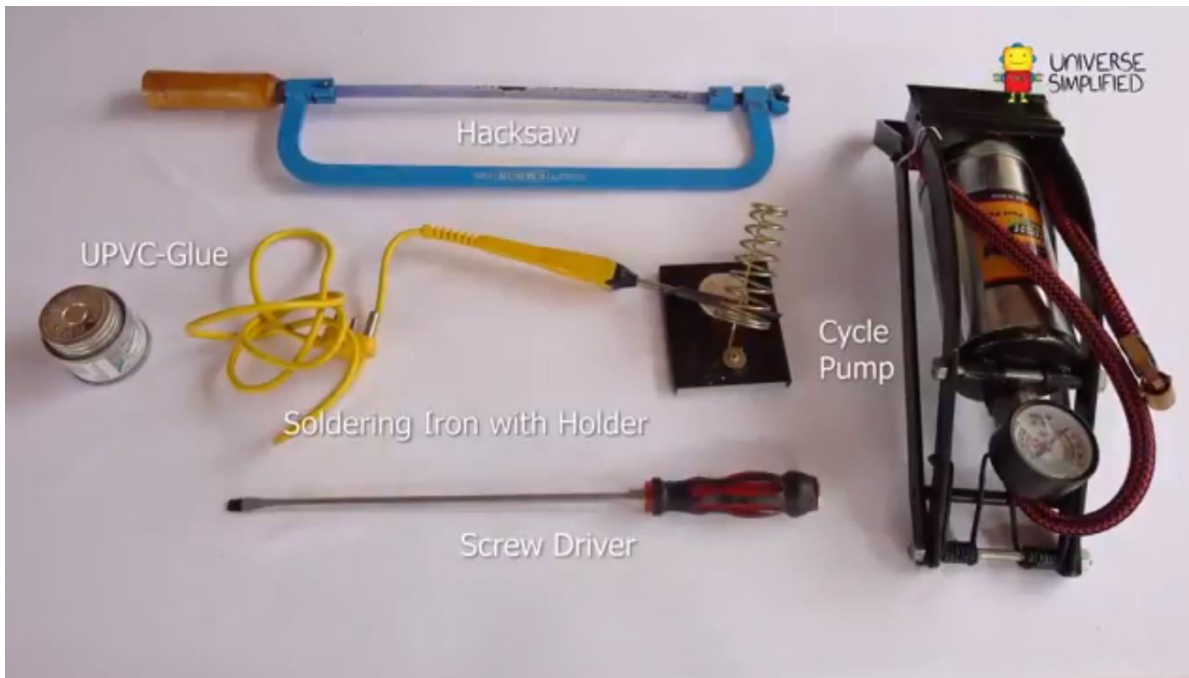
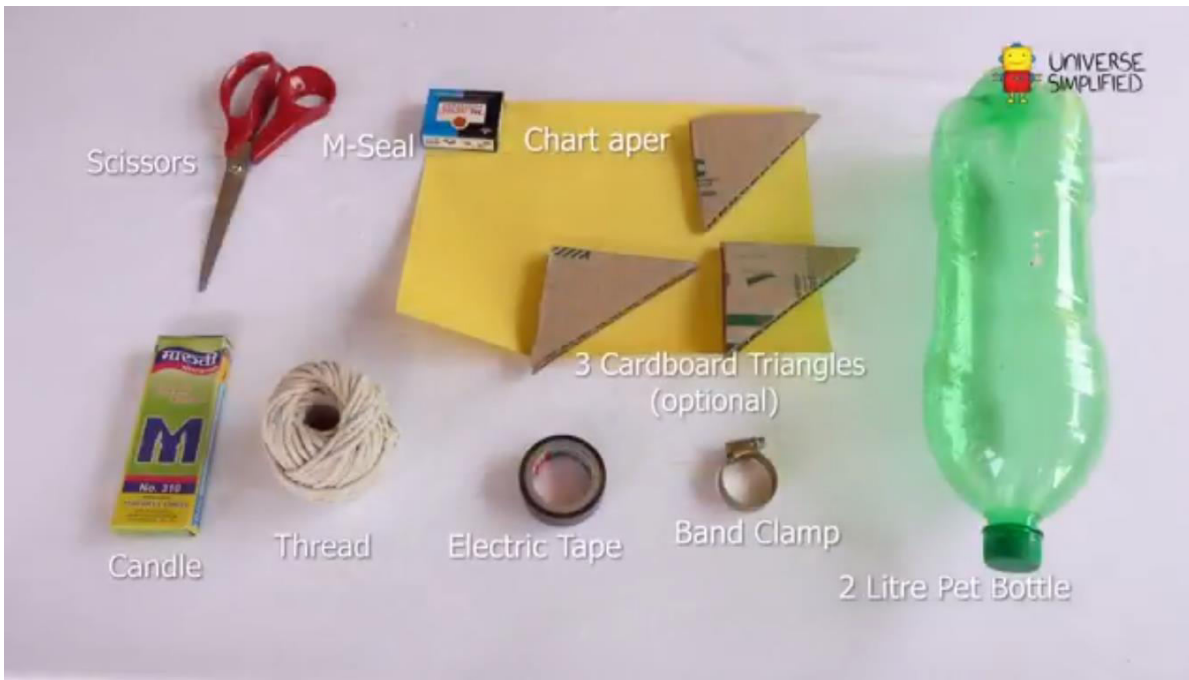


### Water Rocket

#### Material





### Preparing a launcher

You can design the launcher however you want. You must make sure that you need a base to support your rocket.

We are going to use a 'H' like design for creating a launcher. For doing this you have to assemble the pvc pipes and connector in a 'H' like pattern.

#### Step 1

Take two pipes and a tee connector. Connect both the pipes to the opposite side of the connector leaving the centre hole empty.



**Step 2**

Repeat the above step for two more sets.

**Step 3**

Connect all three sets to form 'H'. Leaving only a single hole of a tee empty facing upward.



**Step 4**

Connect end caps on three pipes leaving one open.



