

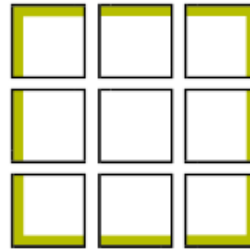
# On the Edge



Four tiles can be painted and arranged so that the edge of the large square is blue (as shown) or green.



Can you paint and arrange nine tiles so the edge of the large square can be green, blue or yellow?



[nrich.maths.org](http://nrich.maths.org)

Struggling to get started?

- Take one colour at a time and see how many edges are being used up on the edge of the big square.
- Once the edges have been used, they can be 'hidden' in the middle.
- Try making this puzzle so that you can experiment with the colours – maybe use pieces of paper and colouring pencils or labels.
- Is there an algebraic formula to link the number of squares being used and the number of corners and edge pieces?

Extension:

- Now try to colour sixteen tiles so that four 4 by 4 squares can be made - one with a green edge, one with a blue edge, one with a yellow edge and one with a red edge.
- Find a way to colour 25 tiles so that five 5 by 5 squares can be made, each with a differently coloured edge.
- Do you think this is possible for 36 tiles and six coloured edges?
- Will it always be possible to add an extra colour as the squares get larger?
- Would this problem translate into a 3D problem building cubes from smaller cubes with coloured faces?