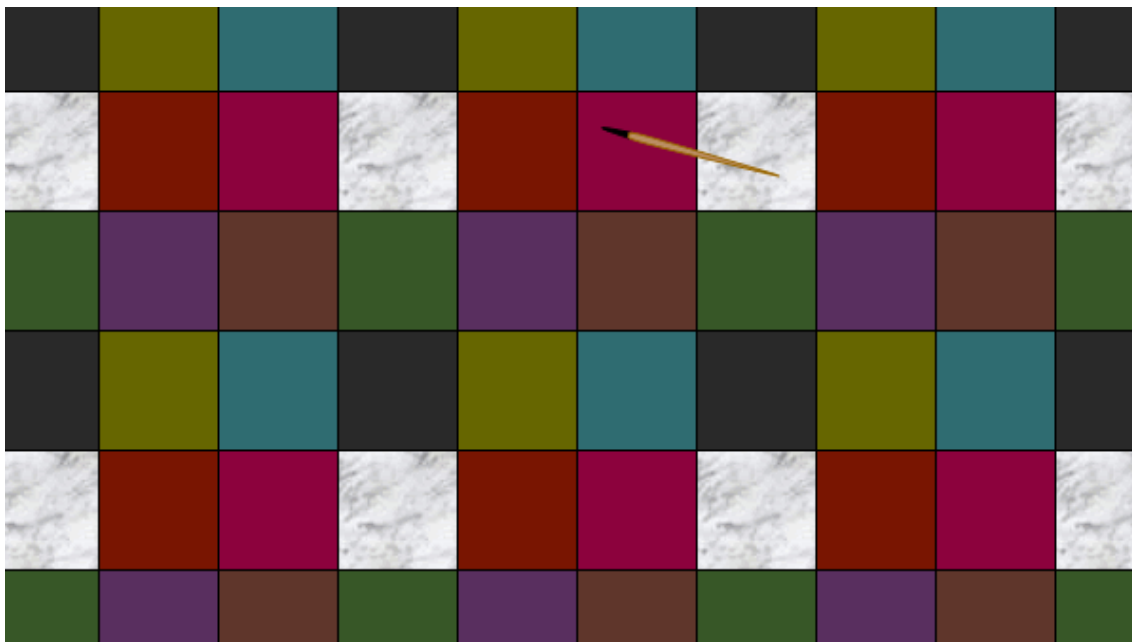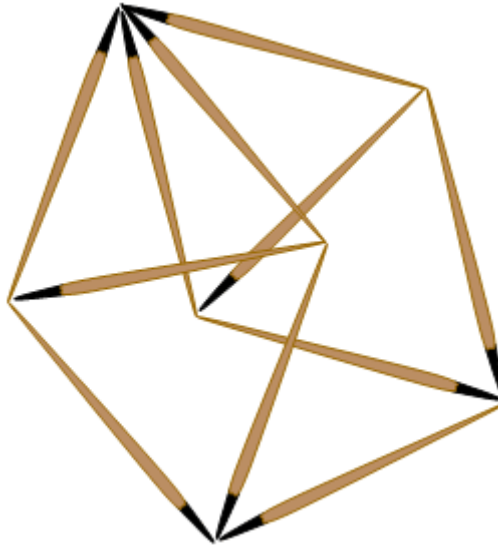# Vermeer's Paintbrush

When painting this painting of a music lesson, Vermeer, the great Dutch artist, dropped his paintbrush on the tiled floor. He noticed that two ends of the paintbrush rested on floor tiles of a different colour. Will this always happen with this brush on this floor? Will it work for brushes of different lengths?

Can you find a tile pattern which uses 2 less colours and maintains this property?

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Extensions:

- Can you prove that there is no tile pattern using just three colours that has this property? The following diagram may help:

- What is the smallest number of colours that you need to use in order to tile the floor so that Vermeer's paintbrush can be dropped and its ends always rest on different colours?

  Warning: This is an unsolved problem in mathematics. All that is known is that the number is greater than 3 and less than or equal to 7 as you have just discovered.

The Math in This Problem:

This classroom investigation involves the observation of shapes and colours within a given tile pattern. Having to eliminate two colours, students must study these properties and figure out a way to keep Vermeer's Paintbrush from resting its ends on tiles of the same colour.