RICH MATHEMATICAL TASK BOOKLET

ALGEBRA

Teacher Booklet

YEAR 2

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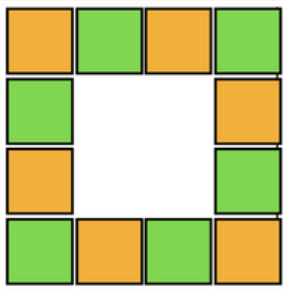
Task 1

Tatiana is making a border for her picture frame with squares. This is her first frame:



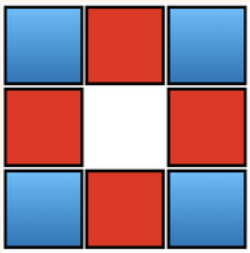
Copy the pattern using the cubes.
Draw the pattern.
What is the unit of repeat?

Tatiana makes another pattern using squares:

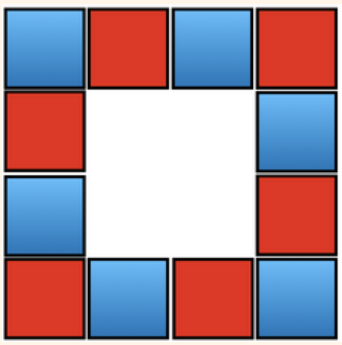
Copy the pattern using the cubes.
Draw the pattern.
What is the unit of repeat?

What do you notice?

Help Tatiana by using the same pattern for the picture borders below:



Copy the pattern using the cubes.



Copy the pattern using the cubes.

Big Ideas

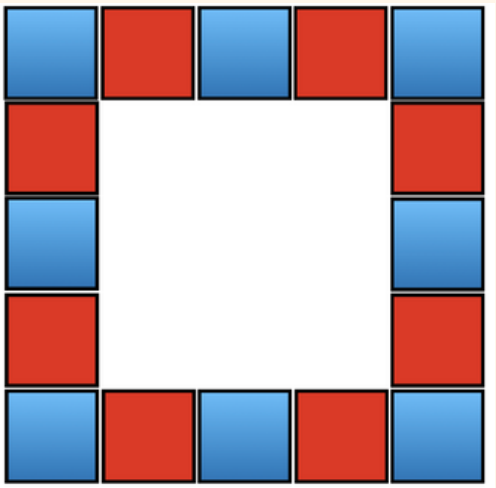
Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Task 1



Copy the pattern using the cubes.

Teacher Notes

Have cubes or multi-link cubes.

During the launch, ask students to share where they see patterns in their lives. Reinforce discussion that patterns have repeating elements.

If students have difficulty making the pattern, support them to notice by putting their pattern next to a picture of the correct pattern and ask them to identify what is the same and what is different.

Facilitate the students to use the term unit of repeat or chunks. Support students to notice that each unit of repeat should be the same and all cubes should be included.

In the connect, students may notice that the borders have the same number of squares at the top and bottom and on the two sides. Every border has a relationship to two with the second block a twos number.

For the independent task, have cubes or multi-link cubes available.

Shareback

Select students to share who use the unit of repeat to structure the patterns and recognise that the border pattern and ABAB pattern in a line are the same.

Curriculum Links

Recognise and describe the unit of repeat in a repeating pattern, and use it to predict further elements using the ordinal position.

Follow and give step-by-step instructions for a simple task, and identify and correct errors as they are followed

Mathematical Language

Unit of repeat, pattern, sequence.

Connect

Remove the pictures of the square borders and ask students to recreate these using cubes.

What do you notice about each border that you made?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

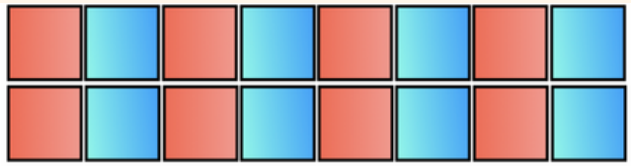
Continue patterns.

