

# How to Build a Home Made Water Rocket

You can make a home made rocket out of some used plastic pop bottles. You can use 2 liter bottles as described below, or you can experiment with bigger or smaller ones. The “fuel” for your rocket is something that costs next to nothing – water.

## Materials

- Two, 2-liter empty pop bottles
- Some stiff plastic or cardboard
- A kitchen garbage bag
- Several feet of string
- Duct tape or glue
- A straw
- A cork or rubber stopper
- Some scrap wood and drywall screws
- A stiff coat hanger
- Two metal rods to hold rocket down

## Tools

- A pump and needle valve
- A saw
- A screw driver

To make the rocket, cut out three or four fins from some stiff plastic or cardboard. Turn one of the 2-liter bottles upside down and attach the fins to the bottom of the rocket body, equally spaced. Discard the cap from this bottle as the opening here will act as the rocket nozzle. The fins can be attached with either glue or duct tape. Cut a section of straw and attach to the joint between one of the fins and the body of the rocket.

Next, cut the bottom off of the other 2-liter bottle and discard. Lay the kitchen garbage bag out flat and cut a 2 foot square out of the plastic to use as a parachute. You can make an octagon parachute out of the square piece of plastic. To do so, take the upper right corner and fold it over to the bottom left corner to form a triangle. Then take the top corner of the triangle and fold it over to the bottom right corner of the triangle. Take the left corner of this triangle and fold it over to the right corner. You should now have a the folded plastic in the form of a right triangle with the right angle on the lower left. Using a ruler, measure the height of the triangle, which should be about one foot. Measure down this distance from the top of the triangle along the hypotenuse or long side of the triangle and make a mark. Carefully cut from the lower left corner of the triangle through all the layers of plastic to the point you marked on the long side. Discard the smaller cut piece. Unfold the big piece and you should have an octagon.

Cut a small piece of duct tape and place it on each corner. Cut eight pieces of string, 2 feet long each. Punch a hole through the duct tape at each corner and attach one end of each string to each corner. Gather the loose ends of each string together and tie into a knot to form your parachute. Cut another piece of string about 2 feet long. Unscrew the

cap of the 2-liter bottle whose bottom has been removed. Fish the string up through the opening and over the lid and tighten the cap back on so the greater length of string is inside the cut bottle. Using tape or glue, attach the other end of the string to the bottom of the 2-liter bottle with the fins. Take the end of the parachute strings with the knot and tie it to the string connecting the two bottles a couple of inches away from the bottom of the bottle with the fins. You can fold the parachute up and put it and the excess string inside the cut bottle and set this gently on top of the other bottle to form your rocket. Do not put it on too tight or the bottles will not fall apart as it falls back down when you launch it. Alternatively, you could glue other sections of straw between the two sections of the rocket to hold them slightly separated from one another.

To make the launch platform, build a flat base out of some scrap plywood with a raised section in the middle to hold another piece of plywood. Find a piece of cork or a rubber stopper that will just fit into the end of the 2-liter bottle and cut a hole in the piece of plywood on the raised section of your launch pad that is wider than the opening in the 2-liter bottle, but small enough that the cork will not fit through it. Drill a small hole through the cork or rubber stopper that allows you to pass the needle valve from a pump through it, but is snug enough that air will not leak around the valve. Stick this up through the hole in the plywood. The rocket will fit down over the exposed end of the cork.

Place the rocket on the base and make a mark on the base directly below the straw attached to the fin of the rocket. Straighten out a coat hanger and drill a hole in the base where you marked it to insert the coat hanger. The coat hanger will act as a guide rod when launching your rocket. Using a scrap 2x4 block of wood, attach it to the base as a launch tower behind your rocket. Drill two holes through the tower so that two metal rods can be inserted through them at the same height as the lip on the nozzle of your rocket. These will be used to hold the rocket down. These can be made either to be withdrawn to launch the rocket or pulled apart to launch it.

To launch your rocket, fill the bottom half of the rocket about  $\frac{1}{4}$  full of water and quickly press it down on your cork. Using a bicycle pump or air compressor, pump air through the needle valve and into the bottom bottle through the water. You will have to experiment with the how much water to put into the rocket and how much air to put in it to get a good launch, but not have it explode! Pull the launch pins or separate them to watch your rocket blast off. When it reaches its height and starts to fall back down, the two bottles should separate, deploying your parachute.

Good luck!



