



Maths-**Whizz**[®]
by **whizz** EDUCATION

Making Maths Stick

End of year four

Maths-Whizz account details:

Username

Password



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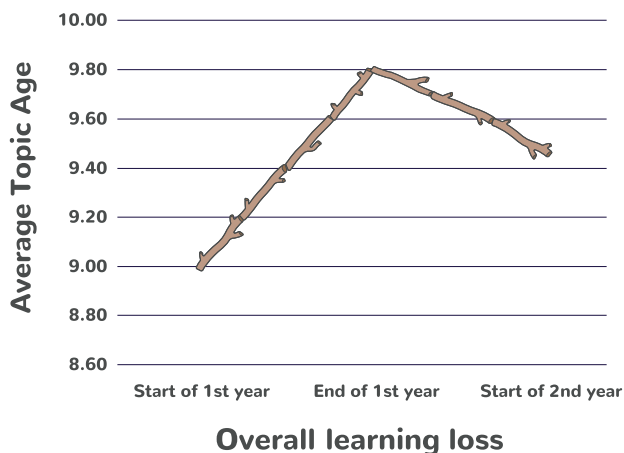
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Making Maths Stick

Did you know?

At Whizz Education, we've been examining our live learning data which shows that **children can lose 2.6 months' worth of learning** when their learning is disrupted for 6 weeks (say, because of the summer holiday or school closures).

This is known as **learning loss** and we've decided to do something about it.



Turning learning loss into learning gains

We recommend children continue to use Maths-Whizz throughout the year, achieving at least 3 Progressions each week (that's likely to take between 45 and 60 minutes per week). So, over several weeks, not only will children be able to maintain their maths knowledge, they will also make additional progress as well. For such a small amount of time each week the gains are huge!

Making Maths Stick

We've created a handy chart for you to stick up at home as a way of tracking the Progressions your child has made on Maths-Whizz over the coming period.

We've also created a fun activity pack, full of ideas, activities and games to bring the maths your children have been learning at school to life, and all inspired by the outdoors! The activities and games can be done at home, in the local park, the wood, in the garden or (when the time is right) when you're on holiday or visiting friends.. Our activities involve a wide range of engaging, hands-on activities and games. Every activity aims to encourage enquiry, creativity and teamwork in making maths fun.

Getting started

Everything you need can be found outdoors or in cupboards at home, so you can be creative! For rainy days or if you want to (or simply have to) stay indoors, you can use paper straws, spaghetti, pencils, beans or building blocks. If you're outside, remind children to be kind to the environment - be careful not to disturb or damage trees or plants, use what you find on the ground instead. And always wash your hands before handling food and drinks.

What's in the pack?

There are 12 activities, for each year group - have a look through and you can choose the pack that matches the year group your child has just finished or the year group they will join in September. Try to complete two a week throughout the holidays.

Connect with us!

Share what you have been up to with us through Twitter or Facebook - just search **@MathsWhizzTutor**. We will share the best of your posts with our followers each week! Most of all, have fun Making Maths Stick.

Name:



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Weekly Progression chart

Maths-Whizz Progressions

Draw a tick over the stone for every Progression you make.
How many did you make in total this week? Write it in the box!

Week 1				<input type="text"/>
Week 2				<input type="text"/>
Week 3				<input type="text"/>
Week 4				<input type="text"/>
Week 5				<input type="text"/>
Week 6				<input type="text"/>

Activities

Put a tick in the box when you have completed the exercise in your 'Making Maths Stick' activity pack!

