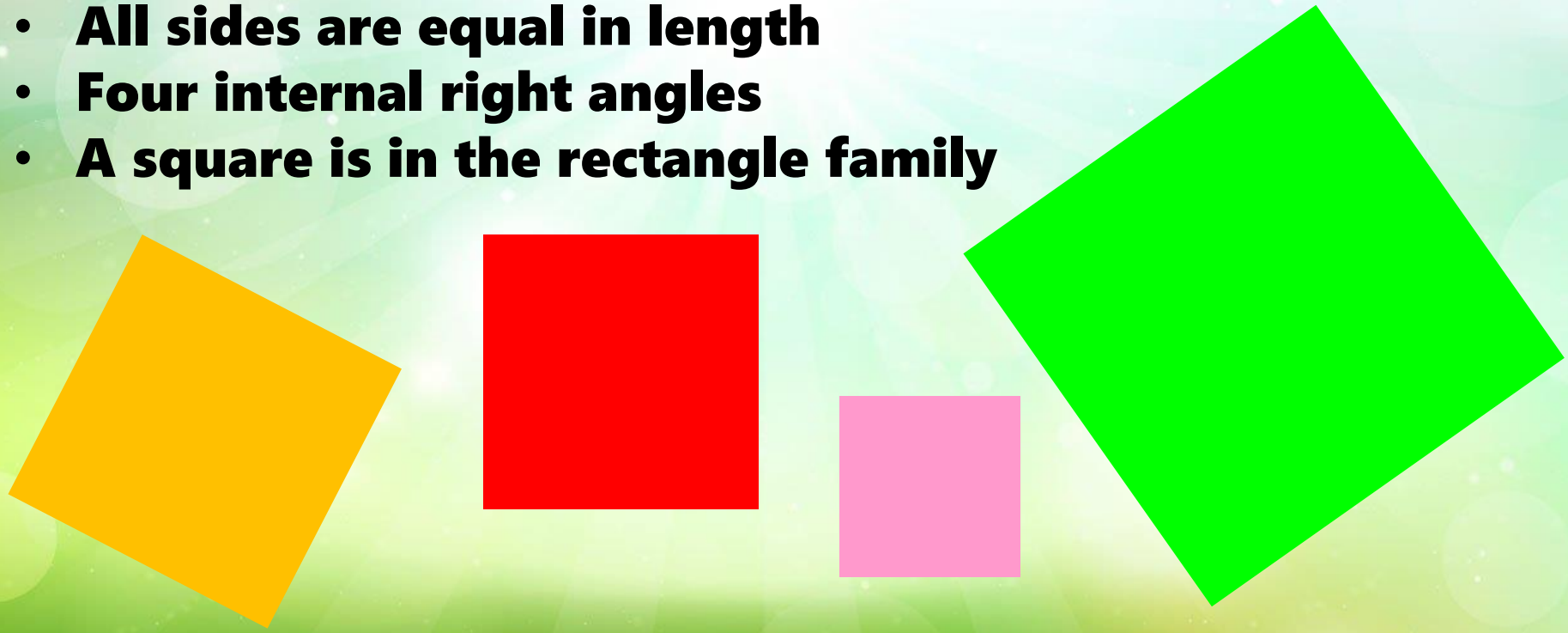
Properties of an Oblong Rectangle

- Four straight sides
- Four corners/vertices/angles
- Two pairs of parallel sides (the distance between each opposite side is the same length)
- Two of the parallel sides are longer
- Four internal right angles
- An oblong is in the rectangle family



