RICH MATHEMATICAL TASK BOOKLET

ALGEBRA

YEAR 3

Teacher Booklet

Task 1

Litea has a giant bag of Skittles. She likes to eat her favourite colours of Skittles in a specific order: red, blue, green, yellow.

What colour will the 42nd Skittle that she eats be?

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

Teacher Notes

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

Have multilink cubes available for the students to model the pattern.

Facilitate the students to model the pattern in a way that highlights the structure of the pattern.

Use the model to support students to notice that certain elements align with specific numbers or multiples.

Use the term unit of repeat for the pattern base.

Notice students who use grouping or identify multiples to solve the task.

Expect students to represent using blocks and numbers and to identify the number patterns associated with the specific colours (similar to choral counting).

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).

In a pattern, the relationship between the ordinal position (e.g., first, second, and third) and the corresponding element is more useful for finding the pattern's rule than the relationship between successive elements. Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Variables are symbols that take the place of numbers, or ranges of numbers. They have different meanings depending on whether they are being used as representations of quantities that vary or change, representations of specific unknown variables, or placeholders in a generalised expression or formula.

Teacher Notes

For the connect, students might notice that the yellow Skittles are all multiples of 4 so the rule for yellow Skittle would be multiply by 4. Ask the students for the rule in words and then model explicitly writing the steps to find the colour before modelling as a rule with variables or informal variables. Ask the students to explicitly create a set of steps to find a specific coloured skittle and then write the rule

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

Shareback

Select students to share who use a grouping strategy to solve the task. For example, students might notice that a yellow Skittle is always a multiple of 4 and use this to get close to 42 by stating that 40 would be yellow and then using the pattern structure.

Connect

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

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

What about the green M & Ms?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue repeating patterns.

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

Identify the element for a repeating pattern for far terms.

Explain that a pattern has consistency.

Develop generalisations for a repeating pattern and express it in words.

Write an explicit set of instructions to find an aspect of the pattern

Curriculum Links

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

Create and use a set of precise, step-by-step instructions to carry out a familiar routine or task.

Mathematical Language

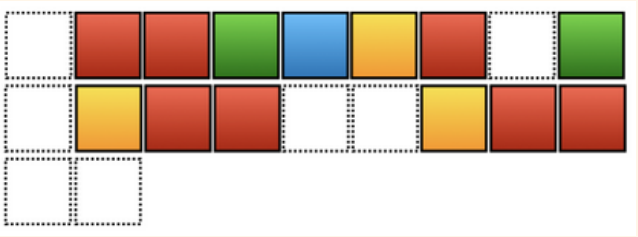
Sequence, element, rule, unit of repeat.

Independent Tasks

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?

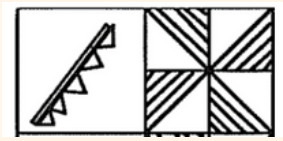
What do you notice about all of the green blocks in relation to their pattern position?

Anticipations

Solutions, Misconceptions

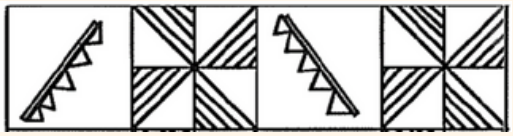
Task 2

Sesimani has been working on their tapa cloth design. She decided to use this pattern for the border.



Pattern 1

When she adds on to the border it looks like this:



Pattern 2

How many striped triangles are there for pattern one and two?
How many striped triangles would there be for pattern four?
How many striped triangles would there be for pattern 10?
If Sesimani wanted to make a long border, how many striped triangles would there by for pattern 50?
How does the pattern grow?

Teacher Notes

Do a pattern quick image warm-up before you launch the task. Show the students the pattern for three seconds and ask them to describe it. Show the pattern again for three seconds and ask them to draw it. Display the pattern and ask them to draw the next term.

Have triangle shapes available for students to model the pattern.

Expect students to represent using triangle and numbers and to show how they see the pattern growing.

