

EVA simulation using ROVs

NASA HERMES



GATEWAY

You will be recycling most of the materials already built for EVA 1 Expedition 53/54.

The followings are just “add on”.

Materials

- Industrial Velcro 2” x 4”
- Cable ties 8
- (1) Plastic mason jar or can (cylinder shape)
- (1) Plastic lid smaller than the jar or can
- (2) 1.5” CPVC pipes
- (2) ½” CPVC tees
- (2) ½” PVC caps
- ¼” Polypropylene rope or 2 pipe cleaners
- (2) Locknuts or something to create ballast

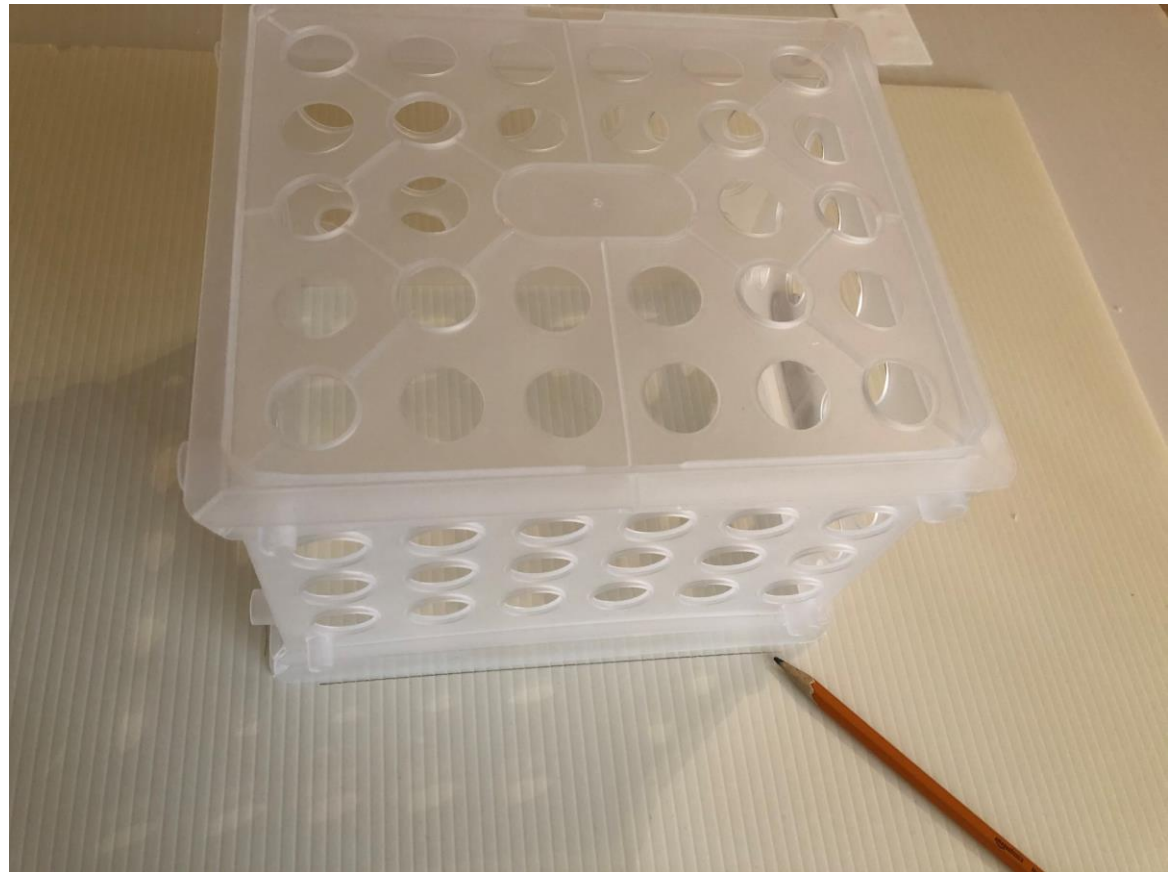
Recycling the base



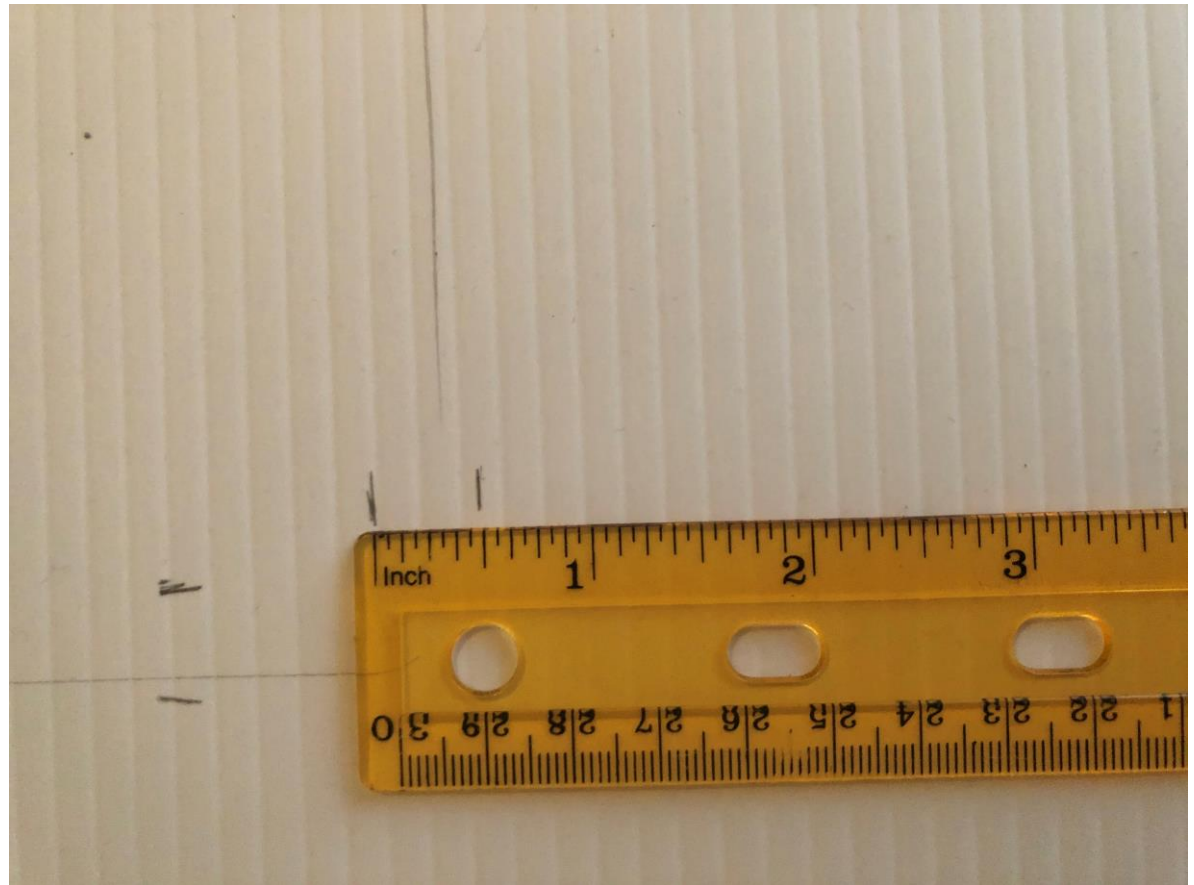
You will be recycling the platform base and crate from EVA 1 Expedition 53/54. It is up to you if you want to reposition the Velcro and give another angle to what the students will be attaching.

Take the corrugated plastic and center the mini storage crate. Draw a line around the crate. Next to each hole in the corners, draw a mark.