Properties of a Square Rectangle

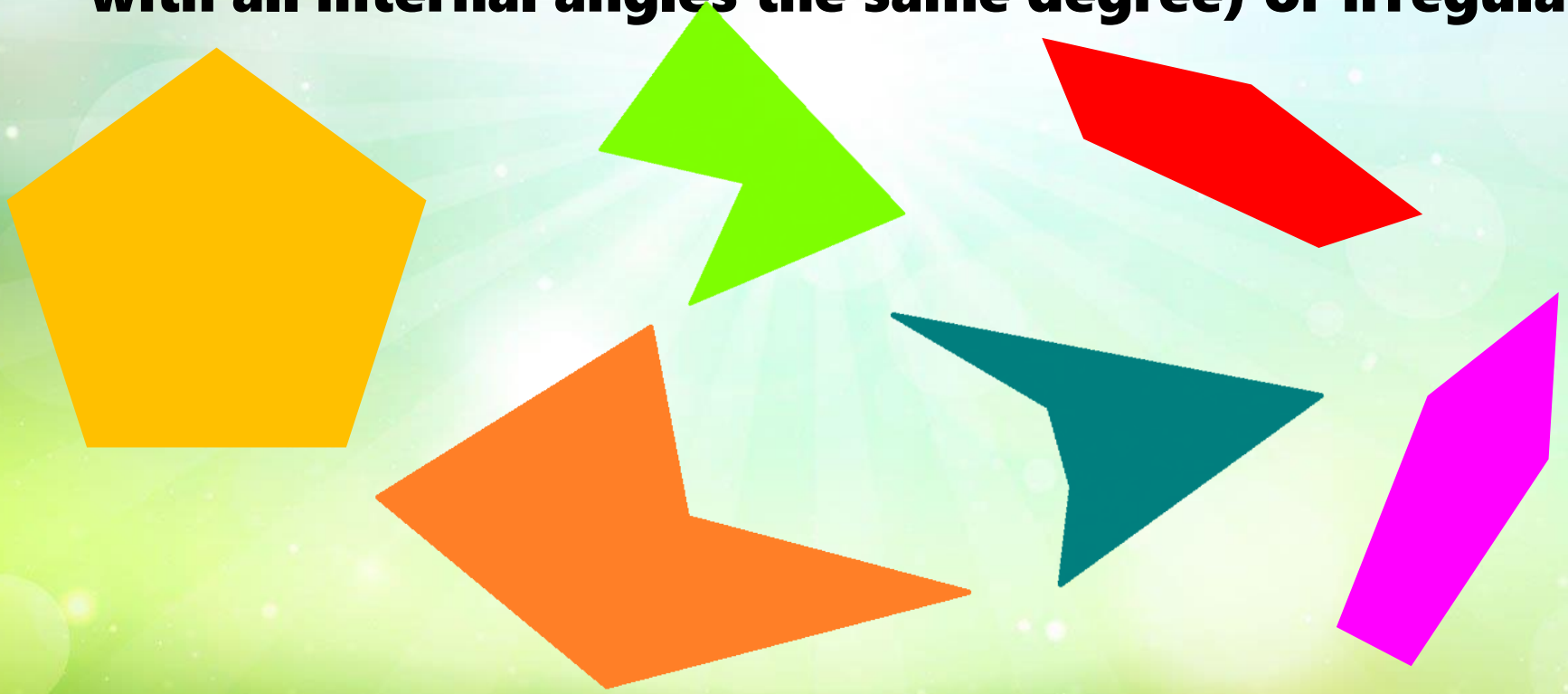
- Four straight sides
- Four corners/vertices/angles
- Two pairs of parallel sides (the distance between each opposite side is the same length)
- All sides are equal in length
- Four internal right angles
- A square is in the rectangle family



Properties of a Pentagon

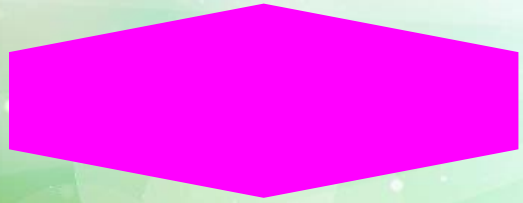
- Five straight sides
- Five corners/vertices/angles

