IDEA

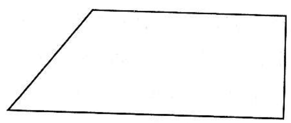
45

UNFOLDING AND LINE SYMMETRY

This is another simple idea to set up yet provides students with plenty to think about and work, on the question: 'Can you show you have found all the possible solutions?'

Draw some polygons, for example a right-angled isosceles triangle, a parallelogram, an asymmetrical trapezium containing two right angles, etc. Each of these shapes are the outcomes after other 'initial' shapes have been folded once in half. The idea is for students to visualize and draw all the possible initial shapes that led to the final shapes.

For example, if the final shape is an asymmetrical trapezium with two right angles there are four initial shapes that can be unfolded to produce this shape.



These are:

- an L-shaped hexagon with one concave angle;
- two pentagons, one having a concave angle;
- an isosceles trapezium.

Such a collection of shapes will provide students with a context to engage in the vocabulary of shapes, such as properties and names.

Furthermore, if the angles of the original shape are known, the angles in each final shape can be calculated and students can extend the task to consider angle sums of polygons.

IDEA

46

TRIANGLES WITH CONSTANT PERIMETER 1

This is a problem I have used on many occasions where different students have been able to develop the idea to different depths. Such a problem as this confirms for me the importance of finding tasks that promote the enrichment of mathematical thinking in contrast to 'accelerating' students' thinking . . . the depth of zooming in rather than the speed of zooming off I suppose!

How many triangles can be made with integer length sides that have a perimeter of 30cm?

This is quite a simple question and is, therefore, accessible for younger students. However, there are dangers lurking of either misinterpreting the question or of not taking into account the basic requirements pertaining to lengths of sides to form a triangle. For students to recognize that the two shorter lengths must total to a value greater than the longest side, is a considerably important piece of knowledge about forming any triangle . . . unless of course the triangle is isosceles in which case . . . or if the triangle is equilateral so that . . .

As we can see there are several complexities which we take for granted at our learners' peril! Indeed, I have seen older students begin work on this problem by writing out a list of triples all of which sum to 30, yet most of which don't form triangles, for example {1, 1, 28} and {1, 2, 27}, etc.

One approach might be to ask students to construct triangles using a compass, pencil and ruler. As different solutions are produced these can be instantly displayed so the task becomes one of: 'Have all the possible solutions been found?'

Extension ideas appear in Idea 47.