

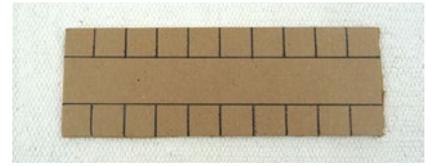
PINBALL PINGER

YOU WILL NEED

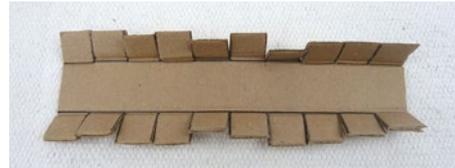
- Long cardboard tube
- Scissors
- Thin cardboard
- Thick cardboard
- Paper clips
- Hairgrip or bodkin
- Modelling clay
- Empty pen tube
- Elastic bands
- Strong tape
- Crochet hook and glue gun (*not essential but very useful if you happen to have one*)



5. Cut a strip of thin card, roughly 10cm wide and 20cm long.



6. Along both the longest edges, snip at 1cm intervals to make tabs. This is going to connect the tube to the pinball board, eventually!



PREPARING THE TUBE

1. Take the long cardboard tube and cut one end on the diagonal, like this:



2. Cut a rectangular shape out of the end you've just created. We'll call it the top end.



3. Cut out a V-shaped bit of cardboard big enough to cover this top end of the tube. Snip the edges on two sides to create tabs.

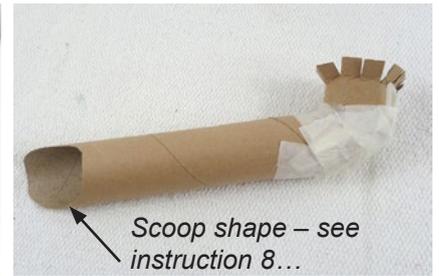


4. Fold the tabs down and, using strong tape, stick the V-shaped piece over the top end of the tube, like a hat.

Fold tabs down and stick to tube



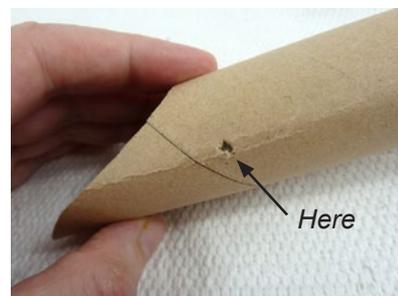
7. Using more strong tape, stick the tabs down around the top end of the tube.



8. At the other end of the tube, cut away a scoop shape.



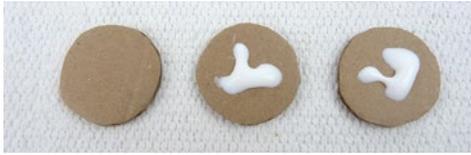
9. With a sharp point (the bodkin will work well) and using a lump of modelling clay to protect your fingers, make a small hole either side of the scoop. This is where your pinger is going to be connected.



MAKING THE PINGER

1. Cut three circles out of thick card. The diameter of these circles should be about 2mm less than the diameter of your cardboard tube.

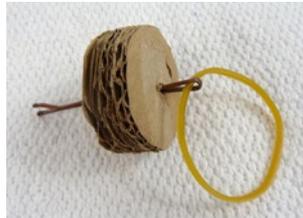
2. With PVA glue stick them together one on top of the other, and leave to dry.



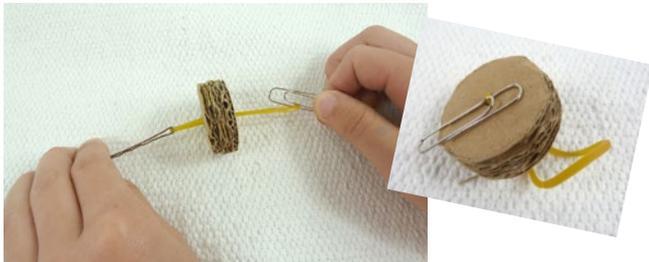
3. With your bodkin and some modelling clay make a hole through the centre of your cardboard disk.



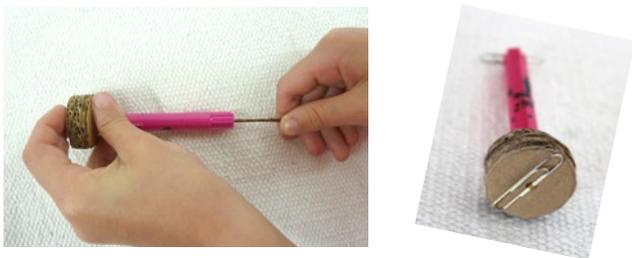
4. Thread an elastic band onto a hairgrip and bring it through the cardboard disk.



5. Attach a paper clip to the elastic band to act as a stopper.



6. Thread the free end of the elastic band back onto the hairgrip, and thread the hairgrip down the length of the empty pen tube. Thread another paper clip onto the end to hold it there.



7. If you happen to have a glue gun, add some hot glue where the cardboard disk meets the empty pen tube, to hold it all in place.



8. Thread a second elastic band through the end of the first. **Don't remove the paper clip just yet though.**

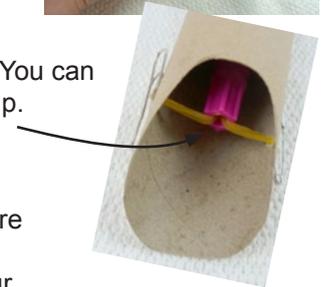


Thread 2nd elastic band through here.

9. Slide the pinger into the cardboard tube so just the end is visible. Then, using the crochet hook, bring the second elastic band through one of the holes in the cardboard tube, and fasten off with another paper clip. Then repeat on the other side.



Your pinger is now in place. You can remove the holding paper clip.



10. With a pen, draw a square somewhere between $\frac{1}{3}$ and $\frac{1}{2}$ way down the neck of your cardboard tube.



11. Carefully, with a sharp pair of scissors, cut it out. This will be the hole where you drop your marble.



12. Using plenty of strong tape, stick your pinger arm to your existing pinball board, taking care to line up the holes.



Now, pull back your pinger, drop the marble into the hole in the top of the tube and let go. Your marble should be launched onto the pinball board.