**Step 5**

Add elbow pvc (L) joint to the remaining pipe.



**Step 6**

Add pipe to the elbow joint.



You will finally have an assembly that looks like the follow



### Preparing a launching mechanism

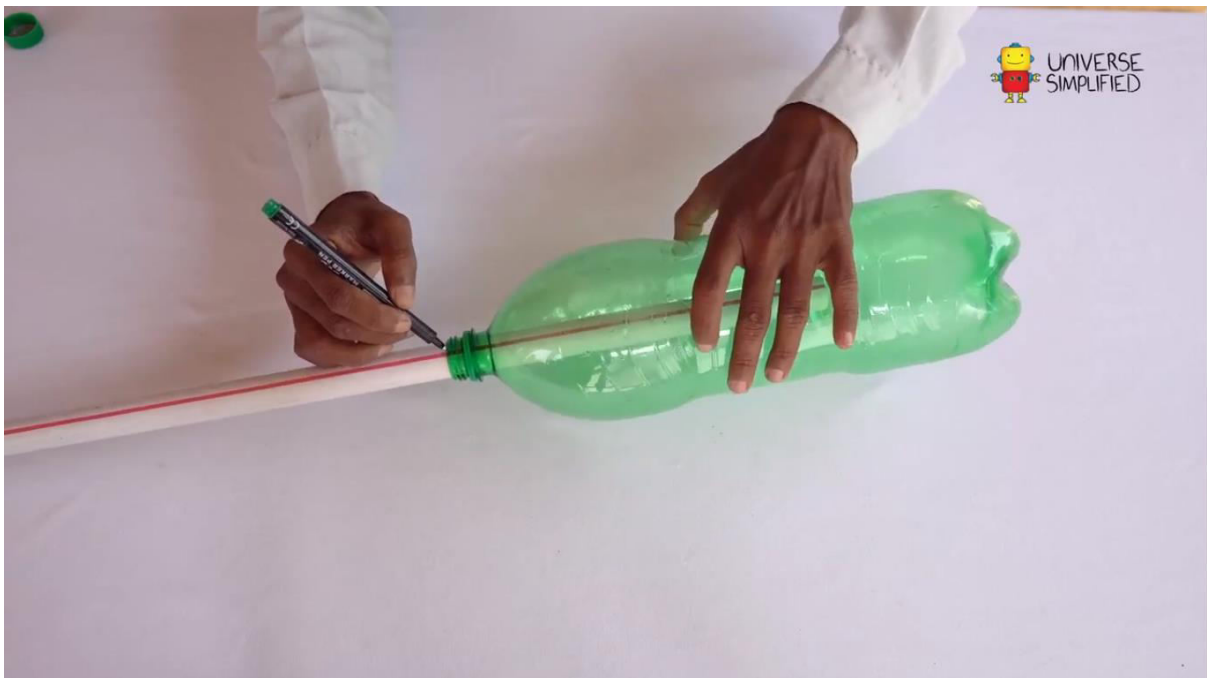
#### Step 7

Take a PVC pipe and a PET bottle. Insert the pipe in the bottle upto  $\frac{3}{4}$  of the bottle.



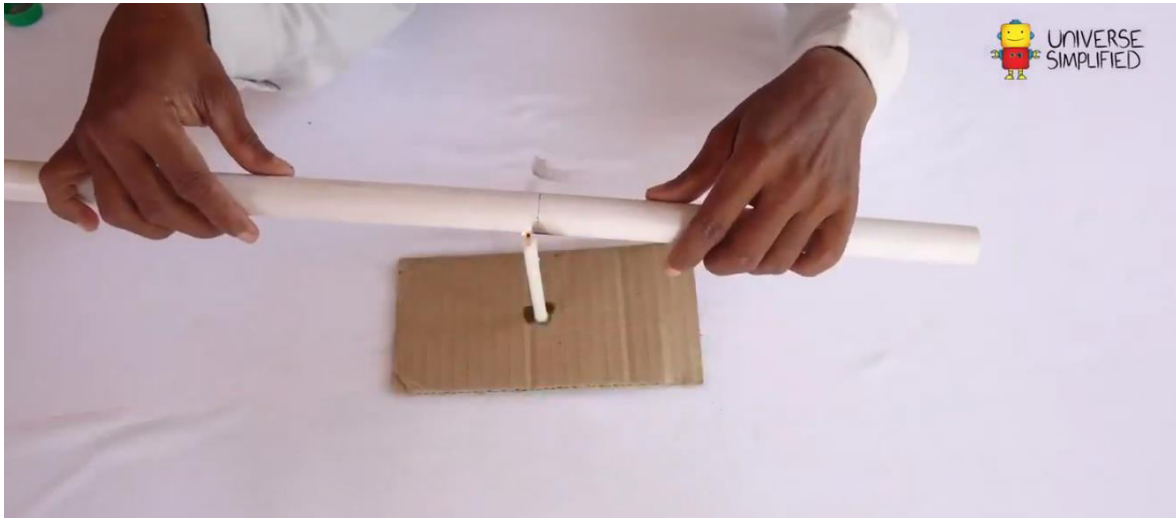
### Step 8

Make a marking on the pipe where the sealing surface of the bottle is touching.