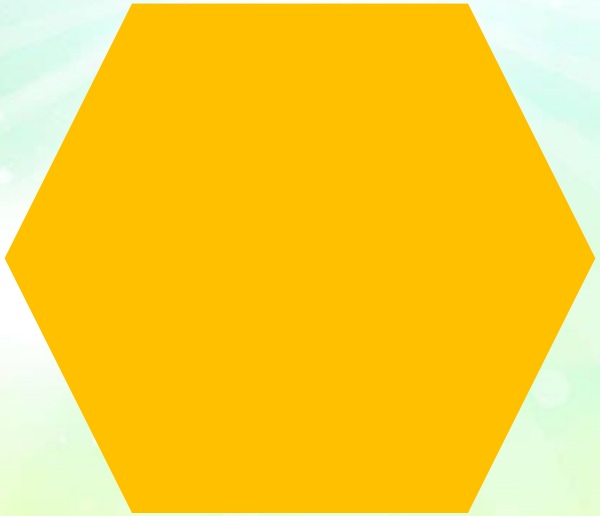
- Pentagons can be regular (all sides the same length with all internal angles the same degree) or irregular



Properties of a Hexagon

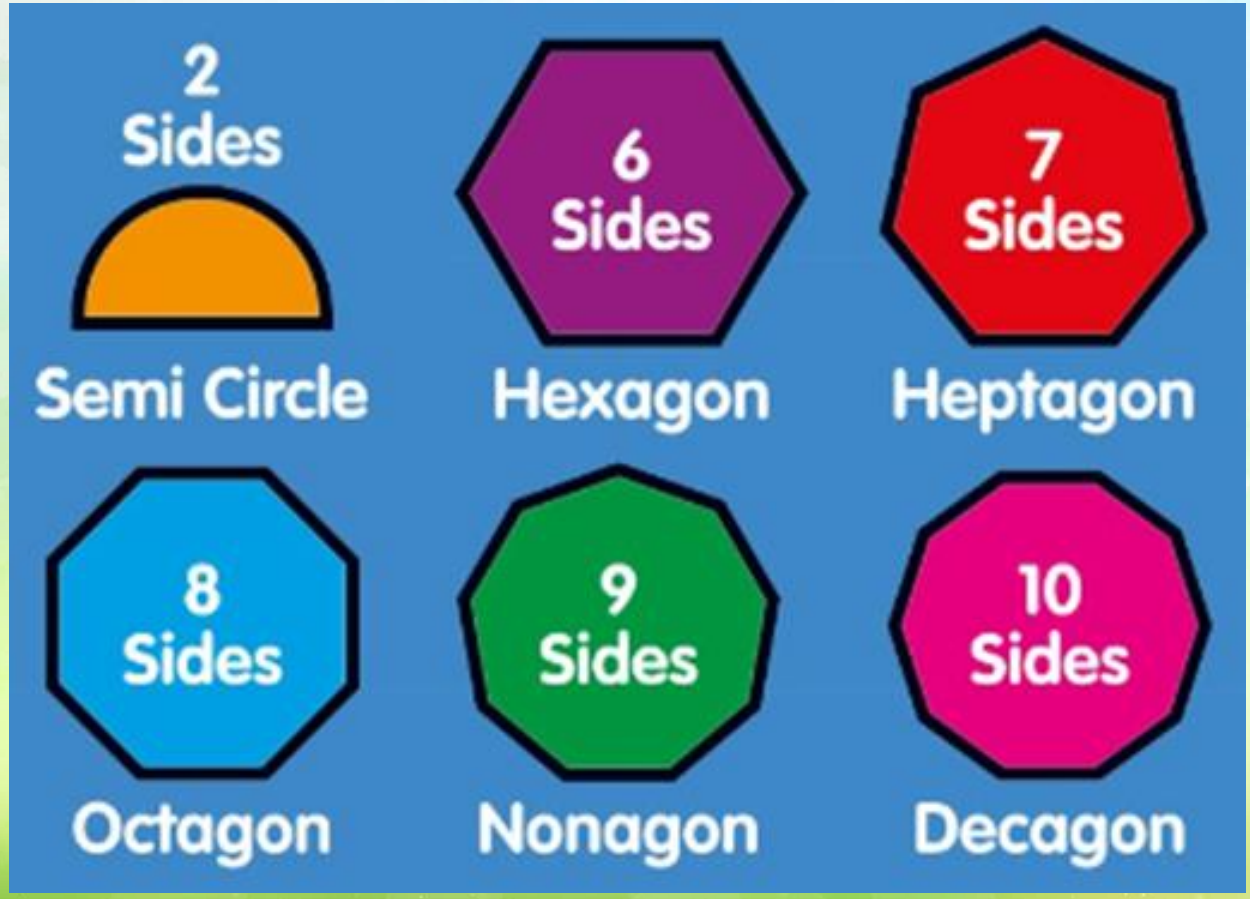
- Six straight sides
- Six corners/vertices/angles
- Hexagons can be regular (all sides the same length with all internal angles the same degree) or irregular





