DEVELOPING MATHEMATICAL INQUIRY COMMUNITIES

Number and Algebra: Patterns and Relationships

Level 2 (Year 3/4)

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: red, blue, green, yellow

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

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

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships
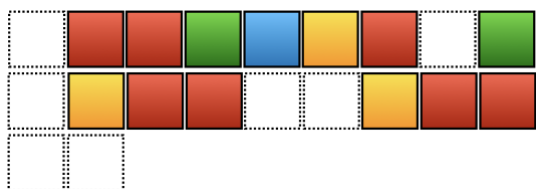
Task 1 (independent)

Tane is making a snake with cubes. This is his 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?

Tane continues making his pattern.

What colour would the 42ⁿᵈ block be?

What colour would the 50ᵗʰ block be?
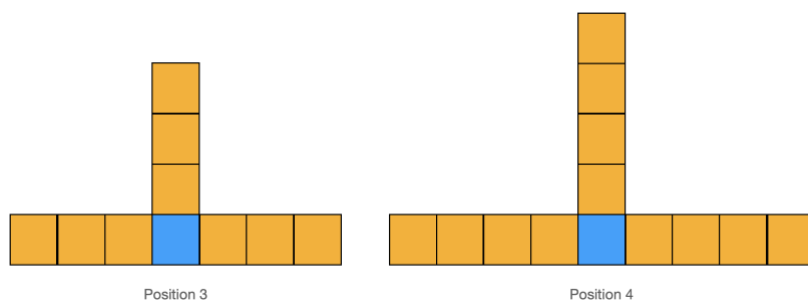
What colour would the 104ᵗʰ block be?

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

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

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 2

Jona is using the shapes to make a pattern:

Position 3   Position 4

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	

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 2 (independent)

Litea has a giant bag of M & Ms. She likes to eat her favourite colours of M & Ms in a specific order: blue, yellow, green, red, orange.
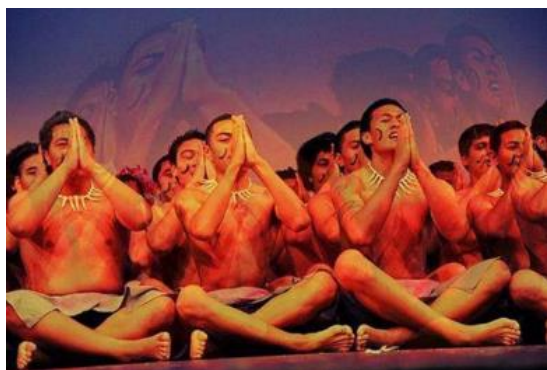
What will be the colour of the 41st M & M that she eats?

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

What do you notice about all of the orange M & Ms in relation to their pattern position?

How could you find the location of every orange M & M?

What about the red M & Ms?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

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 be the next sequence?

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 and three patterns down the table.

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

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

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 3 (independent)

Jona is using the shapes to make a pattern:
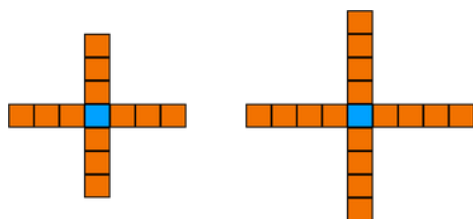
Position 3   Position 4

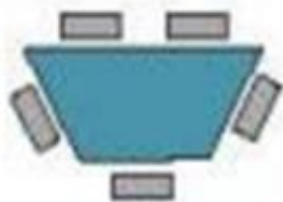How many blocks would I need to make:

Position 8:

Position 12:

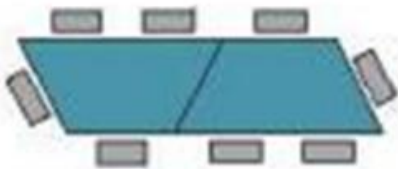If I had 65 orange blocks, what position number could I make? Would I have some orange blocks left over?

Task 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:

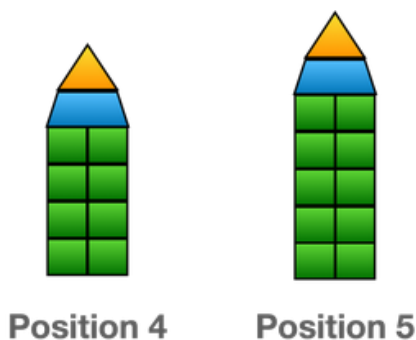How many people could sit around three tables?