### Step 9

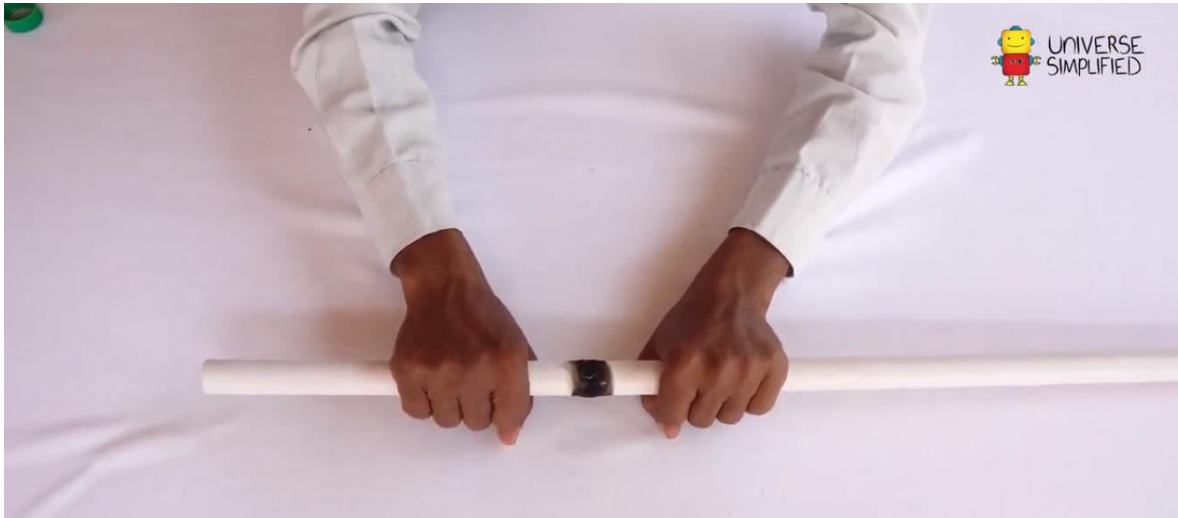
Create a bulge on the pipe around the marking. You can do this by heating the pipe. You must follow the method of continuously rotating the pipe. Excess exposure to heat may break your pipe.



### Step 10

Once you feel the pipe is compressed enough, you can apply pressure from both sides towards the part where you have heated the pipe. This will create a small bulge. Make sure that your pipe does not bend.





**Step 11**

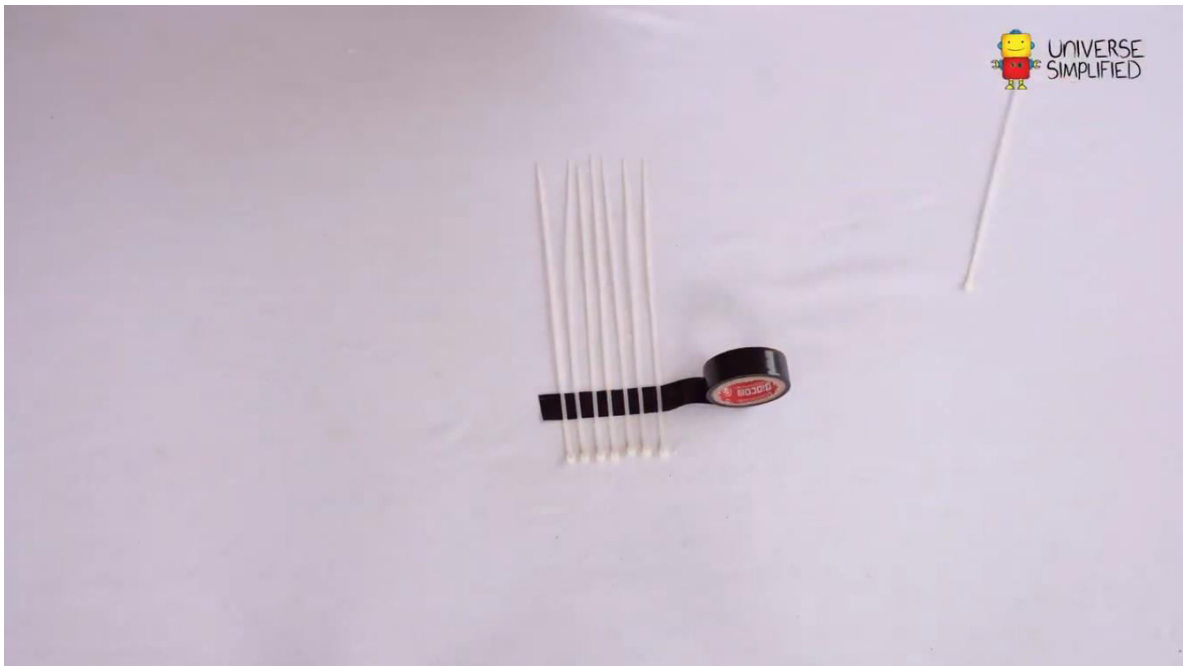
Insert the pipe in the bottle to check that the bottle cannot move beyond the bulge.



### Step 12

Take 6 to 8 zip ties depending on the size of the zip ties. Attach zip ties to the neck of the bottle in a way that it looks the bottle in place.

