Quarterly Problem

- Maths Edition -

The Sofa Problem

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→ *The question of which sofa you can just push through a hallway that turns at right angles is an unsolved mathematical problem. Fame and glory await the designer of the ideal sofa!*

Imagine you have a hallway that turns at a right angle. You also have a gift certificate that allows you to order a fancy designer sofa in a shape of your choice. You would like to have as large a sofa as possible, however, you are worried that it might not fit through the hallway.

Consider what shape your sofa should have so that its area is as large as possible, but it still fits through the hallway.

Your designer sofa must not be tilted in the process because it could break.

Work in small groups. Draw a turning, 10 cm wide hallway on a piece of paper. Then cut out a sofa from paper and try it out to see if it fits through the hallway. If it does, think about how you can make it bigger so that it still fits through. If not, think about where you need to cut something off (as little as possible) so it will fit through. When you have finished designing your sofa, cut it out of clay paper (all groups from the same) and compare with a fine scale (they are usually available in the chemistry room) which sofa is the heaviest, i.e. the biggest.

Brainstorm Box

What would be other ways to estimate the area of the sofa if you don't want to weigh it?

Own source

Compare your methods!

How did you go about it? What shape did you start with and how did it evolve? Did you find it easier to increase or decrease the size of the shape?