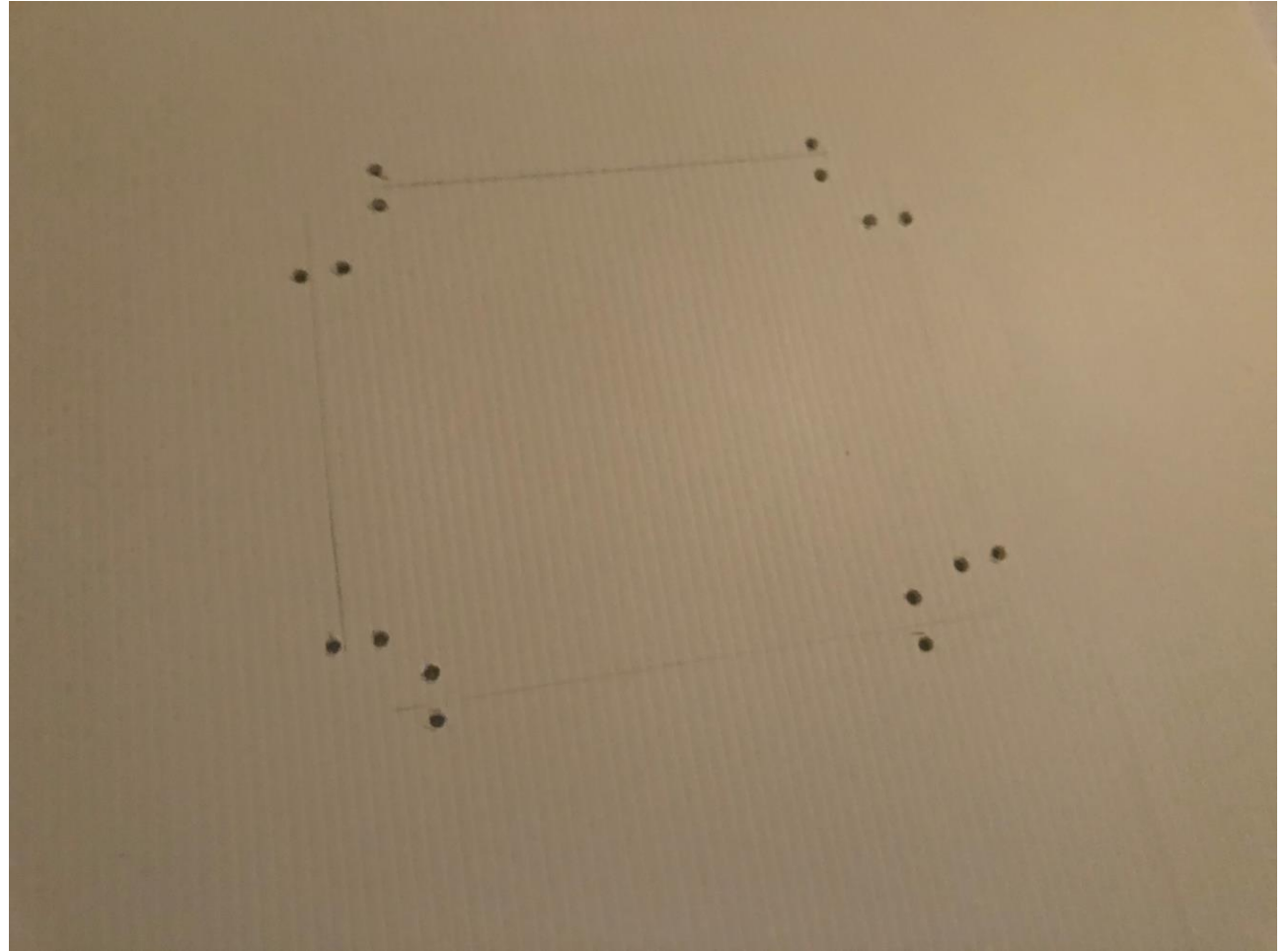
Just in case you want to build a new one and not recycle the EVA 1. I will be giving you the process step by step again.



Remove the crate measure approximately $\frac{1}{2}$ " and draw a second mark. It should be one mark inside the crate and the other outside.



Drill a hole in each mark. You can use a screwdriver or something pointy to do the hole.