Notice students who use grouping or identify the recursive add 4 element for the growing pattern. Facilitate the students to connect this to multiplication (e.g., adding four multiple times is the same as × 4).

Introduce students to the idea that rules can be written using a variable (letters or shapes) to represent any number. Model this during the connect.

For the independent task, have multilink cubes available to model the pattern.

Big Ideas

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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).

In a pattern, the relationship between the ordinal position (e.g., first, second, and third) and the corresponding element is more useful for finding the pattern's rule than the relationship between successive elements. Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Variables are symbols that take the place of numbers, or ranges of numbers. They have different meanings depending on whether they are being used as representations of quantities that vary or change, representations of specific unknown variables, or placeholders in a generalised expression or formula.

Shareback

Select students to share who have developed a rule that moves beyond using a recursive generalisation (add four) to an explicit generalisation (multiply by four). If no students have connected to multiplication then prompt them by asking what is the same as adding four multiple times.

Connect

If there were 400 triangles, what position number would it be? What rule could you use to find the number of triangles for any position number? [Model writing this as 4 × b]

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Find further terms in a growing pattern.

Develop generalisations for a repeating pattern and express it in words.

Independent Tasks

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 the colour of the 41st M & M that she eats be?

Find two different ways of solving the task and use 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?

Curriculum Links

During Year 3
Recognise, continue, and create repeating and growing patterns, and describe a rule to explain a pattern.

Mathematical Language

Position, element, rule, unit of repeat, variable.

Anticipations

Solutions, Misconceptions

Task 3

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

tap, tap, 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			
3			
4			
5			

How many taps, arms, and claps would there be for 10 movement sequences?

How many taps, arms, and claps would there be for 20 movement sequences?

Teacher Notes

Before you launch the task, ask the students to share examples of dances they know from their culture. Ask them to give an explicit set of instructions for a movement sequence for the dance. Record this on the board. Ask students to follow the instructions and see if they work.

To launch the task, ask the students to create an explicit set of instructions for the movement sequence for the maulu'ulu. For example:

1) Tap your feet two times or tap each foot once.
2) Raise your arms to the centre three times.
3) Clap your hands together once.
4) Repeat the movements from step one twice.

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

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Teacher Notes

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 (e.g., the claps increase by one, the total arms increases by 4 each time) or horizontally co-variational or relational thinking (e.g., the total arms are two times the number of taps). Also facilitate students to write their rules using informal variables.

For the independent task, provide the students with square and triangle shape blocks.

Shareback

Select students to share who have developed a rule that moves beyond using a recursive generalisation (add four) to an explicit generalisation (multiply by four). If no students have connected to multiplication then prompt them by asking what is the same as adding four multiple times.

Connect

If there were 400 triangles, what position number would it be? What rule could you use to find the number of triangles for any position number? [Model writing this as 4 × b]

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Find further terms in a growing pattern.

Develop generalisations for a repeating pattern and express it in words.

Give an explicit set of steps to create a movement sequence for a dance.

Curriculum Links

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

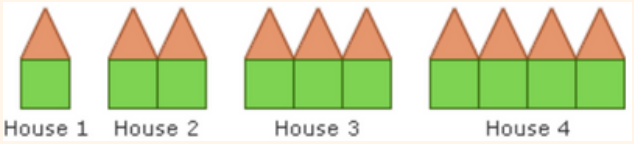
Create and use a set of precise, step-by-step instructions to carry out a familiar routine or task.

Mathematical Language

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

Independent Tasks

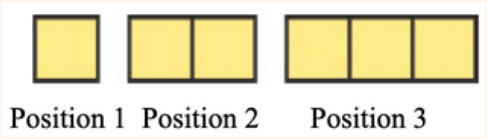
Use the shape blocks to copy this growing pattern:



Draw the pattern.
Draw the pattern for position 5.
Draw the pattern for position 10.

How is the pattern growing?

Use the shape blocks to copy this growing pattern:



Draw the pattern.
Draw the pattern for position 5.
Draw the pattern for position 10.

How is the pattern growing?

