10 Some mathematical questions on the photographs

Dominoes

This appears to be part of a set that includes (1,1) to (6,6) - no blanks.

- Which domino is missing?
- How can you organise the dominoes systematically?
- Can you make a chain with the complete set? How can maths help?
- Can you make a ring with the complete set?
- How many spots are there altogether in a complete set?
  What is a quick way of counting them?
- How many dominoes are there in a complete set from (1,1) to (n,n)?

Calendar

- How are the numbers arranged on the cubes?
- Can you draw nets and make the cubes?
- What impossible dates can be made from these cubes?

Stack of barrels

- How many barrels are in the stack?
- If you make a taller stack 4, 5, ... barrels high, how many barrels will you need?
- Generalise?
- How else could you stack these barrels? What other pyramids are possible?

A pavement in Germany

- What shapes can you see?
- Are all the paving slabs identical? What shape are they?
- Can you work out any angles?
- Can you draw one of the slabs accurately?
- Can you find other pentagons that tessellate?
- What other shapes can paving slabs be?
  Make up some an interesting shape of your own and show how it can tile.

Trike with square wheels

- Does the trike run smoothly?
- Can you make a simple model?
- What is the height of each 'bump' on the track?
- Can you draw the shape of the 'bumpy road' accurately?
- What would happen if you had triangular wheels or hexagonal wheels?

Russian dolls

- Do the tops of the heads lie on a straight line?
  What does this tell you?
- If you divide each doll's height by its width, what do you get?
  What does this tell you?
- If you were to make some bigger dolls in this set - how big would they have to be?