Year 3

At home materials

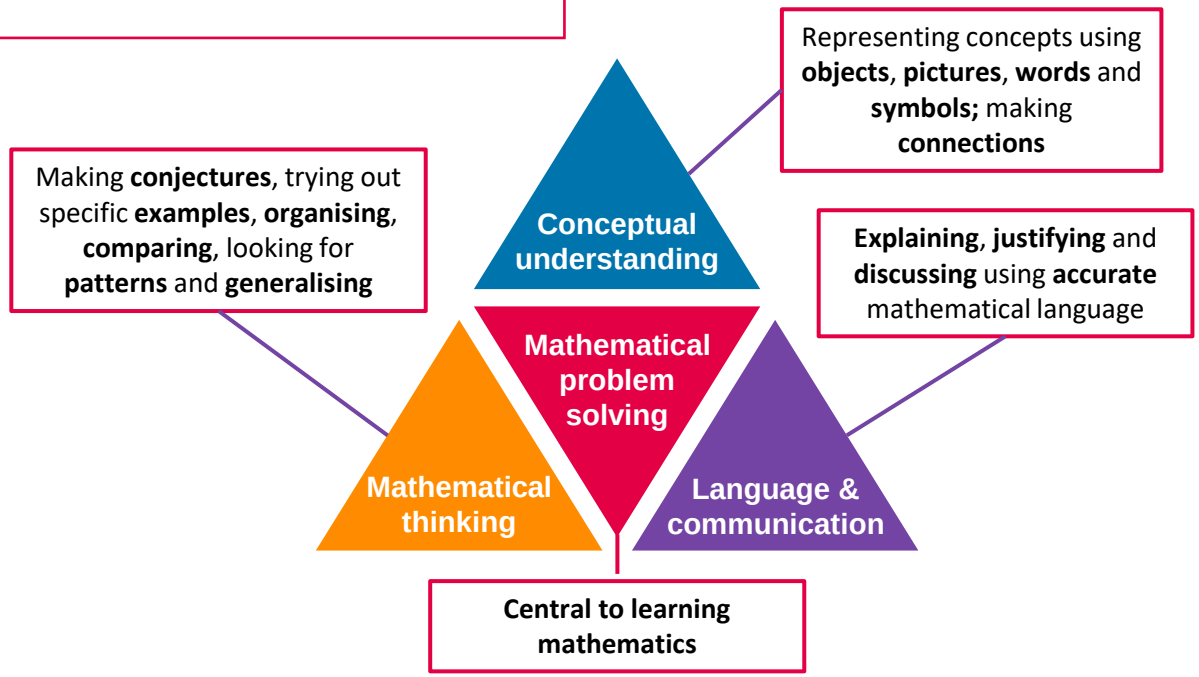
Task Bank

Mathematics Mastery

Mathematics Mastery

What is 'Mastery'?

The 'mastery approach' to teaching mathematics is the underlying principle of Mathematics Mastery. Instead of learning mathematical procedures by rote, we want your child to build a deep understanding of concepts which will enable them to apply their learning in different situations. To achieve this we aim to develop pupils' **Conceptual Understanding, Mathematical Thinking** and **Language and Communication** (see diagram).



Success for all

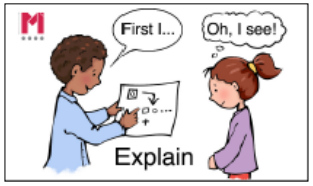
At school we believe all pupils can achieve success in maths. We encourage pupils to have a belief that effort leads to success and that challenges are opportunities to learn.
Here are a few tips to encourage your children at home with maths:

- ✓ Talk to your children about everyday maths
- ✓ Play games with them
- ✓ Value mistakes as learning opportunities
- ✓ Recognise that there is more than one way to work things out
- ✓ Praise children for effort over outcome
- ✓ Avoid saying things like "I'm useless at maths"

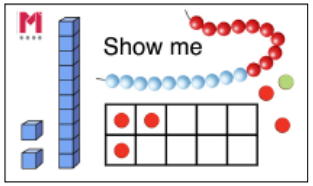
Mathematics Mastery

Ideas for Depth

We have developed ten ideas that challenge pupils to develop a depth of understanding within a concept and build up habits of thinking mathematically.. Each of the ten ideas is represented by a picture or symbol and you will see these throughout the task bank. Each is explained below.

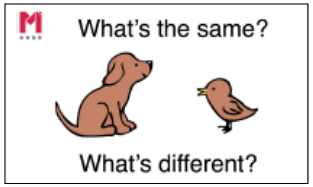


'Reason it'
Explain how you know. Remember to use the star words!

