**Lab 1: Soft Lithography**

**Description:** In this lab you will be creating a microfluidic channel by means of lithography. The channel will be formed in a UV activated, urethane based polymer (Loctite 3108) on top of a Plexiglas substrate.

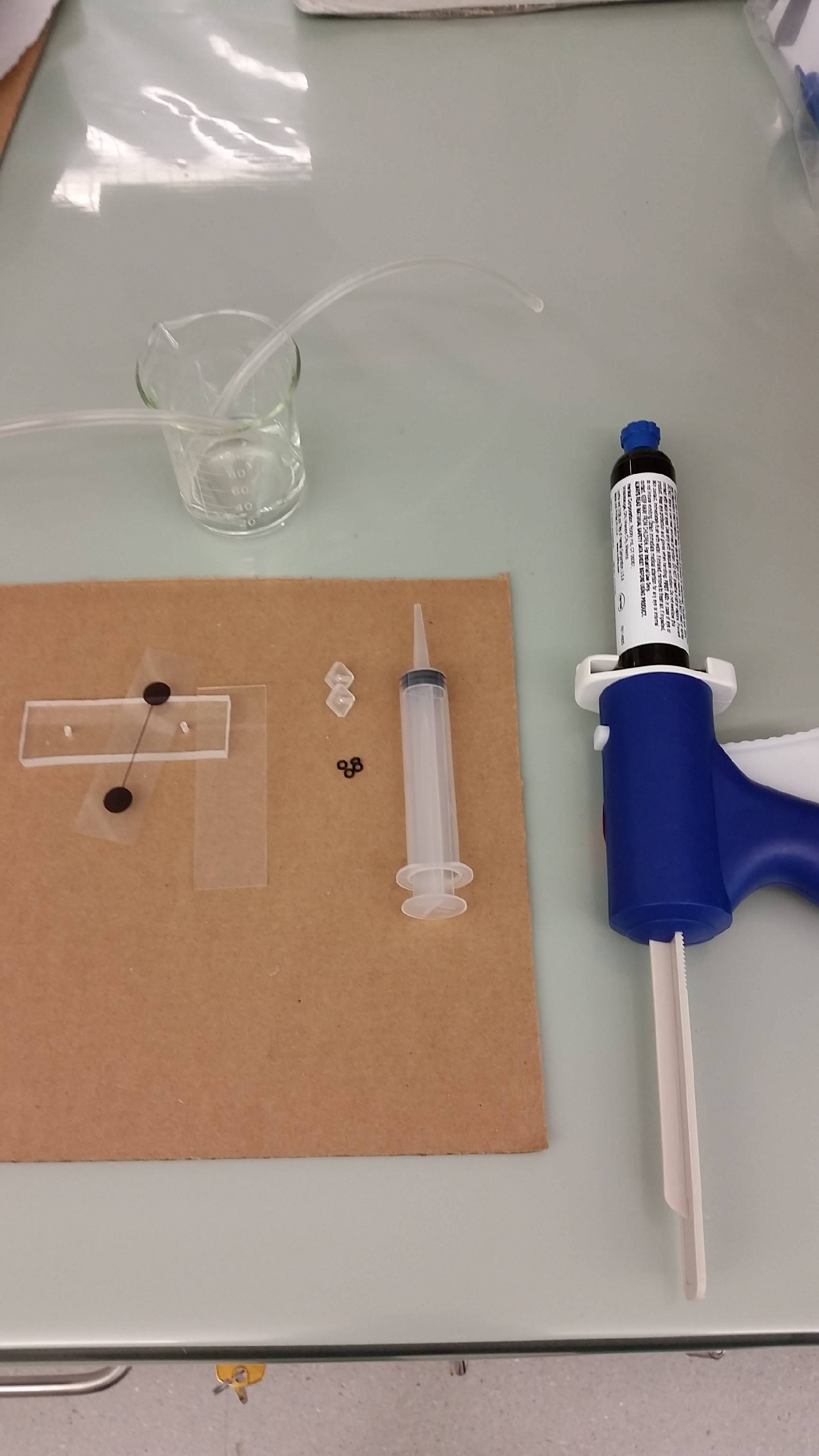
**Materials and tools needed:**

* Plexiglas substrate
* Microscope slide
* Transparency mask
* 4 O-rings
* 2 hose fittings
* 16 inches of hosing
* 1 syringe
* Loctite 3108
* Acetone
* UV lamp

**WARNING:** ACETONE AND LOCTITE 3108 ARE HARMFUL IF BROUGHT IN CONTACT WITH SKIN, EYES, ARE INGESTED OR FUMES ARE INHALED. EXERCISE CAUTION AND WEAR PROTECTIVE EQUIPMENT (GLOVES AND GOGGLES).

