Year 2 Maths Activities - Week Beginning 22.6.20.

Dear Parents and Carers,

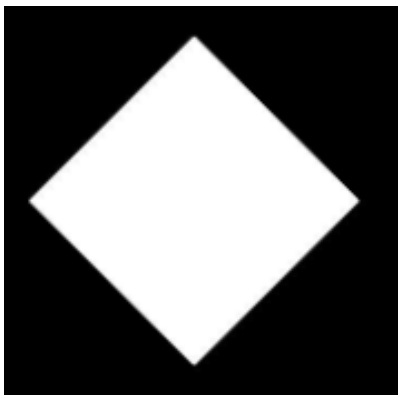
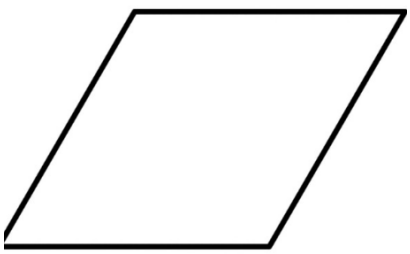
We are going to continue with our revision. Last week we learned about Shape and we are going to continue with that this week. In fact, our work about Shape will continue into a third week. Therefore, the notes below are exactly the same as they were last week, but the activities have been changed.

I have decided not to divide the sessions up into 3 levels of difficulty, as this topic is a bit more straight-forward than some of the others. However, I have tried to find some extra challenges for those children Working At Greater Depth.

Before we begin, let's look at what children in Year 2 need to know about Shape.

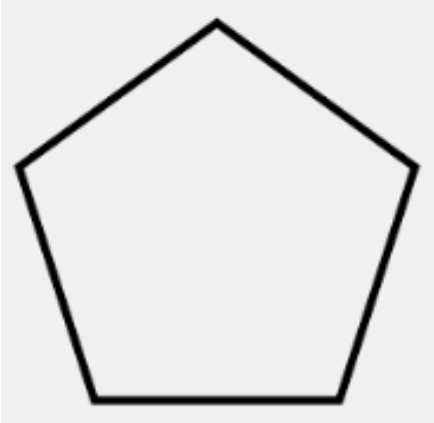
- A lot of this topic is about learning **new vocabulary**. There are a lot of 'special maths words' that we need to know. Children should not only know this vocabulary, but they should also **use it accurately to describe and reason about shapes.**
- We teach that 2D shapes only have 2 dimensions; length and height, but they have no depth or thickness. In reality, 2D shapes can only be drawn as flat images, we cannot pick them up and handle them.
- 3D shapes have 3 dimensions; length, height and depth. They are solid objects that can be picked up and handled.
- When learning about **2D shapes** we teach their properties as **'sides' and 'vertices'**. Sides can be **straight or curved** and we might also be interested in how long they are in comparison to other sides. This is particularly relevant when comparing squares and rectangles.
  Children often say things like 'a rectangle is a squashed square or a square that has been stretched' – we want to ***discourage*** *talk like this. They should be saying that a rectangle is a quadrilateral (4 sided shape), with 2 longer sides and 2 shorter sides, whereas the sides of a square are all equal in length.*
  'Vertices' are corners, or the points where two sides meet. For example, a square has 4 vertices.

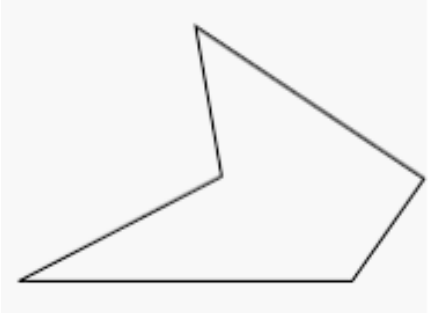
- When learning about **3D shapes** we teach their properties as **'edges', 'vertices' and 'faces' or 'surfaces'.** Typically, we would want to know the number of edges, faces / surfaces and vertices a shape has, but we might also want to know the length of the edges in comparison to other edges and we would want to know the shape of the faces / surfaces.
  Children often confuse 2D and 3D shapes when talking about them. They might call a 'cube' a 'square', when they should be saying 'it is a cube, and it has 6 square faces'. In other words, we use the names of 2D shapes when talking about the shape of the faces on a 3D shape, but we know that the overall shape has a different name.
- Children also need to know that shapes can be **rotated, but this does not change their name.** Below are two squares. The second one is not a diamond (in fact, the word 'diamond' is not a mathematical term at all). Just because it is being shown at an angle that we are not used to seeing, does not mean that its name changes, it still has 4 sides that are equal in length and 4 vertices. It also has 4 right angles. We don't strictly teach about angles in Year 2, but I find it is often necessary to have a very basic discussion about them because otherwise we wouldn't be able to differentiate between things like squares and rhombuses.