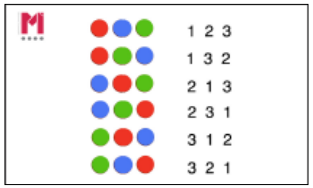


'Show me!'
Build something to convince me that you are right.

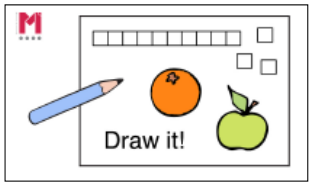
'What's wrong with this?'
Can you explain what is wrong with this and correct the error?



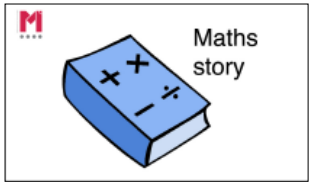
'What's the same? What's different?'
Describe as many things as you can.



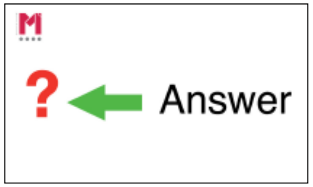
'Have you found all possibilities?'
Is there more than one way of completing this? Is there more than one answer? Have you found them all?



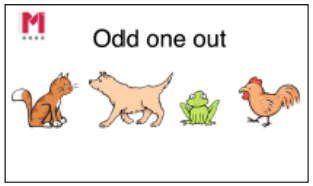
'Draw it'
Draw a picture to explain or demonstrate what you have worked out.



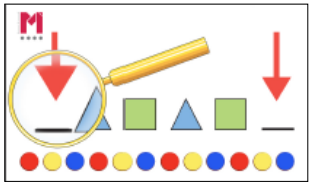
Maths story'
Make up a real-life story using your equation/numbers or shapes. Try to use the star words.



'What's the question?'
If this is the answer, what could the question have been?



'Odd one out'
Find an odd one out and explain why it doesn't fit. Does your partner agree with you? Could another one be the odd one out? Why?



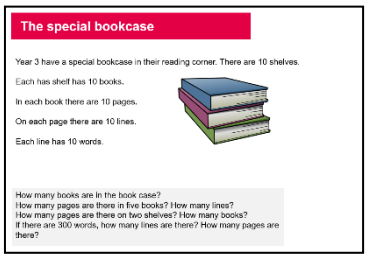
Find a pattern'
Can you see a pattern? Continuing this pattern, what would happen if...? What came before? What comes next? Explain how you know

Contents

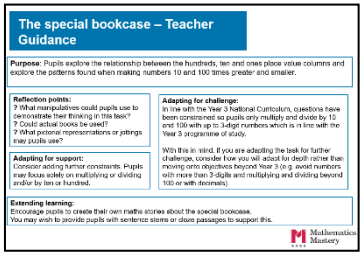
Task banks are organised by the following topics and we recommend exploring one topic per week.

Aim to complete one task per day. There is a range of tasks to choose from each week.

Task



Guidance or answers



Mathematics Mastery

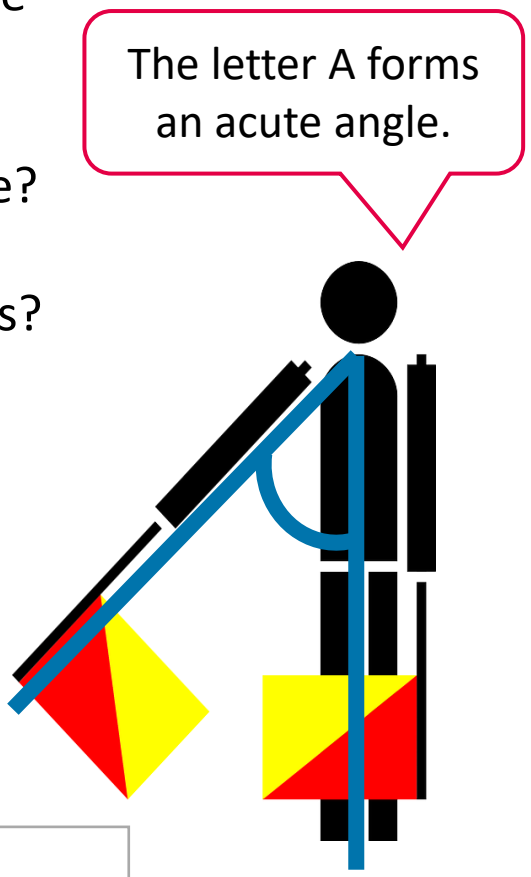
Flag fantastic

Semaphore is a signalling system using flags or other hand-held equipment. The position of the flags shows a letter of the alphabet. This is the signal for the letter A.