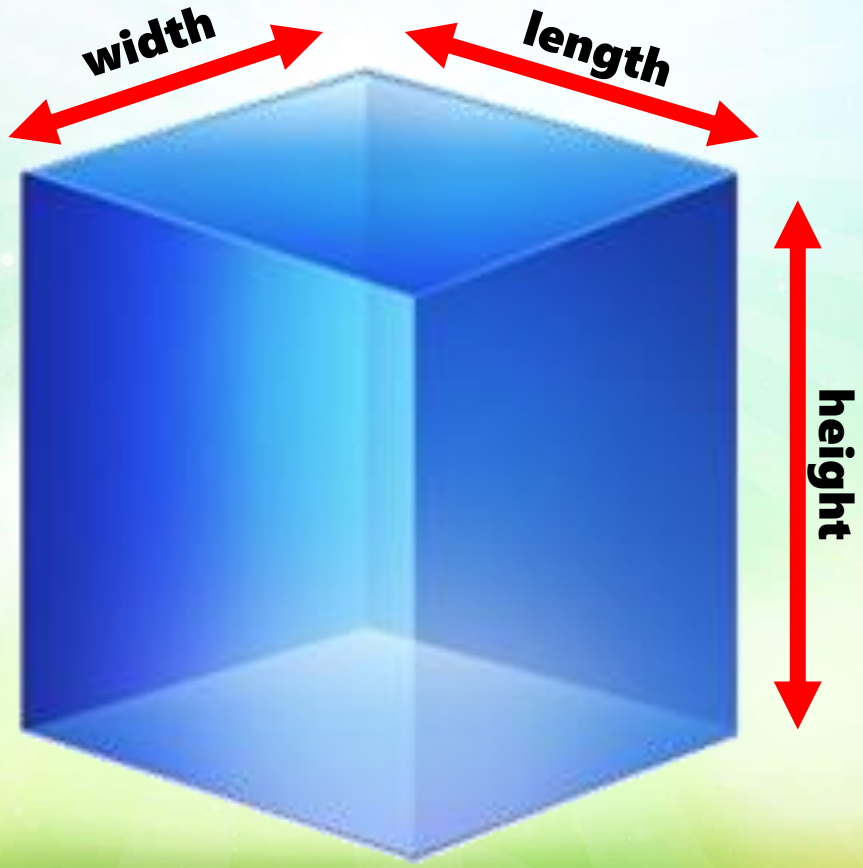
Other 2D Shapes

There are many other 2D shapes; however, we focus on the most common ones in depth. The children will still see and discuss other 2D shapes.