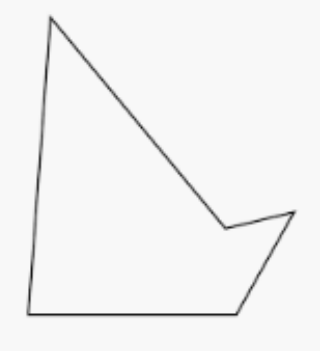




square…….**also a square**…….**rhombus** (not a square)

- Children also need to know about **regular** and **irregular** shapes. Regular shapes are the ones we are used to seeing, like the square above. All sides and internal angles are the same. Irregular shapes have sides and angles that are not all the same. Below are some pentagons. They are 5 sided shapes and that is what makes them pentagons, however only the first one is regular.



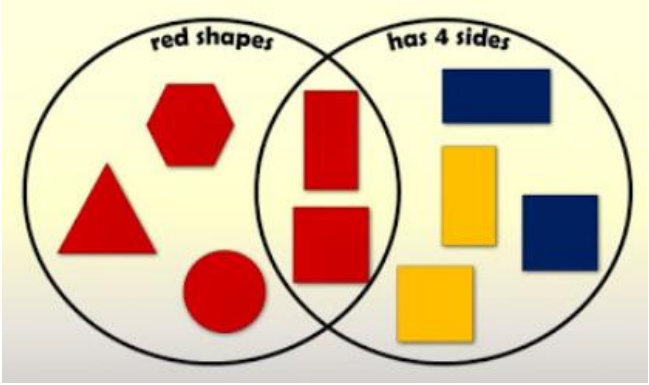




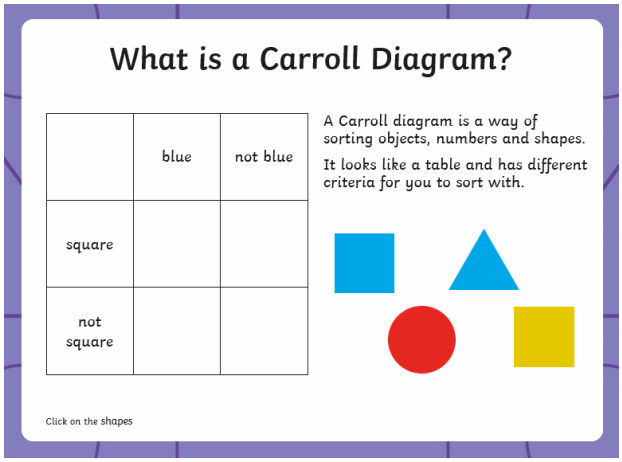
- Please see the attached sheets / posters which give the properties of 2D and 3D shapes. Just a couple of small notes;
    - **Unfortunately the rhombus on the 2D poster actually does look like a rotated square (you might want to stick a more accurate rhombus over the top of it!)**
    - **There are several 4 sided shapes on the 2D poster, although I don't think it shows all of the possible 4 sided shapes. Teach your child that the collective term for 4 sided shapes is 'quadrilateral'. Squares, rectangles, rhombus', kites, parallelograms, etc, are all different types of quadrilateral. We can give them different names when we know about their other properties, such as length of the sides and their angles.**
    - **The 2D poster only shows one type of triangle. Any 3 sided shape is a triangle (like we said about pentagons above, and in fact we could say it about other shapes, such as hexagons too!). Make sure that your child sees different types of triangles, e.g. equilateral, right angle, isosceles, etc.**

- **The 3D shape poster refers to 'surfaces'. We can use the term 'surface' to essentially mean the same thing as 'face'. It can be useful, particularly when talking about shapes that have curved surfaces. For example, a cone has one flat face or surface that is a circle, but it also has a 'curved surface' that sort of wraps all the way around. It has 2 faces / surfaces really, one that is flat and one that is curved.**

- Children learn to use all of this mathematical vocabulary to describe shapes and to explain their reasoning about them. They also use what they know about shapes and their properties to sort them in different ways (typically in Venn and Carroll diagrams). They also use shapes to identify, describe and create patterns.



