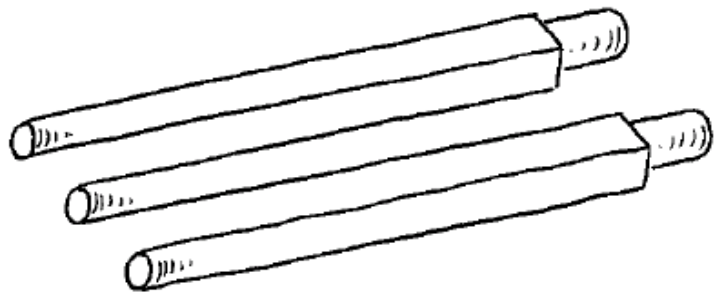
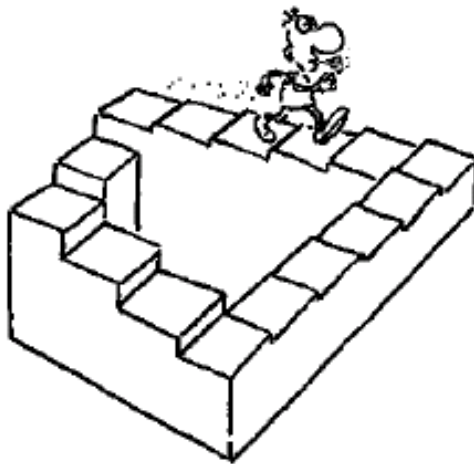
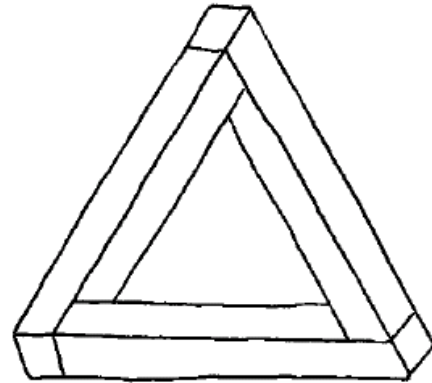


1. **Seeing is believing!**

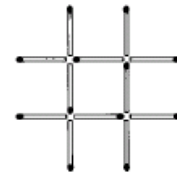
We are trained to interpret certain kinds of two-dimensional drawings as representing three-dimensional objects, and the ability to understand such diagrams and to draw them is an aid to thinking and communicating ideas about space. However, as the drawings illustrate, visual impossibilities can be created. Is the last drawing a 3-pin or a 2-pin plug? Can a staircase join up on itself? Could you make the triangle from three pieces of wood?

Visual perception is more the area of study of the psychologist than the mathematician, but diagrams are widely used by mathematicians to help in thinking about space so their shortcomings need to be recognised



2. **Matchstick manoeuvres**

Move, not remove, four matches in the Os and Xs grid to form three identical squares. There are three quite different solutions, can you find them?



3. **The scouts' initiative test!**

A scout was stood on each of three barrels placed at the vertices of an equilateral triangle, a distance 3 metres apart.

They were told to imagine that they were surrounded by crocodile-infested waters and had to find some way of transferring themselves from one barrel to another. To help them in this enterprise they each had a floorboard of length 2.5 metres. How could they safely bridge the gap?



1.

2.

Four matches have to be moved so the number of matches in the solution is twelve, the same as at the start.

As three identical squares are to be formed we are looking for three squares with no matchstick common to two squares. From the starting point, five solutions at first seem possible, see below, but only the last three are solutions as the others require that more than four matches are moved. It is also possible to form three identical squares by moving only three matches. Can you see how?



3.

The scouts' initiative test!

They overlapped the three planks as shown in the diagram. You can convince yourself of the effectiveness of this solution by using three rulers and three bottles or cans.