Explain and justify the pattern in relation to ordinal aspects of counting.

Explain that a pattern has consistency.

Follow step by step instructions to make a pattern and correct any erros made while making a pattern.

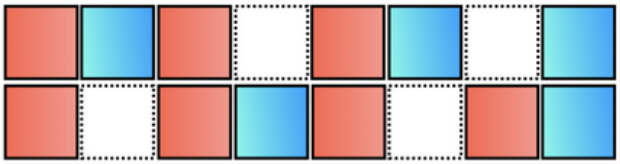
Independent Tasks



Copy the pattern.

What is the unit of repeat? Circle this.

How many blocks are there altogether?
How many pink blocks?
How many blue blocks?



Draw the missing blocks.

Independent Tasks

Copy the pattern.

What is the unit of repeat? Circle this.

How many shapes are there altogether?
How many triangles?
How many squares?

Draw the missing shapes

Make your own pattern.

What is the unit of repeat for your pattern?

Anticipations

Solutions, Misconceptions

Task 2

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 24th block be?
What colour would the 30th block be?
What colour would the 101st block be?

Teacher Notes

Have cubes and a hundred board available.

If students have difficulty making the pattern, support them to notice by putting their pattern next to a picture of the correct pattern and ask them to identify what is the same and what is different.

Facilitate the students to notice the pattern is made of chunks (unit of repeat). This could be linked to multiplication when identifying the number of elements in the pattern. Use the term unit of repeat with the students.

After students have drawn the snake pattern, ask them to circle the unit of repeat or chunks of the pattern. Support students to notice that each unit of repeat should be the same and all cubes should be included.

Expect the students to connect to multiplication when working out different elements. The hundred board can be used to highlight the patterns.

For the independent task, provide cubes and shapes to make the patterns.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Shareback

Select students to share who use patterns and multiplication to work out the further elements. If students do not use patterns and multiplication, then model this to them.

Connect

Use a hundred board and ask students to colour the green block and yellow blocks in relation to the numbers.
What patterns do you notice?
What rule could you use to predict which number the green block would be?
What rule could you use to predict which number the yellow blocks will be?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a repeating pattern.

Explain and justify the pattern in relation to ordinal aspects of counting.

Communicate, explain, and justify their pattern.

Predict a point in a sequential pattern.

Explain that a pattern has consistency.

Follow step by step instructions to make a pattern and correct any erros made while making a pattern.

Curriculum Links

Recognise and describe the unit of repeat in a repeating pattern, and use it to predict further elements using the ordinal position.

Follow and give step-by-step instructions for a simple task, and identify and correct errors as they are followed

Mathematical Language

Unit of repeat, pattern, sequence, rule.

Independent Tasks

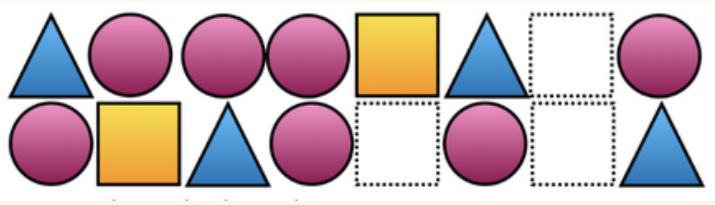
Copy the pattern.

What is the unit of repeat? Circle this.

Use the equipment to make a second snake that matches but uses different colours. Extend this by one unit of repeat.

Use the equipment to make another pattern that matches and extend this by one unit of repeat.

Make another pattern that matches using sounds or actions and extend this by one unit of repeat.



Draw the missing shapes.

Make your own pattern.

What is the unit of repeat for your pattern?

Anticipations

Solutions, Misconceptions

Task 3

Anshuma is helping to make mala for her cousin's wedding. Each garland uses the following pattern:

Use the picture cards to copy the pattern.

What is the unit of repeat?

