RICH MATHEMATICAL TASK BOOKLET

ALGEBRA

YEAR 4

Copy Masters

Task 1

Litea has a giant bag of M & Ms. She likes to eat her favourite colours of M & Ms in a specific order: brown, blue, red, green, yellow, orange.

What colour will the 83rd M & M that she eats be?

Find two different ways of solving the task and show representations to prove your solutions.

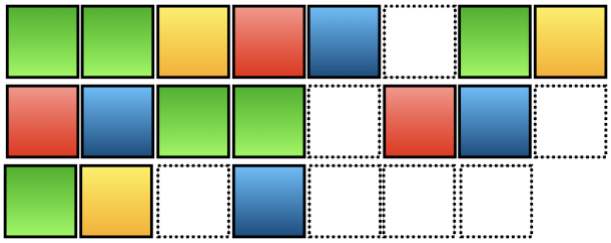
Task 1 (independent)

Lulu is making a snake with cubes. This is her first snake:

Copy the pattern.

What is the unit of repeat? How many cubes in the unit of repeat? How many cubes are there altogether?

Draw a picture of the snake and colour it.



What colours would the missing cubes be?

Lulu continues making her pattern.

What colour would the 56^{th} block be?

What colour would the 77^{th} block be?

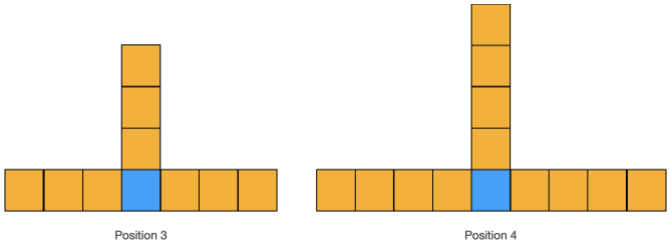
What colour would the 110^{th} block be?

What do you notice about all of the yellow blocks in relation to their pattern position?

What do you notice about all of the blue blocks in relation to their pattern position?

Task 2

Jona is using the shapes to make a pattern:



Make and draw position 1 and 2 and 5.

How do you see the pattern growing? Represent this with numbers.

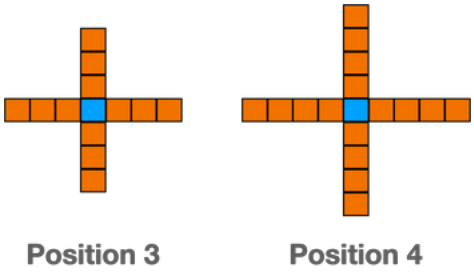
How would you draw position 10?

Complete the table

Position number	Number of blocks
1	
2	
5	
10	
12	
15	

Task 2 (independent)

Jona is using the shapes to make a pattern:



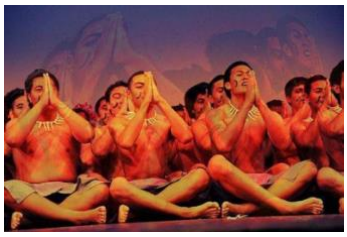
How many blocks would I need to make:

Position 8:

Position 12:

If I had 65 orange blocks, what position number could I make? Would I have some orange blocks left over?

Task 3



Tevita's group is practising their sasa for the Polyfest.

The first sequence is: clap, slap, slap, clap

The second sequence is: clap, slap, slap, clap, slap, slap, clap

The third sequence is: clap, slap, slap, clap, slap, slap, clap, slap, slap, clap

What would the next sequence be?

Represent the pattern sequence using the shape blocks.

Complete the table:

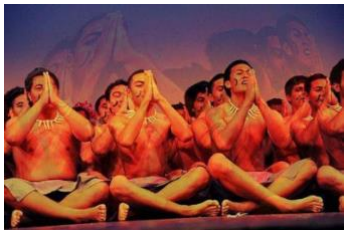
Sequence number	Number of claps	Number of slaps	Total number of movements
1			
2			
3			
	5		
		10	
			19

Identify three patterns across the table rows and three patterns down the table columns.

How many claps and slaps would there be for the eighth sequence?

How many claps and slaps would there be for the 25th sequence?

Task 3 (independent)



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The first sequence is: clap, slap, slap, clap

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The third sequence is: clap, slap, slap, clap, slap, slap, clap, slap, slap, clap

Represent the pattern using different material.

Represent the pattern again using another type of material.

Create your own dance pattern.

What is the unit of repeat for your pattern?

Represent your dance pattern using different material.