What angles can you form using the letters of your name?

Can you find a word containing **exactly three** right angles?

Can you find a word containing **only** obtuse angles?



Create a message for someone else using this code.

Flag fantastic – the semaphore alphabet

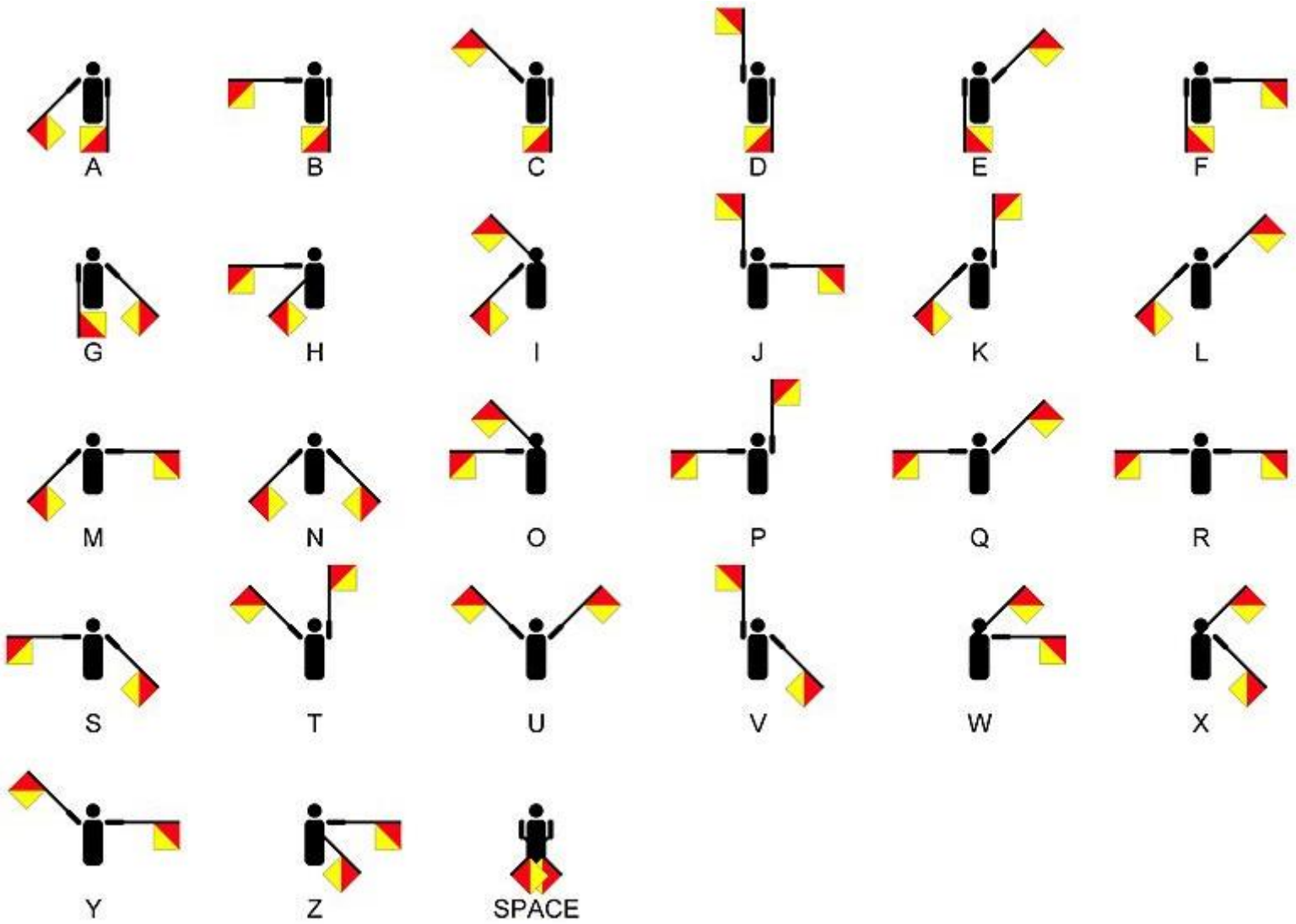
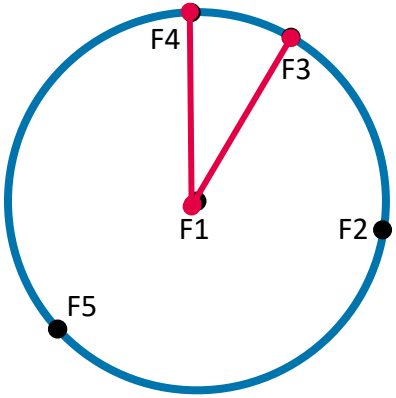