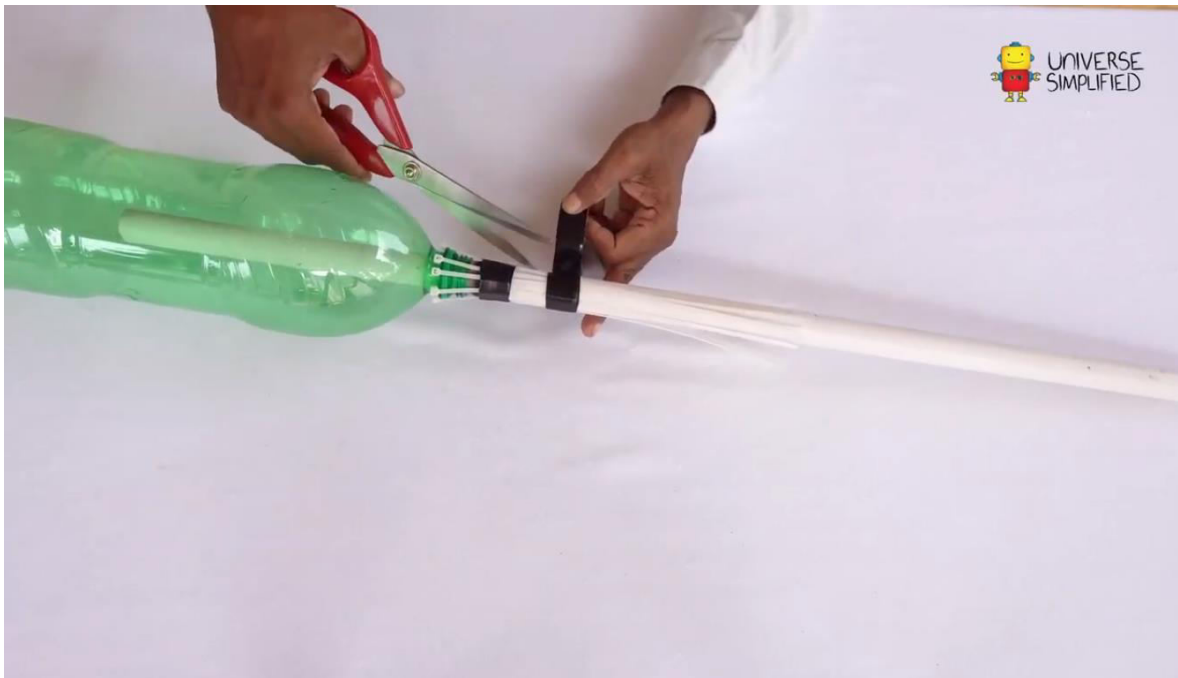








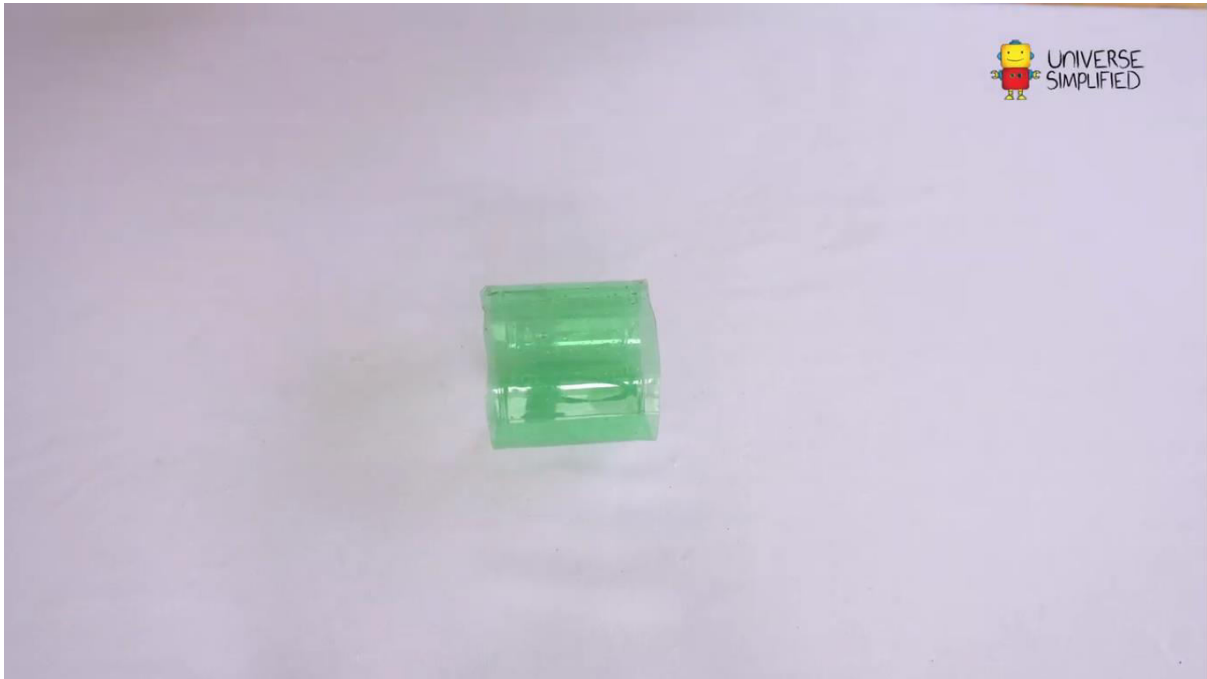
Secure the zip ties in place with another layer of tape.



Cut off the extra end of the zip ties.

**Step 13**

Make a spring using a plastic bottle.



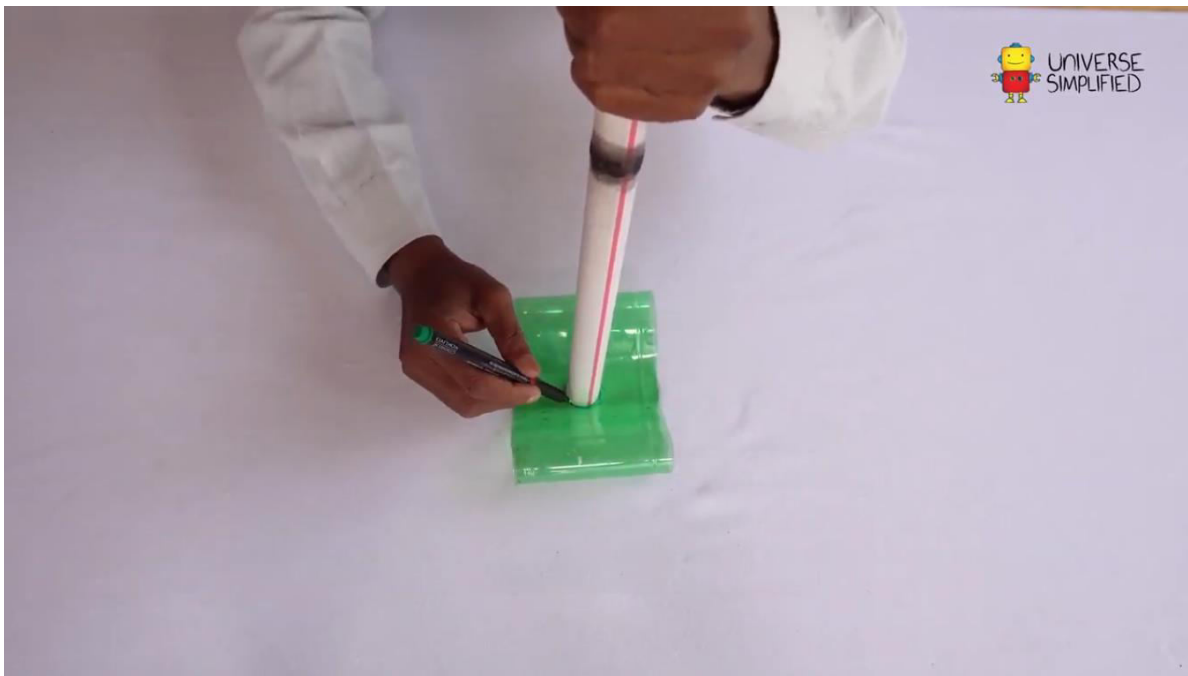
This can be done by cutting the bottle  $\frac{1}{4}$  from the top and  $\frac{1}{4}$  from the bottom, so you get the central part of the bottle.





