1. Lay a blanket, towel, or tarp on the ground to prevent the balloon from directly touching the ground. Especially when working on grass, the macroscopic sharpness of the grass can cause microtears in the balloon.
2. Unscrew the safety lid from the gas tank. From this point on, everyone within 20 feet of the balloon should be wearing safety glasses.
3. Attach the regulator to the gas tank. For Helium, this should be a CGA-580 regulator. A single-stage regulator is fine, but a dual-stage regulator is preferred due to safety reasons. A dual-stage regulator will allow users to regulate the rate at which the gas leaves the tank and has a separate valve to cut off the gas from leaving the regulator; however, dual-stage regulators are much more pricey.

4. Spread the balloon out on the blanket, and be careful not to step on the latex. The neck of the balloon is much thicker and can stand a little bit of roughness, but the skin on the rest of the balloon is very easy to tear. Using gloves and hairnets prevents the oil produced from the human body from getting onto the

balloon and degrading it, as well as preventing the hair on our heads from poking microscopic tears in the balloon.

5. Insert the balloon fill-line into the neck of the balloon and zip tie it around the outside of the neck of the balloon. Before tightening the zip tie, please attach a small string with a loop to the zip tie and tie another length of string to attach to the gas tank cart or another weight to prevent the balloon from flying away if someone lets go of it.

6. If using a single-stage regulator, open the valve at the top of the tank, then slowly open the valve to stream gas into the balloon. Slowly open the regulator until the valve is entirely open. If using a dual-stage regulator, open the valve at the top of the tank, set the flow limit of the gas into the regulator, then slowly open the other valve at the end of the regulator. Slowly open the regulator until the valve is entirely open.
    a. It is good practice that once a valve is opened entirely, the valve be closed a hair of a turn, so if someone else tries to test the state of the valve that they don't break it.
    b. During this process, someone should be holding onto the tank and monitoring the pressure left in the tank while a separate person monitors the balloon by holding onto the neck.
    c. Additional people may be required if the balloon is large or if it is windy; these additional people can put their hands up to stop the balloon from blowing in a certain direction.


7. Once the balloon lifts itself off the ground, attach the force scale to the string with the loop and either stake the other end into the ground or securely hold the force scale in place, like by gripping the handrail of the gas cart, so the lifting weight can be measured properly. Continue filling the balloon until the desired lift weight is achieved.
    a. If the predetermined lift weight is too much for the force spring scale, a digital fish scale is not recommended. It is recommended that gym weights

or calibration weights be used to hang from the same loop and to continue to fill the balloon until the balloon naturally lifts these weights off the ground without sinking.

8. Once the balloon has achieved its desired lift weight, close the valve to the regulator and the tank. Hold the neck of the balloon and twist the rest of it to cut off the flow through the neck. Place a zip tie around the twist so it doesn't undo itself. While maintaining a tight grip on the balloon, twist the inflator hose out of the neck and try not to let the zip ties that are holding the tether string fall. Push these zipties further up the neck of the balloon, and tighten them down around the twist. Very carefully, with the points pointed away from the balloon, snip the tails of the zip ties off.

9. Feed the neck of the balloon through an o-ring and fold the neck over the o-ring so it sits next to the twist. Use additional zip ties to hold the end of the neck up so the o-ring stays in place. Carefully cut the tails of the zip ties off and use electrical tape to cover the sharp ends so they do not swing up and puncture the balloon.



10. Attach a string for the payload to attach to, and attach the string tether to the o-ring.
11. Assign someone from the balloon filling team to hold the balloon via the o-ring until it is launch time.