1	2	3
4	5	6
7	8	9
10	11	12

Activity one - Counting stick

Key skills

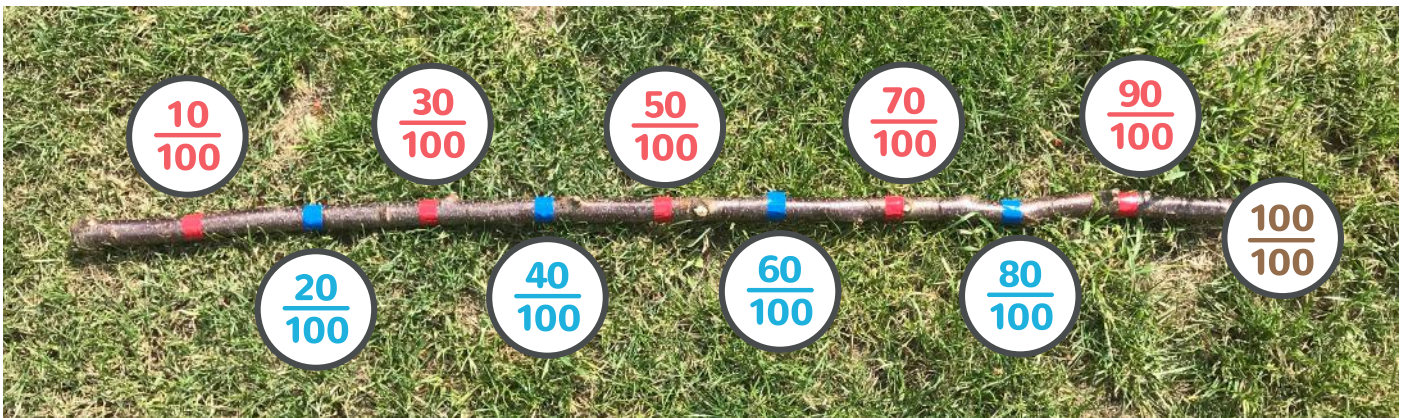
- To be able to count forwards and backwards from zero or any given number.
- To count in multiples.

Have ready

- A stick, broom handle or pole at least a metre long, OR...
- Draw a chalk line on paving slabs, or even use the edge of a table and tape.

Activity

- Using the resources, make a counting stick (no longer than a metre) and with your child work out how to divide it into 10 equal parts.
- Mark each division with a pen, tape or tie string.
- This is now ready for all sorts of counting.
- Each mark/division can represent whatever you want it to. Point to the division as you count.



For example, you could ...

Count up and down in tenths or hundredths

Recall multiplication facts to 12 x 12

Count up and back in fractional amounts

Activity two - Spot the shapes

Key skills

- To compare and classify geometric shapes based on their properties and size.

Have ready

- Yourself.
- Possibly a camera.



Activity

- Have a look around you and see if you can find (and take a photo of) a shape with:



four sides.



four equal sides.



four right angles.



one pair of parallel sides.



two pairs of parallel sides.



line of symmetry.

- You could make the shapes you see with sticks!



Activity three - Crossing sticks

Key skills

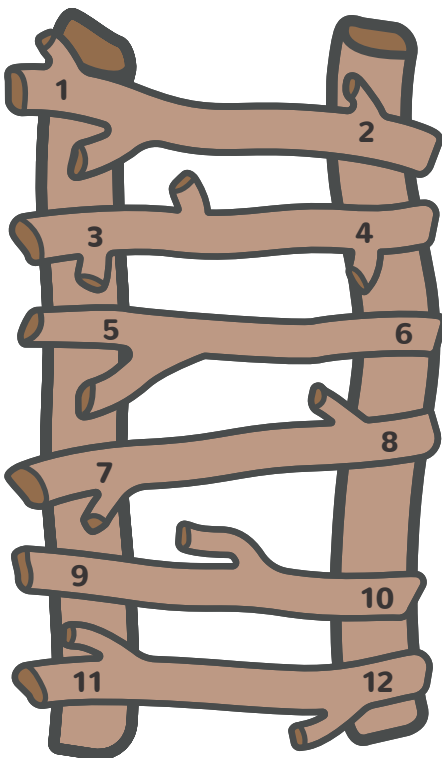
- To problem solve.

Have ready

- Sticks or alternatives.

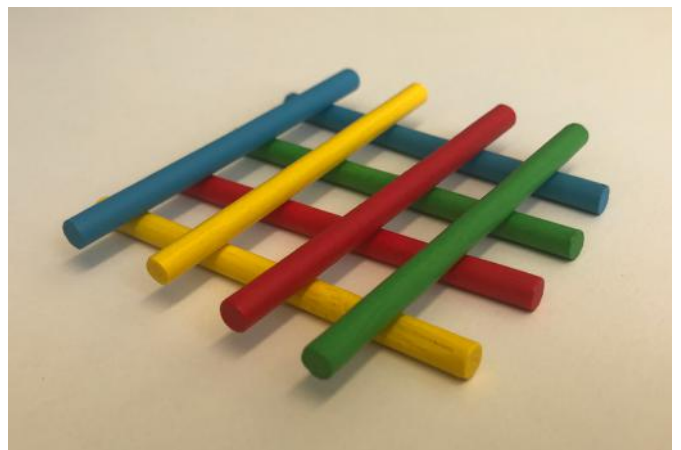
Activity

- Take 8 sticks. You can only place them horizontally or vertically to each other.
- Unless all sticks are parallel to each other then sticks placed horizontally will always cross sticks placed vertically.
- For example, with 8 sticks placed like this there are 12 places where the sticks cross.