Anticipations

Solutions, Misconceptions

Task 4

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

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

They repeat these moves lots of times throughout the dance.

Represent the pattern using different material.
Represent the pattern again using another type of material.

Create your own dance pattern.
Write an explicit series of steps for the movements for your 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.

Teacher Notes

Do a pattern quick image warm-up before you launch the task. Show the students the pattern for three seconds and ask them to describe it. Show the pattern again for three seconds and ask them to draw it. Display the pattern and ask them to draw the next term.

Expect students to represent the pattern using written symbols and concrete materials and facilitate them to justify how their representation matches the pattern.

In the connect, support students to notice that in each representation the unit of repeat has the same structure.

For the independent task, have shape cards and blocks available.

Big Ideas

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Shareback

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Expect students to represent the pattern using written symbols and concrete materials and facilitate them to justify how their representation matches the pattern.

In the connect, support students to notice that in each representation the unit of repeat has the same structure.
For the independent task, have shape cards and blocks available.

Connect

Record at least 3 different ways that the maulu'ulu pattern was represented and ask the students to identify what is the same and different in each representation.

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Translate a growing pattern into another form.

Create a growing pattern.

Write an explicit set of steps for a movement sequence for a dance

Curriculum Links

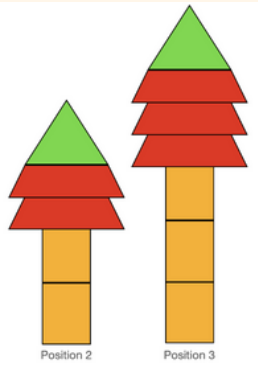
Recognise, continue, and create repeating and growing patterns, and describe a rule to explain a pattern.

Create and use a set of precise, step-by-step instructions to carry out a familiar routine or task.

Mathematical Language

Position, element, rule, unit of repeat, variable.

Independent Tasks



Copy the pattern using the shape cards.

Build and draw Position 1.

Build and draw Position 4.

Build and draw Position 10.

Complete the table

Position number	Number of rectangles	Number of quadrilaterals	Number of triangles	Total number of shapes
1				
2				
3				
4				
5				
6				
7				
8				

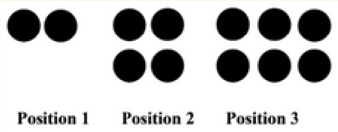
Identify three patterns going horizontally and three patterns going vertically.

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

Anticipations

Solutions, Misconceptions

Task 5

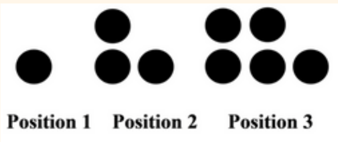


How do you notice the pattern growing?
Use the counters to make position four and position five.

Represent the position number and number of dots in a table:

Position number	Number of dots

What is the rule for this pattern? How would you make position 100?



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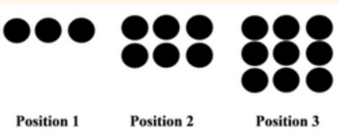

How do you notice the pattern growing?
Use the counters to make position four and position five.

Represent the position number and number of dots in a table:

Position number	Number of dots

What is the rule for this pattern? How would you make position 100?

Big Ideas

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Generalisations can be expressed with both words and symbols.

Teacher Notes

Have counters available for the students to construct the pattern and to use for the connect.

To launch the task, begin by putting two counters on the whiteboard, then add two more in a horizontal line and finally another two counters. Ask the students to think about what they notice.

Expect students to describe in words how the patterns grow including both with the counters and numerically.

Facilitate the students to notice that growing patterns always have a rule which is a description of how the sequence grows. The description or rule may differ, for example, the first pattern could be described as starting with two and adding two each time OR as the position multiplied by two – both of these are correct.

Support students to develop an explicit generalisation in words and number sentences for each pattern.

For the independent task, have counters available

Shareback

Select students to share firstly who use a recursive generalisation strategy such as add two each time or add three each time. Next, select students to share who have used an explicit generalisation such as multiply by two. If students have not used an explicit generalisation then support them to connect to multiplication and model this for them.

