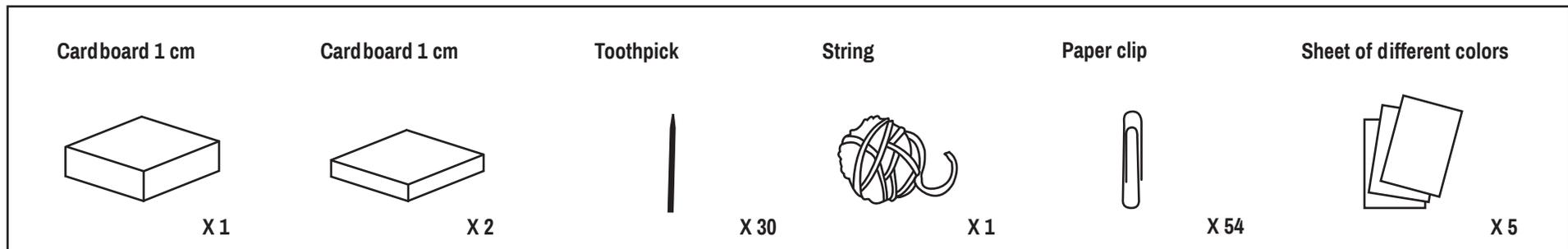
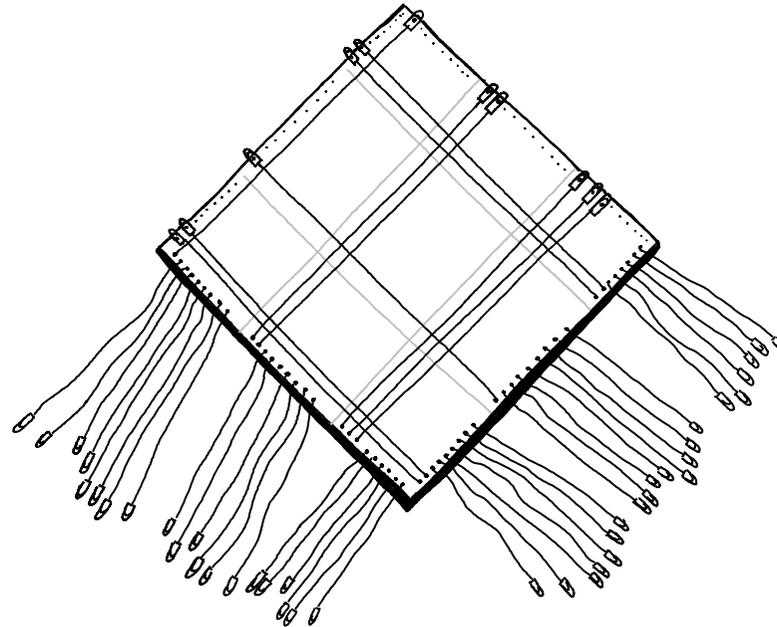
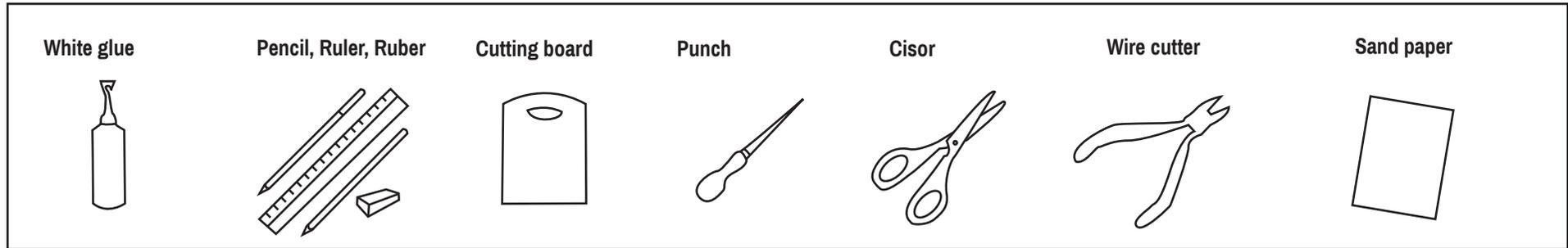


