Making things work : Printing

Description

This topic looks at challenges derived from printing processes where geometric thinking is required.

Activity 1: Folding booklets

Activity 2: Placing adverts

Folding booklets has instructions for making a booklet with 16 pages and asks pupils to find a correct numbering for the pages. Begin the activity by demonstrating how the booklet is made. You may need to show how to manipulate the folded booklet in order to pencil in the page numbers. Ask your pupils to find a correct page numbering in this way then unfold their sheet of paper and compare their answers. Encourage them to observe or deduce patterns.

For example:

■ each odd number has the following even number on the reverse

■ numbers adjacent to a square containing an even number always contain an odd number

■ each even number has the following odd number on the same side of the paper

■ the sum of adjacent page numbers is 17 (for a 16 page booklet).

This will support them in finding correct numberings without re-folding. This is a difficult problem – an early suggestion might be to find correct numberings for a 4 and then an 8 page booklet.

When pupils move on to consider other booklets made like this encourage them to compare the numberings and make further observations or deductions. You may need A3 paper for the 32 page booklet.
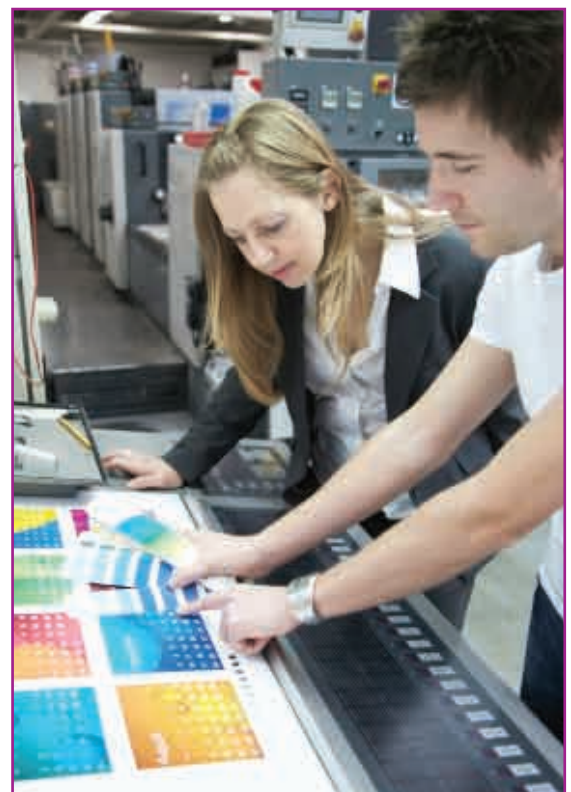
Making things work : Printing

Placing adverts explores the problem of fitting different sized rectangles into a given area. Ask your pupils to fit the adverts onto a 10cm by 14cm grid drawn on squared paper. This might involve fitting the larger advertisements first and looking for adverts with the same height or width to arrange in rows or columns.

Here are some solutions:
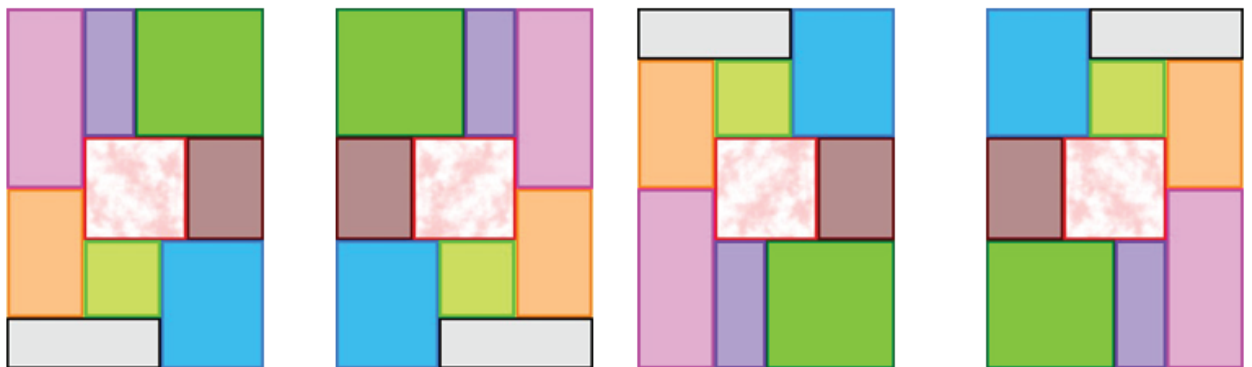
Encourage pupils to compare their solution with others and to note similarities and differences in these solutions. Challenge them to find as many of the possible 64 ways the complete set of adverts can be fitted onto the page. Prompt them to think about which positions of pairs of adverts can be swapped over and how many solutions arise from this. Similarly, the positions of rows can be exchanged to make new solutions.

Pupils then consider when other rectangular page sizes could work. Possible widths and heights for the page are the ordered factors of 140 – 1 x 140, 2 x 70 and so on. Encourage them to create logical arguments about why some of these cannot be used.

The mathematics

In Folding booklets pupils will use logic and number patterns. Placing adverts develops pupils awareness of area and leads into work on factors.