Connect

Use the counters to make this growing pattern:

Add a row of four dots at the bottom.
Continue the pattern to position five.
What is the sequence for the number of dots? What is the rule for the pattern?

Add one dot to each side (e.g., ).

Continue the pattern to position five.
What is the sequence for the number of dots? What is the rule for the pattern?

Curriculum Links

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

Mathematical Language

Position, element, rule, unit of repeat, generalisation.

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Translate a growing pattern into another form.

Develop generalisations for a repeating pattern and express it in words.

Independent Tasks

Use the counters to make this growing pattern:

Add a row of four dots to the side each time.
Continue the pattern to position five.
What is the sequence for the number of dots? What is the rule for the pattern?

Use the counters to make this growing pattern:

Add three dots to the top each time.
Continue the pattern to position five.
What is the sequence for the number of dots? What is the rule for the pattern?

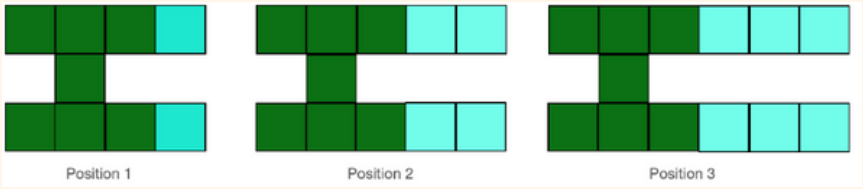
Use the counters to make your own growing patterns.
Continue the pattern to position five.
What is the rule for your growing pattern?

What growing patterns can you see around you?
Draw the growing patterns that you spot

Anticipations

Solutions, Misconceptions

Task 6



Use the square tiles to make the pattern and continue this for position 4 and position 5.

Complete the table:

Position Number	Blue squares	Total number of squares
1		
2		
3		
4		
5		
6		

How many blue squares would Position 10 have?
How many squares would Position 10 have altogether?

How many blue squares would Position 20 have?
How many squares would Position 20 have altogether?

Describe how you would find the total number of squares for Position 50.

Teacher Notes

Have counters available for the students to construct the pattern and to use for the connect.

To launch the task, begin by putting two counters on the whiteboard, then add two more in a horizontal line and finally another two counters. Ask the students to think about what they notice.

Expect students to describe in words how the patterns grow including both with the counters and numerically.

Facilitate the students to notice that growing patterns always have a rule which is a description of how the sequence grows. The description or rule may differ, for example, the first pattern could be described as starting with two and adding two each time OR as the position multiplied by two – both of these are correct.

Support students to develop an explicit generalisation in words and number sentences for each pattern.

For the independent task, have counters available

Big Ideas

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Generalisations can be expressed with both words and symbols.

Shareback

Select students to share who have used either recursive or explicit generalised reasoning to find further terms for the pattern. If no students have used an explicit generalised reasoning then support them to turn the recursive reasoning into explicit generalised reasoning.

Recursive generalisation (total number of squares for position 50):
Begin with 6 squares and add two squares 50 times.

Explicit generalised reasoning (total number of squares for position 50):
50 multiplied by two and add six squares.

Connect

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

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Identify the growing element and constant in a linear growing pattern.

Translate a growing pattern into another form.

Develop generalisations for a repeating pattern and express it in words.

Curriculum Links

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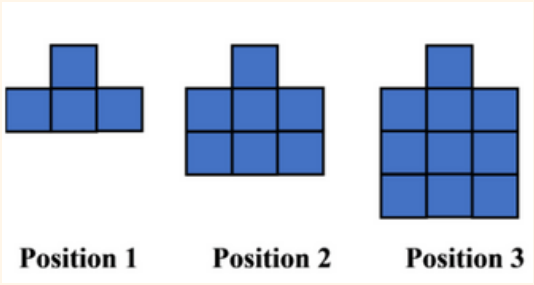
Independent Tasks



Use the square tiles to make the pattern and continue this for position 4 and position 5.

Complete the table:

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

How many squares would Position 10 have?