Image taken from: https://commons.wikimedia.org/wiki/File:Semaphore_Signals_A-Z.jpg

Feel the Turn



Using four or five mini figures (e.g. Lego, Playmobil, teddies) place them in a circle with one in the middle.
The figure in the middle faces another figure around the edge of the circle.
Without moving off the spot, now turn the figure to face another figure.

How many ways can you describe the turn? What did you feel?

Now, facing the same starting point, turn complete other turns always starting at the same starting point.

Compare each of these turns to the original turn how would you describe them?

This is not as bigger turn as this.

This is not as small a turn as this.

I have turned more.

This is a smaller turn.

I have turned less.

This is a bigger turn.

Feel the Turn – Adult guidance

Guidance video

https://vimeo.com/manage/390836257/g

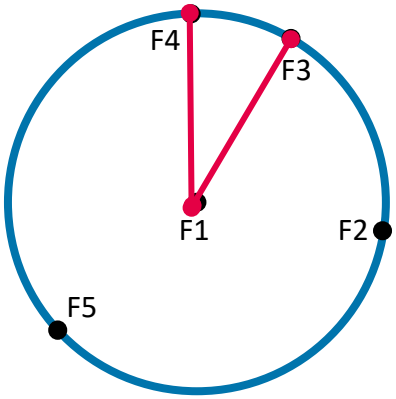
Purpose: For pupils to experience angle as a measure of turn between two points and to compare the differing turns using informal language

Suggested sequence of learning: Set the figures into a circle with one placed in the middle. You may wish to draw a dot in the middle to keep them rooted to the spot.
Ask the pupils to turn the figure in the middle from one figure to another in the circle.
Encourage them to choose another figure to turn to and face whilst keeping the figure on the spot.

Encourage informal language to describe, think and talk about what they feel when turning and comparing turns to each other.

? If figure 2 were to walk closer to the middle, would the angle be bigger, smaller or stay the same?
? How could we change the size of the angle? How can we make the angle smaller? Bigger?
? Where would we need to place XX to make the angle the same?

Adaptations: There are various ways this task can be adapted.
- Provide with a set of turns to complete and describe as shown on the right.
- Pupils could mark the lines on the ground use skipping ropes or chalks to represent the arms of a static angle. This will support them in making connections between angle as a measure of turn and the static lines drawn on a page.



Mathematics Mastery

Criss-cross

Points	
Acute	3 points
Obtuse	2 points
Right	1 point

Using tape, take five strips each and lay them across the table so they all criss-cross.

Take it in turns to identify an angle. What angles can you see? Total up your points for each correctly identified angle.

Example and non-examples

Using your arms…

What examples can you make of a right angle?
What non-examples can you make of a right angle?

Now try the same for acute angles.

Now try the same for obtuse angles.

What examples can you find around your house?

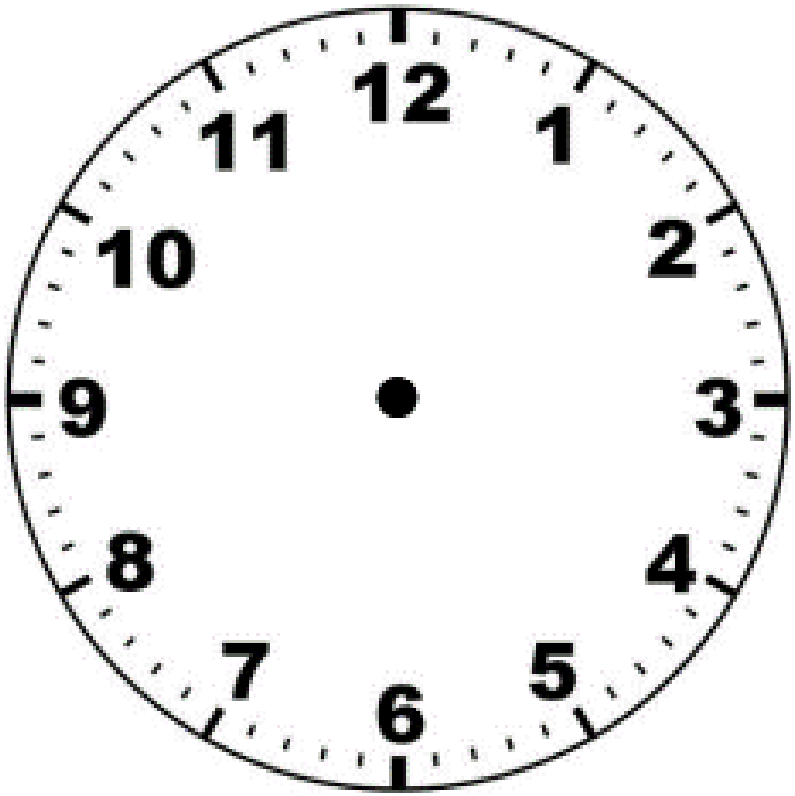
How can you prove that it is or isn't a right angle?