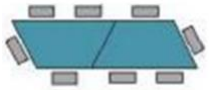
Represent the pattern again using another type of material.

Task 4

You are having a family reunion at your church hall and need to help set the tables up so everyone will fit.

One table looks like this:

Two tables look like this:



How many people could sit around three tables?

How is the pattern growing?

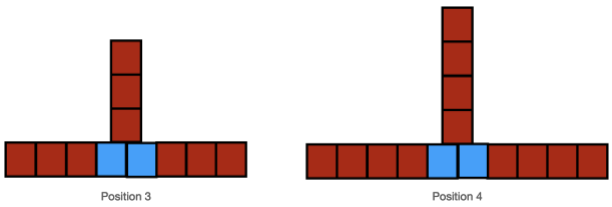
Use drawings and numbers to show how it is growing.

How many people could sit around six tables?

How could you find out how many people could sit around 10 tables?

If there were 65 people seated, how many tables would there be?

Task 4 (independent)



Draw the following position numbers: 1, 2, 5, and 6.

How would you draw position 10?

Complete the table

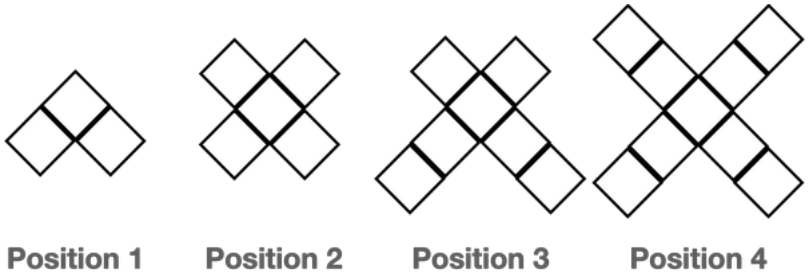
Position number	Number of red squares	Total number of squares
1		
2		
3		
4		
5		
6		
7		
8		

Identify three patterns going horizontally and three patterns going vertically.

What rules could you use to find the number of different shapes?

Task 5

Tui is weaving and develops a pattern that looks like this:



How many squares does each position have?

Use colours, numbers, and drawings to show how the pattern is growing.

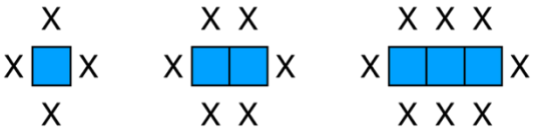
Complete the table:

Position	Number of squares
1	
2	
3	
4	
5	
8	
10	
12	
25	

Task 5 (independent)

You are having a party at a hall and need to help set the tables up so everyone will fit.

The first three tables look like this:



How many people could sit around four tables?

How is the pattern growing?

Use drawings and numbers to show how it is growing.

How many people could sit around 5 tables?

How many people could sit around 10 tables?

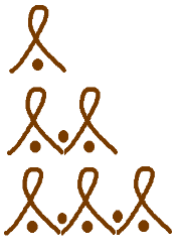
How many people could sit around 20 tables?

How could you find out how many people could sit around 200 tables?

What is a rule that could be used to find out how many people could sit around *p* tables?

Task 6

Parveen and her family are preparing for her cousin's wedding. The women and girls are all having their hands decorated with mehndi. Parveen notices that there is a pattern in one of the designs her aunty is creating.



Parveen is interested in working out how many circles there will be for different amounts of loops.

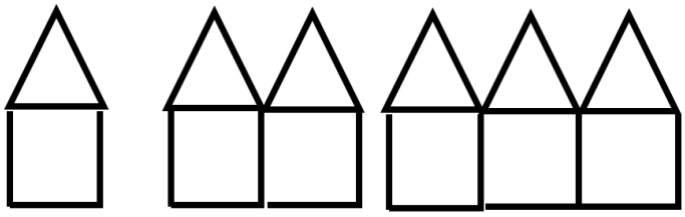
How many loops and circles would there be for positions 4, 5 and 6?

How is the pattern growing as the position increases?

Use what you notice to work out the number of circles and loops for position 12 and 24.

Can you come up with a rule to find out how many loops and circles there would be for any position?

Task 6 (independent)



How many different patterns can you see in the picture?

Use colours and or number to show the different patterns.

How would you draw the next stage?

How would you draw the 10^{th} stage?

How many houses would there be if there were 103 ice-block sticks? Would there be any sticks left over?

Task 7

Viliami has saved some money (he only has dollars and no cents). His Kui fefine wants to reward him for helping her with some jobs. She offers him two deals:

Deal 1: She will double his money

Deal 2: She will add $10 to his savings.