**Attach the
cable ties and
join the crate
to the
corrugated
plastic.**

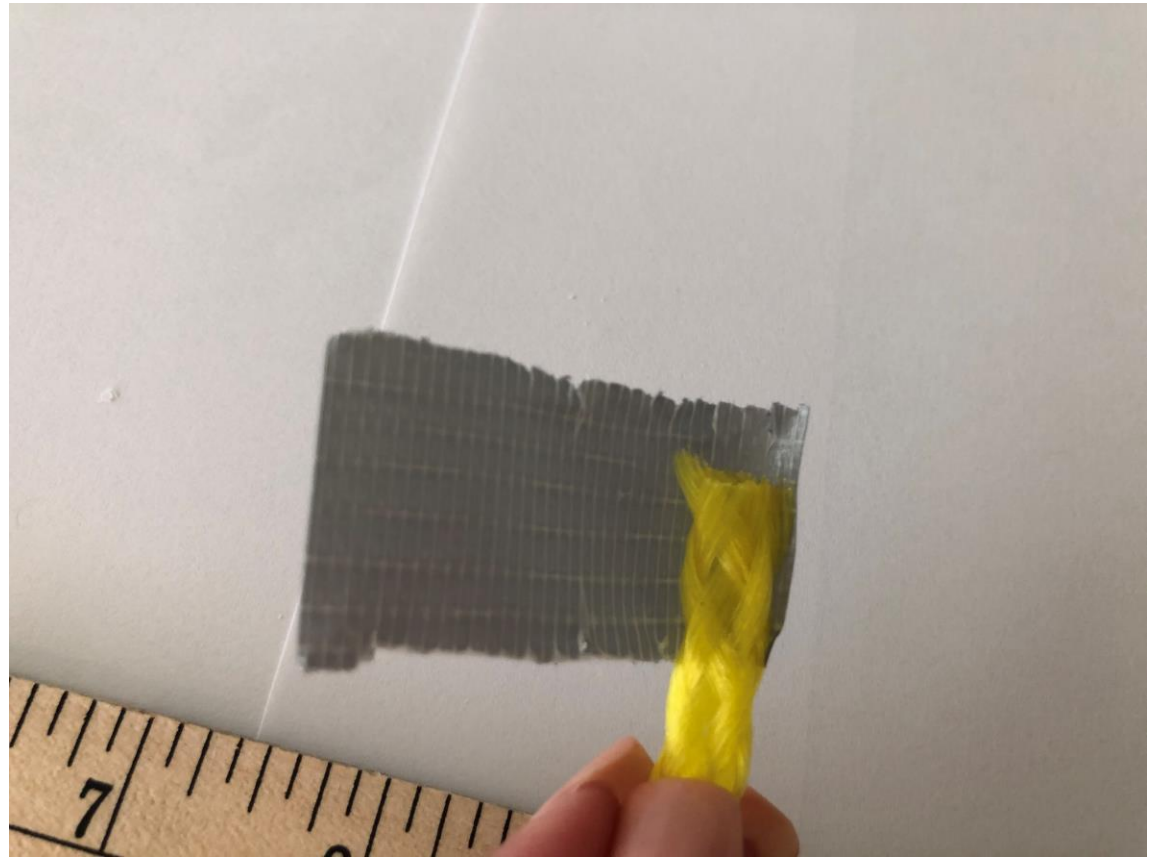


Recycling the containers



You will be recycling the containers from EVA 1 Expedition 53/54. I will be giving you the process, just in case you want to do a new set.

Measure approximately 8" of $\frac{1}{4}$ " Polypropylene rope and cut four pieces. You can also use 4 pipe cleaners. Be free to change the measure of the rope because it will depend on the size of your container.



Cut a piece of duct tape and put it at each end of the rope.

Take the food container and drill holes in each side. Pass each end of the rope through the container. Join both ends of the rope with a piece of duct tape.



