Water Purifying Solar Distillery

by New Water

Are you in need of some clean water but don't have the resources for filters and other fancy water purifiers? This is a tutorial that will take you step by step with easy to follow instructions on how to build your very own solar distillery made from easy to find materials. It's capable of producing over a gallon of clean water a day!

Step 1: Supplies Needed

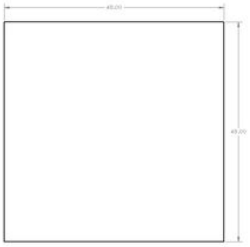
- Solar Collector Box
    - sheets of 22 in. by 44.5 in. by 1/8 in. thick glass - x2
    - sheet of 4 ft. by 8 ft. by 2 in. thick foam insulation with the aluminum wrapped side - x1
    - sheet of 4 ft. by 8 ft. by 1/4 in. thick plywood - x1
    - 10 ft. of 1 inch PVC pipe
    - 1 inch PVC pipe elbow - x2
    - Some scrap wood for small blocks
    - Duct tape
    - Kitchen and bath silicone

- Dirty Water Tank
    - 5 Gallon bucket with lid
    - 1/2" threaded ball valve
    - Plastic bucket sealed tap with 1/2" threads

Step 2: Making the Wood Base

Using the dimensions in the picture, cut off an end of the 1/4 inch plywood. Make sure that your measurements are square!

NOTE: THE DIMENSIONS ARE IN INCHES!!!



Step 3: The Short Wood Sides

Using the dimensions in the picture, cut 2 pieces out of the 1/4 inch plywood.

NOTE: THE DIMENSIONS ARE IN INCHES!!!

Step 4: Wooden Entrance Panel

Using the dimensions in the picture, cut out the shape from the 1/4 inch plywood. The hole in the picture has to be at least 1.32 inches in diameter or bigger.

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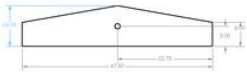

Step 5: Wooden Exit Panel

Using the dimensions in the picture, cut out the shape from the 1/4 inch plywood. The holes in the picture has to be at least 1.32 inches in diameter or bigger.

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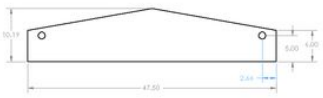

Step 6: Wooden Blocks

Using the dimensions in the picture, cut 8 of these blocks from any scrap wood.

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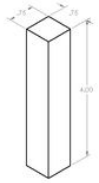
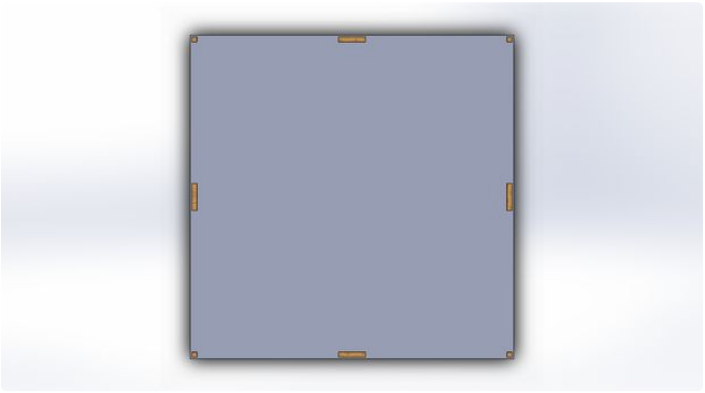


