



**Bottle Rocket Launcher
2018-2019
Construction Instructions**

Materials Needed:

- 5 feet - 3/4" schedule 40 PVC
- 4 - 90° 3/4" PVC elbows
- 4 - 3/4" PVC Tees
- 1 - 2-3 inch piece 1.5" PVC (Collar)
- 1 - 1/2" to 1" Hose Clamp
- 1 - 1/4" Air Valve
- 1 - 1/8" hose barb x 1/4" female valve adapter brass fitting
- 3 feet - 1/4" irrigation tubing
- 1 - #4 Rubber Stopper with 1-hole
- 10-15 - Cable Ties
- 6 feet - twine
- 1 - 3-4 inch nail
- Duct Tape
- PVC Cement

Tools Needed:

- PVC Cutter
- Flathead Screwdriver
- Needle Nose Pliers
- Tape Measure
- 1/4" Wood Screw
- Marker
- Ruler
- Phillips Head Screwdriver

Instructions:

1. Cut PVC into the following pieces
 - a. 2 - 9 inch pieces
 - b. 4 - 4 inch pieces
 - c. 2 - 3.5 inch pieces
 - d. 1 - 5 inch piece
 - e. 1 - 2 inch piece
 - f. 1 - 12 inch piece
2. Layout pieces as in figure 1
3. Take the 5 inch and 2 inch piece and glue them on either side of a PVC Tee
4. Connect all frame pieces loosely. No glue needed at this time.
 - a. Connect the support tube to the off-center tee and the launch tube to the centered tee.
 - b. Make sure that the launch tube is pointed up at 90 degrees.
 - c. Turn the support tube so that it crosses the launch tube about mid-way up (see figure 2). A clamp can be used to secure the launch tube to the support tube for extra stability during launches

5. Without moving the support tube, use a sharpie to mark a line between the elbow and 5 inch piece and between the elbow and 2 inch piece. These marks are meant to align the pieces during the glue process to ensure you permanently secure the support tube at this angle.
6. Glue the 5 inch plus 2 inch tube to their respective elbows.
7. Set aside the PVC and grab the irrigation tubing, the rubber stopper, and a wood screw.
8. Push the tubing into the rubber stopper as far as you can. When it stops take the wood screw and screw it into the opposite end of the rubber stopper until the screw is into the tubing. Then take some pliers and pull the tubing through until it is flush with the top of the stopper or just past. Vaseline may help.
9. Take the 12-inch launch tube and drill a hole about three inches from one end. This is where your irrigation tube will exit.
10. Take 10 cable ties and lay them out side by side. Place a ruler just under the heads of the cable ties. Tape the ruler to the table and then push the cable ties down so they are all parallel. Next use a strip of duct tape to tape all of the cable ties together. Remove the ruler and then flip the ties over and tape the other side.
11. Wrap the cable ties around the end of the launch tube opposite the hole. Make sure the cable ties are about 1.5" from the end of the tube and that the heads are facing inward, then use a hose clamp to secure the ties to the tube.
12. Slide the irrigation tubing into launch tube so that the end comes out of the hole you drilled. Make sure the tubing can slide easily in and out of the tube. If it does not you may need to enlarge the hole.
13. Take the 1.5" PVC collar and place it over the tube over the cable ties. Take a 2-liter bottle and insert the stopper and place it on top of the launch tube. Slip the collar over the heads of the cable ties and make sure the bottle is secure. If not adjust the cable ties until the bottle is secure. If it is secure then mark the launch tube just below the collar. Remove the tubing and drill a hole through the launch tube on the mark. Be careful not to drill your cable ties. This will be where the nail secures the collar to prevent a premature launch.
14. Drill a small hole on the bottom of the collar. This is where the trigger pull cord will be attached.
15. Slide the tubing back into the launch tube and out the hole you drilled previously. Attach the hose barb to open end of the tubing and then screw the air valve on.
16. Push your PVC pieces together. Replace the support tube and launch tube. Your launcher is done.
17. Have fun launching rockets!

Figure 1

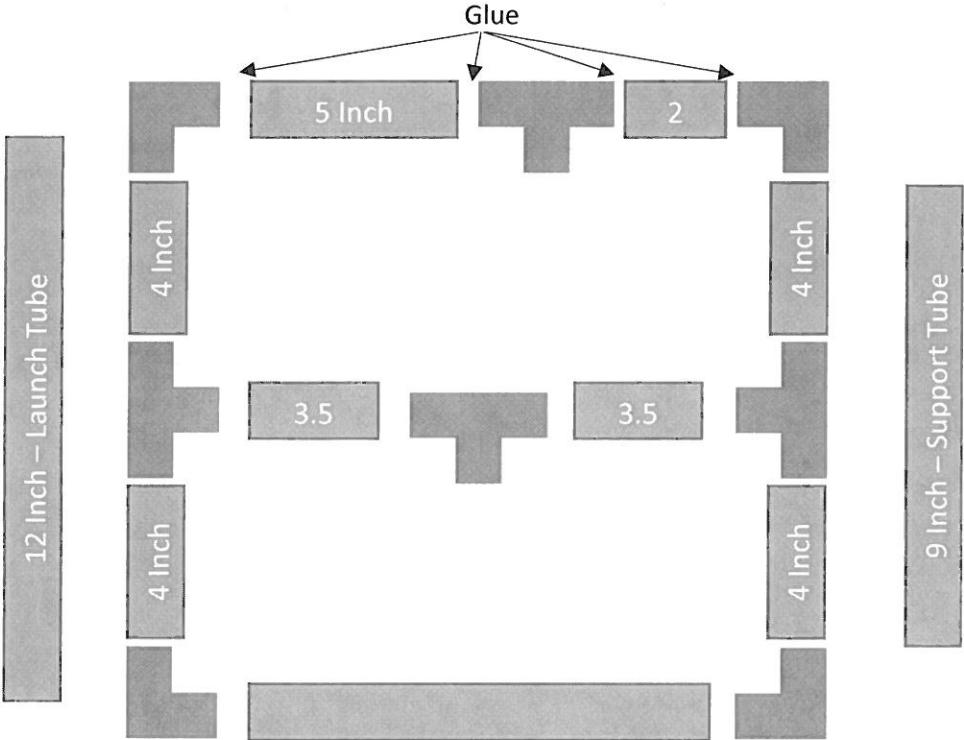


Figure 2