Take pictures of the different angles you find and create.
How would you sort them?

Clock watching

Using a clock, what angles can you make using the hands as the arms?

What times have you made? What if you swapped the minute and hour hands?



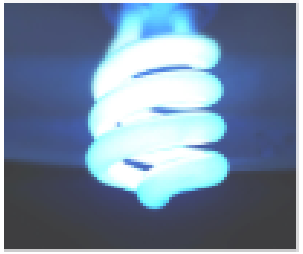
How many different times can you make where the arms represent;

- a right angle?
- an acute angle?
- an obtuse angle?

Shape hunt

Use the things in the place where you are to find and describe different shapes and patterns.

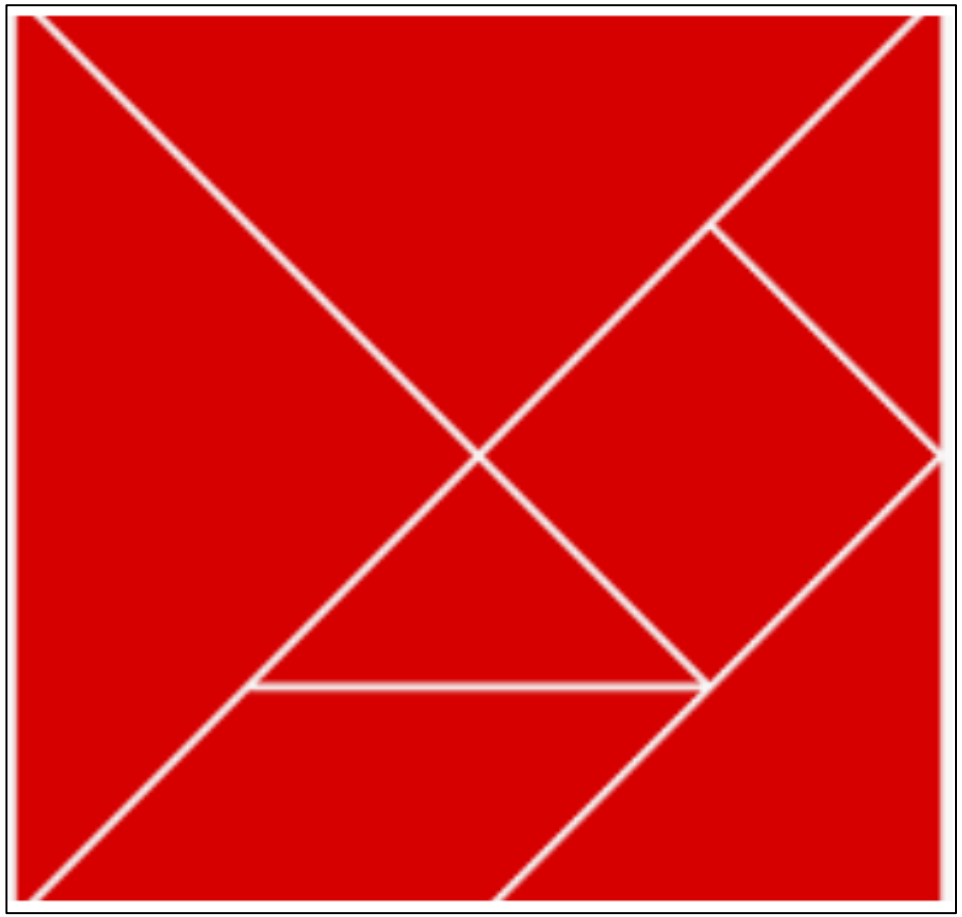
How many different mathematical words and phrases can you use?