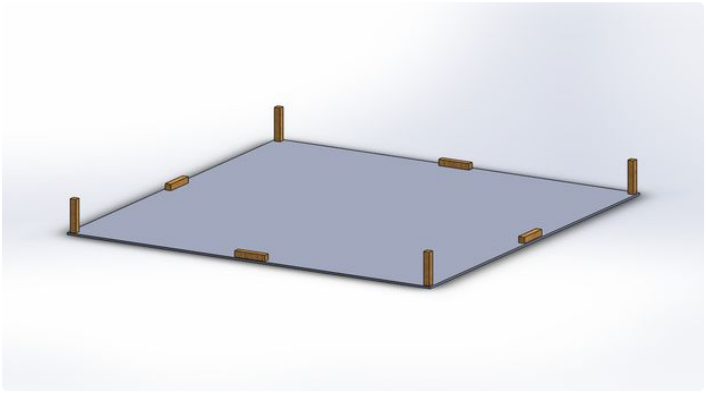
Step 7: Assembling the Wood Box

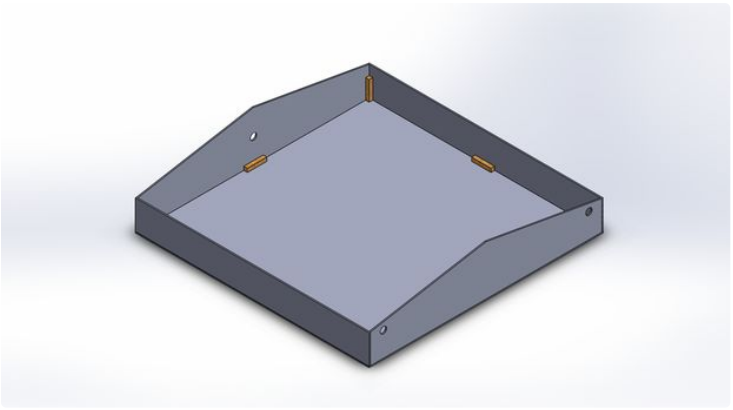
Nail or staple the wood blocks onto the wooden base in the pattern seen in the pictures making sure that the blocks in the middle are centered.

ALL OF THE BLOCKS NEED TO BE 1/4 INCH IN FROM THE EDGES OF THE SQUARE!!!

Once the blocks are secure, secure the walls to the blocks as seen in the third picture. The short sides should overlap the larger sides with holes.







Step 8: Foam Base

Using the dimensions in the picture, cut the shape out of the 2 inch thick foam. This can be done with a small hack saw, a sharp razor blade, or a styro-foam specific cutting knife. Be sure to note the notches on each corner and in the mid section of each side. This is where the wooden blocks will be once the foam is inserted into the box.

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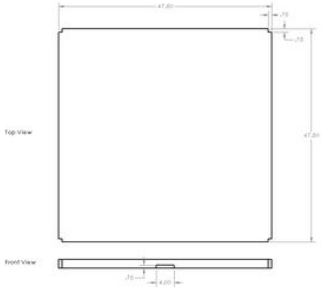

Step 9: Foam Short Sides

Using the dimensions in the picture, cut 2 pieces of foam each 43.5 inches long with the cross-section shown in the picture. Make sure that the shiny aluminum side is on the tall side of the foam pieces.

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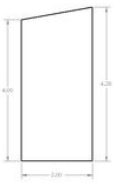

Step 10: Foam Entrance

Using the dimensions in the picture, cut the shape shown. The top portion of the picture is just zoomed into the right side of the big picture. The hole in the picture has to be at least 1.32 inches in diameter or bigger.

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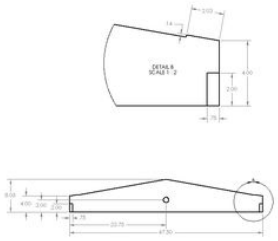

Step 11: Foam Exit

Using the dimensions in the picture, cut the shape shown. The top portion of the picture is just zoomed into the right side of the big picture. The holes in the picture has to be at least 1.32 inches in diameter or bigger.

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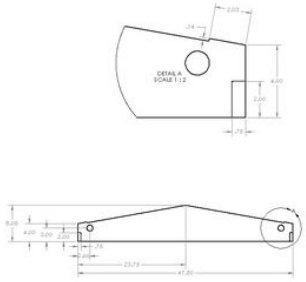
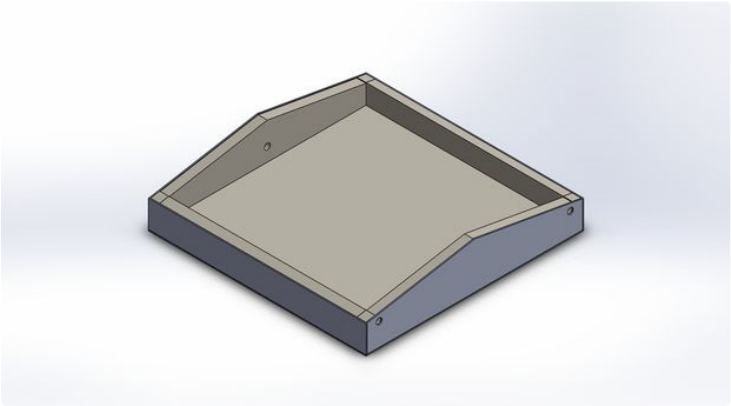