Venn



Carroll

- In addition to the above features / properties, children also learn about lines of symmetry and to count the number of lines of symmetry 2D shapes have.

Activity 1	**Objective:** Sort 2D shapes.

Notes and Guidance

Children need to be able to recognise and name 2D shapes including circle, square, triangle, rectangle, pentagon, hexagon and octagon using a range of different orientations and real life objects. Children need to be able to count the number of sides and vertices on 2D shapes including circle, square, triangle, rectangle, pentagon, hexagon and octagon. Children may have been introduced to the Venn diagram in cross curricular work so they can focus on the shapes within this step.

Mathematical Talk

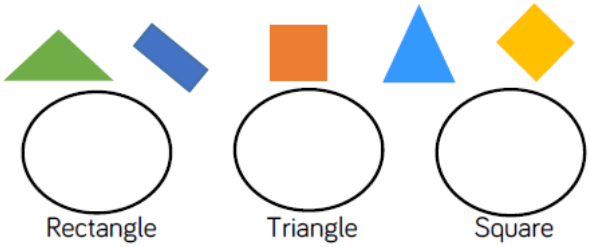
How have you sorted your shapes?

How do you know you have sorted your shapes correctly?

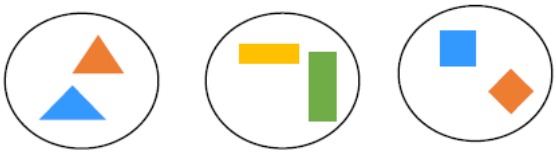
Which method have you used to sort your shapes?

Activities

1. Sort these 2D shapes into the correct group:



2. Give children prepared groups of 2D shapes and labels. Match the labels to the groups and justify how they have been sorted. How are the shapes sorted?



3. Sophie sorted the shapes by the number of vertices. What shapes belong to each group?

4 vertices	More than 4 vertices

N.B. For activity 2 (above), I have provided some sheets of 2D shapes that you can print out and cut up if you have a printer. If you don't have a printer, you could try drawing the shapes.

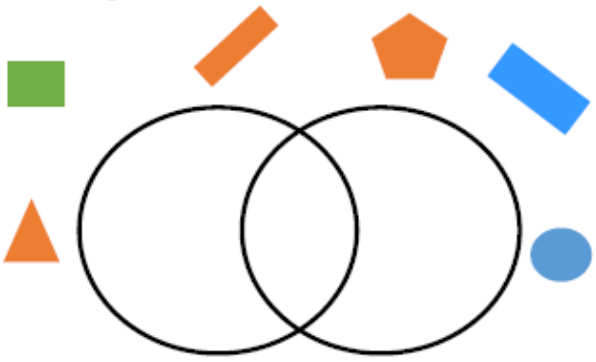
Alternatively, try out this game! *I'm not having much luck today with weblinks so the link below doesn't work! Try copying it and pasting it into the address bar on your web browser instead! Sorry!*
https://mathsframe.co.uk/en/resources/resource/83/sort-shapes-venn

Encourage your child to think about different ways of sorting;

- By shape name (triangle, square, circle, etc),
- By regular / irregular shapes,
- Using a 'group' or 'family' of shapes, such as 'quadrilaterals', 'triangles', etc.
- By the number of sides or by the number of vertices,
- By the number of lines of symmetry,
- By curved sides / straight sides.

Ben sorted the shapes in order of the number of sides. Has he ordered them correctly?

Where should these shapes go in the Venn diagram?

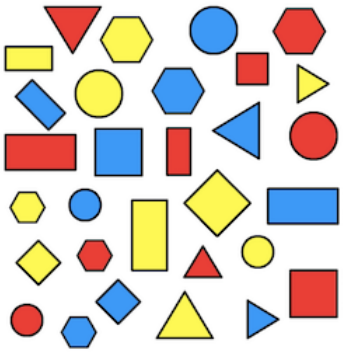


Complete the worksheet about sorting 2D shapes.

[Extra Activities for Children Working at Greater Depth]

Sorting Logic Blocks

Age 5 to 11 ★



For this task, you'll need some blocks of different shapes and colours, or you could print off and cut out the shapes on this sheet.