Use a number sentence to represent the two deals.

Show the results for Deal 1 and Deal 2 in a table.

Viliami's savings	Deal 1	Deal 2

Which deal is better?

What advice would you give Viliami depending on the amount of money he has saved?

Task 7 (independent)

Principal has decided to have a ‘best reader’ contest for all the students at school. The student who reads the most books in their year level will get a lollipop. The principal has a box with 200 lollipops. Each day 7 lollipops are taken and given to the ‘best reader’ for each year level (Year 0 – 6).

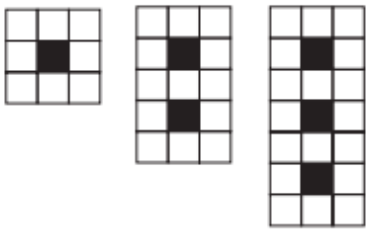
How many lollipops will be left in the box after the contest has lasted 4 days? 6 days? 10 days? 20 days?

Write a number sentence or rule that calculates the number of lollipops after any number of days.

How many days will there be until the lollipops run out?

Task 8

Niu was looking at a design to make a mat. She would like your help to work out how many white squares she will need.



How does the pattern grow?

Show how the pattern grows using colours and or numbers.

What part stays the same and what part grows?

How many white squares would there be for position 6?

How many white squares would there be for position 9?

How many white squares would there be for position 11?

How would you find the number of white squares for position 99?

Can you work out a rule for the number of white squares?

Task 8 (independent)

Develop a growing pattern to match these rules:

Tiles = Position number multiplied by two ($g = 2 \times k$)

Tiles = Position number add four ($a = b + 4$)

Tiles = Position number multiplied by two add two ($f = d \times 2 + 2$)

Develop your own growing patterns and write a rule to match them.

Task 9

Use the coloured squares to create your own tivaivai pattern. Make sure that parts of the pattern repeat or grow.

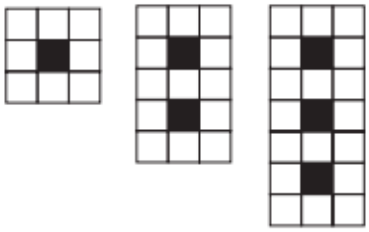
Write out the instructions and steps for a pattern to create your tivaivai.

Make sure to include steps in your instructions that could be repeated multiple times.

Test your instructions using the coloured squares and revise them to solve any potential problems.

Task 9 (independent)

Niu was looking at a design to make a mat.



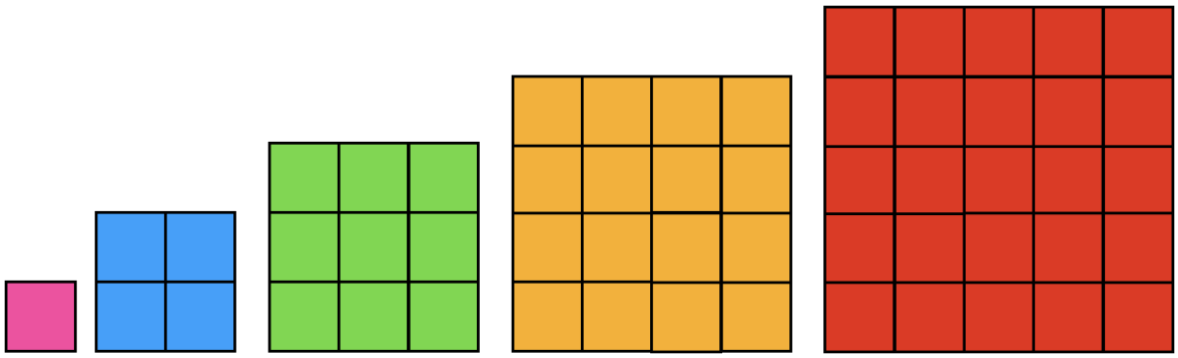
What position number would have 18 white squares?

What position number would have 53 white squares?

What position number would have 123 white squares?

Write a set of instructions to make the pattern for the third position. Use the squares to test whether your instructions work and refine them further.

Task 10



How many squares are there on each card?

Why are these called square numbers?

Place your cards in order from the smallest to the largest.

What do you notice changing?

Now draw the pattern on the grid paper and write a number sentence that matches the pattern.

How many squares would be in the next position?

Draw the next position.

What are the different ways that you can find the next position?

Continue the pattern as far as you can.

How does the pattern change each time?