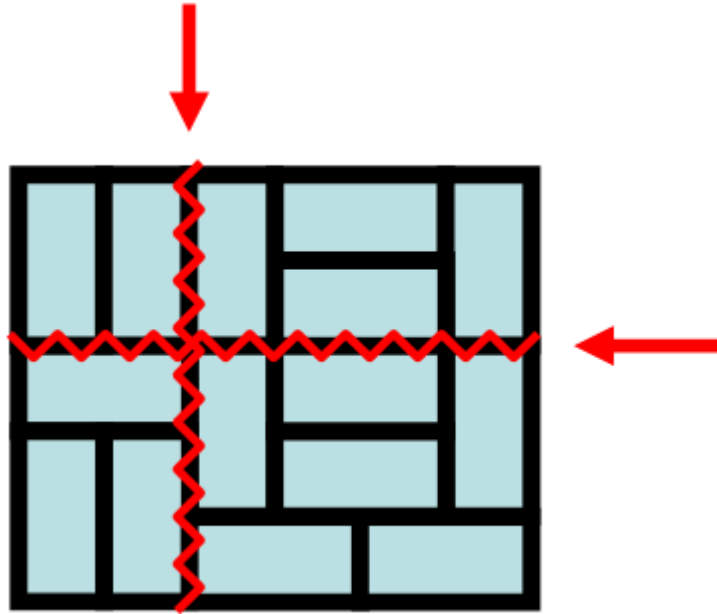


Karate Bricks

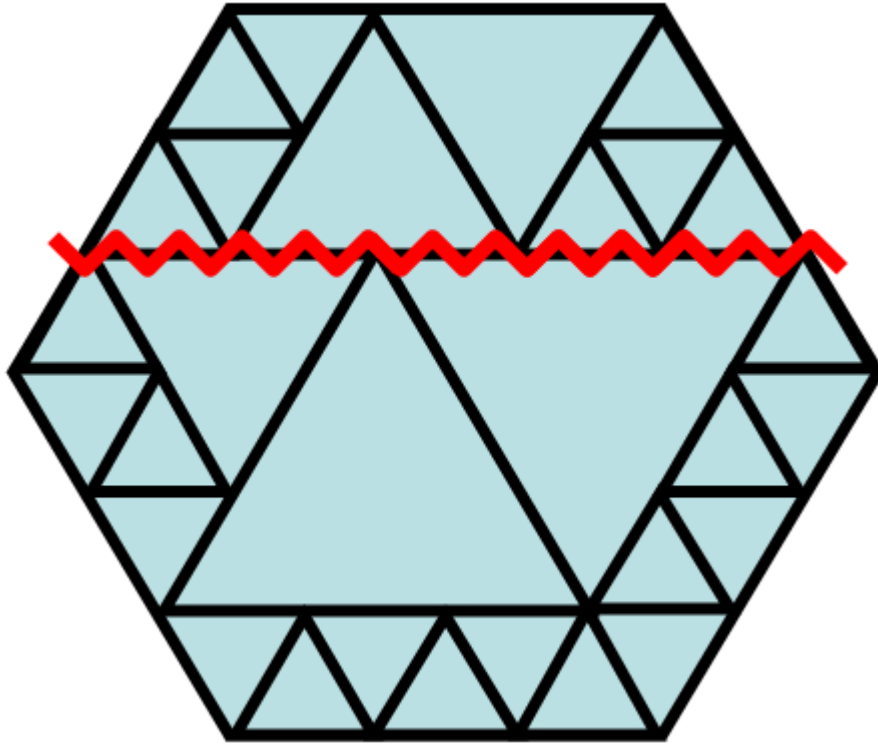
A fake karate brick looks like a regular brick, but when it is hit with a karate chop, it disintegrates. Sometimes people use these fake bricks to convince other people that they have a black belt in karate. The difference between real and fake karate bricks is that the real bricks do not have a fault line.



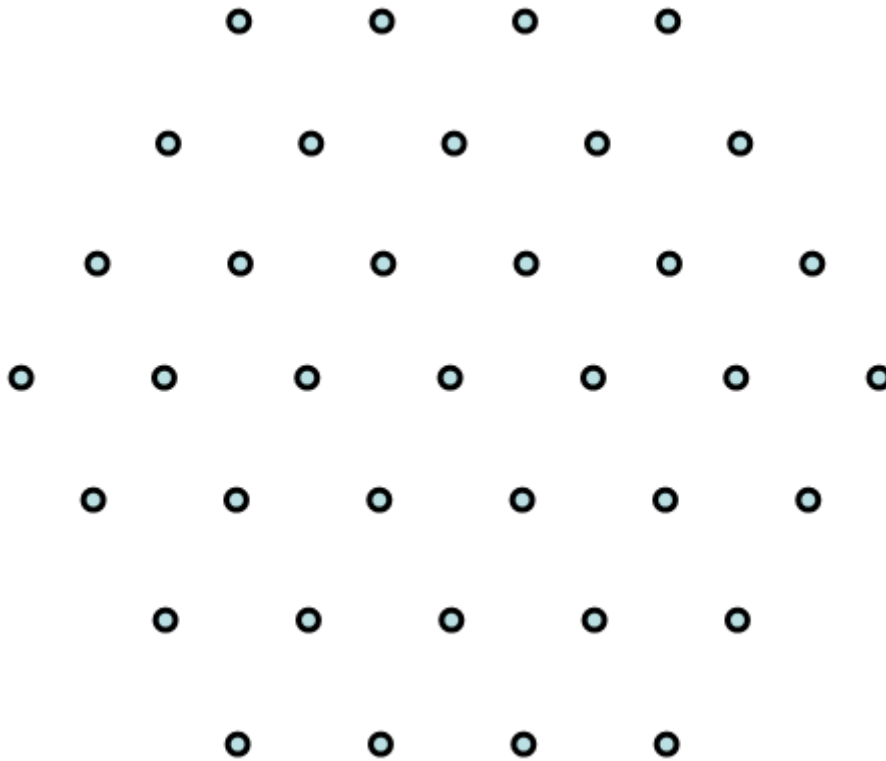
This is a fake karate brick because it has fault lines.

Can you make a real karate brick the same dimensions as the brick above, using the same fifteen 5cm x 10cm dominos?

There are also fake solid metal pipes that look difficult to bend, but are actually easy. Fake solid metal pipes have a cross-section with a fault line (see below).



Using equilateral triangles on the grid below, make a pipe cross-section without a fault line.



Extensions:

- Prove that there is no real rectangular karate brick made of 5cm x 10cm dominos that is 20cm wide.
- Prove that there is no real square karate brick made of the same dominos that has a 30cm side.
- What is the smallest cube that can be constructed of smaller cubes so that there are no fault planes?
- Can you find other fake and real constructions like the [pipes](#) and bricks and email them to Galileo.

How many ways are there to create a fake rectangular karate brick that is 15cm wide and

- 10cm long
- 20cm long
- 30cm long
- 40cm long
- 50cm long
- 60cm long

Do you recognize a pattern?

Credits:

The initial problem and last extension are found in "Polyominoes : A Guide to Puzzles and Problems in Tiling" by [George Martin](#), ISBN: 0883855011

Theme, Pipe Problem and Extensions by Gord! © 2005 Galileo