3D Shapes

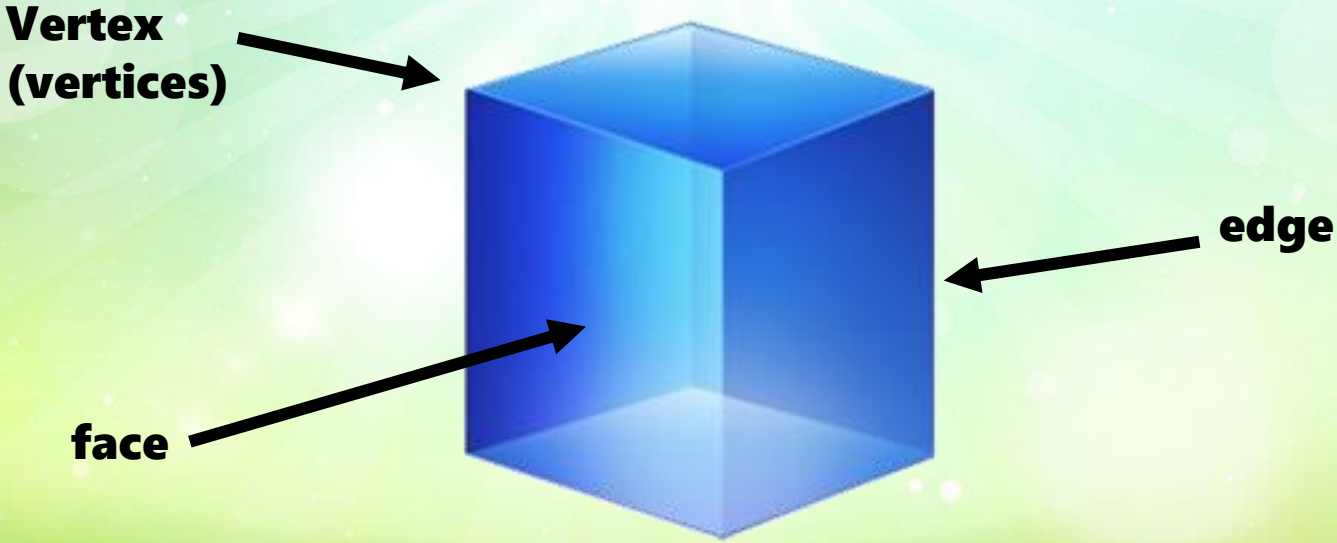
- These shapes are solid or hollow.
- They have three dimensions – length, width/depth and height.



3D Shapes Vocabulary

To describe a 3D shape we use the following vocabulary.

- **Face (can be flat or curved) – we can use 2D shape names to describe these**
- **Edge – the line where two faces meet**
- **Vertex (vertices) – where three or more edges meet**