JAPANESE MULTIPLICATOR



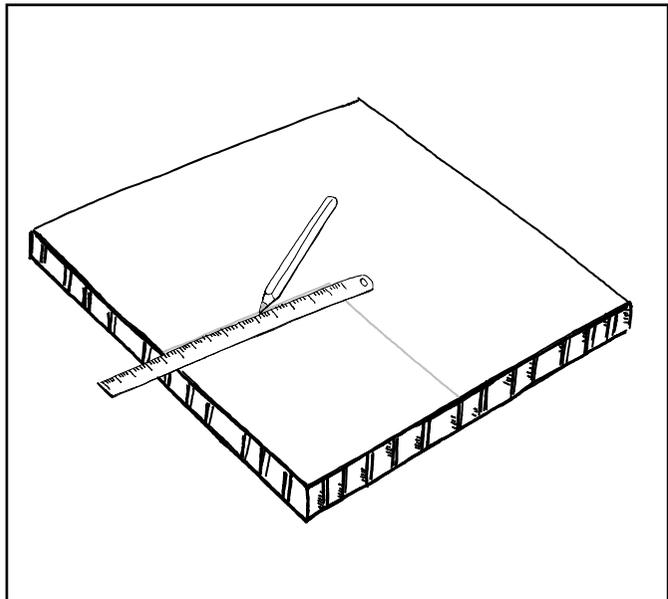
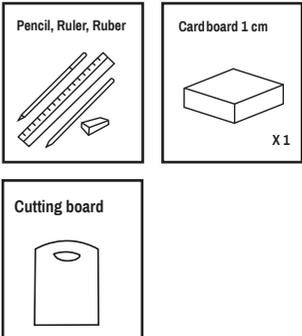
This method, which we can find origins in the Maghreb back in the 13th century, is in reality, not Japanese. Still, it is a fantastic method to learn and experiment with multiplication in a simple and visual form. This project takes it to another stage by explaining how to make a physical object to encourage the learning of multiplication. The format is also quite unusual as you can make multiplication up to 999 x 999.

Tools

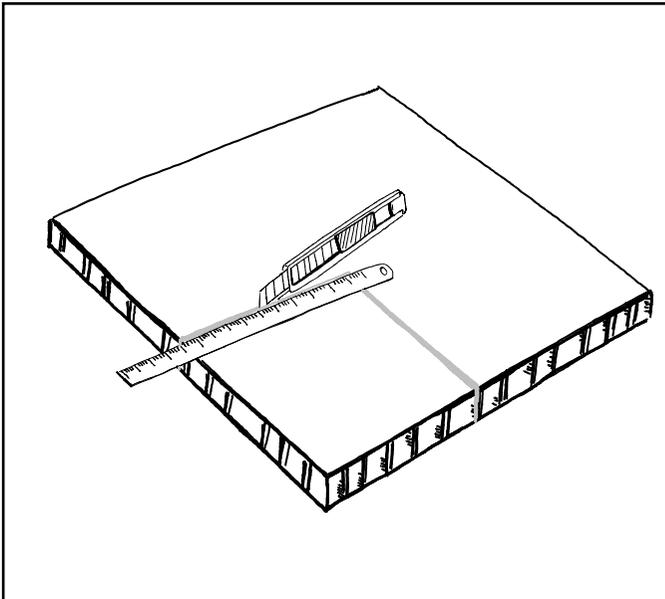
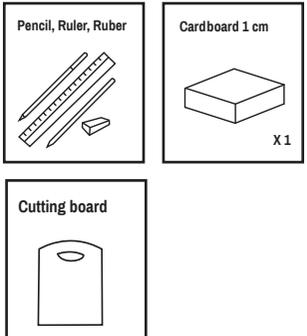