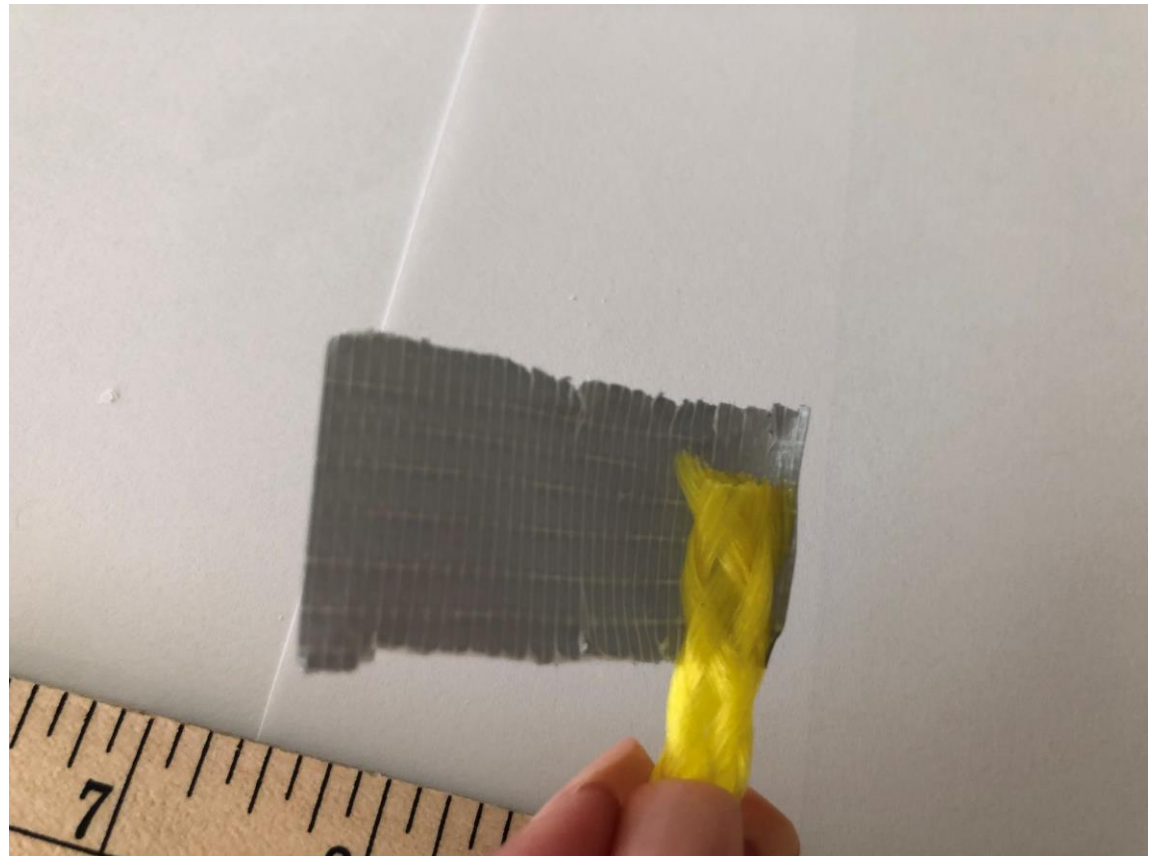
Take the lid and glue the lens of the camera (water bottle lid or magnetics tins) to the lid.



Once the lids are dry, put some fender washers or something heavy to create ballast and close the container.



Measure
approximately 8" of 1/4"
Polypropylene rope.
Cut and attach duct
tape at
each end.



**Recycling
one cap.
You need to
build a
second one**



You will be recycling the cap from EVA 1 Expedition 53/54. I will be giving you the process because you need to build a second one. One will be the sun sensor and the other the magnetometer sensor.



Take a ½” PVC cap and drill a hole in the middle. Attach the rope to the cap and secure it with duct tape.

Cut 8" of CPVC pipe. Insert the CPVC pipe in the crate (next hole after the corrugated plastic) and secure it with cable ties.

