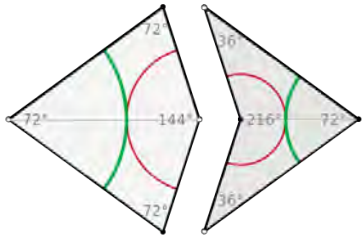


Penrose's kite and dart tiling

This tiling, invented by the mathematician Roger Penrose, uses quadrilaterals called the **kite** and **dart**.

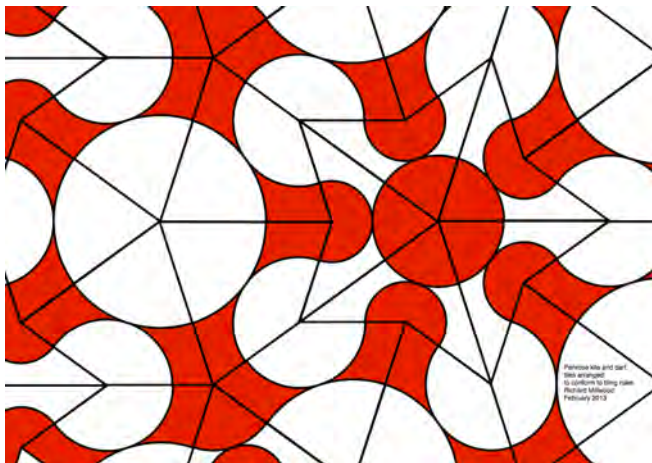


The **kite** is a quadrilateral whose four interior angles are 72° , 72° , 72° , and 144° .

The **dart** is a quadrilateral whose four interior angles are 36° , 72° , 36° , and 216° .

The colours are used to force a **matching rule**

The **matching rule** force the placement of tiles, in my design the tile colours must match along the edges.

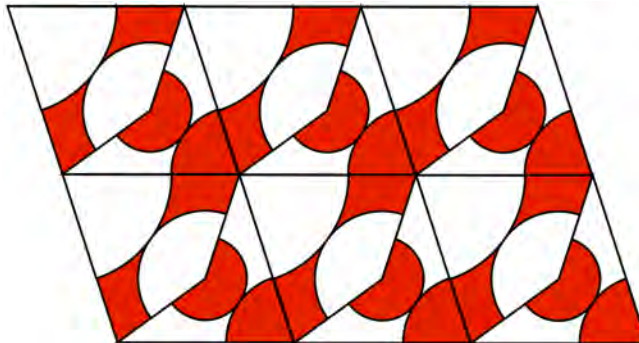


A Penrose tiling, employing the matching rules, has many remarkable properties, most notably:

- It is non-periodic, which means that it lacks any translational symmetry.
- It is self-similar, so the same patterns occur at larger and larger scales. Thus, the tiling can be obtained through "inflation" (or "deflation") and any finite patch from the tiling occurs infinitely many times.

Making the tiles

I printed this 'incorrect' tiling using computer software to use as a template - this layout makes cutting simpler.



I rolled the clay with a rolling pin between two rods to make a thin slab of even thickness, then laid the template over the slab and cut out the tiles.

The tiles were left to dry and then 'bisque' fired, baking the undecorated clay hard.

The following week, I dabbed glaze on to the tiles with a sponge using the same template as a stencil, by cutting out the red areas to make holes.

Finally the tiles were fired a second time to fix the glaze.

This was a test run, to establish experience. For example, the tiles shrink, so the glazing template should have been shrunk to match.

Next steps

I hope to make two 'cookie cutters' to make more, since drawing a needle through the clay to cut out the tiles easily distorts the shape.

Finally, I would like to incorporate the circular outlines into the tiles' face by making a stamp which fits inside the cookie cutter! This should make the glazing more accurate and easier than using a stencil.

Richard Millwood

Richard Millwood 2013

richardmillwood.net

My thanks for the excellent teaching from Peter Norris and suggestions from fellow potters at the Fold.