Assembly

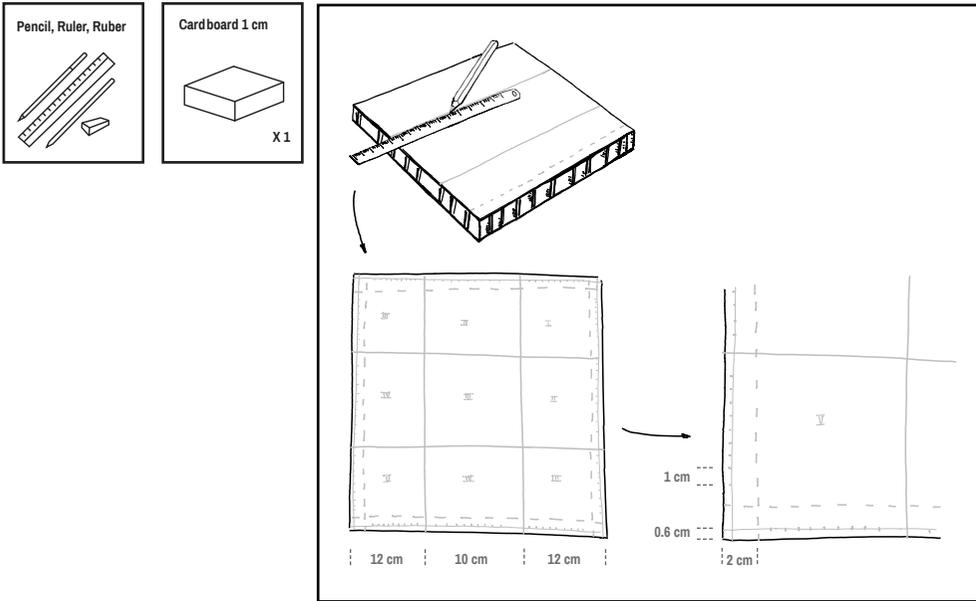
1 Draw a square of 34x34 cm on a 1 cm thick cardboard. If you need to assemble several cardboards, repeat this operation as many times as necessary.



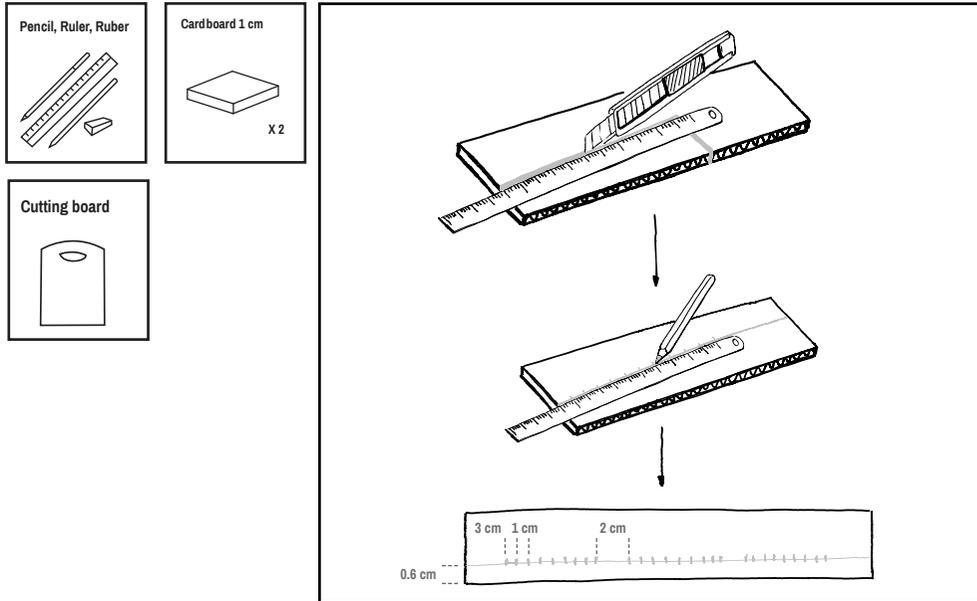
2 Using a cutter and a metal ruler, cut out the square.