Choose a rule, like 'only have four-sided shapes' or 'only have large shapes'.
Challenge someone else to work out your rule.
They can do this by choosing a shape for you to say either "Yes, that obeys my rule and is in my set" (you then put it over on the left) or "No, this does not obey my rule and so is not in my set" (you then put it over on the right).

How did they decide which shapes to choose?
Did they get quicker at finding out the rule?
What was the smallest number of shapes they needed to try?
Could you make some more shapes to add to the set? What would you make and why?

Tell us about some of the rules you chose and how you decided which shapes to try.

N.B. the link above that says 'this sheet' doesn't work. The sheet is saved on the school website along with the other resources.

Activity 2	**Objective:** Make patterns with 2D shapes.

Notes and Guidance

At this stage children should be able to name and draw 2D shapes and be familiar with their properties. Children should recognise symmetry within shapes and be shown shapes in different orientations. Children should be encouraged to place the shapes in different orientations when making patterns and recognise that it is still a square, triangle etc. Squares do not become diamonds when turned sideways.

Mathematical Talk

Can you explain the pattern? How many time does the pattern repeat?

How are these patterns similar? How are these patterns different?

How can you work out which shape will come ___th?

Activities

1. Continue this pattern:

2. Draw pictures to represent this pattern:

Square, circle, triangle, triangle, square, circle, triangle, triangle.

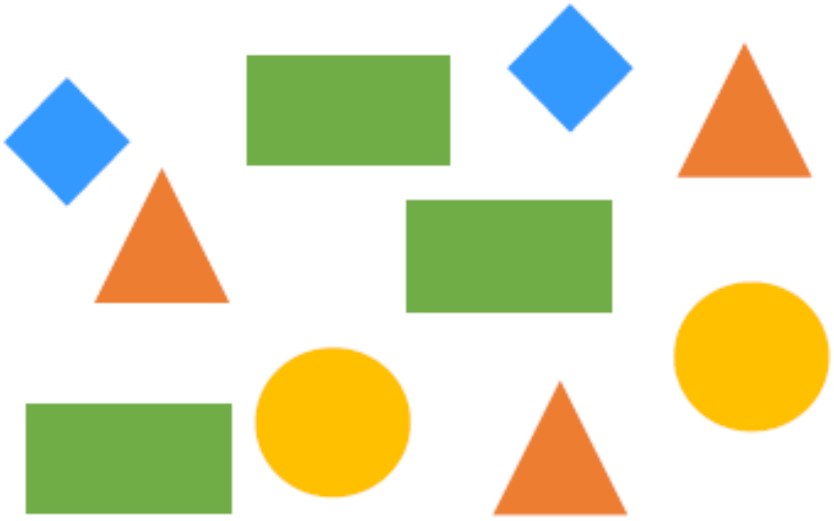
3. Make repeating patterns using only one shape

Use the shape sheets provided for yesterday's activity (saved as 'Shapes to Cut Out' and 'Sorting Logic Blocks Sheet'). Cut them out and make your own patterns (or you could draw your patterns). Try making a pattern like the one above that uses only one shape that has been rotated in different ways.

Catherine says that the 12th shape in this pattern will be a triangle.

Is she correct?
How do you know?

How many different ways can you arrange these shapes to make a repeating pattern?



Create a pattern that only uses shapes with 4 vertices.

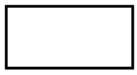
Complete the worksheet about making patterns with 2D shapes.

Extra Activities for Children Working at Greater Depth

Two by One

Age 7 to 11 ★

In Tom's house there are tiles on the floor. Each tile is twice as long as it is wide so they each look like this:



How do you think they fit together to cover the floor? Use squared paper to help you to draw your pattern.

Can you find any other patterns?

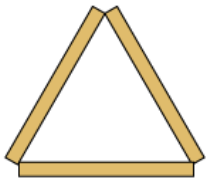
How many different patterns can you find?

Sticky Triangles

Age 7 to 11 ★★★

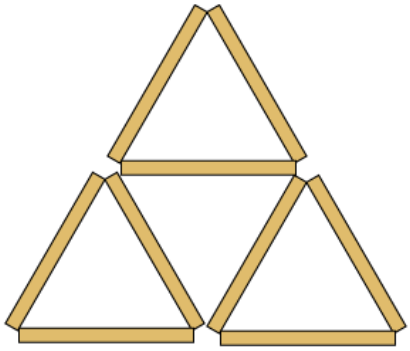
I was exploring a puzzle in which headless match sticks had to be moved to make a different number of triangles.