Create sketches of different items. Change your position and explore how this changes the shapes you can see.

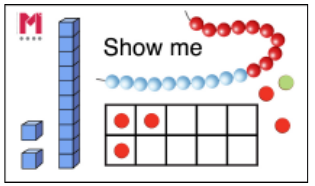
Tangram

Cut out the seven shapes.

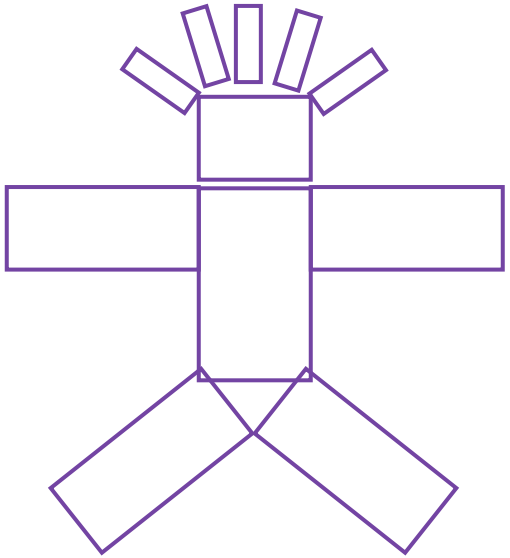


What pictures can you make using these shapes?

Shape Pic



Using different 2D shapes, what pictures can you draw?

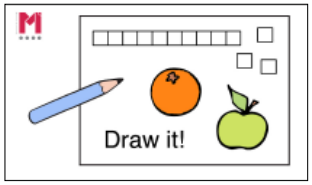


What picture can you draw using squares?

What picture can you draw just using triangles?

What picture can you draw using just rectangles?

What's my shape? Can it be drawn?



I draw four lines which join to create a shape. Two lines are parallel. What could my shape be?

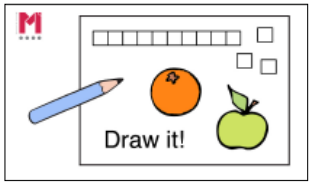
I draw three lines. None of the lines are parallel. What could my shape be?

I draw five lines which join to create a shape. Two lines are perpendicular. What could my shape be?

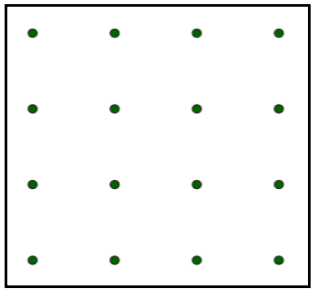
I draw seven lines which join to create a shape. Two lines are parallel. What could my shape be?

Use the clues to draw the shapes using a ruler.
What shapes do they make? Can they be made?

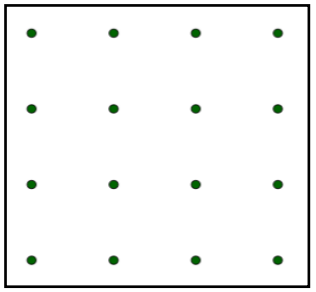
Poly-possible?



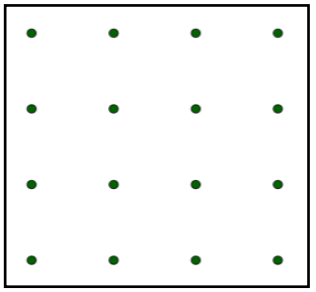
Is each one true or false? Show an example or if you think it is false, show how close you can get.



I can make a pentagon with two right angles



I can make a quadrilateral with three acute angles



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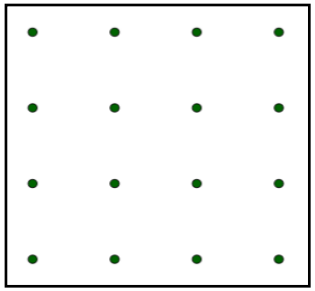
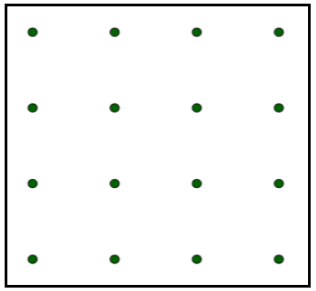
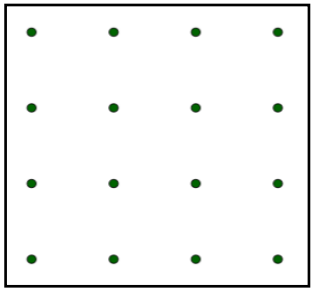


