The iBoards Company is coming to the Australian market. iBoards is famous for making surfboards, skateboards and snowboards.

The company is looking for a talented young designer to create some exciting deck designs for its new Aussie iBoard range.

There are strict guidelines for design – each deck must have no more than $\frac{3}{4}$ of its surface covered by design and no less than $\frac{1}{4}$ of its surface covered by one solid colour. Investigate a way to prove that your pattern covers as close as possible to $\frac{3}{4}$ of the board.

The designs must be geometric and consist of a specific set of lines and shapes.

Get designing!

✔ Topics

Before you start the Investigation you need to know…

Understanding the Investigation

1 Read and plan.

Make sure you understand the meanings of: *Australian market, company, range, geometric, colour scheme, deck designs, regular, guidelines, patterned, enlarge, overlapped, represent, design elements* and *solid colour*.

Read and discuss the rubric.

Download your Investigation plan. This will help you with the organisation and understanding of the Investigation.

Teacher note

- Comprehensive lesson notes, suggestions and resources are available in *iMaths 4 Teacher Book*.

- The BLMs and Investigation plan for this Investigation can be downloaded from **www.imathsteachers.com.au**.

Materials
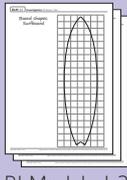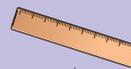
2 Look at other board designs.

Look at the size and shape of surfboards, skateboards and snowboards. Examine the deck patterns. Are there any with geometric patterns?

Choose your favourite board type and print out the appropriate template from **BLMs 1.1–1.3**. Keep in mind that only $\frac{3}{4}$ of the board will be patterned. You may need to enlarge the board template to A3 so you have a bigger design space.

Using maths

3 Calculate $\frac{3}{4}$ of the board.

Use the appropriate blank board shape (**BLMs 1.1–1.3**) to investigate a method to find $\frac{1}{4}$ of the area of your board .

Once you have $\frac{1}{4}$, it should be easy to find $\frac{3}{4}$. The area you find will be your design space.

4 Plan and draw your design.

Read the guidelines in the box to the right. Experiment with designs that meet the guidelines. Arrange the geometric pattern to cover $\frac{3}{4}$ of the board.

When you are happy with your design plan, carefully draw it onto the outline of your board.

Name your creation.

Reasoning and reporting

5 Find the most popular, accurate design.

Make a class display of all designs. Group the boards by type.

Explain how you have included all the geometric design elements that were required.

Prove that $\frac{1}{4}$ of your board has been left blank for the solid colour.

Choose the three boards you would select to submit to iBoards.

Give reasons for your choices.

imathskids.com.au

Go to **imathskids.com.au** – The Investigation 1 area contains the Investigation plan, websites and BLMs that you need to complete this Investigation.

Guidelines for board design

The board design must include:
- 2 small triangles
- 2 medium triangles
- 2 large triangles
- 6 horizontal lines
- 6 vertical lines
- 3 sets of parallel lines
- 4 intersecting lines
- An interesting shape that will tessellate at least 8 times
- An unusual shape that is flipped or reflected
- An acute, right and obtuse angle.
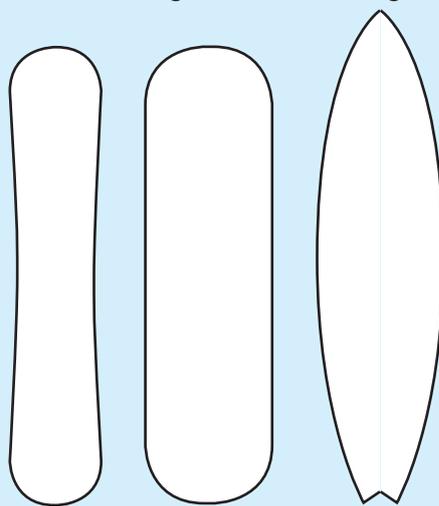
Inquiry

Investigate and list 5 reasons why boards come in so many different shapes, sizes, designs and materials.