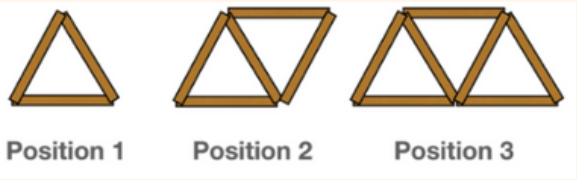
How many squares would Position 20 have?

Describe how you would find the total number of squares for Position 50.

Anticipations

Solutions, Misconceptions

Task 7



How many different patterns can you see in the picture?
Use colours and or number to show the different patterns.

How many sticks would position 4 have?
How many sticks would position 5 have?
How many sticks would position 10 have?

How many triangles would there be if there were 30 ice-block sticks?
Would there be any sticks left over?

Teacher Notes

Do a pattern quick image warm-up before you launch the task. Show the students the pattern for three seconds and ask them to describe it. Show the pattern again for three seconds and ask them to draw it. Display the pattern and ask them to draw the next term.

Have sticks available for the students to build the pattern.

Expect students to represent patterns using drawings, colours, and numbers to show how they see the pattern growing.

Notice students who use grouping or identify the recursive add 2 element for the growing pattern. Facilitate the students to connect this to multiplication (e.g., adding two multiple times is the same as × 2).

Support students to develop an explicit generalisation in words and number (2h + 1) to find the number of sticks.

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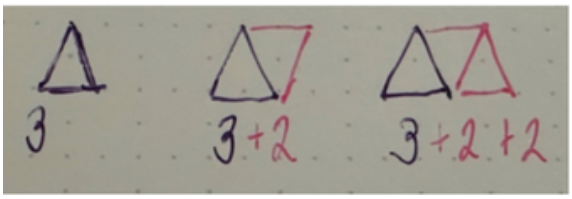
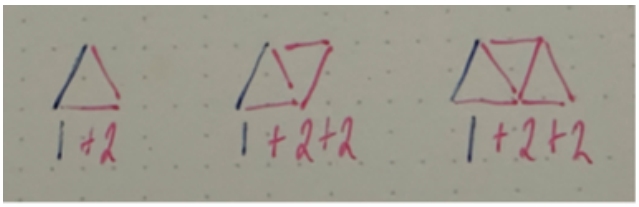
Shareback

Select students to share who use generalisation strategies such as:

1. Chunking generalisation



2. Recursive generalisation



3. Explicit generalisation
   Builds on diagram above but connects to multiplication – for example, multiply by two add one for the pattern.

Model any of the generalisation strategies if students have not used them.

Connect

What is different about the generalisation solutions?
What is the same about the generalisation solutions?
What connections can you make between the different types of generalisation?
Can you connect this to a rule?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Identify the growing element and constant in a linear growing pattern.

Represent the growing element and the constant using numbers and symbols.

Represent a growing pattern in a table of data.

Develop generalisations for a repeating pattern and express it in words.

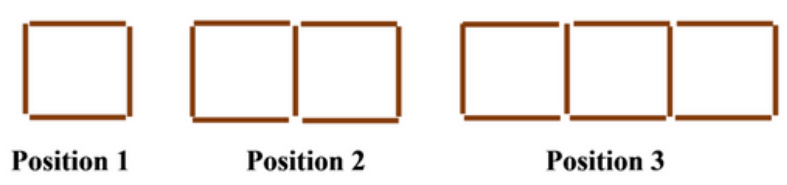
Curriculum Links

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

Mathematical Language

Position, element, rule, unit of repeat, generalisation.

Independent Tasks



How many different patterns can you see in the picture?
Use colours and or number to show the different patterns.

How many sticks would position 4 have?
How many sticks would position 5 have?
How many sticks would position 10 have?

Anticipations

Solutions, Misconceptions

Task 8

In October, at the Flaxmere Community Garden, Anahera planted some tomato seeds in a pot. At the beginning of December, she put the tomato plant outside and also planted a bean seed in another pot.

