

Extension – day 1

Light Blue - Dark Blue

Age 7 to 11

Challenge Level ★★

Look at each of these five squares.



What is the pattern?

How much of the second square is light blue? Can you write this as a fraction?

For each of the five squares, write the area of the square that is light blue as a fraction.

Can you work out what the next two diagrams would look like? What fraction of these squares will be light blue?

Day 1 – extension solution

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Francesca investigated this problem. She imagined that each time the big square was split up into little blocks that looked like the light blue ones. Then she counted how many light blue ones there were, and how many overall. This is what she got :

$$1, \frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \frac{16}{81}, \dots$$

She noticed that the number on top got multiplied by 2 each time, and the number on the bottom got multiplied by 3 each time.

Some of our more advanced readers might know that we could write this as

$$\frac{2^n}{3^n}.$$

Francesca also noticed that the amount of light blue got smaller and smaller each time. She thinks that if we could do this forever, in the end the whole square would be dark blue.