Draw the missing flowers.

What colour would the 20th flower be?

What colour would the 24th flower be?

What colour would the 30th flower be?

Teacher Notes

Have flower pictures available.

If students have difficulty making the pattern, support them to notice by putting their pattern next to a picture of the correct pattern and ask them to identify what is the same and what is different.

Facilitate the students to notice the pattern is made of chunks (unit of repeat). Use the term unit of repeat with the students.

Facilitate the students to notice that elements in the pattern can be found without creating the whole pattern by instead noticing and using relationships and patterns.

For the independent task, have pegs and other concrete material (e.g., counters, cubes, teddies) for the students to use.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Shareback

Select students to share who use patterns and multiplication to work out the further elements. If students do not use patterns and multiplication, then model this to them.

Connect

Use the flower cards to show each garland vertically and write the corresponding numbers.

Etc up to 20

What patterns do you notice?
What colour would the 60th flower be?
What colour would the 61st flower be?
What colour would the 63rd flower be?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a repeating pattern.

Explain and justify the pattern in relation to ordinal aspects of counting.

Communicate, explain, and justify their pattern.

Predict a point in a sequential pattern.

Explain that a pattern has consistency.

Follow step by step instructions to make a pattern and correct any erros made while making a pattern.

Curriculum Links

Recognise and describe the unit of repeat in a repeating pattern, and use it to predict further elements using the ordinal position.

Follow and give step-by-step instructions for a simple task, and identify and correct errors as they are followed

Mathematical Language

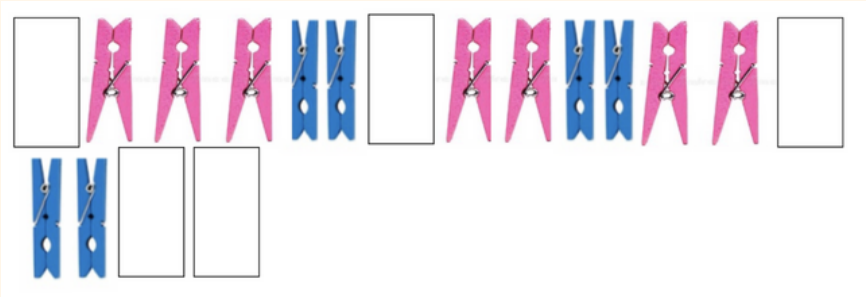
Unit of repeat, pattern, sequence, element, rule.

Independent Tasks

Hamuera is playing with the washing pegs and makes this pattern:

Use the picture cards to copy the pattern.

What is the unit of repeat?



Draw the missing pegs.

Hamuera continues the pattern using the pegs.

What colour would the 21st peg be?

What colour would the 40th peg be?

What colour would the 45th peg be?

Use differen material and make the same pattern.

Anticipations

Solutions, Misconceptions

Task 4

Kiriwai is looking at the piwakawaka in her garden.

She decides to count all the tails for the piwakawaka that she sees.
If there was one piwakawaka, how many tails would there be?
If there was two piwakawaka?
If there was four piwakawaka?

She decides to count all the eyes for the piwakawaka that she sees.
If there was one piwakawaka, how many eyes would there be?
If there was two piwakawaka?
If there was four piwakawaka?

Now she decides to count all the eyes and tails for the piwakawaka that she sees.

If there was one piwakawaka, how many eyes and tails would there be?
If there was two piwakawaka?
If there was four piwakawaka?

Complete the table:

Number of piwakawaka	Tails	Eyes	Tails and eyes
1			
2			
3			
4			
5			
6			
7			
8			

What if there was 20 piwakawaka, how many eyes and tails would there be? How many eyes and tails would there be altogether?

What if there was 50 piwakawaka, how many eyes and tails would there be? How many eyes and tails would there be altogether?

Find three patterns across the table and three patterns down the table.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Teacher Notes

Have the pictures of piwakawaka printed onto individual cards for students to use if necessary.