I can make a hexagon with two right angles

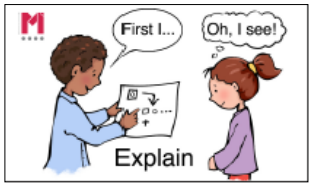


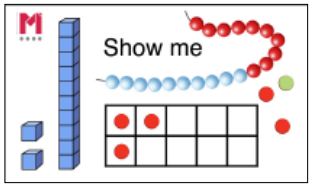
I can make a triangle with an acute angles



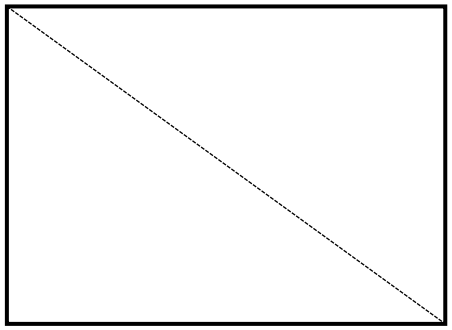
I can make a triangle with an acute angles

Cut the quads

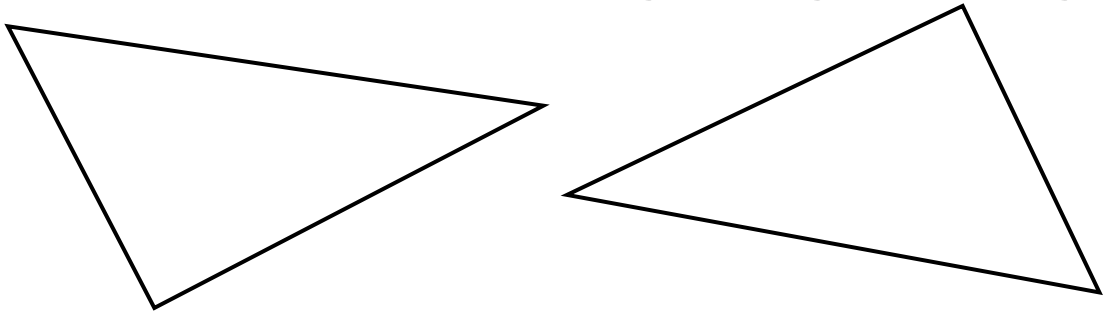




Using a piece of paper cut it in half diagonally from corner to opposite corner.



You should now have two right-angled triangles.

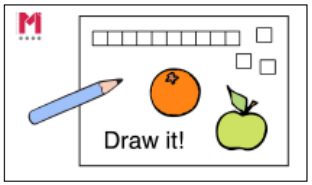


How many different **quadrilaterals** can you create?

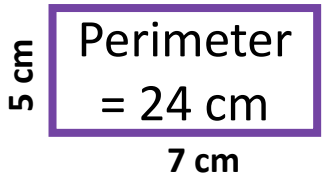
Can you create any other polygons?

How are you going to record your solutions?

Related perimeter



Complete the table with one example per instruction.

*Different shape, **greater** perimeter*	*Same shape, same perimeter, different side lengths*	*Same shape, **greater** perimeter*
Different shape, same perimeter		*Same shape, **half the** perimeter*
*Different shape, **smaller** perimeter*	*Same shape, same perimeter, different side lengths*	*Same shape, **smaller** perimeter*

Compare with a partner. What is the same? What is different?

Related perimeter – Adult Guidance

Guidance video

https://vimeo.com/manage/39291657

Purpose: To provide opportunities for deliberate practice of calculating perimeter of 2-D shapes, with a focus on rectangles.

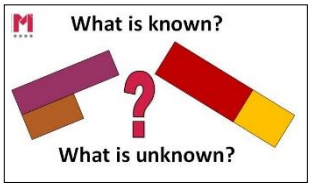
Possible sequence of learning: The task could be printed out or pupils could sketch their own grid. Pupils complete the grid, exploring rectangles with the same perimeter but different dimensions as well as rectangles and other 2-D shapes with perimeters greater than, less than and equal to 24 cm. Some pupils may need prompting to find a way in to the task: consider modelling one or two of the prompts, thinking aloud e.g. 'The perimeter of this rectangle must be smaller than 24 cm. The sides must be less than 5 cm and 7 cm. I could try 4 cm and 6 cm.' Some pupils may benefit from an adapted grid with some zones already completed. Consider making use of mini-plenaries to share and discuss different responses, considering what is the same and what is different.