- If I changed the direction of some of the sticks would the number of crossings change?

- Have a go with six sticks.
- Explore different variations.



- How many different numbers of crossings are there?
- If all lines are parallel, how many crossing points will there be?
- What is the next largest number of crossings after zero? Can you explain your answer?
- What is the largest number of crossings? Can you explain your answer?
- Explore for different numbers of sticks.

Activity four - Perimeter

Key skills

- To calculate the perimeter of rectilinear figures.

Have ready


- Sticks or strips of scrap paper.

Activity

- Using sticks/ paper make a shape with the perimeter of:

 25cm.

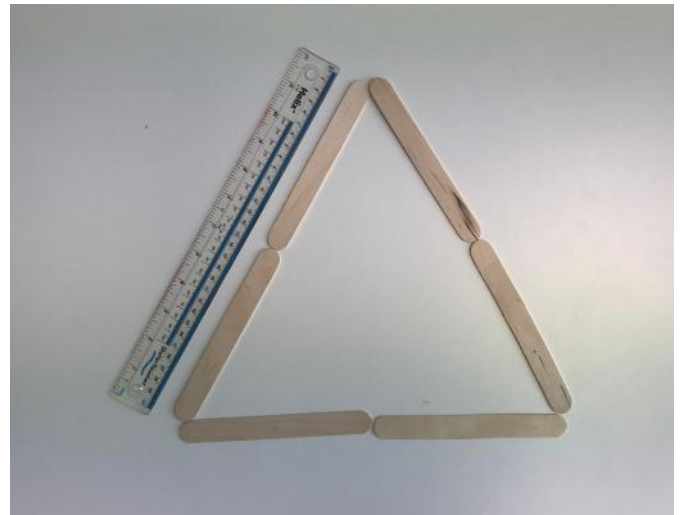
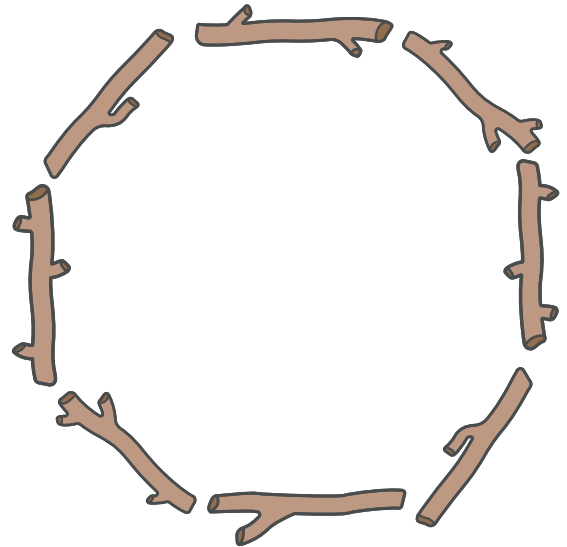
 40cm.

 $\frac{1}{2}$ m.

 64cm.

 1m.

- Can you make other shapes with the same perimeters?



Try making 3, 4, 5 and 6 sided shapes all with the same perimeter!

