

# I Spy Symmetry!

## You need

★ kōwhaiwhai patterns (see copymaster)

★ a measuring tape

★ classmates

## TECHNOLOGY

Purpose, shape, size, and decorative features are important to consider when designing a product or a building. Decorative features often have special meanings.

## Activity One

Kiri and her class are learning about reflective symmetry. Their teacher sends them off on a “symmetry search”. Here are some of their finds:



A line of symmetry (mirror line) is an invisible line that divides an image into two halves. One half is a reflection of the other half. This kind of symmetry is known as reflective symmetry.



- Which of the pictured items will only work properly if they have reflective symmetry? Why is this?
  - Symmetry is pleasing to the eye and is often used in decoration. Which of the pictured items use symmetry for this purpose?
- As a class, do your own symmetry search. Find items that:
  - only work properly if they are symmetrical
  - are symmetrical for reasons of appearance.
- Which of the items pictured in question 1 or found in question 2 are natural (not made by humans)? Where can you find symmetry in nature?

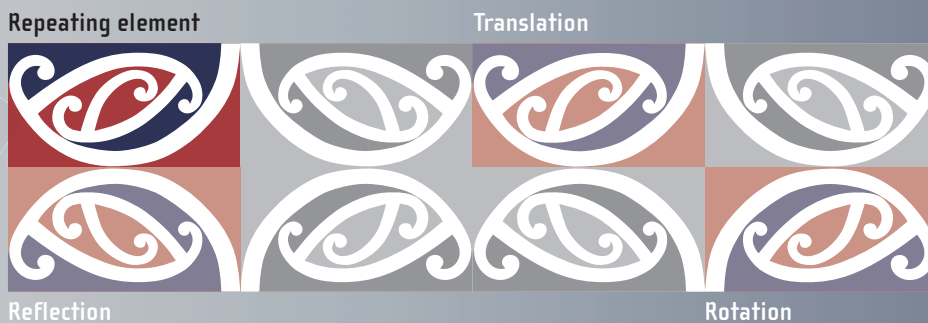
## Activity Two

Kiri and her class visit a marae. Kiri sees many examples of symmetry in the wharenuī, including in the kōwhaiwhai that cover the rafters.

**Kōwhaiwhai are not just decoration. Usually, they symbolise some aspect of the natural environment. They are chosen for their relevance to the people and the location.**

A kaumātua explains the meaning of the different patterns and how they are created. First, a single, complete “element” is designed as a stencil. This stencil is then reflected (flipped), rotated, and translated as required to make the repeating pattern.

Back at school, their teacher encourages the students to explore these ideas further.



1. Look closely at these kōwhaiwhai patterns:



On your copy of the kōwhaiwhai pattern sheet, find the repeating element in each pattern. Colour in this element.

2. Use a different colour to show an example of:

- reflection
- rotation
- translation.

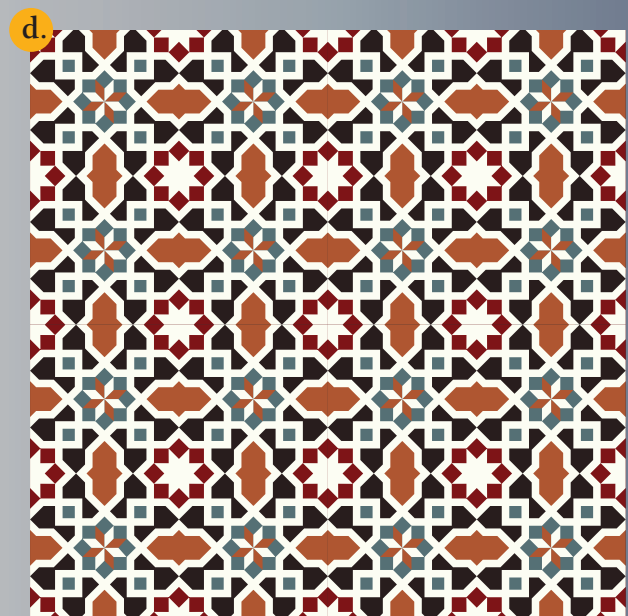
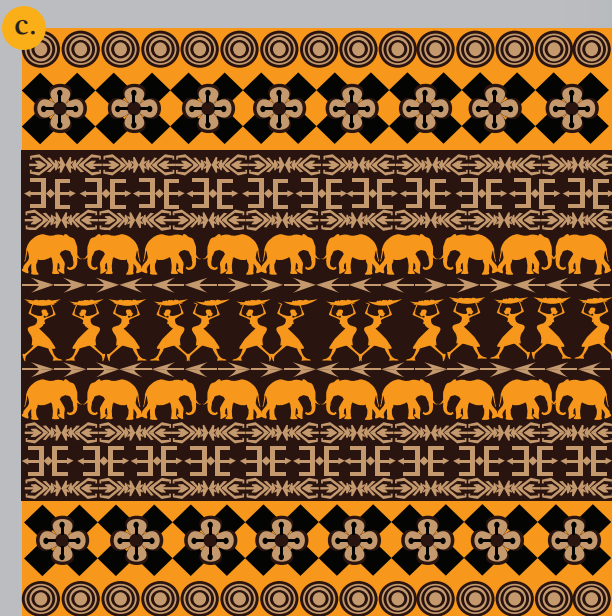
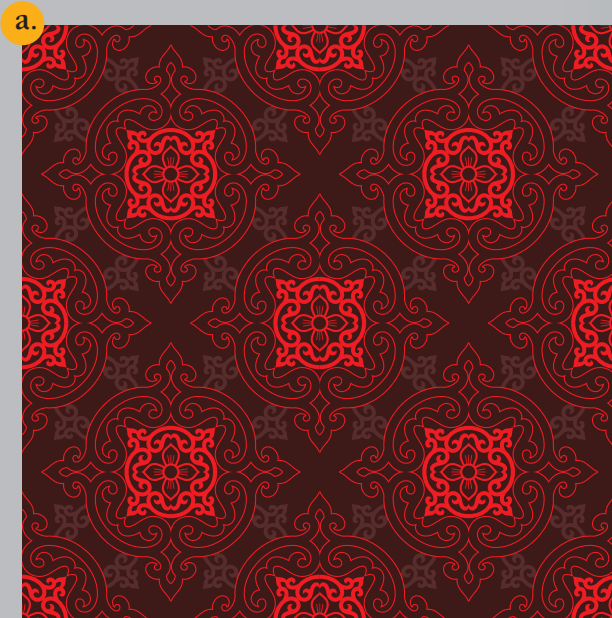


## Activity Three

1. Many cultures have symbols and decorative features that have special meanings for them. These symbols and features are often combined into patterns that use transformations: reflection, rotation, and translation.

With a classmate, look at these examples of cultural patterns.

Describe what transformations have been used to create each design.



- 2.
- Choose or create a simple design element (for example, a symbol) that has meaning for you.
  - Using a computer drawing program (or by hand), reflect, rotate, and translate this element to create a pattern that fills an A4 sheet.