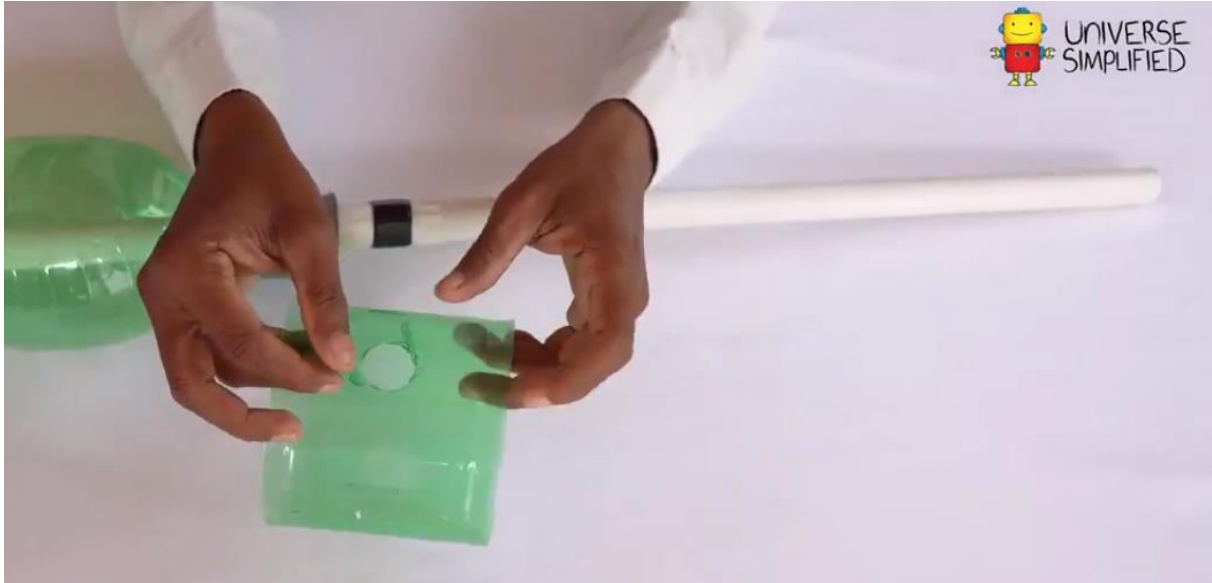
**Step 14**

Press the bottle piece down to and with the help of PVC pipe, draw a circle on the front and back of the bottle piece.



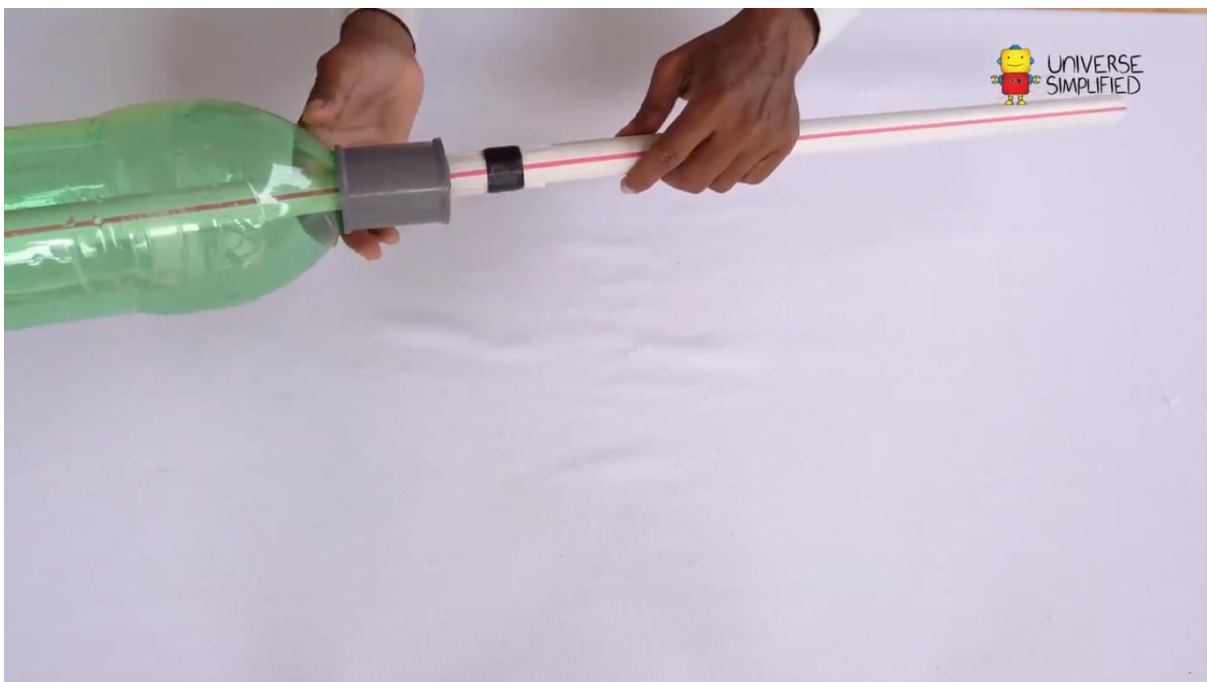
**Step 15**

Cut one circle completely. On the opposite end, cut it in a way that you get two semicircles, still attached to the piece of bottle.



