

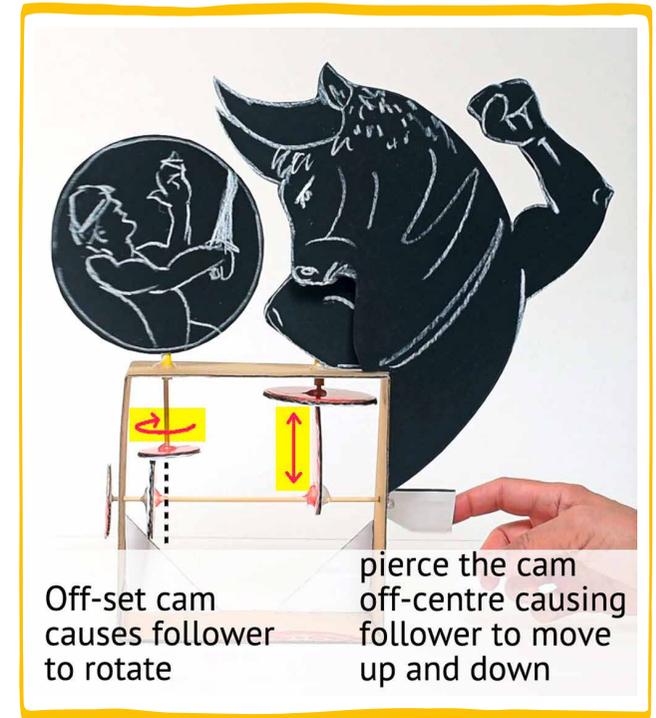
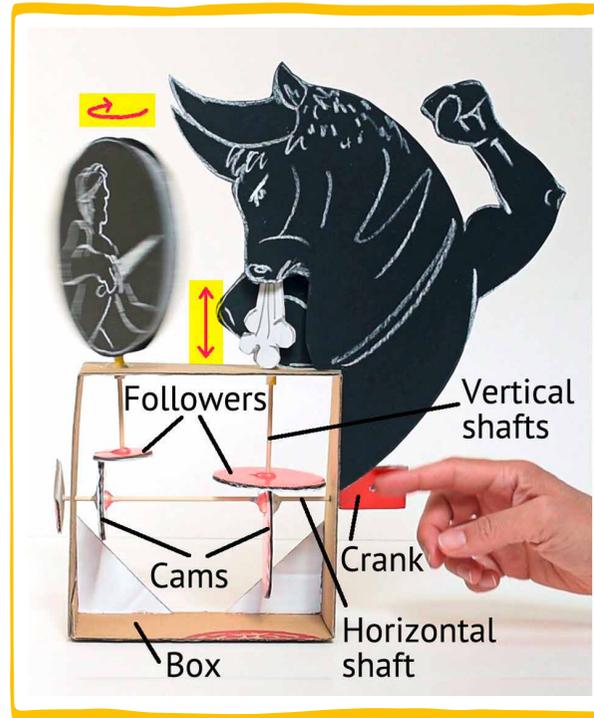
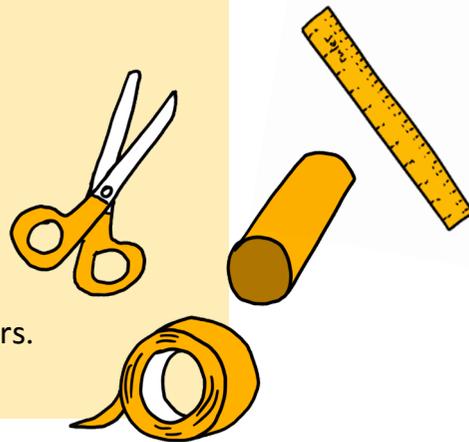
# Let's build an automata!

Time to crank it up and get making! Build your automata - that's a mechanism with moving parts which can operate rotation and up and down movement. You can make use of one or both of these movements to explore ideas for your invention.

**To make your own automata follow the how to guide on the next page!**

## You will need:

- Cardboard
- Card
- 3 x bamboo skewers
- 1 x straw
- Blu-tack
- UHU glue (optional: hot glue & gun)
- Plus drawing / colouring materials, ruler, pencil and scissors.