After ten days, the bean plant was 1cm tall. The tomato plant was 38cm tall.

Anahera visited the community garden each afternoon to measure the plants. The next day the bean plant had grown 2cm more and every day it grew double the amount it had grown the day before.
The tomato plant grew at 5cm each day.

Complete the table:

Day									
Tomato									
Bean									

How many days would it take until the plants are the same height? How tall would they be?

Teacher Notes

Do a pattern quick image warm-up before you launch the task. Show the students the pattern for three seconds and ask them to describe it. Show the pattern again for three seconds and ask them to draw it. Display the pattern and ask them to draw the next term.

To launch the task, ask the students to consider a range of different plants with different rates of growth:

1) The capsicum plant is 3cm tall. If it grows 4cm a day, how tall will it be on the second day? What about the third day?

2) The raspberry vine is 5cm long. It doubles in length each day; how long will it be on the second day? What about the third day?

Expect the students to represent the plant growth using numbers, pictures, or physical material (e.g., centi-cubes).

Facilitate the students to notice that the plant's growth varies in two different ways.

Expect students to represent using number sentences and a variable and a table of data

Big Ideas

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).

In a pattern, the relationship between the ordinal position (e.g., first, second, and third) and the corresponding element is more useful for finding the pattern's rule than the relationship between successive elements. Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

Variables are symbols that take the place of numbers, or ranges of numbers. They have different meanings depending on whether they are being used as representations of quantities that vary or change, representations of specific unknown variables, or placeholders in a generalised expression or formula.

Shareback

Select students to share who can represent the unknown using a letter or informal variable (shape) and use the table of data to compare the results.

Connect

Ask students to show the results for plants growing (from day ten) on a line graph using two different colours.

Ask them to discuss how the graph could help them make predictions.

Suggested Learning Outcomes

Solve number sentences with different quantities.

Represent a function from a table of data.

Compare functional situations for different quantities.

Independent Tasks

The grape vine has grown the following length over 4 days after it has sprouted:

Day One	1 cm
Day Two	4 cm
Day Three	13 cm
Day Four	40 cm

What is the pattern for how it is growing?
What length will it be on day five?
What length will it be on day ten?

Curriculum Links

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

Mathematical Language

Unknown, variable, table of data.

Independent Tasks

The passionfruit vine has grown the following length over 4 days after it has sprouted:

Day One	1 cm
Day Two	5 cm
Day Three	9 cm
Day Four	13 cm

What is the pattern for how it is growing?
What length will it be on day five?
What length will it be on day ten?

The watermelon vine has grown the following length over 4 days after it has sprouted:

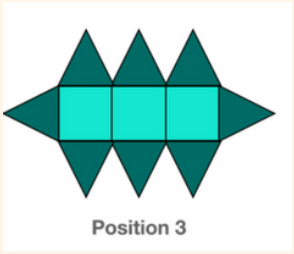
Day One	1 cm
Day Two	5 cm
Day Three	21 cm
Day Four	85 cm

What is the pattern for how it is growing?
What length will it be on day five?
What length will it be on day ten?

Anticipations

Solutions, Misconceptions

Task 9



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 9 have?
How many shapes would Position 9 have altogether?

Describe how you would find the number of triangles for Position 51.

Teacher Notes

Have shapes available for students to construct the pattern.

Facilitate the students to notice that the pattern has a constant (the part that stays the same) and a part that grows. Support them to colour the part that stays the same in one colour and the part that grows in a different colour and link their number sentences to this.

Notice students who use a table of data or a structured way of tracking the number of triangles and total number of shapes as the pattern grows. Position students to use a table of data if needed.

Expect students to move from recursive generalisation (it increases by + 2) to an explicit generalisation.

Shareback

Select students to share who have developed different generalisations and number sentences or a coloured representation to justify this.

Big Ideas

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).

In a pattern, the relationship between the ordinal position (e.g., first, second, and third) and the corresponding element is more useful for finding the pattern's rule than the relationship between successive elements. Identifying the rule of a pattern brings predictability and allows generalisations to be developed.