If needed to complete the table, show the corresponding number of piwakawaka cards, continue to use this process for the five piwakawaka. Facilitate the students to notice the relationship between the number of piwakawaka and total number of eyes and also total number of eyes and tails. This can be connected to multiplication.

Notice students who use grouping or multiplication to work out the number of eyes and tails (e.g., 4 piwakawaka and 3 elements so 12 in total) OR relational reasoning (e.g., the number of tails matches the number of the unit of piwakawaka).

Patterns in the table vertically may include sequential or single variational thinking (e.g., the number of tails increase by one, the total increases by 3 each time) or horizontally co-variational or relational thinking (e.g., the eyes are double the number of tails).

For the connect, model to students how the rule could be written using informal variables, e.g., n = a or (tails) or n = 2a or

Shareback

Select students to share who use grouping/multiplication or patterns and relationships to work out the number of eyes or tails and eyes together.

Connect

If Kiriwai saw 100 piwakawaka, how many tails would she see? How many eyes? How many tails and eyes?

If Kiriwai saw 200 eyes, how many tails would she see?

What rule could Kiriwai use to work out the number of tails no matter how many piwakawaka there are?

What rule could Kiriwai use to work out the number of eyes no matter how many piwakawaka there are?

Curriculum Links

Recognise and describe the unit of repeat in a repeating pattern, and use it to predict further elements using the ordinal position.

Mathematical Language

Unit of repeat, pattern, sequence.

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a repeating pattern.

Explain and justify the pattern in relation to ordinal aspects of counting.

Communicate, explain, and justify their pattern.

Predict a point in a sequential pattern.

Explain that a pattern has consistency.

Independent Tasks

Anshuma is helping to make mala for her cousin's wedding. Each garland uses the following pattern:

Use the picture cards to copy the pattern.

What is the unit of repeat?

Draw the missing flowers.

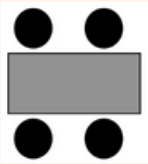
Use different material and make the same pattern.

Anticipations

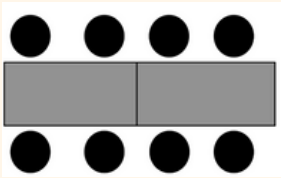
Solutions, Misconceptions

Task 5

Abraham is arranging tables for his birthday lunch. He can fit 4 friends around one table:



When he has two tables, he can fit 8 friends:



How many friends could fit if he has 3 tables?
How many friends could fit if he has 5 tables?

Complete the table:

Number of tables	Number of friends
1	
2	
3	
4	
5	
8	
	40
20	
	100

Teacher Notes

Have rectangular shapes and counters available to model the tables if needed or students can draw.

Facilitate the students to notice the relationship between the number of tables and number of friends. This can be connected to multiplication.

Notice students who use grouping or multiplication to work out the number of friends.

Ensure that students use multiple representations, numbers, drawings or counters and shapes to justify their reasoning and prove their rule.

For the connect, model to students how the rule could be written using informal variables, e.g., n = 4a or (number of tables to number of friends). Explain that the letter or shape represents any number for an unknown amount.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

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Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Shareback

Select students to share who use grouping/multiplication or patterns and relationships to work out the number of friends.

Connect

If Abraham had 30 tables, how would you work out how many friends could be seated?

What rule could Abraham use to work out how many friends can be seated no matter how many tables he has?

If Abraham could seat 400 friends, how many tables would he have?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a repeating pattern.

Explain and justify the pattern in relation to ordinal aspects of counting.

Communicate, explain, and justify their pattern.

Predict a point in a sequential pattern.

Explain that a pattern has consistency.

Curriculum Links

Recognise, continue and create repeating and growing patterns, and describe a rule to explain a pattern

Mathematical Language

Unit of repeat, pattern, sequence, rule.