Step 12: Putting in the Foam

1. Start by laying down the foam base into the wood box using some caulk as adhesive and making sure that the shiny aluminum side of the foam is facing up. Then insert the other sides with adhesive and also making sure that their shiny aluminum side is pointing inward.
2. Use caulk to seal all of the inside corners of the still to prevent any water from leaking when it is being used.
3. When all of the foam is in its place, there should be a slight height difference between the foam edges of the triangle portions of the wall and their respective wood portions.



Step 13: Painting

Flat black paint should only be applied to the top shiny aluminum surface of the foam base. This will absorb most of the sunlight hitting it which will heat the water faster than without.

MAKE SURE NOT TO USE SPRAY PAINT!!! Spray paint can cause the styro-foam to start melting due to a chemical reaction between the spray and the foam.

Instead, use some sort of latex based paint and brush it on thick over the entire surface.

Step 14: Building the Gutters

Using the dimensions in the picture, create 2 of these gutters using the 1 inch PVC pipe.

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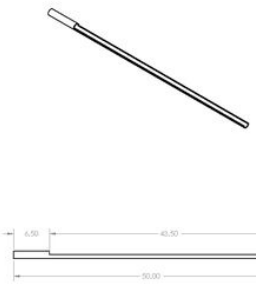
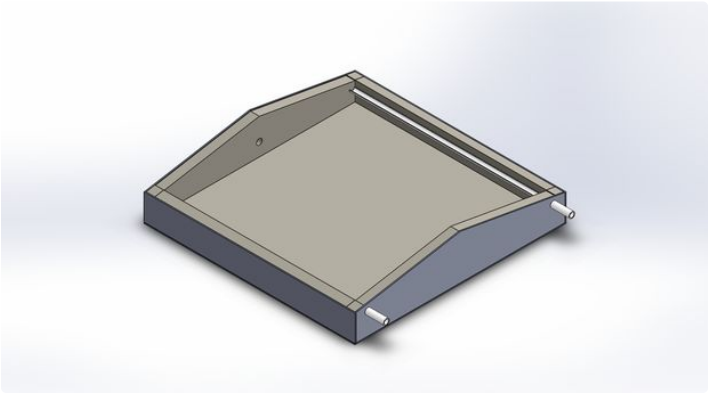


Step 15: Attaching the Gutters

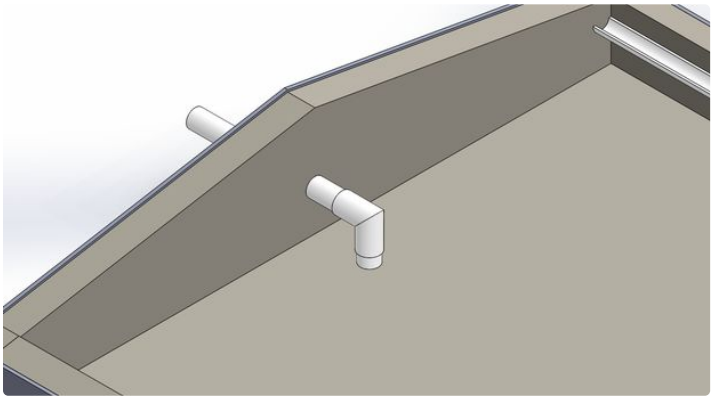
The gutters can be pushed through the exit holes to the other side of the still. Make sure that the gutters slope towards the exit holes in in the foam and wood. This is what will collect the water to exit the solar still. They can be attached to the side using caulk while being held with clamps as shown in the picture.



Step 16: PVC Entrance Piping

With the rest of the 1 inch PVC pipe, cut one segment at 2 inches and the other close to 12 inches long. Push both of these into the 1 inch PVC elbow and insert into the entrance hole of the solar still so that the short segment points down.

The tip of the short pipe should be around 1/4 inch above the foam.



Step 17: Glass

For the glass, you can cut it yourself with a glass cutter or you can higher a professional at your local glass pane shop to cut 2 glass panes at the dimensions in the picture using 1/8 inch glass.