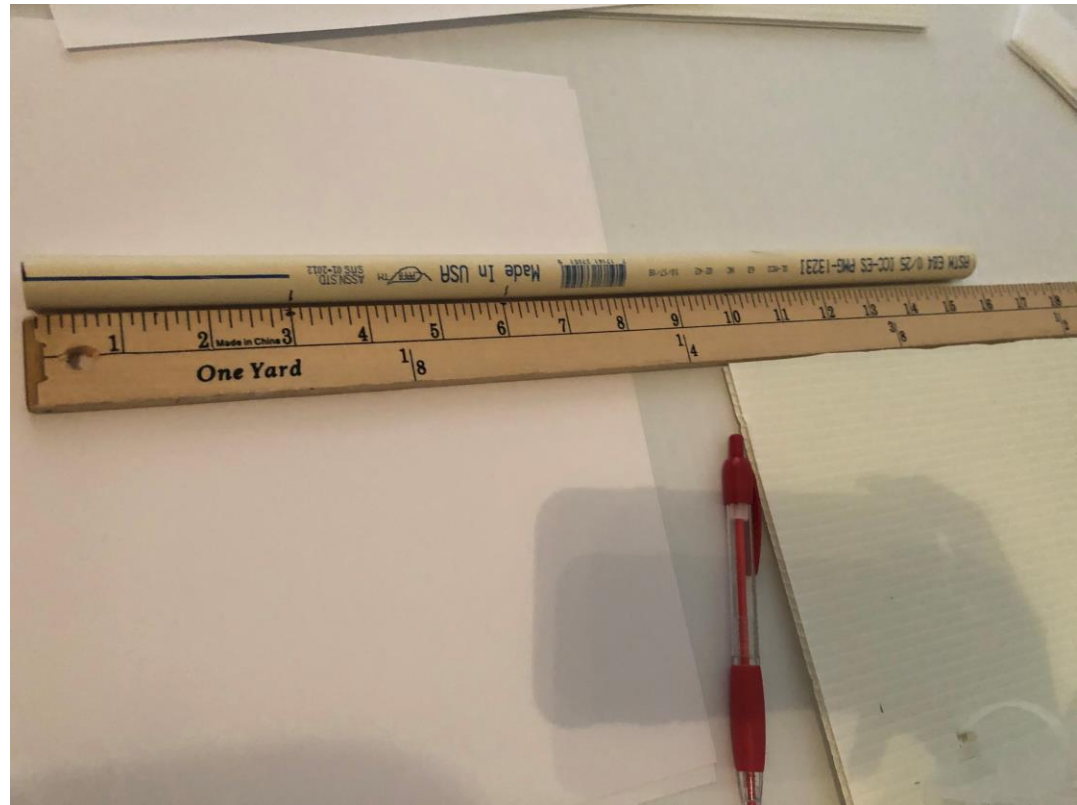


Cut six pieces of 2" x 4" of Velcro. Attach to the back of the corrugated plastic in two rows of three, leaving 4" between each Velcro. Be sure that the Velcro side is the opposite at the one that is on the test tank, so it can match.

Glue a piece of 2" x 4" of corrugated plastic to the back of the containers. Once is dry, attach the Velcro to the corrugated plastic.

Take 2 pieces of 2" x 4" of corrugated plastic and attach the other part of the Velcro to it. Use hot glue to attach one piece of corrugated plastic to the crate (middle) and the other to the top.

Magnetometer and Sun sensors



Cut one CPVC pipe of 2" and another of 3".

Magnetometer and Sun sensors



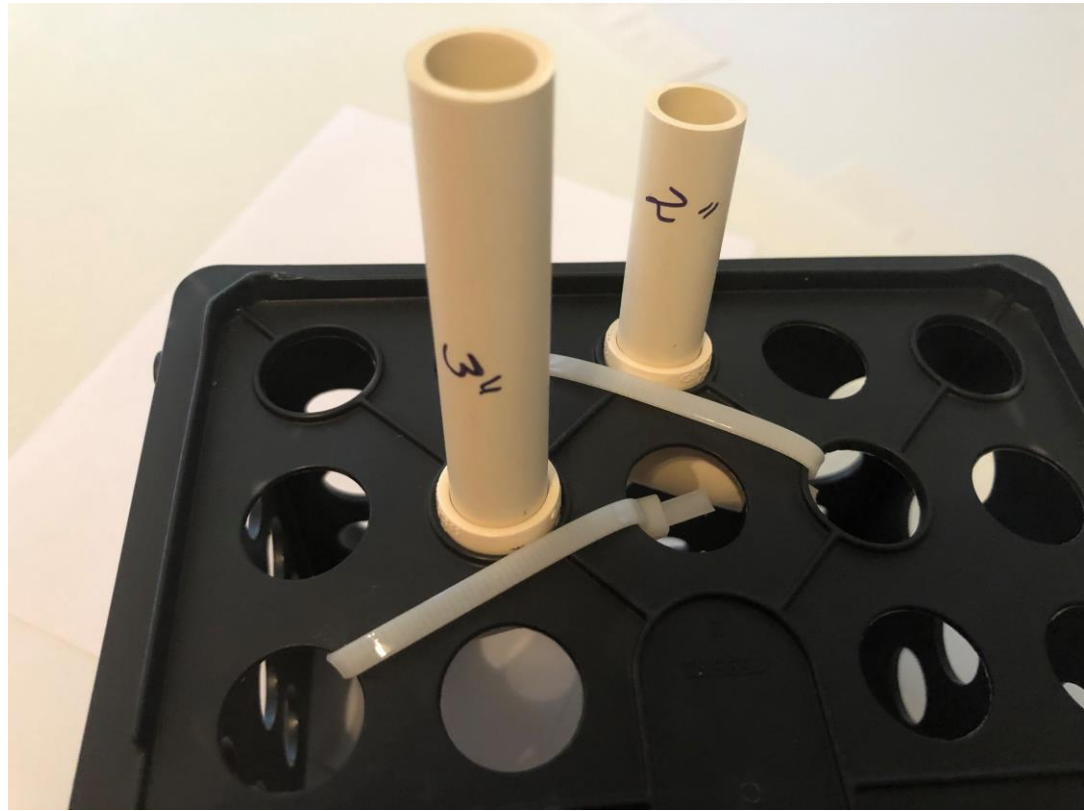
Take a CPVC Tee and insert the Tee with the middle hole pointing up in one of the holes of the crate next to the side. Take a cable tie and pass it through one end of the Tee to the other, so you can secure the Tee to the crate.