Anticipations

Solutions, Misconceptions

Independent Tasks

Roman sees some children riding tricycles at the park.

He decides to count the number of wheels and children that he sees.

Complete the table:

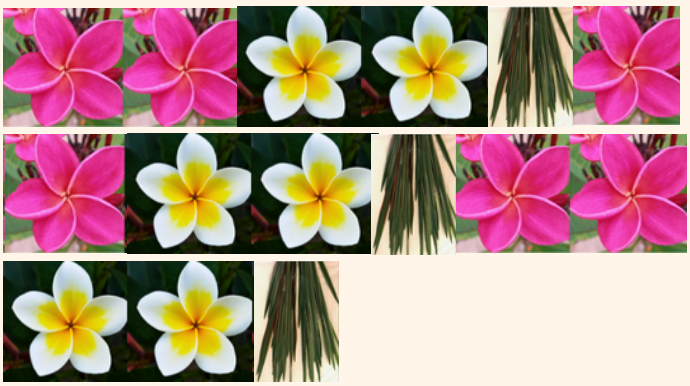
Number of tricycles	Wheels	Children	Wheels and children
1			
2			
3			
4			
5			

Write three patterns that you notice going down.

Write three patterns that you notice going across.

Task 6

Mereana is making an ‘ei katu with leaves and flowers
She is making this pattern:



Use the picture cards to copy the pattern.

What is the unit of repeat?

Complete the table below:

Number of units of repeat	Yellow flowers	Pink flowers	Total number of flowers
1			
2			
3			

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

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Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Teacher Notes

During the launch, ask students to share where they see patterns in their lives. Reinforce discussion that patterns have repeating elements and that they can grow.

If necessary to complete the table, use a piece of card and cover up the flowers so only one unit of repeat is visible, for the second set, use the card to show only two units of repeat, continue to use this process.
Facilitate the students to notice the relationship between the number of the unit of repeat and number of flowers. This can be connected back to multiplication.

Notice students who use grouping or multiplication to work out the number of flowers (e.g., 3 units of repeat and 5 elements so 15 elements in total) OR relational reasoning (e.g., the number of grass matches the number of the unit of repeats).

For the connect, patterns in the table vertically may include sequential or single variational thinking (e.g., the grass increases by one, the total flowers increases by 4 each time) or horizontally co-variational or relational thinking (e.g., the total flowers are four times the number of grass).

Facilitate students to write rules using informal variables, e.g., n = 4a or (total number of flowers). Explain that the letter or shape represents any number for an unknown amount.

For the independent activity, have picture cards or flowers available.

Shareback

Select students to share who use grouping/multiplication or patterns and relationships to work out the number of flowers.

Connect

Find three patterns across the table and three patterns down the table.

What rules could you use to find different parts of the pattern?

Yellow flowers.
Pink flowers.
Total number of flowers.
Grass to yellow flowers.
Pink flowers to total number of flowers.

Curriculum Links

Recognise and describe the unit of repeat in a repeating pattern, and use it to predict further elements using the ordinal position.

Mathematical Language

Unit of repeat, pattern, sequence, rule.

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue growing patterns.

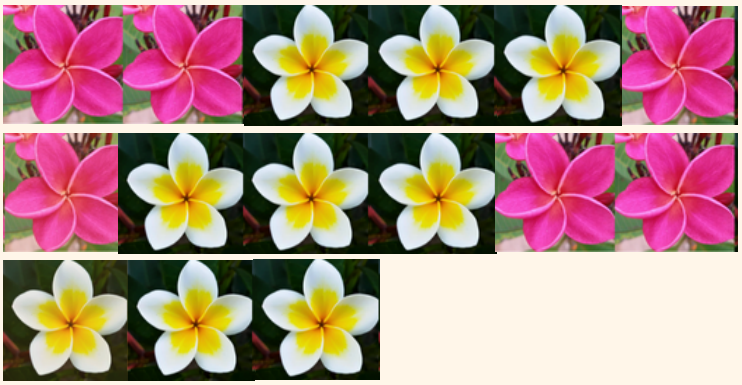
Generalise the number of elements in a multiplicative growing pattern for certain points.