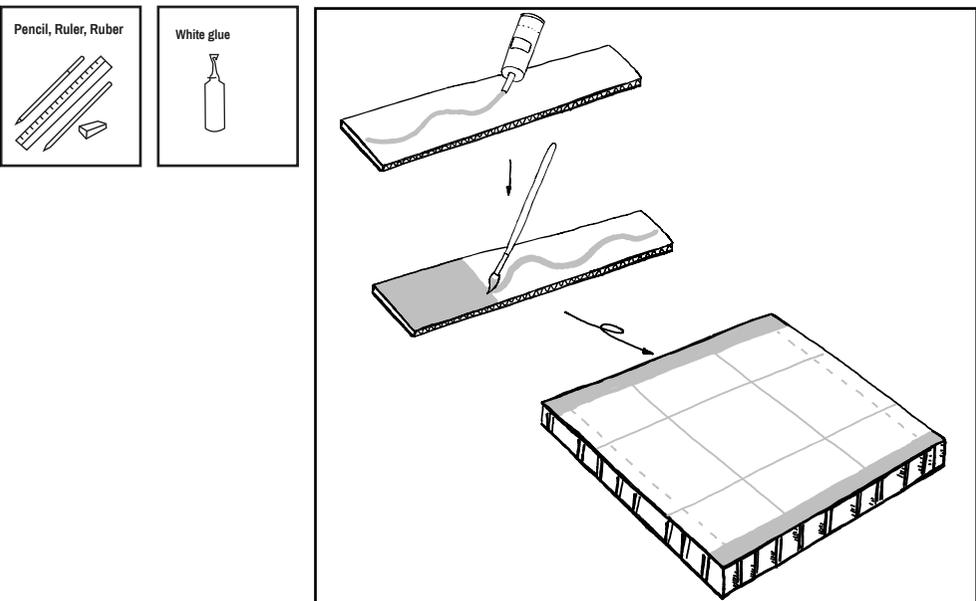
3 Draw the various lines as shown in the diagram below.



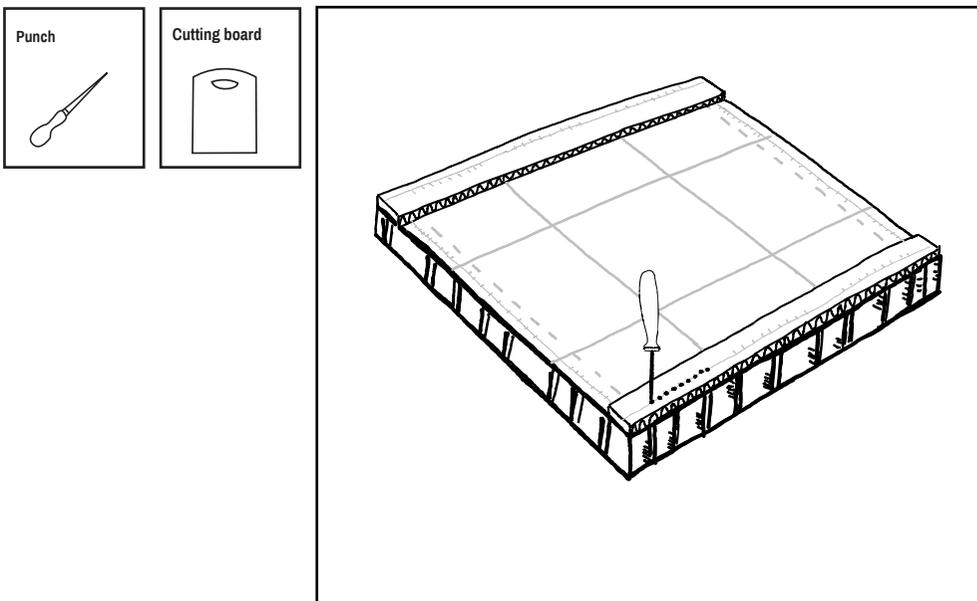
4 Cut two 2x34 cm strips from the 1 mm thick cardboard. Mark the locations of future holes with a pencil.