Activity five - Make a 2D shape



Key skills

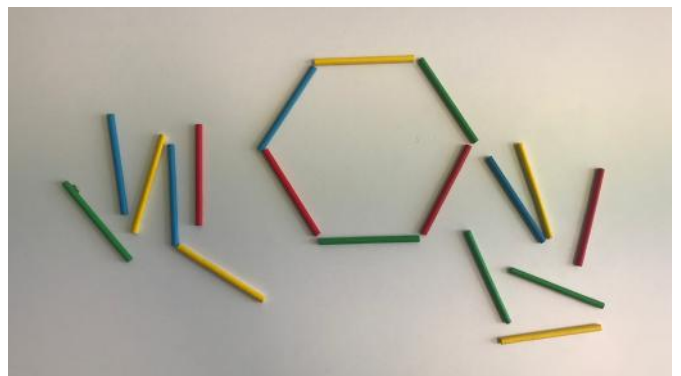
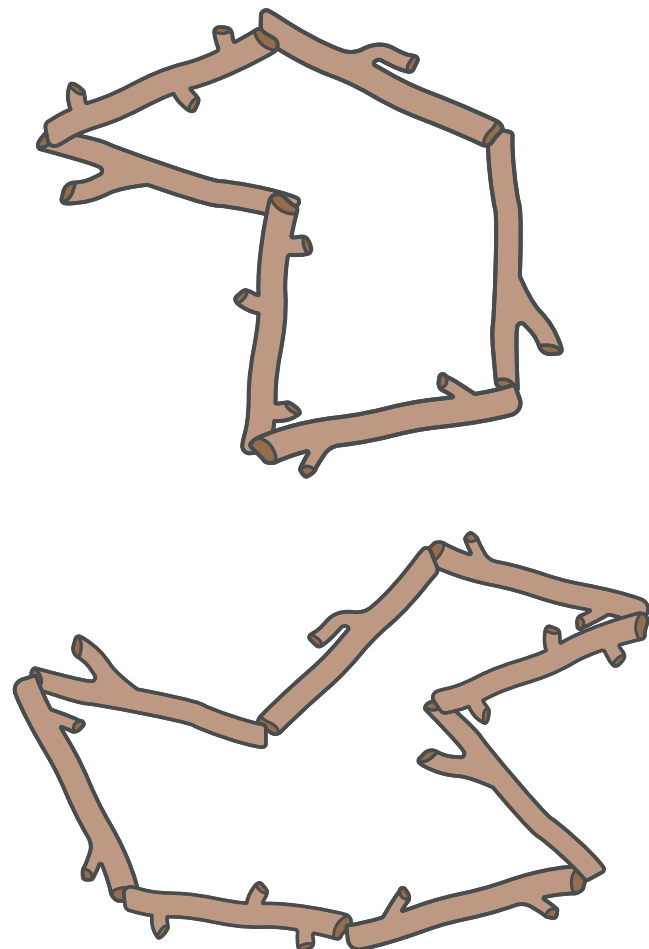
- To make shapes based on their properties and size.

Have ready

- Sticks or alternatives, all the same length.

Activity

- How many hexagons can you make with 18 sticks? How many octagons can you make? What other shapes can you make with 18 sticks?
- Brad makes a rectangle using sticks. How many identical rectangles could he make with 18 sticks. Can you make one rectangle using all 18 sticks?
- Make your own shape, how many sticks did you use?



Activity six - Rock, paper, maths

Key skills

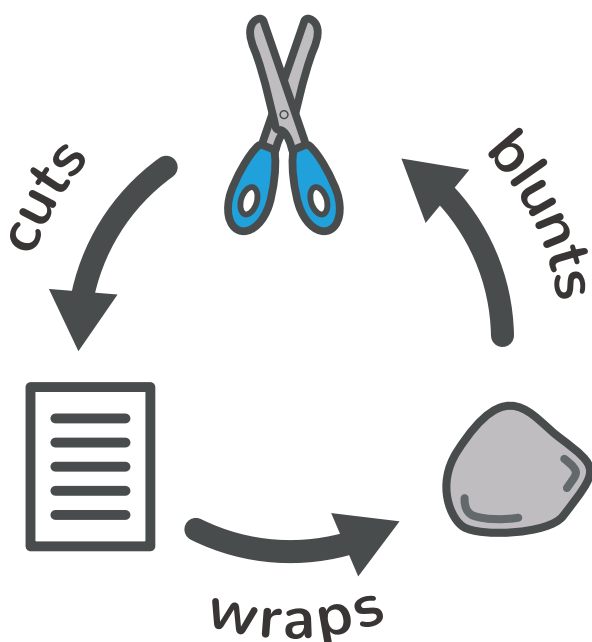
- To practice quick recall of addition and multiplication facts.

Have ready

- Two players.

Activity

- There is a game called Rock, Paper, Scissors. The two players after the count of three would shape their hand into a rock, paper or scissors at the same time.
- For rock make your hand into a fist. For paper hold your hand flat. For scissors put two fingers out.
- You discover who wins because scissors beats paper, paper beats rock and rock beats scissors.
- This is what happens - SCISSORS cut PAPER wraps ROCK blunts SCISSORS



- You can play this game, but another version is Rock, Paper, Maths.
- Instead of shaping your hands to one of these commands this time either using one hand or two both players show so many fingers.
- You need to decide whether you are adding or multiplying and then calculate the answer using the number of fingers shown. It's the first player to shout out the answer.

- For example:**

Player 1 holds up 6 fingers



Player 2 holds up 8 fingers



If adding $6 + 8 = 14$

OR

If multiplying $6 \times 8 = 48$

Activity seven - Mayan numbers

Key skills

- To understand place value in a different number system.

