

BUILDING A WATER ROCKET LAUNCHER

LAUNCHER:

Revised 7/7/06

MATERIALS NEEDED:

1 – 10 FOOT LENGTH OF ½ INCH PVC SCH40-600 PSI WATER PIPE
1 – ½ INCH PVC T FITTING
1 – ½ INCH PVC QUAD FITTING
3 – ½ INCH PVC END CAPS
1 – ½ INCH PVC THREADED FEMALE FITTING
1 – ½ INCH PVC THREADED MALE FITTING
1 – GALVANIZED ¼ INCH X 6 INCH TO 8 INCH THREADED PIPE
1 – GALVANIZED ½ INCH TO ¼ INCH REDUCER
1 – ¼ INCH THREADED PRESSURE AIR VALVE
SMALL CAN OF PVC PIPE GLUE AND CLEANER
ELECTRIAN TAPE
TEFLON PIPE THREAD TAPE

STEP ONE: CUT THE FOLLOWING FROM THE 10 FOOT LENGTH OF PVC PIPE.
CUT 3 – 14 INCH PIECES FROM THE LENGTH OF PVC PIPE.
CUT 1 – 3 INCH PIECE FROM REMAINDER OF THE PVC PIPE.
CUT 1 – 6 INCH PIECE FROM THE REMAINDER OF THE PVC PIPE.

HINT: READ THE INSTRUCTIONS ON THE CLEANER AND GLUE. ALWAYS USE THE CLEANER BEFORE GLUING ANY OF THE JOINTS TOGETHER. THIS WILL HELP SEAL THE JOINT.

STEP TWO:

GLUE AN END CAP ON ONE END OF EACH OF THE THREE 14 INCH LENGTHS OF PVC PIPE.

STEP THREE;

GLUE ONE 14 INCH PVC PIPE WITH CAP INTO THE QUAD FITTING.
OPPOSITE THE FIRST FITTING YOU JUST GLUED, GLUE A SECOND 14 INCH PVC PIPE WITH END CAP.

STEP FOUR:

GLUE WHAT WAS LEFT OF THE ORIGINAL 10 FOOT PIECE OF THE PVC PIPE INTO THE QUAD FITTING.

STEP FIVE:

OPPOSITE THE LONG PVC PIPE GLUED IN STEP FOUR, GLUE THE 3 INCH PIECE OF PVC PIPE.

STEP SIX:

PLACE THE QUAD PIECE OF PVC PIPE ON A FLAT SURFACE, AND BEFORE GLUING, ASSEMBLE THE REMAINING FITTINGS AS FOLLOWS: PUT THE LONG SIDE OF THE T FITTING ON THE SHORT 3 INCH PVC PIPE, GLUED ON IN STEP 5. PLACE THE 14 INCH CAPPED PVC PIPE IN THE T FITTING OPPOSITE THE 3 INCH PICE. PLACE THE ½ INCH THREADED FITTING ON THE 6 INCH PVC PIPE AND PLACE IT IN THE T FITTING IN AN UPRIGHT POSITION. YOU CAN USE A SQUARE TO PLACE THE 5 INCH PVC PIPE. ONCE THE FITTINGS ARE ASSEMBLED WITHOUT GLUE, TAKE OFF ONE AT A TIME AND CLEAN AND GLUE THEM BACK TOGETHER.

STEP SEVEN:

TAKE THE ¼ INCH GALVANIZED PIPE AND HAND THREAD IT INTO THE ½ INCH THREADED FITTING GLUED ON THE 5 INCH PVC PIPE.

STEP EIGHT:

GLUE THE ½ INCH FEMALE PVC FITTING ON THE OPEN END OF THE LONG PVC PIPE.

STEP NINE:

TAKE THE ½ INCH TO ¼ INCH GALVANIZED REDUCER AND WRAP THE THREADED END WITH TEFLON TAPE. THE TAPE SHOULD BE WRAPPED 2-3 TIMES ON THE THREADS IN A CLOCK WISE DIRECTION. TURN THE ½ INCH TO ¼ INCH REDUCER INTO THE FEMALE PVC FITTING ON THE END OF THE LONG PVC PIPE.

STEP TEN:

TAKE THE ¼ INCH PRESSURE VALVE AND WRAP THE THREADS WITH TEFLON TAPE AS IN STEP NINE. TURN THE PRESSURE VALVE INTO THE ¼ INCH HOLE ON THE REDUCER ON THE END OF THE LONG PVC PIPE.

STEP ELEVEN:

BEFORE USING THE LAUNCHER, TAKE AND MAKE TWO OR THREE WRAPS OF ELECTRICIAN TAPE AROUND THE THREADED PORTION OF THE 1/2 INCH MALE FITTING. THIS WILL CREATE A SEAL ON THE BOTTLE ROCKET.

TO USE THE LAUNCHER:

Simply take the water rocket, fill about 1/3 full of water, tip the launcher and place the bottom of the rocket (the small end of the complete bottle) over the threaded fitting. Some pressure will need to be applied to keep the water from leaking out. Attach a bicycle pump to the valve stem fitting and pump.

SAFETY:

Do not catch the water rockets. They will leave the launcher at approximately 40-60 miles per hour which means they will come down with the same force. This will cause injury.

Other options: only glue a 15 inch piece of PVC instead of the long piece on the quad adapter. Get fittings for 1/8 inch plastic hose and install one end on the 15 inch PVC. On the other place the fitting for the valve stem. This hose should be about 6-8 feet long. This option allows for transportation of the launcher much easier because the hose can be coiled around the launcher upright.

The formula for estimating the height of the rocket is as such:

Height = $(T/2)^2 \times 16$ T is Time of flight from launched back to ground.