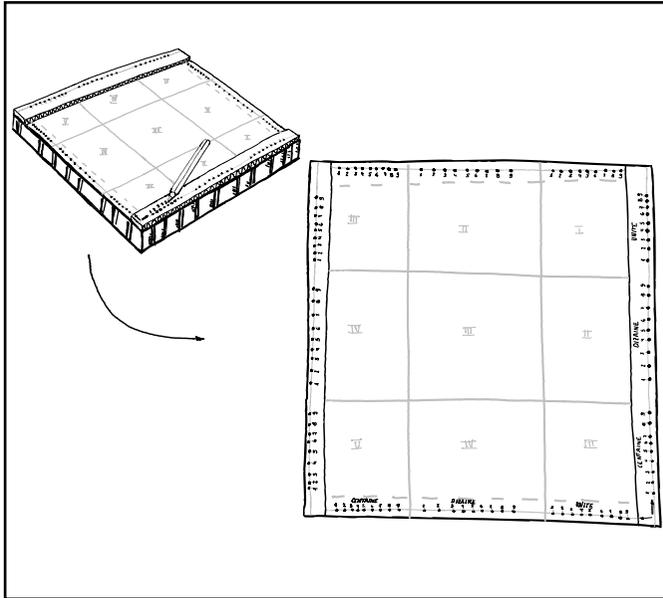
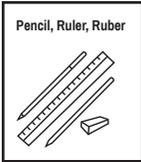
5 Glue with white glue the strips at the ends of the 1 cm thick cardboard.



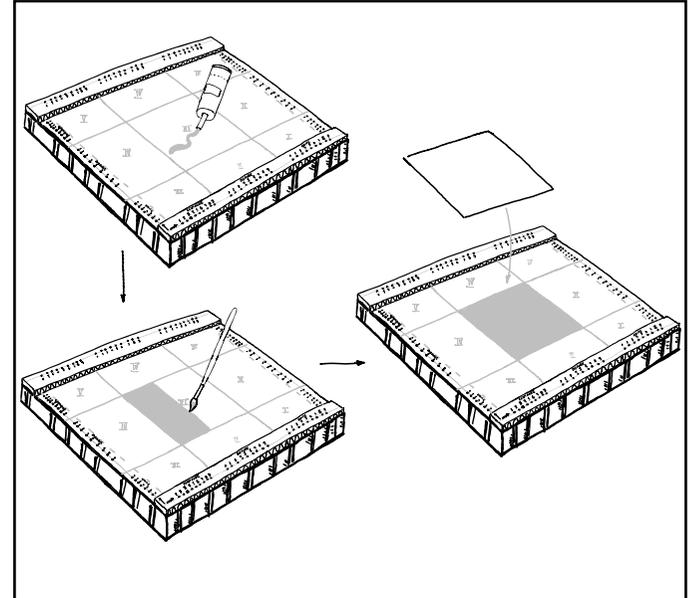
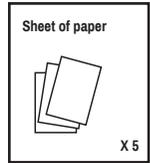
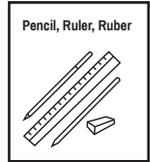
6 Make holes with a punch at the previously marked locations.