I made one small triangle

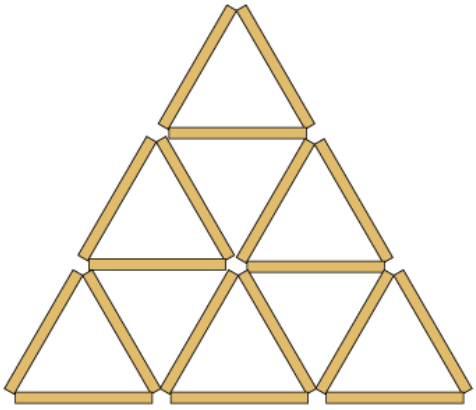


3 matches

I made it into 4 small triangles by adding 6 matches.



9 matches

	I added another row and counted the number of small triangles and counted the matches.  I made a table of my results and continued adding rows. I found many patterns. Have a go and see what patterns you can find. You do not have to use match sticks (or cocktail sticks) - drawing lines will do just as well. Find a good way to record your results. See if you can predict the numbers for rows of triangles you have not drawn. When you have done all you can with triangles, see if you get the same sort of results with squares. Then think of other shapes which might make number patterns as they grow.
Activity 3	**Objective:** Count faces on 3D shapes. **Notes and Guidance** Children will use their knowledge of 2D shapes to identify the shapes of faces on 3D shapes. To avoid over counting the faces children need to mark each face in some way. Children need to be able to visualise the 3D shape from a 2D representation on paper. Cones should be described as having 1 face and 1 curved surface; cylinders as having 2 faces and 1 curved surface and spheres having 1 curved surface. **Mathematical Talk** What do we mean by the 'face' of a shape? What is the difference between a face and a curved surface? What real life objects have 6 faces like a cube? Does a cuboid always have 2 square faces and 4 rectangular faces? Which 2D shapes can you see on different 3D shapes? How can you make sure that you don't count the faces more than once?

Activities

1. Look at these 3D shapes:

Which 2D shapes can you see on each one?
How many 2D shapes can you see on each one?

2. Complete the table:

Shape	Name	Flat Faces	Curved Surfaces
			
			
			

3. I am a 3D shape with 2 square faces and 4 rectangular faces.
What am I?

Samir says my 3D shape has 6 faces.
Jolene says he must have a cube.
Is Jolene correct?
Explain your answer.

Hannah has sorted these 3D shapes.
Can you spot her mistake?
Can you add another shape to one of the circles?

Sam is drawing all the 2D shapes she finds on 3D shapes. She draws 8 squares for a cube. Is she right?

Prove it!

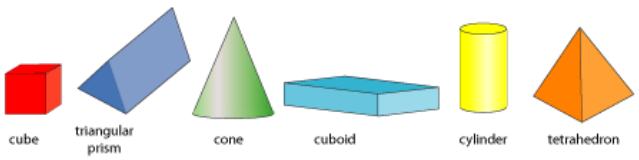
Complete the worksheet about counting the faces on 3D shapes.

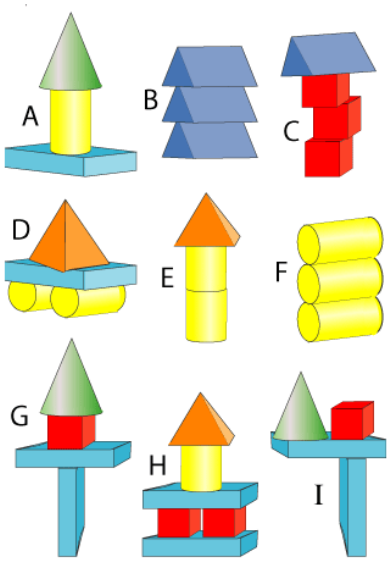
Extra Activities for Children Working at Greater Depth

Building with Solid Shapes

Age 5 to 7 ★

We have a box of solid shapes. In it there are cubes, triangular prisms, cones, cuboids, cylinders and tetrahedrons.