**Step 16**

Pull the coupler up the pipe towards the bottle and on the zip ties.



**Step 17**

Pull this piece of the bottle up the pvc pipe in a way that the complete hole is towards the coupler.



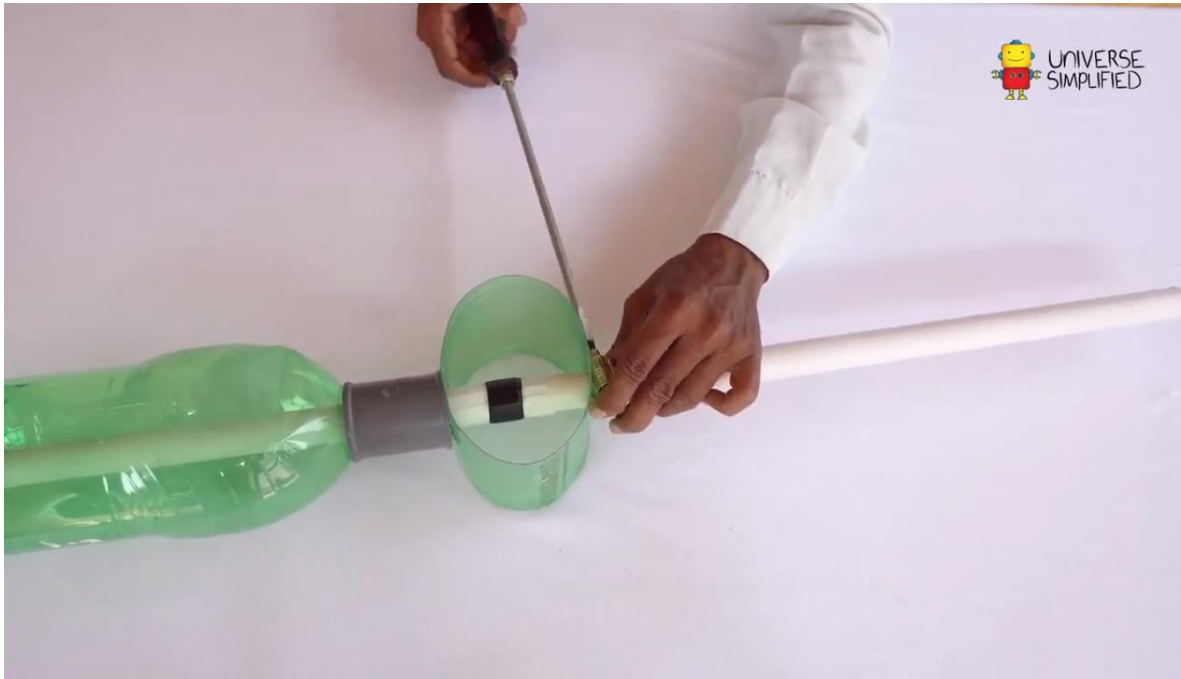


Check to see if this works like a spring.



### Step 18

Attach a band clamp to the base of the spring. Insert the semicircles within the band clamp and tighten it.



Glueing the launcher

Step 19

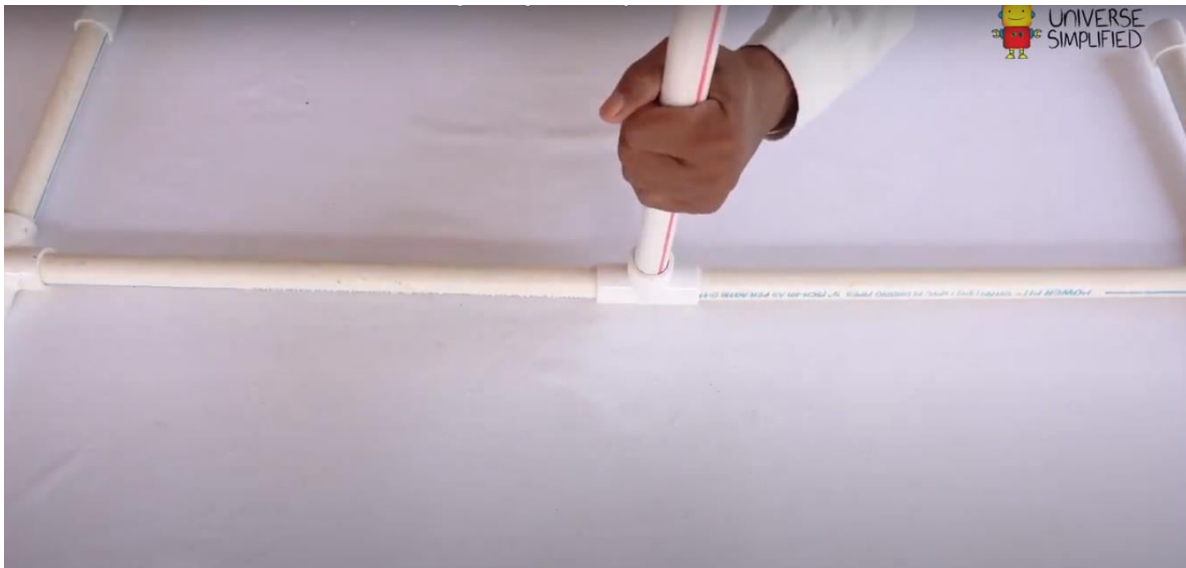
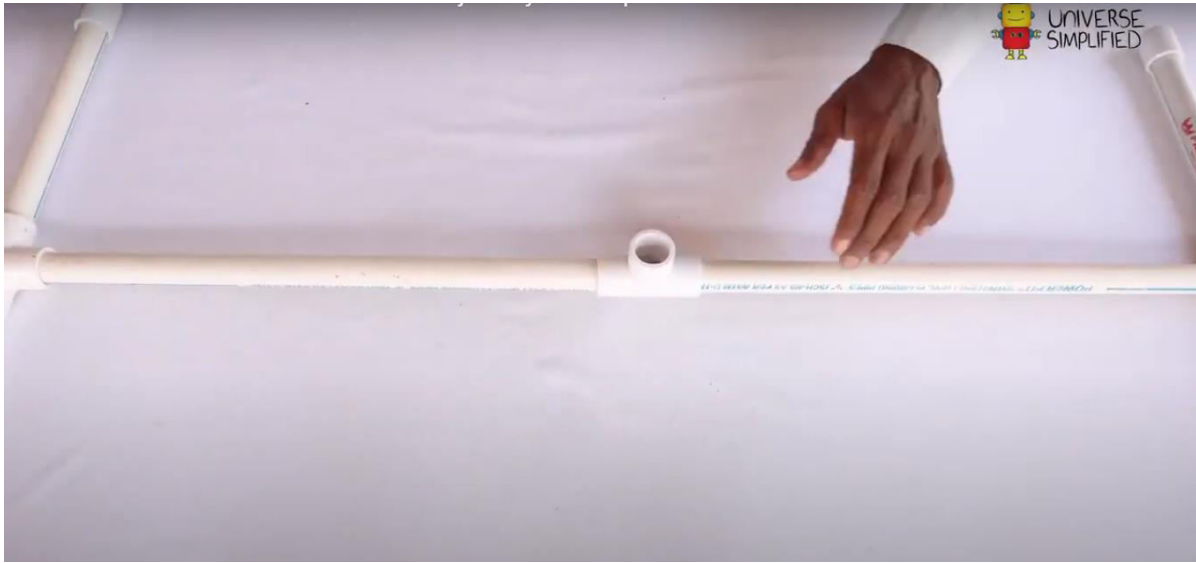
Glue all the joints on the launcher. Make sure that there is no place for air to escape near the joint. Glue the joints generously.





