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Build your own Temperature Pagoda

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If you want to measure outside temperature there are a couple considerations you must take into account.

- No Direct Sunlight
- Ventilation

When I say no direct sunlight this means that you may not enclose the temperature sensor inside or under a object. When the sun hits the object it will heat up.

You must provide multiple layers with air space. This will simulate shade. The more layers the better.

The pagoda shaped enclosure I built here works very well. Use this article as a guide to build your own. You can built it just like the one presented here or make enhancements.

## Parts

First you will need at least 3 saucer shaped bowls like ones shown in Figure 1. I picked these up for less than a \$1 each at a local department store. The shape is important. The flatter the bowls the better. They should overlap enough to provide ventilation when properly spaced.

If you can find white or a very light color then you wont have to paint them later.

You will need the following 1" plastic pipe.

- 1, Cap
- 3, 45 degree Elbows
- 1, 5-1/4" Pipe
- 1, 4-1/2" Pipe
- 1, 2-1/2" Pipe

These are shown in Figure 2.

You will also need 3, 3/4" spacers like the ones shown in Figure 3. These are made by cutting 3.4" end off of each section of a Tee. These will be used to slip over the pipe to hold the bowl sections in place.

To cut the spacers mark a ring around the end of the Tee or other pipe joint and cut with a HackSaw, BandSaw or ScrollSaw.



Figure 1



Figure 2



Figure 3

## Assembly

### Step 1

The first thing you need to do is to cut a hole in the center of the bowl as shown in Figure 4. The hole should be just large enough for the plastic pipe to slip through but not so large that the plastic cap does not cover it. In my case the hole was 1-3/8".

Once the hole is cut you need to paint the outside of the bowl as shown in Figure 4. Clean the surface with Alcohol first and use a quality paint. Also use a Gloss White. If the bowl is a dark color it will absorb heat. I used paint specifically meant for plastic.



Figure 4

### Step 2

Next take the 5-1/4" pipe and drill some 1/2" holes at 3-5/8" from the end as shown in Figure 5.

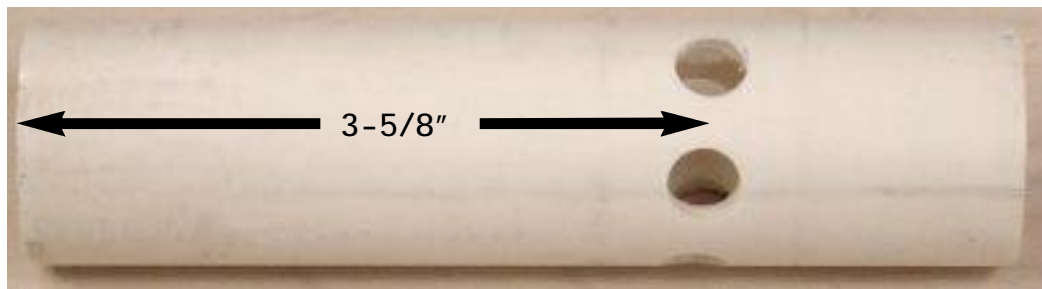


Figure 5

### Step 3

Attach the cap to the 5-1/4" pipe as shown in Figure 6. Use ABS glue designed for plastic pipe.



Figure 6

#### Step 4

Slip the pipe through the first bowl. Put a ring of glue around the base where the ring will be slipped. Next slide one of the rings down over the pipe until it comes in contact with the bowl as shown in Figure 7.

#### Step 5

Slip the next bowl onto the pipe and repeat the previous step.

#### Step 6

Slip the final bowl onto the pipe and again repeat the previous step.

#### Step 7

Take the remaining pieces and assemble the shape shown in Figure 7. You should dry fit the pieces before gluing. On my pagoda the pieces fit so tight that I did not glue them at all.

#### Step 8

Your sensor should be mounted on a length of cable that can slip through all the pipe fittings and reach your weather box from the location you mount the pagoda. I make my temperature sensors by attaching a DS18B20 on one end and a RJ45 on the other. The sensor is dipped in liquid electrical tape.

The goal here is for the sensor to be suspended in the middle of the pipe near the ventilation holes. Weave the cable in and out of the holes that you drilled as shown in Figure 8.



Figure 7



Figure 7



Figure 8

## Mounting

Use a couple metal straps to attach the base portion of the pagoda to your weather pole as shown in Figure 8. If you are not using a wood pole you can use a couple adjustable straps.

To attach the pagoda to the base first fish the sensor wire through the pipe then press fit the pipe. I dont recomend glueing the pagoda to the base.



Figure 9



Figure 8

## Going Further

That's it. There is plenty you can do to change the design. For one you can add an extra bowl. You can use larger spacers and place the ventilation holes between the 2nd and third bowl.

You can use larger bowls to provide more space for other instruments. When I was shopping for the bowls the I had my eyes on some large trash cans that could be used for a very large pagoda.