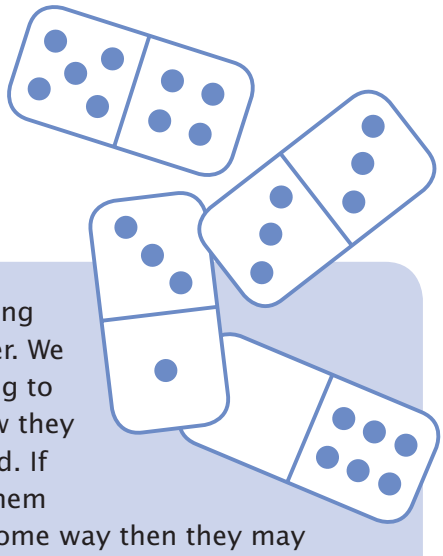
A spotty problem



Setting the context

The year is 2090 and archaeologist Professor Sink of the University of Lost Lands has made the most amazing discovery, 'I cannot quite believe it. We were digging away, wondering whether we would find anything – when all of a sudden I saw spots before my eyes. There they were in all their beauty – four spotty rectangles from the Elizabeth II era. What a find! We have a good idea what they are too. We think they are called dominoes and people in the past used to play games with them by joining them together. We are now trying to work out how they may be joined. If we can put them together in some way then they may unlock some secrets of the past!'

Problem

Can you organise the four dominoes in a square so that each side adds up to nine?

Objectives

To solve mathematical problems or puzzles, recognise and explain patterns and relationships, generalise and predict.
Suggest extensions by asking 'What if...?'
To explain methods and reasoning, orally and in writing.

You will need

Dominoes; photocopiable page 74; paper and pens.

Preparation

Draw out the solution on the board. Draw the multiplication domino problem on the board ready for 'Drawing together'.

What to do

- Read the problem and give the children a few minutes to reflect on the challenge.
- Ask if anyone has played dominoes. Tell the children that a set of dominoes is made up of 28 rectangles, each having two squares with 0, 1, 2, 3, 4, 5 or 6 spots and every combination is represented. The value of the domino is the sum of the value of the two squares. Tell them that 'Domino' is the French word for a Christian priest's winter hood which was black on the outside and white on the inside. The oldest domino sets date from around AD1120 and appear to be a Chinese invention.
- Ask the children questions related to number properties, such as: *How many of the numbers from one to six are prime numbers? How many are composites (numbers with more than two factors)? What is the largest/smallest number you can make?*
- Ask the children to draw the dominoes in a square shape. Do they see that there is an empty 'window' in the middle?
- Discuss whether keeping one domino in the same place throughout is a sensible strategy. Does this make it easier to try different groupings?
- Give out the photocopiable sheet and encourage the children to draw different domino combinations by trial and error until