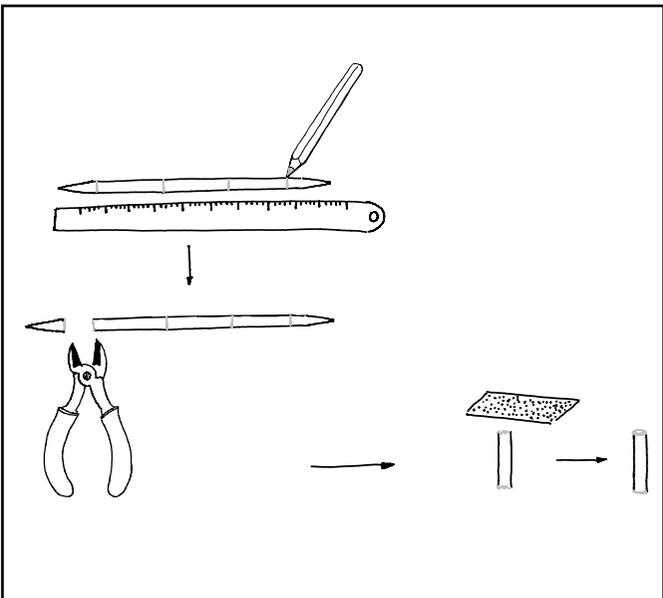
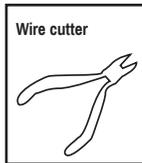
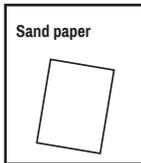
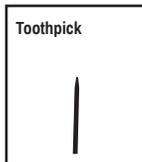
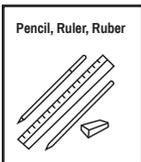
7 Make the inscriptions with a pencil and then iron with a black pen.



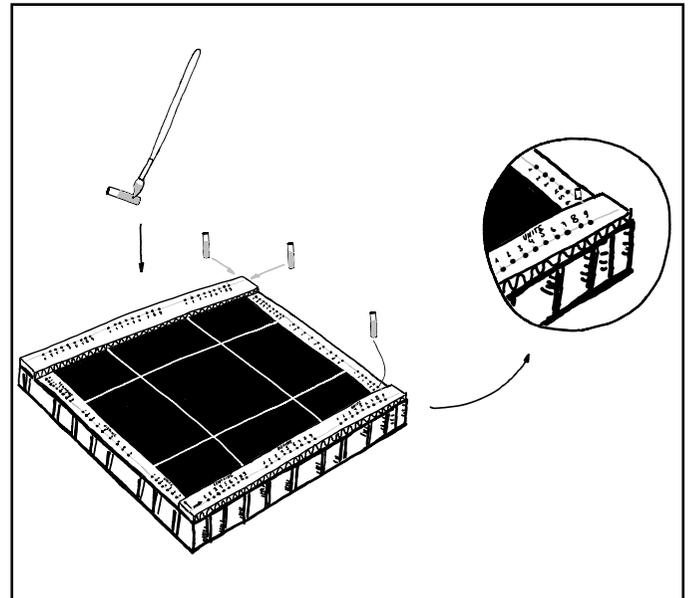
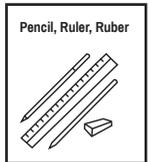
8 Glue the sheet of paper or paint the parts in color. Each roman number correspond of a different color.



9 Mark the toothpicks to make 1.6 cm (~3 ends per toothpick) rods. Cut them with the wire cutter and sand them lightly down. 54 rods are needed.

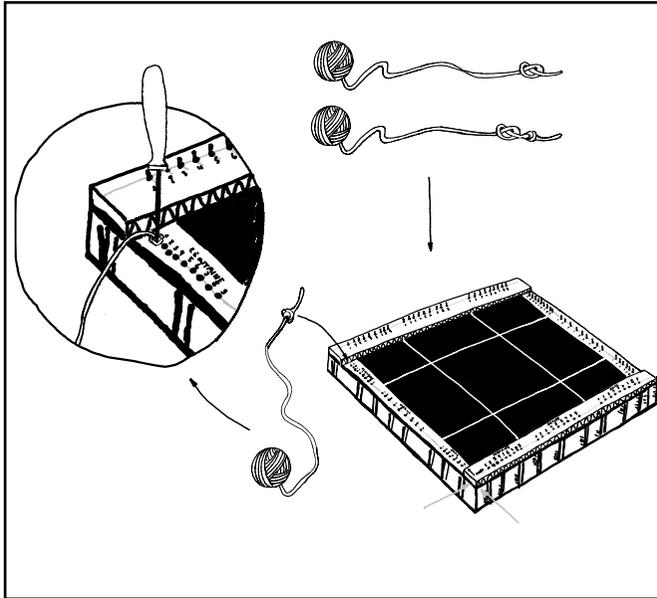
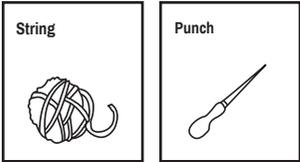


10 Rub all the construction lines. Glue the toothpicks with white glue (gluing with a brush is easier) at the predefined locations. Allow to dry.