Explain that a pattern has consistency.

Develop a rule for a growing pattern in words.

Independent Tasks

Mereana is making an ‘ei katu with leaves and flowers
She is making this pattern:



Use the picture cards to copy the pattern.
What is the unit of repeat?
Represent the pattern using letters or shapes.

Complete the table below:

Number of units of repeat	Yellow flowers	Pink flowers	Total number of flowers
1			
2			
3			
		8	
	15		
6			
7			
8			

Independent Tasks

How many units of repeat would there be if there were 50 flowers in total?

If there are 12 units of repeat, how many yellow flowers will there be? How many pink flowers will there be? How many flowers altogether?

If there are 20 units of repeat, how many yellow flowers will there be? How many pink flowers will there be? How many flowers altogether?

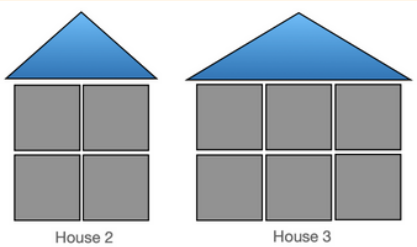
What patterns do you notice in the table?

Anticipations

Solutions, Misconceptions

Task 7

Jonah is using the shape blocks to build houses.



Use the picture cards and draw to show House 1.

What might House 4 look like? What about House 5?

Can you draw these patterns?

Can you draw what House 10 would look like?

Can you describe in words what House 20 would look like?

Teacher Notes

Have picture cards with squares and triangle or shape blocks available. Facilitate students to construct the pattern with material and to draw the pattern.

If students have difficulty constructing the pattern, show them the picture of the pattern and ask them what is the same and what is different and support them to change their pattern construction.

This growing pattern introduces a constant which is the triangle so the rule for the total number of shapes would be $t = 2a + 1$ (this could be modelled to the students using informal variables).

For the connect, the rule would be the house number multiplied by two for the squares and the house number multiplied by two add one (triangle) for the total number of shapes.

For the independent task have shape blocks or cards available.

Shareback

Select students to share who continue the pattern and develop a generalisation for the pattern structure.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

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A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Connect

How would you tell someone to draw any stage at all for the house pattern?
What rule could you use to find the number of squares?
What rule could you use to find the total number of shapes?

Suggested Learning Outcomes

Explain and justify the pattern using the visual characteristics of the geometric pattern.

Explain that a pattern has consistency.

Generalise the number of elements in a geometric growing pattern for certain points.

Provide a rule in words for the generalisation.

Independent Tasks

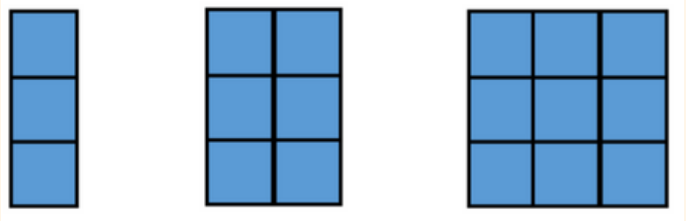
Copy the pattern using the shapes cards.

Draw the pattern.

Draw what the pattern would look like for pattern 6.

Draw what the pattern would look like for pattern 9.

Describe what the pattern would look like for pattern 20.



Copy the pattern using the shapes cards.

Draw the pattern.

Draw what the pattern would look like for pattern 5.

Draw what the pattern would look like for pattern 10.

Describe what the pattern would look like for pattern 20.