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)

Position 4   Position 5

This is my pencil pattern.

Draw the following position numbers: 1, 2, 3, and 6.

How would you draw position 10?

Complete the table

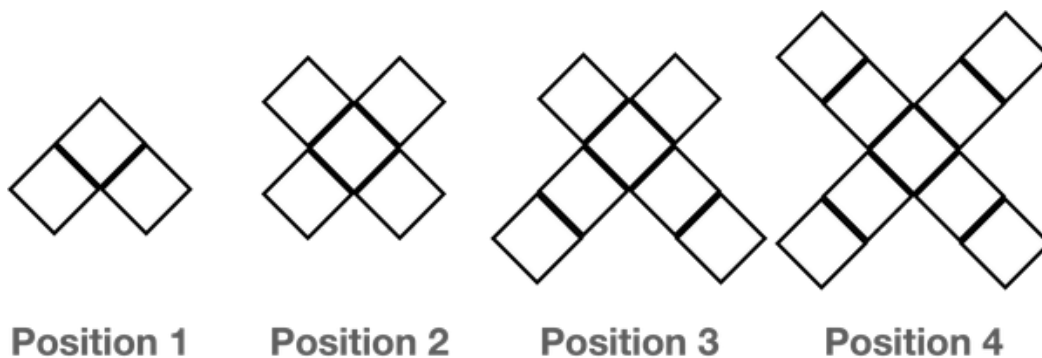| Position number	Number of squares	Number of rhombuses	Number of triangles	Total number of shapes
1				
2				
3				
4				
5				
6				
7				
8				

Identify three patterns going horizontally and three patterns going vertically.

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

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 5

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

Position 1   Position 2   Position 3   Position 4

How many squares does each position have?

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

Complete the table:
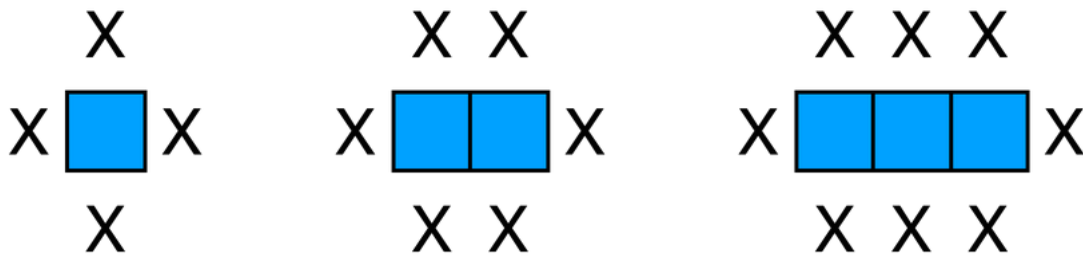
Position	Number of squares
1	
2	
3	
4	
5	
8	
10	
12	
25	

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 5 (independent)

You are having a birthday 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 6 tables?

How many people could sit around 9 tables?

How many people could sit around 12 tables?

How could you find out how many people could sit around 100 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.
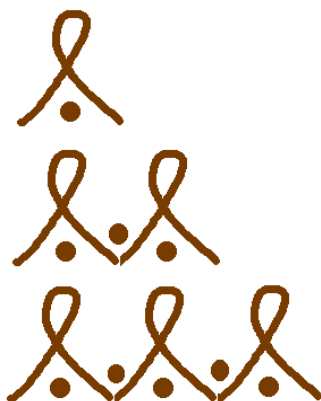
Parveen is interested in working out how many circles there will be for different amounts of loops.

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

How is the pattern growing between each position?

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?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 6 (independent)

Ice-block sticks
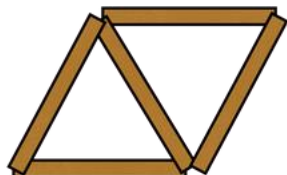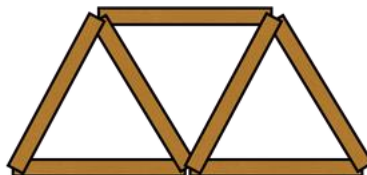
Position 1   Position 2   Position 3

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 10th stage?