Have ready

- An assortment of materials to represent the counting system below.
- Mayan place value frame (see resources).

Activity

- The Mayans had a number system to help them keep track of the date. They counted in twenties.
- Their numbers look like beans, sticks and shells.
- Let's have a look...



0



1



2



3



4



5



6



7



8



9



10



11



12



13



14



15



16



17



18



19

- Mayans arranged their sticks and beans in layers.
- Our numbers are written horizontally but the Mayans worked vertically.

Activity seven - Mayan numbers (cont.)

- The Mayan number system is base 20 and the numbers are written in a vertical place value format using powers of 20: 1, 20, 400... as opposed to our Arabic horizontal base 10 number system of 1, 10, 100...

- So 58 would be:

20	• •	2×20
1	• • • =====	18

- So 2458 would be:

400	• =====	6×400
20	• •	2×20
1	• • • =====	18

- Have a go at using the materials to write different numbers using the Mayan place value grid.

Activity eight - Equivalent fractions

Key skills

- To recognise and show equivalent fractions.

Have ready

- Sticks or alternatives.

Activity

- Collect lots of sticks of different lengths.
- Compare the length of the sticks.
- Have a go at building a fraction wall.



Activity nine - Sticky triangles (Nrich)

Key skills

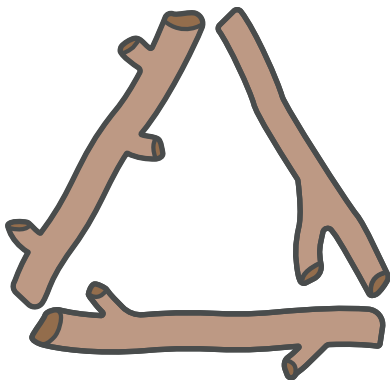
- To problem solve.

Have ready

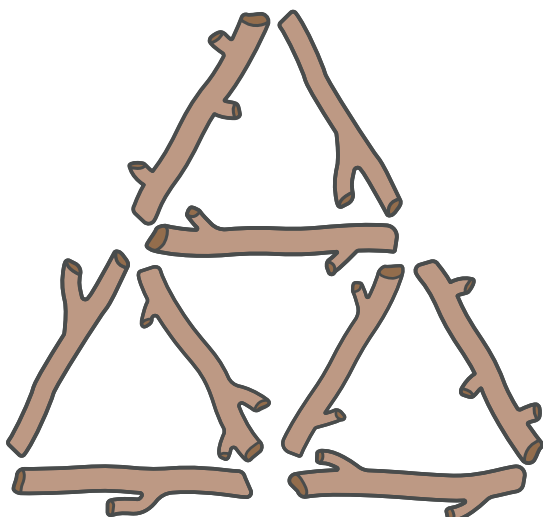
- Small sticks, cut straws, cocktail sticks, strips of paper.

Activity

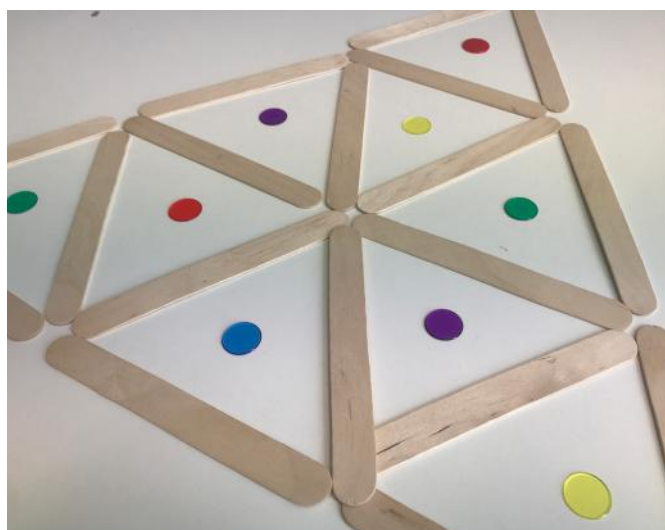
- Make one small triangle.



- Now make it into 4 small triangles by adding 6 sticks.