	Which of the buildings below would fall down if we tried to make them? Which ones would be unstable and possibly collapse?  Can you write sentences to explain WHY some of these buildings would fall down and why others wouldn't? When writing your sentences, look at the 3D shape poster from last week's resources (archive folder). Use the correct vocabulary, such as 'face', 'curved surface', 'edge', 'vertices or vertex', 'flat', 'curved', etc.
Activity 4	**Objective:** Count edges on 3D shapes. **Notes and Guidance** Children will use their knowledge of faces and curved surfaces to help them to identify edges on 3D shapes. They need to be discretely taught that an edge is where 2 faces meet or where a face and a curved surface meet. To avoid over counting the edges children need to mark each edge in some way. Children need to be able to visualise the 3D shape from a 2D representation on paper. **Mathematical Talk** What do we mean by the 'edge' of a shape? How can you make sure that you don't count the edges more than once? What do you notice about the shapes with ____ edges?

Activities

Before starting, it might be useful to make some 3D shapes. I have provided some 3D shape nets for you to cut out, fold and stick together. Perhaps your child could use a felt tip pen to mark the edges on their shapes as they count them?
N.B. the cone does not have a circle to make the flat face! Maybe you could cut out your own circle to make it? There is a shape called a 'rectangular prism' but your child can refer to it as a 'cuboid'.

1 Look at these 3D shapes:

How many edges can you see on each one?

2 Complete the table:

Shape	Name	Faces	Edges
			
			
			

3 Sort your shapes depending on the number of edges and/ or faces.

Josh has sorted these shapes according to the number of edges.
Which shape is in the wrong place?
Explain why.

Anna says my 3D shape has 12 edges.

Lilly says she could have a cube, cuboid or square based pyramid.

Is Lilly correct?
Explain your answer.

Abigail is folding paper to make a 3D shape.

Work out the shapes she has made by looking at her folded papers.
How many faces and edges has each one got?

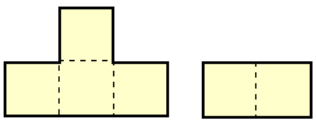
Complete the worksheet about counting the edges on 3D shapes.

Extra Activities for Children Working at Greater Depth

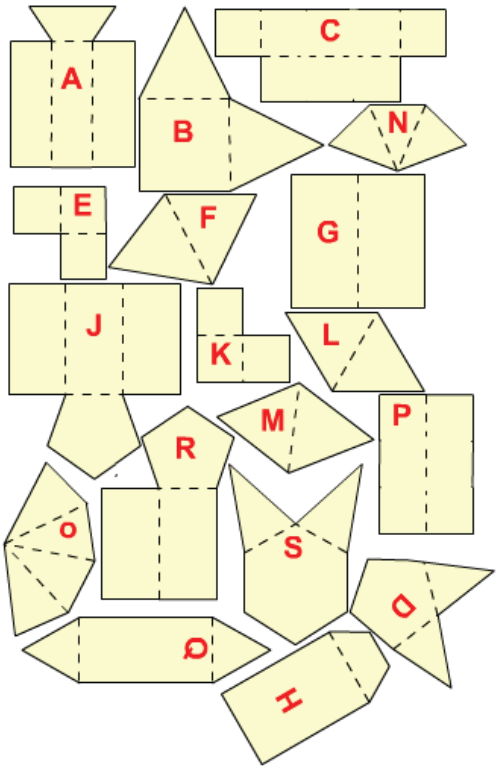
Cut Nets

Age 7 to 11 ★★

The net of a cube has been cut into two. It could be put together in several ways so that it could be folded into a cube.



Here are the nets of 9 solid shapes. Each one of these has been cut into 2 pieces, like the net of the cube.



Can you see which pieces go together?

N.B. if this problem seemed a bit tricky (as it did for me!), the solution can be found here;
https://nrich.maths.org/2315/solution
Again, the link does not work. Sorry! Please copy and paste it ☺

Activity 5	**Objective:** Count Vertices on 3D shapes. ## Notes and Guidance Children will use their knowledge of edges to help them to identify vertices on 3D shapes. They need to be discretely taught that a vertex is where 2 or more edges meet. Note – a cone has an apex not a vertex, because it has one curved surface. To avoid over counting the vertices children need to mark each edge in some way. Children need to be able to visualise the 3D shape from a 2D representation on paper. ## Mathematical Talk What do we mean by the 'vertices' of a shape? How can you make sure that you don't count the vertices more than once? How many edges meet to make a vertex on a 3D shape? How many sides meet to make a vertex on a 2D shape?