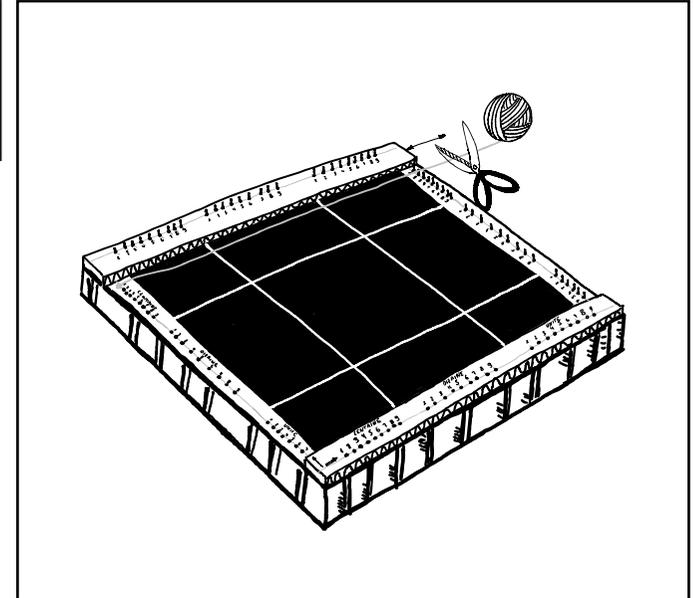
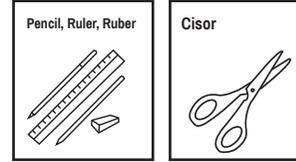
11

Make a double knot at the end of the string, pass the knot through one of the holes using the punch. Check that it holds well.



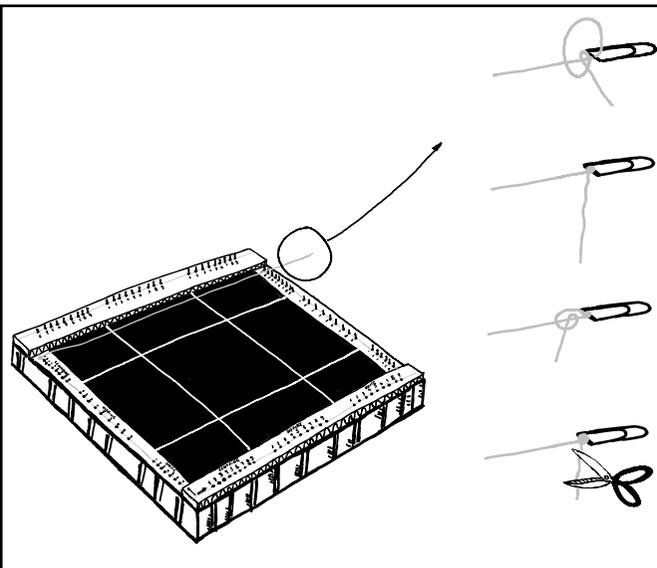
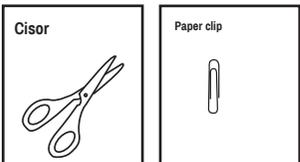
12

Run the string across the cardboard and let it protrude about 5 cm and then cut.



13

Take a paper clip and tie a light knot at the beginning. Check that the string is tight when the paper clip is in place. Once you have found the right length, make a double knot and then cut by letting a piece of string protrude.



14

Repeat operation on steps 11 - 13, 54 times. It's ready to work ! Happy multiplications