Magnetometer and Sun sensors



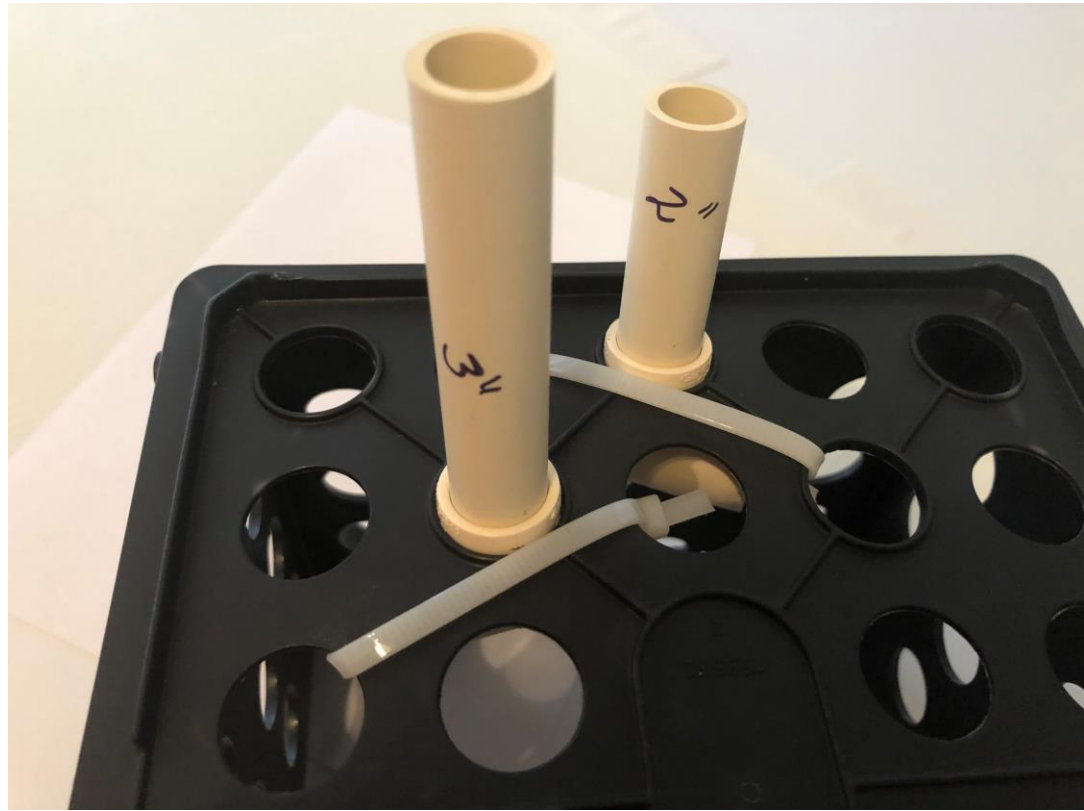
Do the same with the second CPVC Tee.

Magnetometer and Sun sensors



Attach the CPVC pipes to the Tees.

Magnetometer and Sun sensors bases



**Attach the CPVC pipes to the Tees.
They are ready for the caps!**

Electron Electrostatic Analyzer (EEA)



Take a plastic container (cylinder shape) and drill holes.

Electron Electrostatic Analyzer (EEA)



Open the lid of the container and pass 2 cable ties through the holes. You will be attaching that to the crate.

Electron Electrostatic Analyzer (EEA)



Attach the container to the crate in the corner. In that way, you should have space to place the Velcro.