How many triangles would there be if there were 31 ice-block sticks?
Would there be any sticks left over?

How many triangles would there be if there were 50 ice-block sticks?
Would there be any sticks left over?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

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?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

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?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

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.
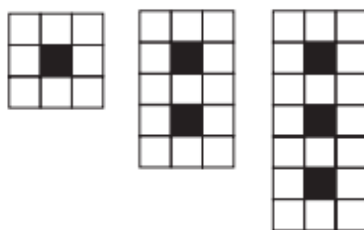
How does the pattern grow?

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?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 8 (independent)

Develop a growing pattern to match these rules:

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

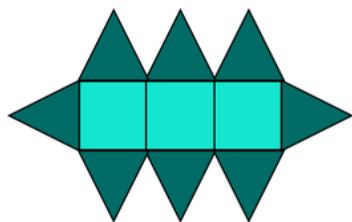Tiles = Position number add four ($a = b + 4$)

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.

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 9 (optional task)

Flower pattern

Position 3

Use the counters to make Position 2, and Position 1

How many different patterns can you see? Explain these and justify them with colours, numbers, and the counters.

How many triangles would Position 4 have?

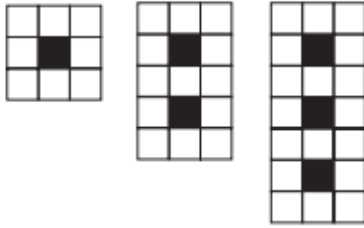How many shapes would Position 4 have altogether?

How many triangles would Position 4 have?

How many shapes would Position 4 have altogether?

Describe how you would find the triangles for Position 51.

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

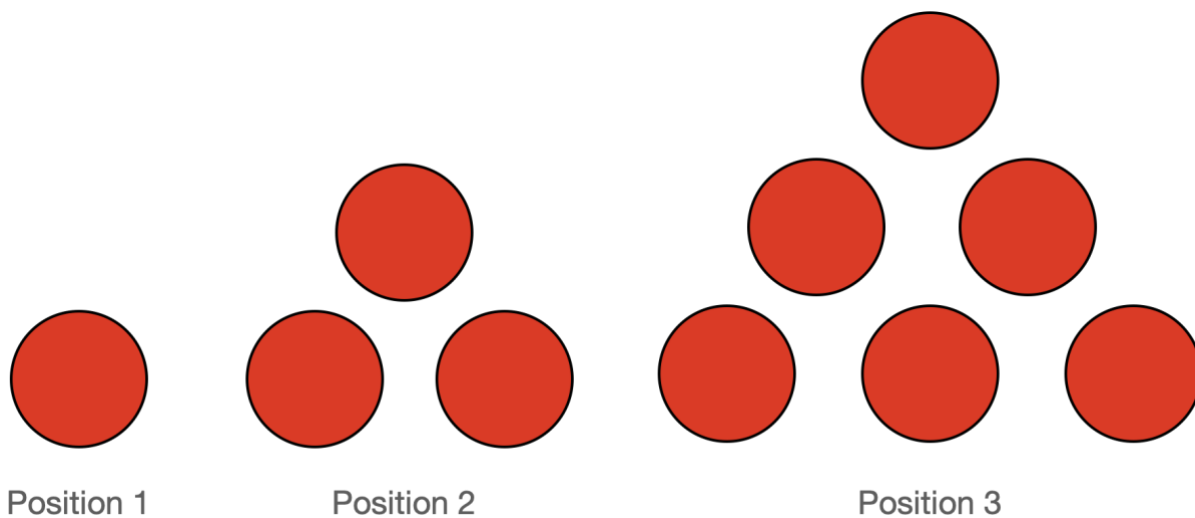## Task 9 (independent optional task)

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?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Task 10 (optional task)

Position 1   Position 2   Position 3

Show Position four with the counters.

Show Position five with the counters.

Show Position ten with the counters.

What patterns do you notice?

What would be a quick way to count the counters for Position ten?

Level 2 Year 3/4: Number and Algebra: Patterns and Relationships

Quick Images (Warm Ups)