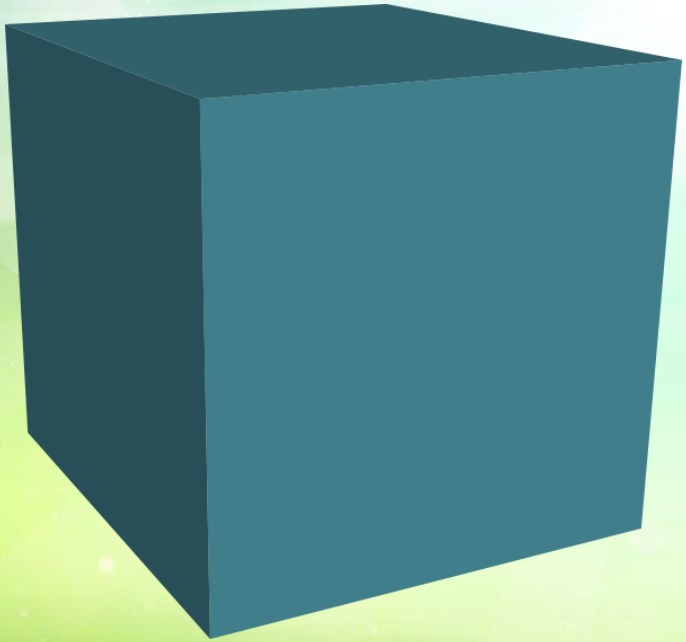


Properties of a Sphere

- One curved face
- Zero edges
- Zero vertices

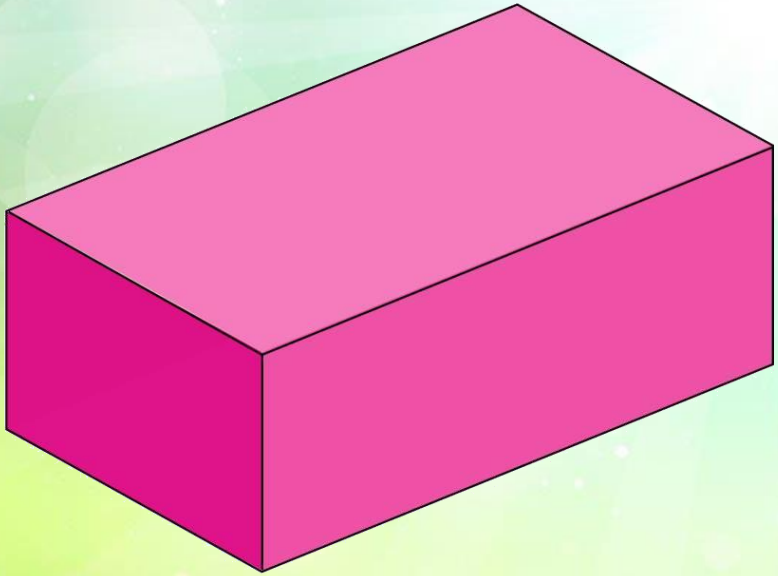
Properties of a Cube

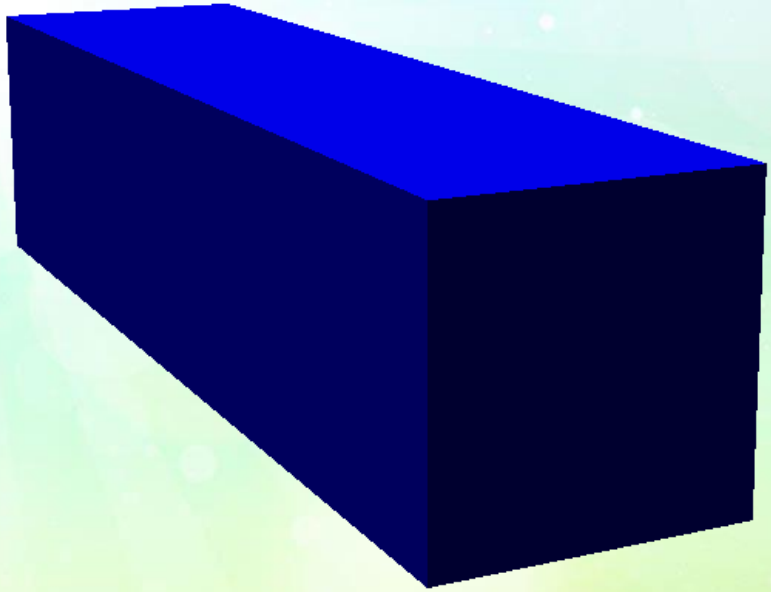
- Six faces – that are square rectangles
- Twelve edges
- Eight vertices
- Also a cuboid where all the faces are square; therefore, equal in shape and size



Properties of a Cuboid

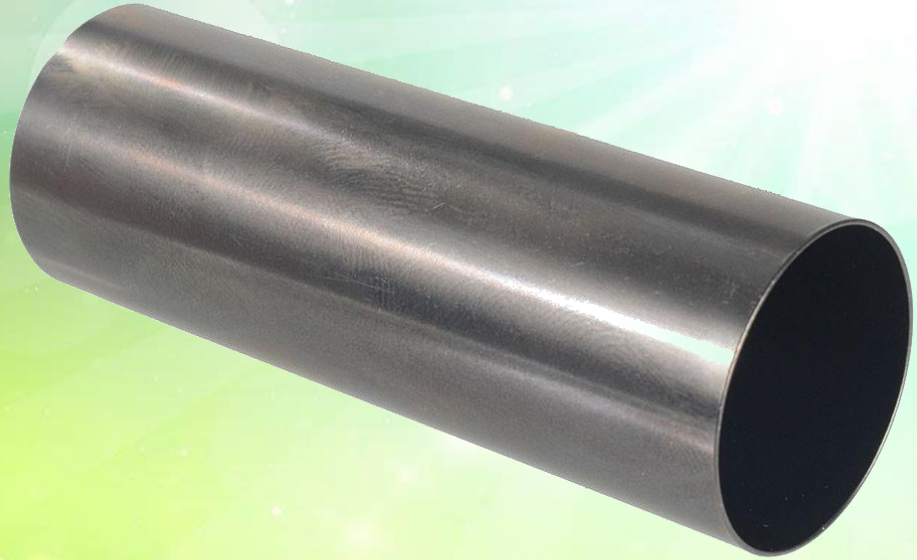
- Six faces – that are rectangles
- Twelve edges
- Eight vertices

