

## Catapult in a Box

### Materials:

- 1 narrow shoebox (or a box of similar size), with one end cut out except for a 1" strip on the bottom
- Ruler
- Marker
- One-hole puncher
- 1 push pin
- 2-3 pieces of duct tape
- 3 full, smooth unsharpened pencils, and 1 sharpened pencil
- 1 plastic spoon
- 1 rubberband
- 1 big pompom or marshmallow

1. On the cut-out end of the box, measure 2.5" inches in from the end on the side of the box, and mark the spot with a marker. Repeat on the other side, across from the mark. Put the hole puncher over the 2.5" mark and push it as far down as you can. The hole puncher should go down about  $\frac{3}{4}$ " on the box. Punch the hole in that spot (about 3/4" down and 2.5" back). Repeat this step where you marked the box on the other side.
2. Push a sharpened pencil through the hole, one side at a time. Twist the pencil around a little bit to widen the hole. Repeat on the hole on the other side. Then, insert a full, smooth pencil through both holes so that you have a cross bar.
3. Attach the bottom half of your plastic spoon handle to the top of a second unsharpened, smooth pencil with a piece of duct tape.
4. Using 1-2 pieces of duct tape, attach the spoon-pencil vertically to the crossbar, so it creates a cross—the pencil should sit on the side of the pencil closest to the closed end of the box. The spoon should be on top, facing the closed end of the box. The bottom of the vertical pencil should sit evenly on the bottom of the box.
5. Tilt the vertical pencil up a bit and mark the spot where the bottom of the pencil was resting on the box. Remove the pencil-cross from the box temporarily.
6. Using the 1" strip on the cut-out end as a handle, lift the box up a bit. Use a pushpin to make a couple small holes on the spot you marked on the bottom of the box. Be careful not to poke your fingers! Once you have a hole small enough for the tip of a sharpened pencil, start twisting and pushing a sharpened pencil through the hole until it widens and fits through completely.
7. Put the pencil-cross back in through the side holes in the box.
8. Take your third smooth, unsharpened pencil and twist a rubberband 1-2 times around its middle. Take the end of the rubberband and push it up through the hole at the bottom of the box, keeping the third pencil on the underside of the box. Attach the loose end of the rubberband around the bottom of the vertical pencil-cross several times, so it's nice and tight, with not much slack in the rubberband.
9. Get a pompom and test out your catapult!

**DO NOT use your catapult to toss anything harder than a marshmallow!**

**DO NOT aim your catapult toward anyone's face or body!**

Instructions and materials modified from:

<http://www.education.com/activity/article/ready-aim-marshmallows/>