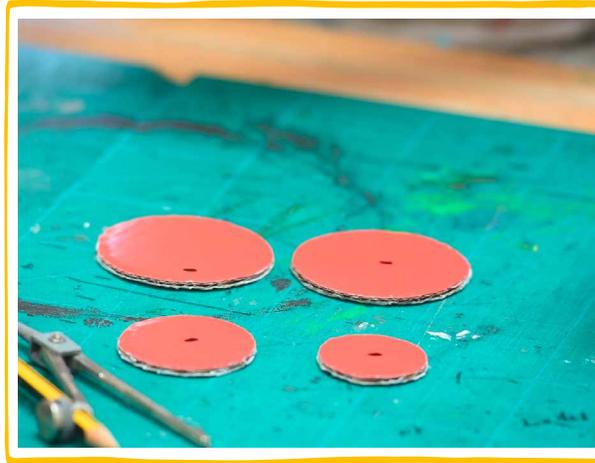
In this example, Theseus darts around the angry Minotaur whose blowing hot air down from his nostrils

You can watch this example being made at [arthoppers.co.uk/mmm](http://arthoppers.co.uk/mmm)





**1.** Cut a piece of cardboard measuring 64cm x 8cm. Mark 4 x 15cm sections down the length. Fold and tape in place. Position overlap at the bottom.



**2.** Cut out 4 circles of cardboard measuring approx 5cm in diameter. These will be the cams (on the horizontal shaft) and followers (vertical shaft).



**3.** Push the point of a skewer through the top of your box to create the holes for your vertical shafts. Make large enough for the width of a straw.



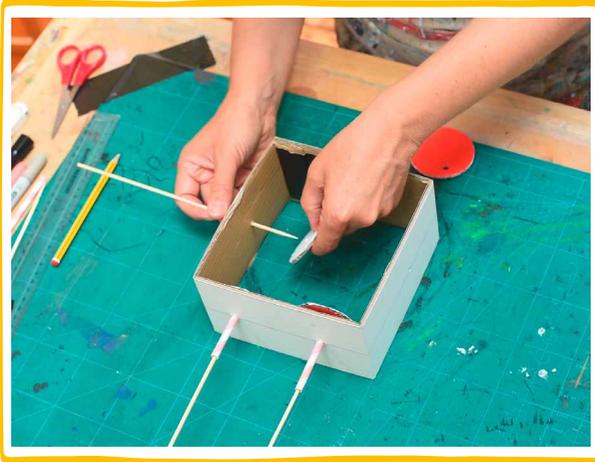
**4.** Cut 2 x 5cm lengths of a straw. Carefully push down through the holes until it just emerges below. Glue or Blu-tack around the top to hold firmly in place.



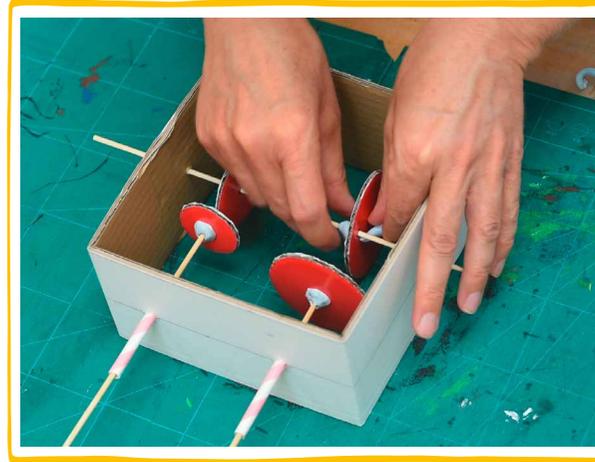
**5.** Press the flat end of a skewer into the middle of a follower. (don't puncture through). Put a ball of Blu-tack on the mark and firmly press the skewer down.



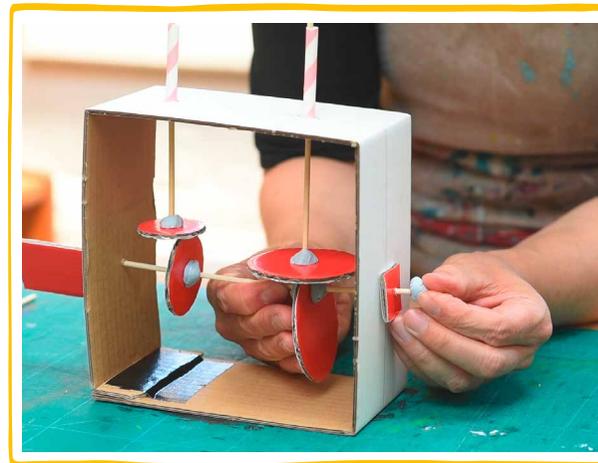
**6.** Slide the followers on their vertical shafts up through the bottom of each straw. Place the box down on it's face. Gently push the followers to the top.



**7.** Push a third skewer through the middle of one side of the box. Pierce one cam in the middle, the other off centre, then push out through the side of the box.



**8.** Line up the cams below the followers. Firmly wrap blu-tack around both sides of each cam against the shaft to fix them in place. Test / adjust as needed.



**9.** Glue a rectangle of cardboard to one end of the horizontal shaft to make a crank or handle. Add a stopper to the other end to prevent the shaft sliding out.



**10.** You're now ready to add your invention idea to the top of the automata. Get creative, have fun and enjoy experimenting with your moving machine!