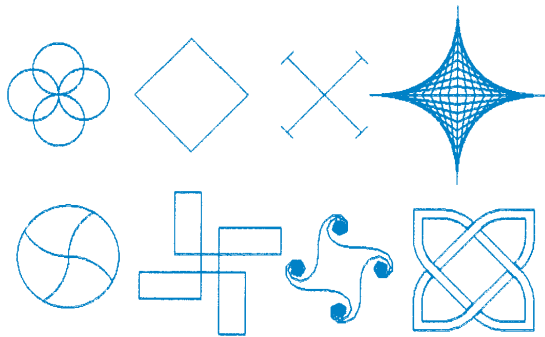


Geometric transformations

Here is a brief comment on the problem which Maria Wesslén and Saínsa Fernandez addressed in *MT191*, ‘Transformation Geometry’, pp27-29. The problem was ‘why do (ie, teach or learn) geometric transformations?’ I have a lot of sympathy with their answer.

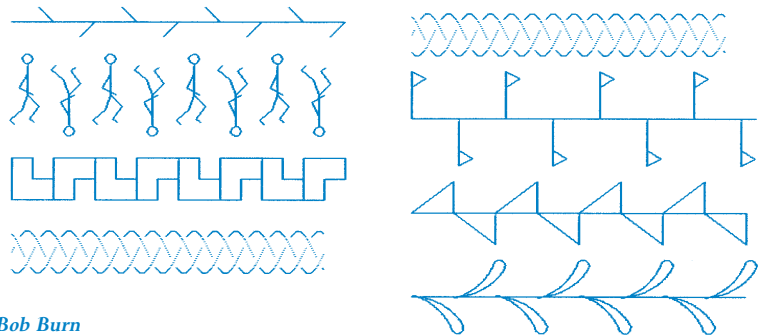


The curriculum answer lists reflection, rotation and translation. The snag with using that answer as it stands, is that each of the transformations seems to have a sufficient motivation of its own. Reflections describe what mirrors do. Rotations are another way of looking at angle, and translations are like vectors. Wesslén and Fernandez wanted their answer to cohere. The answer would cohere in just the way they want (with the addition of glide-reflection) if they had asked how to analyse the symmetry of patterns.

What are the similarities and differences in the patterns shown on the left?

All eight patterns have 90° rotations. The patterns on the left have four reflections as well. The patterns on the right have no reflections. Might there be other patterns with four reflections but no rotations? The questions which arise here are simpler than those needed in their discussion, because these patterns do not admit translations or glide-reflections. This is the level of investigation in the new ATM pamphlet (*Sorting by symmetry: patterns with a centre* – code: ACT062; list price £11; personal ATM members: £7.70.)

To take the further step that they wanted, any frieze pattern needs translations for its analysis, and the following patterns taken from a further proposed pamphlet on friezes, provoke the idea of a glide-reflection.



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