Step 20

Glue the pipe with the launching mechanism on the launcher as well.

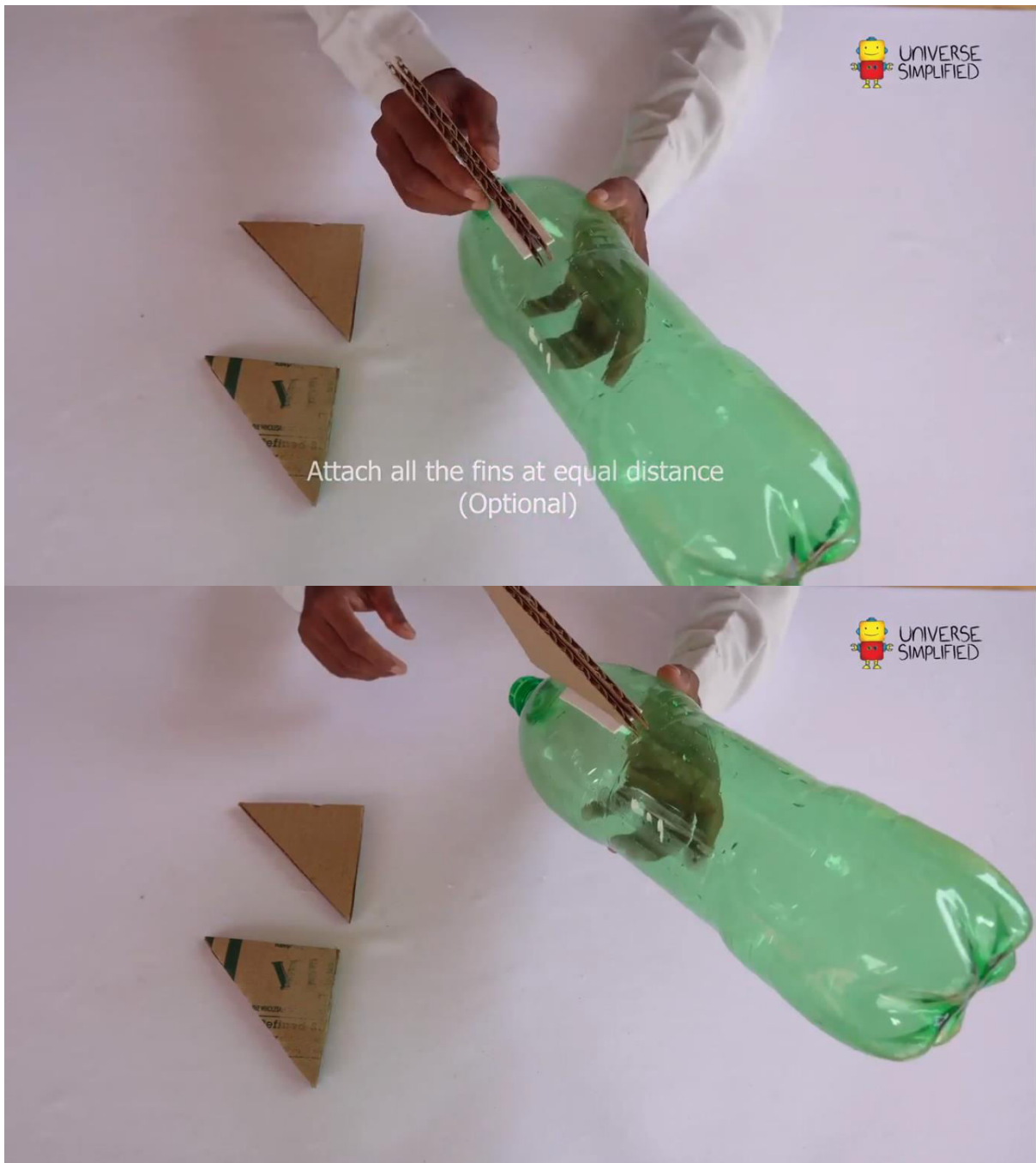


## Making a rocket

### Step 21

Take a PET bottle. Attach a cone made of paper on the bottom of the bottle. Since we will be using a bottle upside down as a rocket, this cone becomes the nose cone of the rocket. You can also make fins out of the cardboard. This is optional.