- Add another row and count the number of small triangles and count the sticks.
- Have a go and see what patterns you can find. 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 ten - Mayan addition

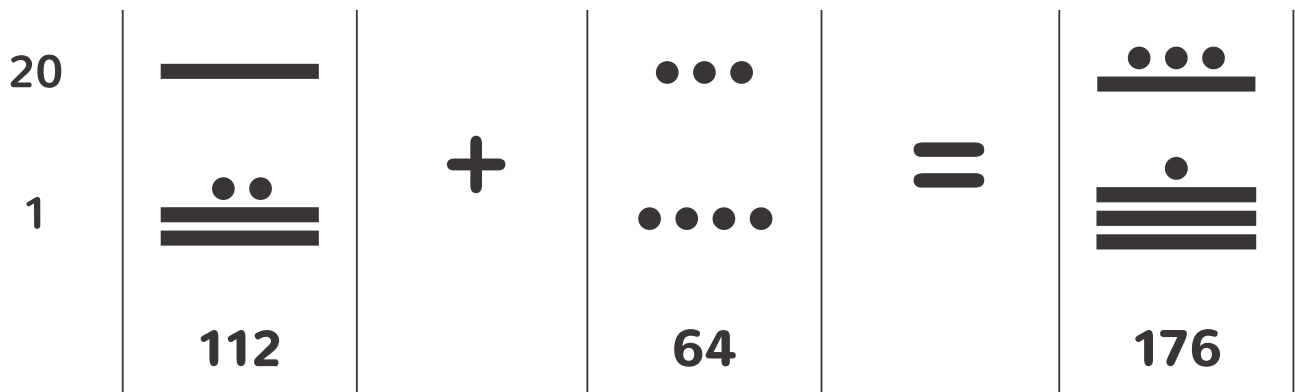
Key skills

- To add using a different number system.

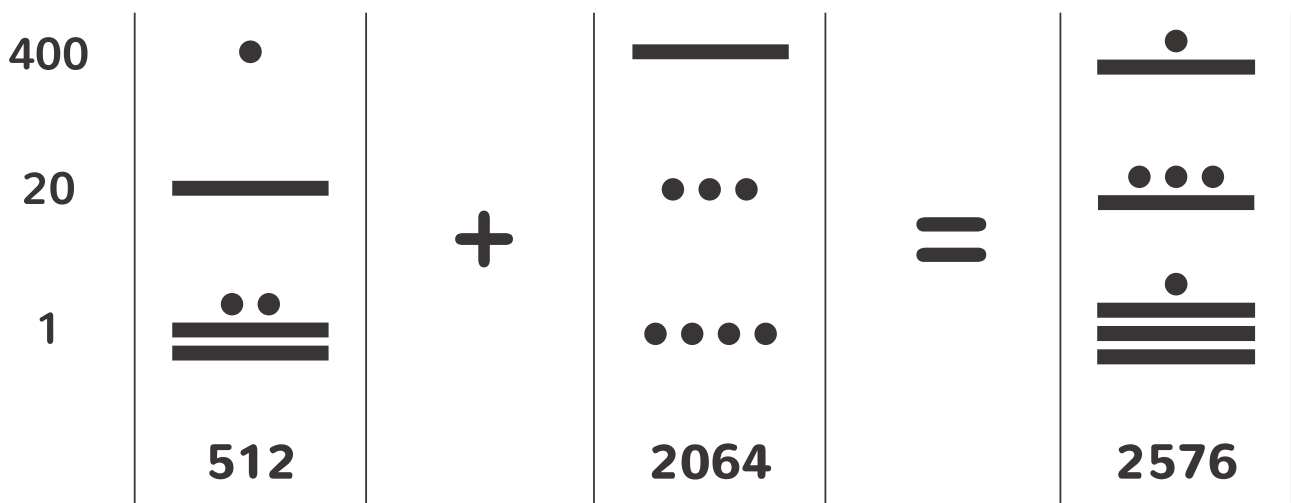
- An assortment of materials.
- Mayan addition frame (see resources).

Activity

- With the addition frame, try adding two numbers using the Mayan number system.
- Try just the 1s and 20s first.
- For example:



- Now let's extend to adding larger numbers.



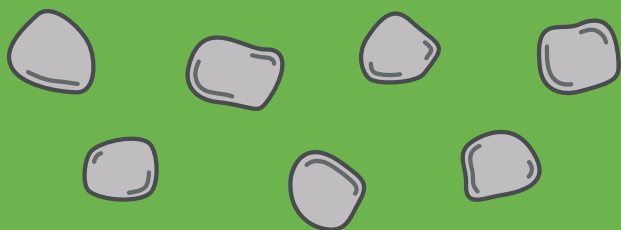
Activity eleven - Common nim

Key skills

- To problem solve.

Have ready

- Seven objects like stones, sticks, counters.
- It is a game for two players.