Curriculum Links

Recognise, continue and create repeating and growing patterns, and describe a rule to explain a pattern

Mathematical Language

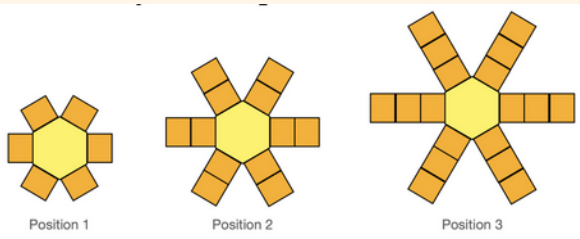
Unit of repeat, pattern, sequence, rule.

Anticipations

Solutions, Misconceptions

Task 8

This is my flower pattern:



Copy the pattern using the shape cards.
What might Position 4 look like?

Complete the table:

Position number	Hexagon	Squares	Total number of shapes
1			
2			
3			
4			
5			
6			
10			
20			

Teacher Notes

Have picture cards with squares and hexagon or shape blocks available. Facilitate students to construct the pattern with material and to draw the pattern.

If students have difficulty constructing the pattern, show them the picture of the pattern and ask them what is the same and what is different and support them to change their pattern construction.

This growing pattern introduces a constant which is the hexagon so the rule for the total number of shapes would be $t = 6a + 1$ (this could be modelled to the students using informal variables).

For the connect, the rule would be the position number multiplied by 6 for the squares and the position number multiplied by 6 add one (hexagon) for the total number of shapes.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Shareback

Select students to share who continue the pattern by using grouping or multiplication.

Connect

Describe how you would find the number of shapes for position 100.
What rule could you use to find the total number of squares for any position number?
What rule could you use to find the total number of shapes for any position number?

Suggested Learning Outcomes

Explain and justify the pattern using the visual characteristics of the geometric pattern.

Explain that a pattern has consistency.

Generalise the number of elements in a geometric growing pattern for certain points.

Provide a rule in words for the generalisation.

Curriculum Links

Recognise, continue and create repeating and growing patterns, and describe a rule to explain a pattern

Mathematical Language

Unit of repeat, pattern, sequence, rule, position.

Independent Tasks

Leilani is building a Lego tower:

What is the unit of repeat?

What colour would the 30th brick be?

What colour would the 52nd brick be?

Complete the table:

Number of units of repeat	Red bricks	Blue bricks	Yellow bricks	Green bricks	Total number of bricks
1					
2					
3					
4					
5					
					30
		7			
8					

Anticipations

Solutions, Misconceptions

Task 9

At Te Oro the Siva Samoa group is learning a maulu'ulu. As part of the dance, they used these movements:

tap, tap, tap, tap, arm, arm, arm, arm, clap

They repeat these moves lots of times throughout the dance.

If they repeat the moves two times, how many taps would there be? How many arms would there be? How many claps would there be?

Complete the table below:

Number of movement sequence	Tap	Arm	Clap
1			
			2
		9	
	16		
5			
			6
7			
		24	

If there is 40 taps, how many arms will there be? How many claps will there be?

If there is 12 movement sequences, how many taps will there be? How many arms will there be? How many claps will there be?

If there is 20 taps, how many arms will there be? How many claps will there be? What movement sequence will this be?

Teacher Notes

Have pictures of movements printed onto individual cards for students to use if necessary.

To complete the table, support the students to work with a buddy to complete the movement sequence and count if needed but facilitate the students to notice the relationship between the number of movement sequences and the total number of the different types of movements. This can be connected back to grouping and multiplication so students move beyond counting single movements.

For the connect, patterns in the table vertically may include sequential or single variational thinking or horizontally co-variational or relational thinking. Also facilitate students to write their rules using informal variables.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Teacher Notes

Have pictures of movements printed onto individual cards for students to use if necessary.

To complete the table, support the students to work with a buddy to complete the movement sequence and count if needed but facilitate the students to notice the relationship between the number of movement sequences and the total number of the different types of movements. This can be connected back to grouping and multiplication so students move beyond counting single movements.