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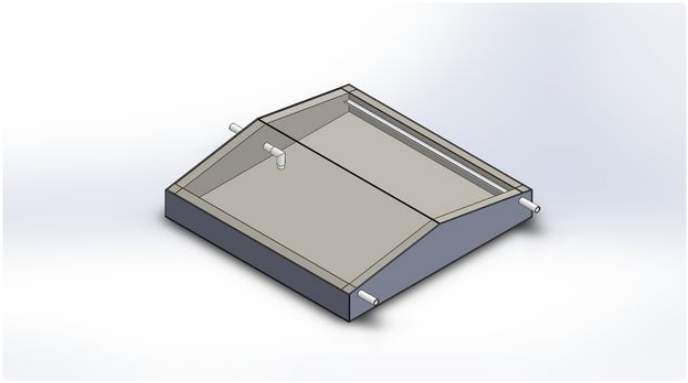


Step 18: Inlet and Exit Attachments

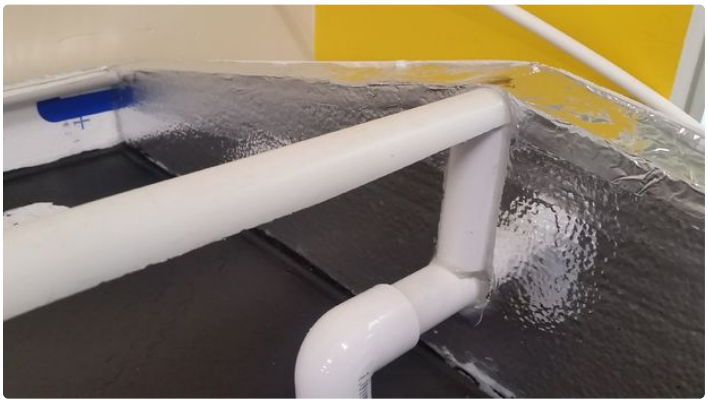
For getting water into the still, it is recommended that more pictures be taken and some better explanations so that random people can understand how to build one of these because the average person may not know what a 1/4 inch barbed inlet is.

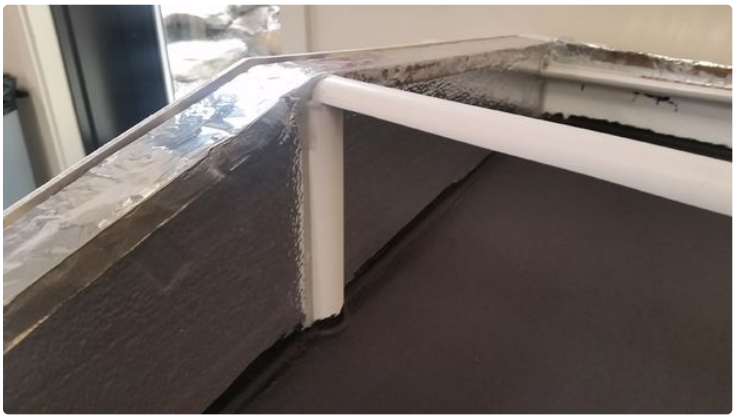
THIS SECTION NEEDS TO BE EXPANDED ON

Step 19: Optional Support for the Glass

With our extra scraps of PVC, we created a top support for our glass panes as seen in the pictures. This is not necessary, but feel free to expand upon the design to whatever fits your needs.

ADD A PICTURE OF THE PVC SUPPORTS





Step 20: Using the Still

1. VERY CAREFULLY, place the glass in its proper spot on the solar still and tape all of the edges. For this, you can use duck tape. We recommend black and yellow caution duck tape for best looks!
2. Connect the inlet bucket and the collection bucket to the solar still.
3. Fill the bucket with water and open the valve.

Note: For best results, make sure the still has full view of the sun for many hours and position the entrance or exit sides towards the sun.

INSERT A PICTURE OF THE STILL WORKING

Step 21: Maintenance

1. When not using the still, it is recommended to remove the glass panes and store them in a place where they are not in danger of breaking.
2. After each use, be sure to clean the gutters and base of the still.
3. If there are any signs of leaks, add more caulk on the inner corners of the still to prevent any further leaks.
4. Before storing away, make sure the still is dry to prevent the growth of mildew or mold.

Good survival tool. Water is your most essential need and this system will simply and reliably get it for you.