Adaptations:

- The number of zones in the grid could be reduced to focus on one aspect e.g. only rectangles, only greater perimeters
- Shapes could be pre-populated for pupils to find the perimeter and check
- Examples of shapes could be provided for pupils to sort
- The criteria could be changed e.g. 'greater than 24 cm but less than 40 cm' or 'a perimeter five times greater'
- The task could be adapted to work with different units of measure, including mixed units

Mathematics Mastery

Ribbon tangle



Solve the clues to find the length of each ribbon.

The length of my ribbon is twice as long as Jake's

Beth

Abdul

My ribbon is 1 cm 6 mm longer than Tamara's

Mine is shorter than Abdul's by 3 cm 2 mm

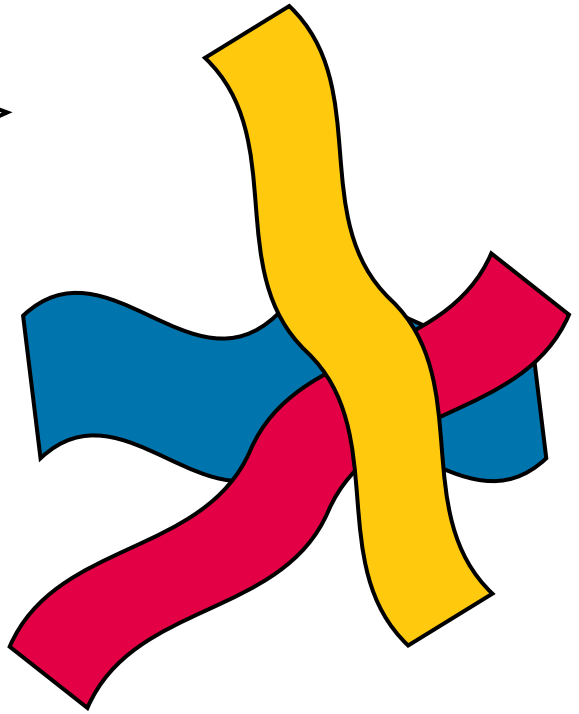
Jake

Sara

Mine is the longest ribbon. It is 5 cm 1 mm longer than Beth's

My ribbon is 10 cm 3 mm

Tamara



Write your own problem using m and cm.

Ribbon tangle – Adult Guidance

Purpose: Pupils solve a problem relating to measure using comparison of length.

Possible sequence of learning: The task is designed to be presented to pupils using all the clues at once, with pupils working through and choosing their own starting point. Prompting pupils to discuss what they know and what they do not know will support them in selecting an appropriate order to solve the clues.

You may wish to adapt the introduction of the clues in order to scaffold pupils finding a solution. Revealing Abdul's clue, discussing what is needed in order to solve it before revealing Tamara's statement allows pupils to experience success before tackling the remaining clues.

? How might you encourage pupils to draw the problem in order to support understanding?

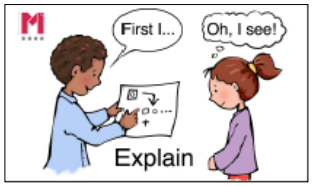
Solution:

Tamara: 10 cm 3 mm **Abdul:** 11 cm 9 mm **Jake:** 8 cm 7 mm

Beth: 17 mm 4 cm **Sara:** 22 mm 5 cm

Mathematics Mastery

What's in the container?

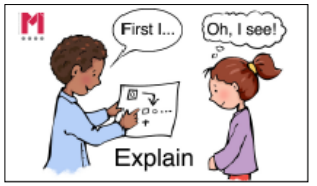


Collect five different empty containers from around the house.
Estimate their capacity and arrange them in an order.
Explain how you've chosen to order them to someone else.
Now test your estimates by filling out and measuring using a jug the actual capacity.

Container	Estimated capacity	Actual capacity	Difference

How close were your estimates? Calculate the difference between your estimates and the actual capacity

Snack attack!



Look through your kitchen cupboards.

What's do you think is the total mass of your snacks and record your estimate.

Using the full mass of the snacks e.g. ignoring if a bag is half eaten for now, total up the mass and record.

Now estimate the mass of what is left.

Estimate:	Approximate total:	Approximate of what's left:

How do you think this will change over the next week?

Piggy Bank Raid

Gather all the coins that you can find.

How many of each coin is there?

What is the value do you have for each denomination?

								
How many?								
How much?								

How much do you have altogether?