Your Rocket and Launcher is ready

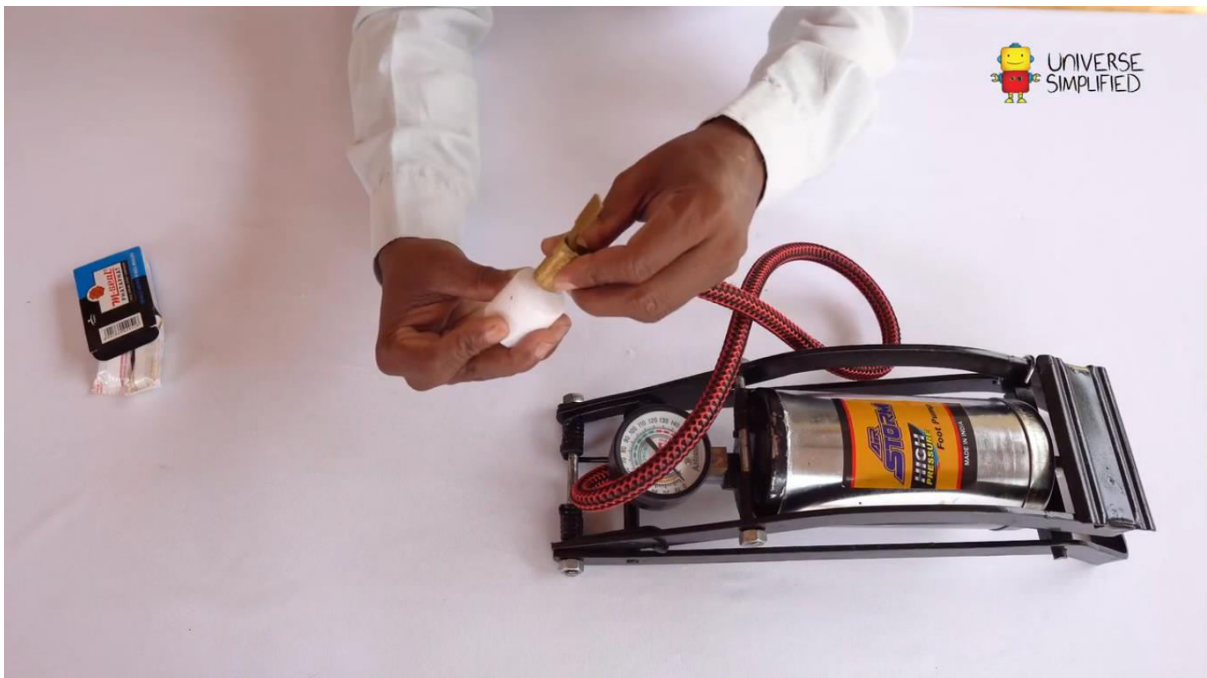


You will need a cycle pump to launch the rocket.

### Readying the cycle pump

#### Step 1

Make a hole in one of the PVC end caps to fit the cycle nozzle through it.

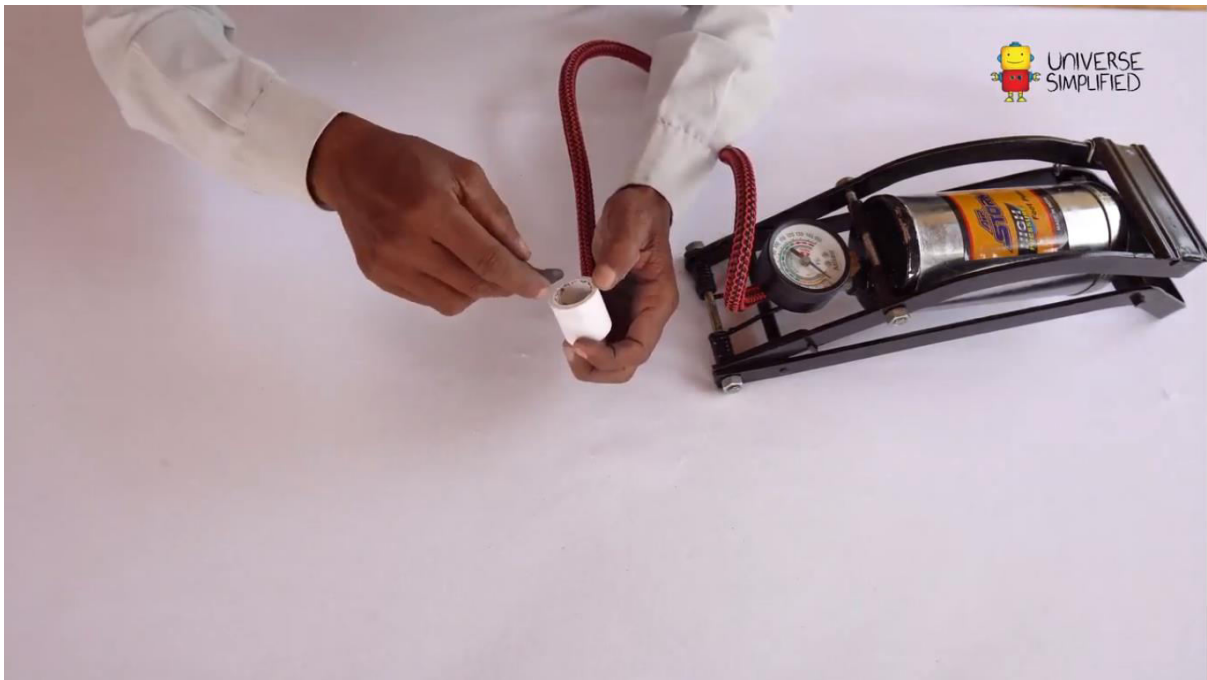




## Step 2

Fit the nozzle inside the endcap. Apply m-seal within and around the endcap.

Make sure you do not cover the hole of the nozzle with the m-seal. Cover only half the cap with m-seal so you can insert the PVC in the end cap.







You can leave everything to dry for 2 to 4 hours before testing it.