Generalisations can be expressed with both words and symbols.

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Connect

What position number would have exactly 42 triangles?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Identify the growing element and constant in a linear growing pattern.

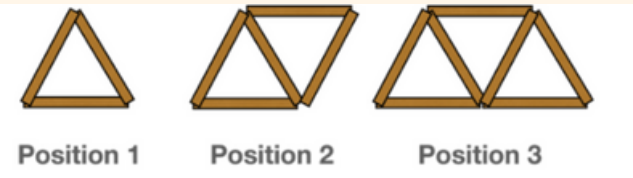
Represent the growing element and the constant using numbers and symbols.

Represent a growing pattern in a table of data.

Develop generalisations for a repeating pattern and express it in words.

Test whether a generalisation works for a growing pattern.

Independent Tasks



What position number would have 41 sticks?

What position number would have 105 sticks?

If there were 208 sticks, how many triangles would there be? Would there be any sticks left over?

Curriculum Links

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

Mathematical Language

Position, element, rule, table of data

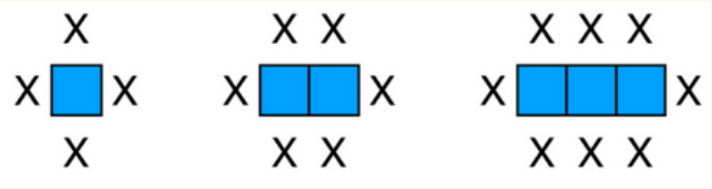
Anticipations

Solutions, Misconceptions

Task 10

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 50 tables?

Teacher Notes

Do a pattern quick image warm-up before you launch the task. Show the students the pattern for three seconds and ask them to describe it. Show the pattern again for three seconds and ask them to draw it. Display the pattern and ask them to draw the next term.

Expect students to represent using drawings, colours, and numbers to show how they see the pattern growing.

Notice students who use grouping or identify the recursive add 2 element for the growing pattern. Facilitate the students to connect this to multiplication (e.g., adding 2 multiple times is the same as × 2). Facilitate the students to notice that the chair at the end would need to be moved out to avoid getting squashed, physically model this if necessary.

Support students to develop an explicit generalisation in words and number ($2h + 2$) to find the number of people who can be seated

Big Ideas

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).

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Shareback

Select students to share who can show how the pattern increases using representations, colours, and numbers.

Connect

How could you find out how many people can be seated for 100 tables?

What rule could you use to find out how many people can be seated for h tables?

Suggested Learning Outcomes

Reproduce a pattern using objects, drawings, or symbols.

Continue a growing pattern.

Identify the growing element and constant in a linear growing pattern.

Represent the growing element and the constant using numbers and symbols.

Represent a growing pattern in a table of data.

Identify patterns in a table of data that draw on single variational thinking or co-variational thinking.

Develop generalisations for a repeating pattern and express it in words.

Independent Tasks

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

Task 1: Cross pattern

Task 2: Squares pattern

Curriculum Links

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

Mathematical Language

Position, element, rule, unit of repeat, variable.

Anticipations

Solutions, Misconceptions

Assessment Task 1 - Algebra - Year 3

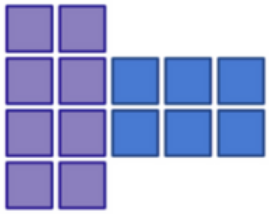
First position Second position Third position

Look at this growing pattern. Can you:

- Show how the number of squares grows using a diagram, numbers, or a table of data. graph.
- Describe the pattern in words and/or numbers
- Show how you work out the number of squares for the following pattern numbers: Pattern 5; Pattern 10; Pattern 50
- Write the rule for the number of squares in words or symbols.

Assessment Task 2- Algebra - Year 3

Position Two



Position Three

Look at this growing pattern. Can you:

- Draw Position One and Position Four.
- Describe the pattern in words and/or numbers.
- Show how you work out the total number of squares for the following pattern numbers: Pattern 5; Pattern 10; Pattern 50.
- Write the rule for the number of squares in words or symbols.