Projectile Popper

In this hack sheet, we will show you how to convert an empty Gatorade bottle into a ping pong ball launcher!

Materials: empty 32 oz Gatorade bottle, string, rubber bands (#32), drill (or hammer and nail) – optional, scissors, goggles, bead, ping pong balls, box cutter (or a knife)
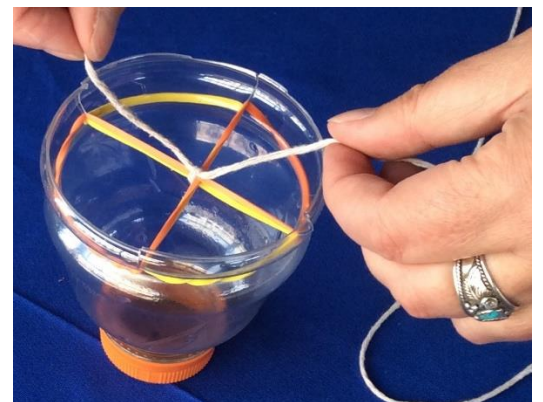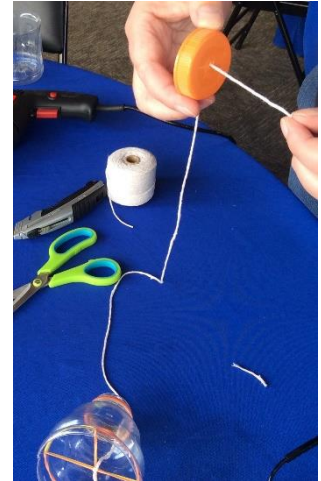

Directions

1. After washing the Gatorade bottle, drill a hole in the center of the cap. You can also use a nail and hammer it through the cap to make a hole or just leave the cap off altogether if don't have either. Use the box cutter to cut along the rib just above the body of the bottle, as shown below. Then, using scissors cut four slits from the edge of the bottle top to the next concave ring every 90 degrees.

2. Next, put a rubber band through two of the slits, flip it to cross in the middle, and slide it through the opposite two slits, as shown on left. A second rubber band can be added, as shown, but it also works with just one. Tie a length of string, needs to be fairly strong (yarn and cotton string not recommended), to the middle of the rubber band, as shown.

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3. Take the cap off the bottle, feed the string through the opening, and also through the cap, as shown to the right. Then, put the cap back on the bottle and tie a bead a few inches from the lid with a double knot as shown below.

4. To launch, put a ping pong ball on top of the rubber bands, pull back on the bead to stretch the rubber bands into the cavity of the bottle, aim, release the bead, and LAUNCH!

Challenges
*   ❖ Can you improve this design using the engineering design process?
*   ❖ How accurate can you get?
*   ❖ Is one rubber band better than using two rubber bands? How do you know?
*   ❖ How can you turn this into a game?
*   ❖ What other bottles can you upcycle into toys?

This hack is based on Toys from Trash Ball Bounce adapted with optimal materials:
http://www.arvindguptatoys.com/toys/Ballbounce.html