





#### Topic: Patterns and algebra

#### Identifying change in growing patterns (1)

##### Lesson concepts

-  **Patterns** — Pattern/non pattern
-  **Patterns** — Describing patterns
-  **Patterns** — Spatial (nonlinear)
-  **Patterns** — Growing

Today students will:

- ▶ continue growing patterns.

#### Resources

##### Digital

Learning object — Growing patterns

##### Find and prepare

Interlocking blocks (for example: linking cubes, set of construction blocks) or counters if blocks are unavailable

Straws, paper strips or twigs (that can be cut up into different lengths)

#### Key terms

growing pattern,  
repeating pattern,  
sequence

For definitions and explanations of terms, please see the [Glossary](#).

## Lesson

### Introduce the lesson

#### Note

It is important to highlight and develop the following vocabulary throughout this lesson.

after, before, bigger, change, colour, continue, copy, decreasing, describe, direction, expanding, explain, growing, growing pattern, increasing, more, next, part, repeating pattern, same, sequence, shape, size, start

### Explore the concept of change to describe a growing pattern

- Talk with students about how people's bodies change and grow over time. For example:

#### Say to students

“ People's bodies change as they get older.  
How is your body different to Gran's body (for example: height, weight, skin texture, control of movements, ability to see/hear/move/bend)?  
Changes happen as you grow. You don't suddenly go from being a young child to being an adult. You grow in stages. ”

- Talk to students about the growth of familiar animals or plants. For example:

#### Say to students

“ Caterpillars grow bigger and fatter, and eventually change into butterflies.  
Trees start out as tiny seedlings. They get taller and thicker as they grow. They also get more and more leaves. ”

#### Focus questions

Q: *How could you describe the changes that happen as a tree grows?*

A: For example: The tree gets taller and thicker as it grows.

Q: *How do the changes happen?*

A: For example: Slowly; in stages; not all at once.

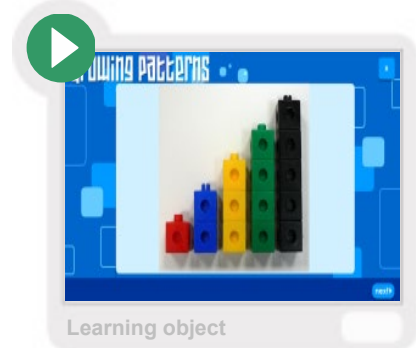
- Ask students to mime how something grows and changes. Suggest they mime a seed growing into a plant, or a caterpillar eating and changing until it turns into a butterfly.

- Explain to students that:
  - change happens in a growing pattern
  - for changes to be a pattern, the change has to be the same at each stage.

### Describe growing patterns

- Have students view the **Learning object — Growing patterns** and ask questions to help them to talk about what part of the pattern is changing and how it is changing.

In this learning object, students will see photos of growing patterns.



- Have students look at the first slide.

#### Focus questions

Q: *What is happening in this sequence?*

A: There is one more block in each tower.

Q: *Is it a pattern? Why is it a pattern?*

A: Yes, each part of the pattern changes in the same way.

Q: *Would you say it is a growing pattern? Why?*

A: Yes, because the towers are growing bigger by one block.

- Ask students to use blocks or counters to copy the pattern on the first slide.
- When they have made the pattern, ask students to describe what is happening in the pattern and explain why it is a growing pattern.



Example student response: One more block is added to each tower. That makes it a growing pattern.

- Explain to students that it is important to look at where the pattern starts. Rearrange the parts of the sequence; for example:



### Focus question

Q: *Is this still a growing pattern?*

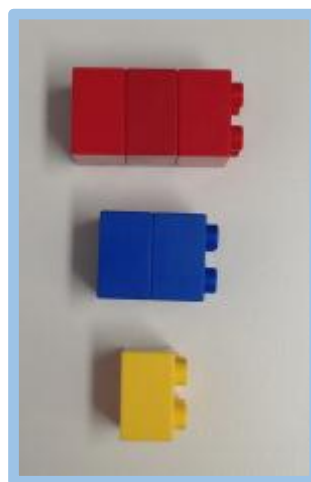
A: No, each part has not changed in the same way.

### Say to students

Yes, that's right. This does not show a growing pattern, because the second part is not larger than the first and the change from one part to the next is not the same.

When we are looking at growing patterns, it is important to look at what comes before and after in the pattern.

- Rearrange the parts of the sequence again, for example:



- Explain that this is a growing pattern because, if you start at the bottom, the parts grow the same way each time.

- Ask students to select a different part as the starting point and show the next parts of the sequence.



Example student response: If I start here, the next part of the pattern would look like this.

- Ask students to place the last part of the sequence first and make a decreasing pattern.



Example student response: If the start is here, the change means the number of blocks is getting smaller.

- Ask students to look at the second slide in the **Learning object — Growing patterns:**



- Have students use blocks or counters to copy the growing pattern.
- Ask questions to help students to talk about the growing pattern.

## Focus questions

Q: *Where is the start of this pattern? How do you know that?*

A: The red part, because it has one block and the next one has two.

*Point to the yellow part.*

Q: *How would you describe this part?*

A: For example: Three across at the top and two underneath.

Q: *How is it different from the one before or after it?*

A: The top part is the same, but there is one extra block underneath.

Q: *What change is happening in this growing pattern?*

A: One block is added underneath in each part.

Q: *What might be next in the pattern after the black part?*

A: Three across at the top and four underneath.

Q: *If you started with the black part, what might be next in the pattern? Why do you think that?*

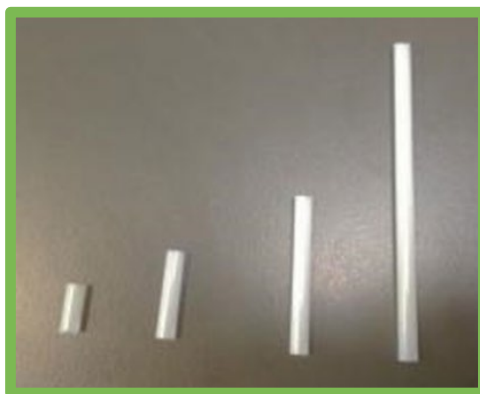
A: For example: The next step could go back to two blocks underneath, because the pattern could get smaller.

Q: *Does the first part have to always be the smallest? Why? How could that happen?*

A: No, The pattern can increase (get bigger) or decrease (get smaller).

## Create a growing pattern

- Assist students to cut up materials, such as straws, paper strips or twigs, to make different lengths.
- Ask students to:
  - sequence the straws
  - describe the sequence (they are getting longer or they are getting shorter)
  - check the parts to identify if the change is the same for each part
  - decide if it is a growing pattern.



- Explain to students that this pattern goes from smallest to largest, and the straws get twice as long each time.