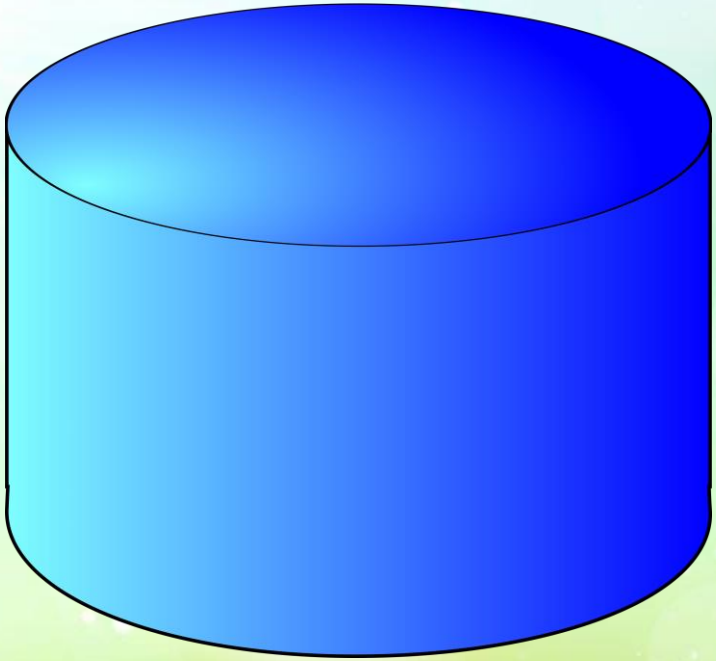




Properties of a Cylinder

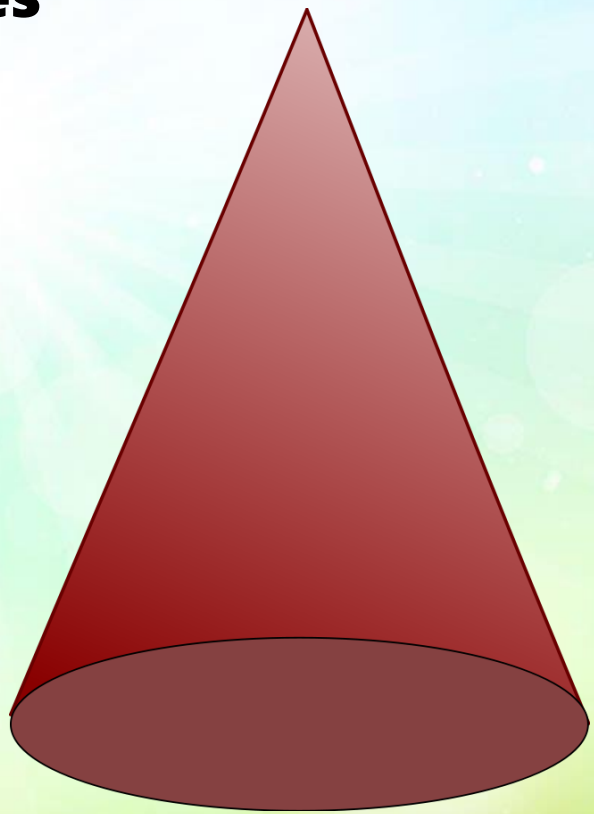
- Three faces – one curved and two flat circles
- Two edges
- Zero vertices