For the connect, patterns in the table vertically may include sequential or single variational thinking or horizontally co-variational or relational thinking. Also facilitate students to write their rules using informal variables.

Have different types of concrete material available to make patterns.

Shareback

Select students to share who use grouping/multiplication or patterns and relationships to work out the number of different types of movements.

Connect

Find three patterns across the table and three patterns down the table.

What rules can you use to find the number for different movements in the ma'uluulu?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue growing patterns.

Generalise the number of elements in a multiplicative growing pattern for certain points.

Explain that a pattern has consistency.

Develop a rule for a growing pattern in words.

Curriculum Links

Recognise and describe the unit of repeat in a repeating pattern, and use it to predict further elements using the ordinal position.

Mathematical Language

Unit of repeat, pattern, sequence, rule, elements

Independent Tasks

Karlos is eating M & Ms. He like to eat his two favourite colours in a pattern:

Complete the table below:

Number of units of repeat	Blue M & Ms	Red M & Ms	Total number of M & Ms
1			
2			
3			
4			
5			

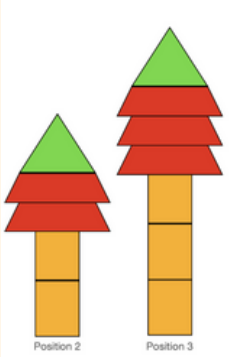
What patterns do you notice in the table?

Anticipations

Solutions, Misconceptions

Task 10

This is my tree pattern:



Copy the pattern using the shape cards.

Build and draw Position 1.

Build and draw Position 5.

Build and draw Position 8.

Describe what Position 10 would look like.

How many shapes would you need for Position 10?

Teacher Notes

Have picture cards or shape blocks available. Facilitate students to construct the pattern with material and to draw the pattern.

If students have difficulty constructing the pattern, show them the picture of the pattern and ask them what is the same and what is different and support them to change their pattern construction.

For the connect, the rule would be the position number multiplied by two add one for the total number of shapes.

Big Ideas

Patterns are sequences (repeating or growing) made of numeric or spatial elements governed by a rule.

Patterns exist both in the world and in mathematics. The same pattern structure can be found in many different forms (e.g., numbers, shapes, colours, and rhythm).

A pattern can be described using a rule or you can create a pattern from a rule. To find the rule for a pattern, you need to identify the unit of the pattern (what is repeated or what grows).

Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Shareback

Select students to share who generalise the geometric pattern structure and describe the pattern using grouping or multiplication.

Connect

Describe how you would find the number of shapes for position 100.
What rule could you use to find the total number of shapes for any position number?

Suggested Learning Outcomes

Explain and justify the pattern using the visual characteristics of the geometric pattern.

Explain that a pattern has consistency.

Generalise the number of elements in a geometric growing pattern for certain points.

Provide a rule in words for the generalisation.

Independent Tasks

Complete the following assessment tasks (attached at the end of the document) as the independent activity:

Task 1: Shell patterns

Task 2: Jellybean patterns

Curriculum Links

Recognise, continue and create repeating and growing patterns, and describe a rule to explain a pattern

Mathematical Language

Unit of repeat, pattern, sequence, elements, rule, position.

Anticipations

Solutions, Misconceptions

Assessment Task 1 - Algebra - Year 2

Nevaeh made a pattern with shells she collected from the beach. Her pattern looked like this:

What shape would the 15th shell be?

What about the 19th?

What about the 29th?

Complete the table below:

Number of units of repeat	Pipi shell	Fan shell	Total number of shells
1			
2			
3			
4			

What patterns do you notice?

Assessment Task 2 - Algebra - Year 2

Nevaeh is eating jellybeans and she likes to eat them in this order:

What colour would the 8th jellybean be?

What about the 15th?

What about the 31st?

Complete the table below:

Number of units of repeat	Purple jellybean	Green jellybean	Total number of jellybeans
1			
2			
3			
4			
5			

What patterns do you notice?