Activity

- To play the ancient game of Nim, place the 7 objects in a pile and decide who will go first. In the next game, the other player will go first.
- Each player takes turns to take away either one or two objects. The loser is the player who takes the last counter.
- The player who takes the last object wins.
- Keep playing until you work out a winning strategy.
- Think about; Does it matter who has the first turn? What happens when you start the game with more objects?

Activity twelve - Follow the trail



Key skills

- To describe position, direction and movement.

Have ready

- Sticks or alternatives.

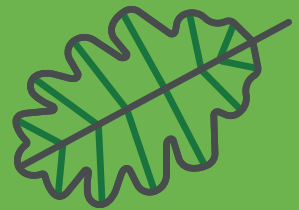
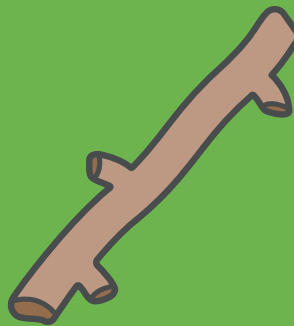
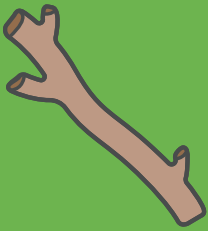
Activity

- Lay a trail of sticks through woods, park, your garden or even in your home.
- Agree a trail code, for example, cross sticks means dead end, arrow turn left or right or straight ahead.
- Use positional language to describe how you get through your trail.



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Resources



Mayan place value frame

400		
20		
1		

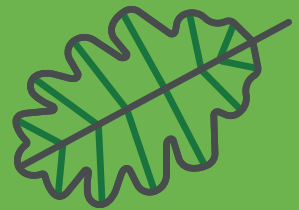
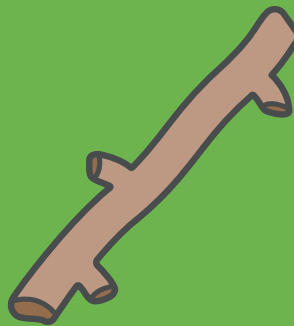
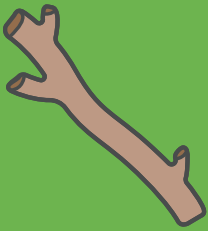
Mayan addition frame

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Glossary



Acute angle



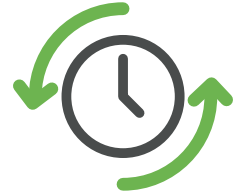
An angle smaller than a right angle. It is an angle between 0° and 90° .

Angle



An amount of turn. Angles are measured in degrees.

Anti-clockwise



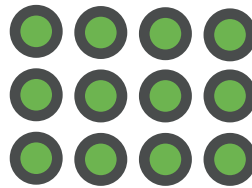
Turning the opposite way to the clock.

Area



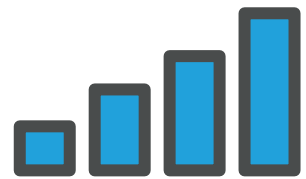
The area of a shape is a measure of how much surface it has.
 $\text{Area} = \text{length} \times \text{width}$

Array



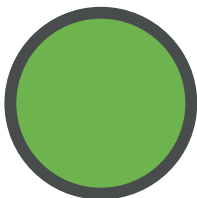
A regular arrangement of numbers or objects. It has rows and columns usually in the form of a rectangle.

Ascending



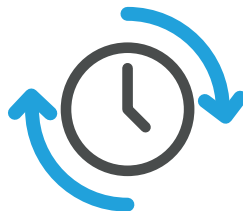
Going up or increasing in order from smallest to largest.

Circle



A shape with every point at its edge at exactly the same distance from the centre.

Clockwise



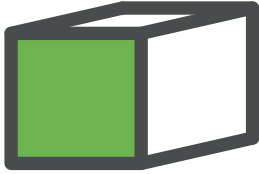
Turning the same way as a clock.

Corner



A corner is a point where two or more lines meet.

Cuboid



Solid shape with six rectangular faces.

Denominator

$$\frac{1}{2}$$

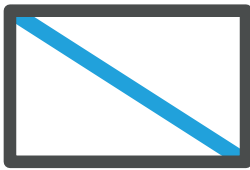
The number below the line in a fraction.

Descending



Going down or reducing in size.

Diagonal



A straight line that joins any two corners which are not adjacent.

Diameter



A line that passes from one side of a circle through the centre to the other side.

Half



One of two equal parts. When something is divided into two equal parts, each part is one half.

