

AMAZING TRIANGLES

MATHS: STRANDS AND STRAND UNITS

Number:	<i>Counting and Numeration, Operations</i>
Shape and Space:	<i>2D shapes – Solve and complete practical tasks and problems involving 2D shapes 3D shapes - Solve and complete practical tasks and problems involving 3D shapes; Draw the nets of 3D shapes and construct the shapes (5th/6th classes)</i>
Measures:	<i>Length</i>

Note: Some of the activities relating to 'Amazing Triangles' could be done with 1st/2nd classes on Cubes and Cuboids.

Shape and Space/ 3-D shapes

1) Triangular pyramid

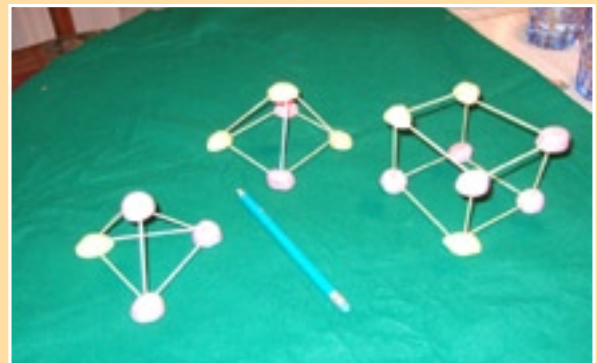
Look at the triangular pyramid which you made with marshmallows and sticks:

How many faces does it have?

How many edges does it have?

How many vertices does it have?

What shape are the faces?



2) Square pyramid

Look at your square pyramid which you made:

How many faces does it have?

How many edges does it have?

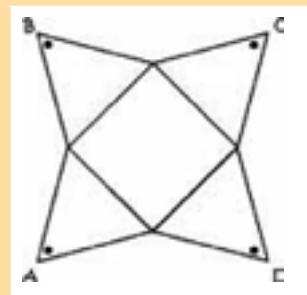
How many vertices does it have?

What shape are the faces?

3) Construct a net

Draw a template (or net) for a square pyramid on thin cardboard (*a cereal packet will do*).

Fold the four triangular parts inwards and stick them together at the top.

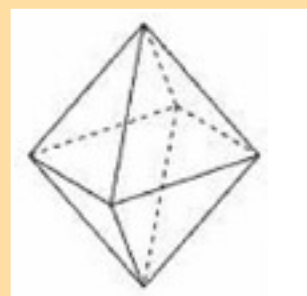


4) Deconstruct a net

Can you deconstruct a triangular pyramid and draw the template from that?

5) Joining 2 pyramids

Put two square pyramids together, turning one of them upside down. What shape do you get now? (*An octahedron*).



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6) Struts

Struts are used to form triangles to make things stronger. A strut is something rigid (does not bend) which divides the shape into triangles.

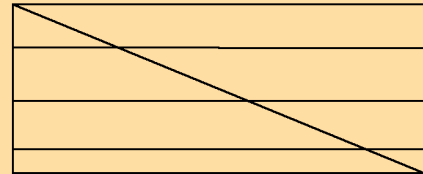
How many struts are used to make the rectangle rigid?

How many struts are used to make the pentagon rigid?

How many struts are used to make the hexagon rigid?

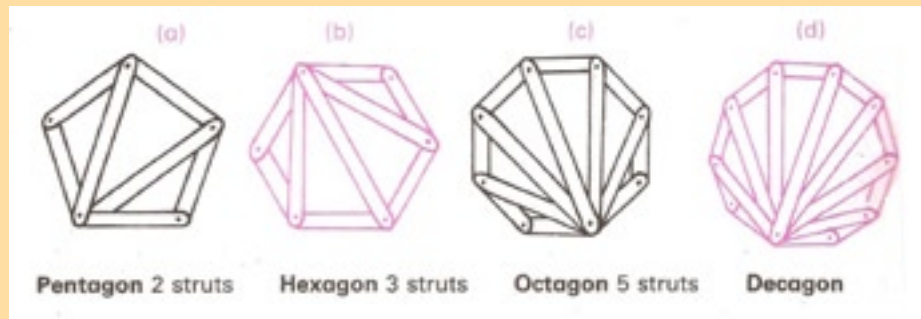
How many struts are used to make the octagon rigid?

Gate



Can you see a pattern to this?
(The least number of struts needed to make a regular polygon rigid is always 3 less than the number of sides in the polygon).

How many struts would a decagon (a 10-sided figure) need? ($10 - 3 = 7$).



7) Make shapes and struts as follows:

You will need: Cardboard (cereal packet is good), scissors, one-hole puncher, paper fasteners (split pin variety).

(If children find it hard to use the hole puncher, they could use a sharp pencil instead, with perhaps a lump of Blu-tak behind the cardboard to protect their fingers)

Rectangle shape

(a) Making the shape

Cut cardboard into strips (1.5 cm wide). Cut 4 strips into suitable lengths to make a rectangle. Punch holes at each end of the strips and make a rectangle using the paper fasteners. Can you wiggle the rectangle out of shape? How stable is it?

(b) Strengthening the shape with a Strut

Cut a strip the length of the diagonal of the rectangle (i.e. the strut), punch holes at each end and attach it to the rectangle. Is the rectangle any more stable?

Repeat for a pentagon, and see how many struts you need to make it stable.

If you have the patience you can test out some of the other shapes above!

Design and Make

Can you design any other shape using strips of cardboard and paper fasteners, and see how you can make it stronger using struts?

Integration:

This activity in relation to struts could be linked to Art – lollipop sticks could be used in construction in Art to illustrate the use of struts for strengthening.