

How to make your own muscle machine

Materials required:

- Cardboard
- Scissors
- String
- Pins
- Straws
- Tape
- Glue
- Toilet paper or kitchen roll tube
- Paper
- Pencils or markers

Step by step instructions:

1. Draw out the 3 parts of the arm or download and print out the template
2. Cut out the 3 sections and trace them out on cardboard then cut them out again.
3. Mark the locations of the holes on the cardboard using a marker



4. From the template cut out the circle which has a diameter of 2 cm. Trace and cut out 8 circles from the cardboard. Cut four pieces of straw of length 1 cm. We'll call these cardboard bobbins.



5. Use glue to attach each end of the straw to a circle of cardboard. You should have 4 pieces in the end.



6. From the template, cut out the biceps and the triceps. You can colour this in or use coloured paper.

7. Stick the 4 cardboard bobbins made in step 4 onto the dots as shown in the picture.



8. Use two split pins to attach the sections together.



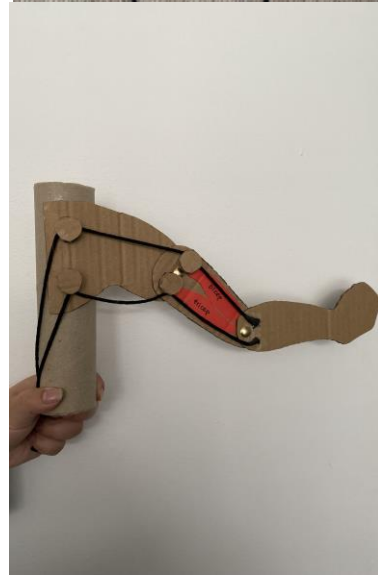
9. Cut two pieces of string of length 45cm. Attach one end of the strings using tape.



10. Thread the string around the cardboard bobbins. The bottom string clockwise and the top string anticlockwise.



11. Use toilet paper or kitchen roll tube as the base and attach your arm to it using glue. Test out how your arm moves!



To explore this concept further:

- How is the muscle machine different from the actual arm? What can you notice about it?
- Could you design a similar machine for a leg?
- What happens when you pull both strings at the same time? What does this represent?