Hexagon



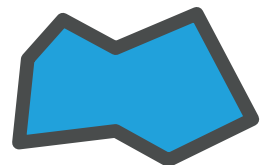
Any polygon with six straight sides.

Horizontal



Same direction as the horizon.

Irregular polygon



Shapes that do not have all their sides the same length. They have different sized angles.

Numerator



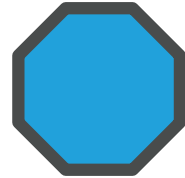
The number above the line in a fraction.

Obtuse angle



An angle that measures between 90° - 180° .

Octagon



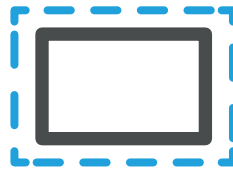
Any polygon with eight straight sides.

Parallel lines



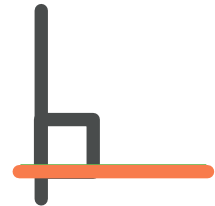
Lines that stay at the same distance apart.

Perimeter



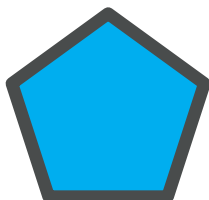
The distance around the outside of the shape.

Perpendicular lines



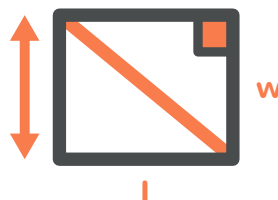
One line is at right angles to another line.

Polygon



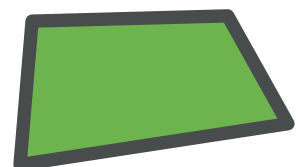
Any 2D shape with straight sides. Polygons can be regular or irregular

Property



A property of a shape is a particular fact or feature of it that makes it part of a group with the same properties.

Quadrilateral



Any polygon that has four sides. The four angles add up to 360° .

Quarter



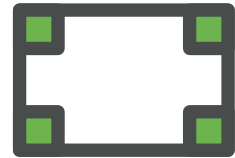
Is one of four equal parts.

Radius



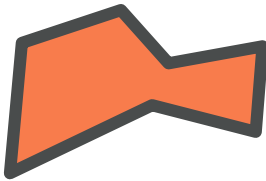
Is the length of a straight line from the centre of a circle to its circumference.

Rectangle



A four-sided flat shape. It has two pairs of opposite, equal parallel sides and each angle is a right angle.

Rectilinear



A rectilinear shape is a shape whose edges are all straight lines. All polygons are rectilinear shapes.

Right angle



An angle of 90° . It is a quarter turn.

Side



A side of a shape is the line that forms part of the edge or perimeter.

Square



A flat shape with four straight and equal sides. The angles in its corners are all right angles.

Square-based pyramid



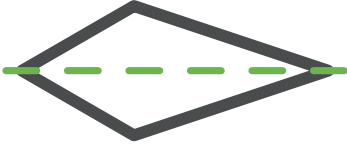
Has a face that is square and the other four faces are triangles.

Straight lines



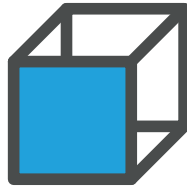
A straight line is half a turn. It is two right angles.

Symmetry



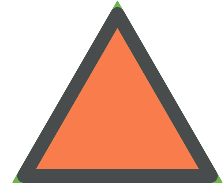
The 'Line of Symmetry' is the imaginary line where you could fold the image and have both halves match exactly.

Three-dimensional shape



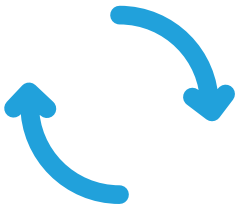
Three-dimensional shapes are solid shapes.

Triangle



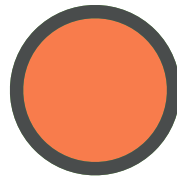
Any polygon with three sides. The angles of a triangle add up to 180°.

Turn



When something turns it spins, rotates, revolves, or whirls.

Two-dimensional shape



Two dimensional shapes are flat shapes.

Unit fraction



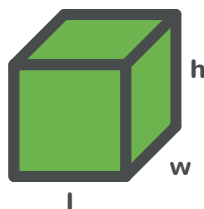
Has a numerator of 1 and any number as a denominator.

Vertical



At right angles to a horizontal line.

Volume



Volume of an object is the amount of space it fills. To find the volume you multiply the length by the width by the height.

Volume = $l \times w \times h$