Activities

1. Look at these 3D shapes:

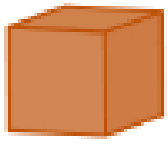
How many Vertices can you see on each one?

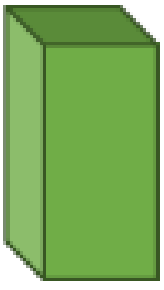
2. Complete the table:

Shape	Name	Faces	Edges	Vertices
				
				
				

3. Alex has a shape with 8 vertices. What 3D shape could it be?

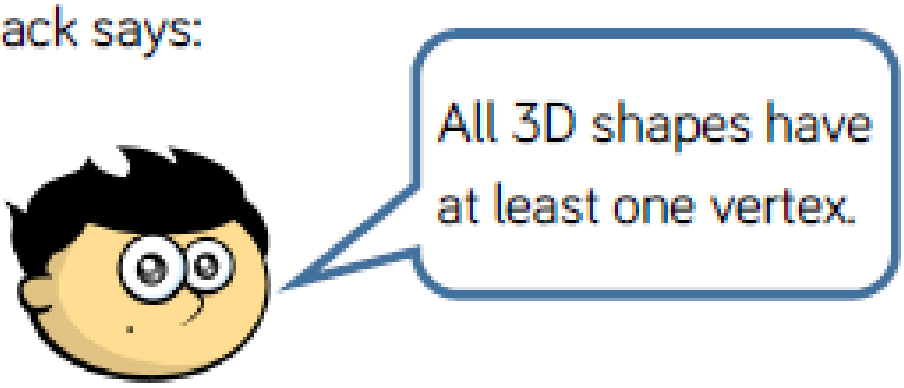
What is the same about these 2 shapes?





What is different about these 2 shapes? Talk about faces, edges and vertices in your answer.

Jack says:



Is this true or false?

Explain why

Complete the worksheet about counting vertices on 3D shapes.

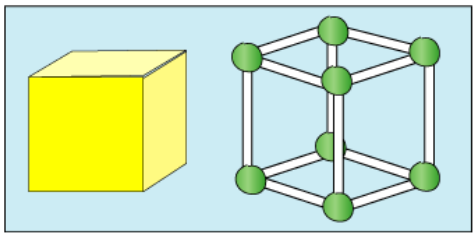
Extra Activities for Children Working at Greater Depth

Skeleton Shapes

Age 5 to 7 ★★

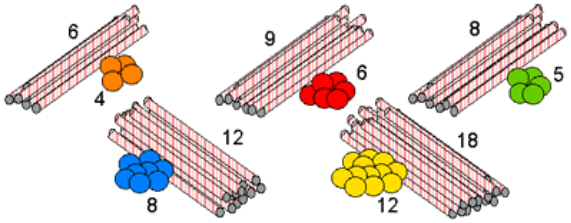
Skeleton shapes are made with balls of modelling clay and straws.

This shows a cube and a skeleton cube:

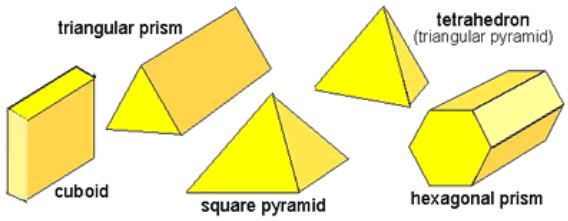


How many balls of modelling clay and how many straws does it take to make the cube?

Here are some piles of modelling clay balls and straws:



Look at the shapes below and decide which piles are needed to make a skeleton of each shape.



N.B.

I have not included the White Rose End of Block Assessment with the materials this week because we will be learning more

about Shape next week (only for the first couple of days).

Just in case you didn't see this last week……..

There is a little extra though!

If you Google 'I See Maths Videos', the top result that comes up is 'All Home Lessons – I See Maths'.

This website has videos for learning maths at home. They teach you how to play little maths games with different levels of challenge. They cover different topics like Money, Addition and Subtraction and Multiples. They have a few printable resources to support the games too. I have watched a couple of the videos and can recommend them. ☺