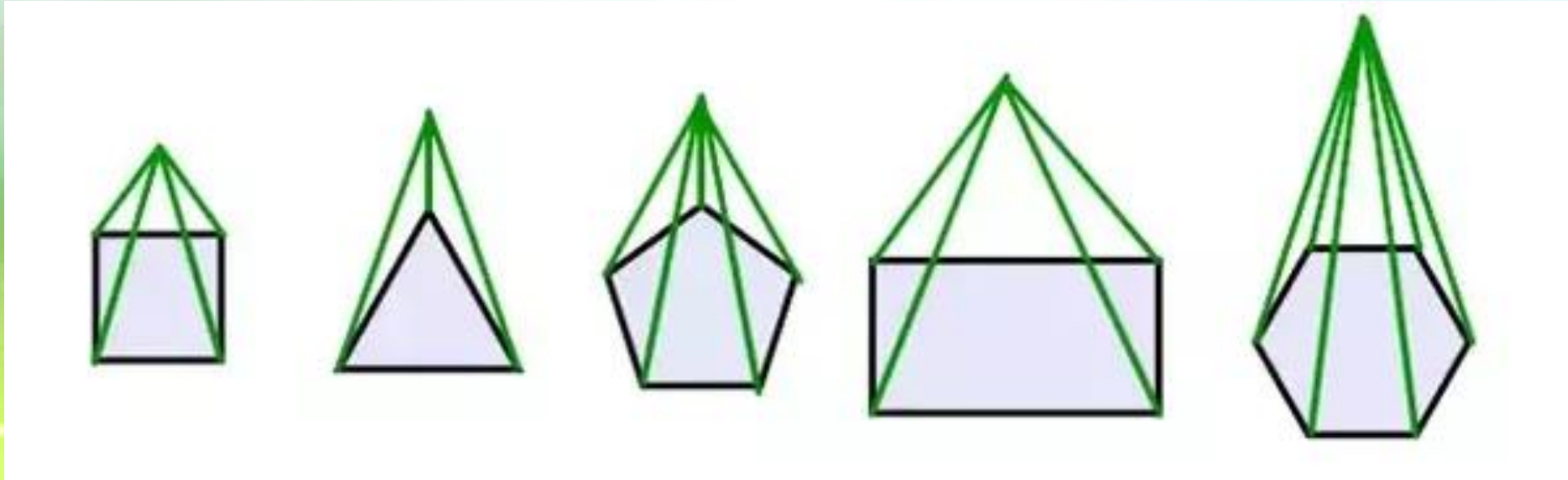
Properties of a Cone

- **Two faces – one curved face which ends at a point and one flat circle**
- **Two edges**
- **One point – but zero vertices**



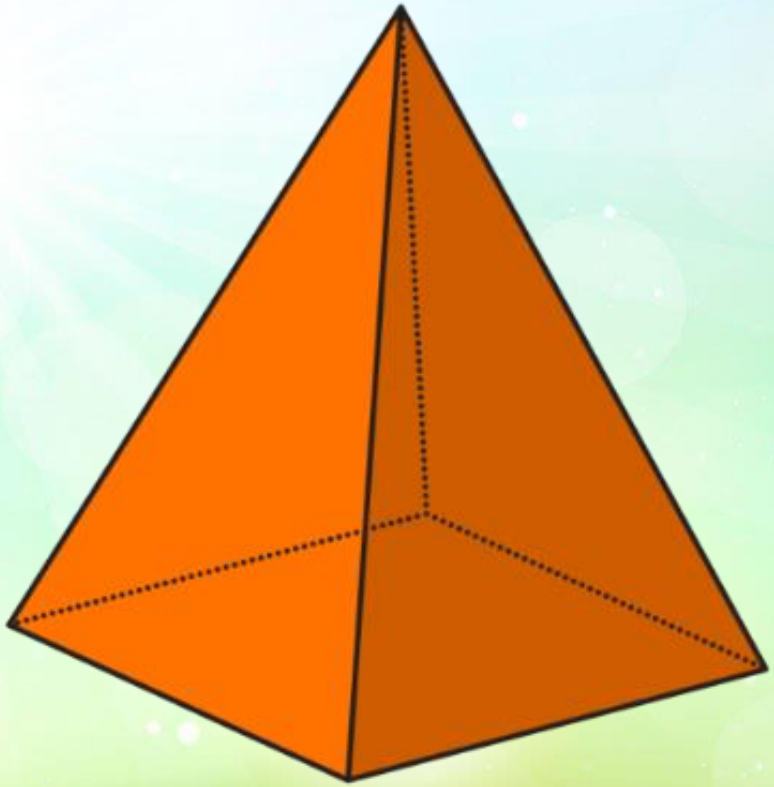
Properties of Pyramids

A three-dimensional shape which has a polygon for its base and triangular faces which meet at one vertex



Properties of a Square Based Pyramid

- Five faces – four triangles and one square
- Eight edges
- Five vertices



Properties of a Triangle Based Pyramid

- Four faces – all triangle shaped
- Six edges
- Four vertices

Properties of Prisms

A three-dimensional shape that has the same cross section all along its length