**Preparation:** Arrange your workspace neatly as shown below:

Figure : Materials needed for lab

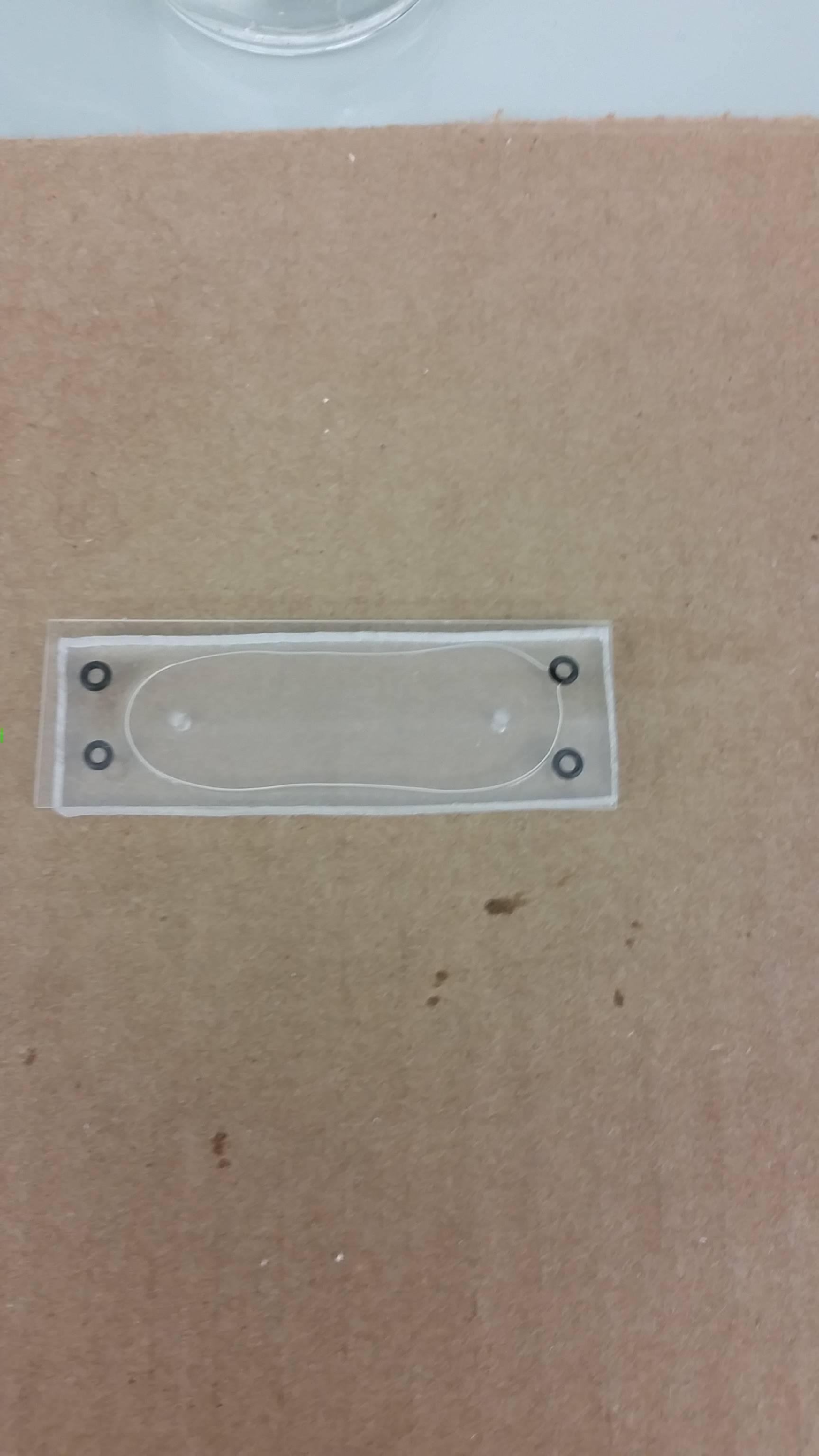


**Step 1:** Place 4 O-rings on the Plexiglas substrate in the corners (see Figure 2).

**Step 2:** Apply a single ½ cm wide bead of Loctite 3108 across the substrate beginning at one hole and terminating at the other. Apply slightly more Loctite 3108 on top of each hole.

**Step 3:** Place microscope slide on Loctite 3108 and flatten until slide rests on O-rings. Remove any excess Loctite 3108 with paper towel.

Figure : Substrate, O-rings, Loctite 3108, and glass slide after flattening



**Step 4:** Carefully place transparency mask on microscope slide so that the reservoirs (large black dots) are centered over the holes in the substrate and place completed sandwich under UV lamp.

Figure : Complete sandwich under UV lamp



**Step 5:** Expose the resulting sandwich to UV light for 5 minutes, use your phone for a timer.

**WARNING: DO NOT LOOK AT THE UV LAMP WHEN IT IS ON. UV LIGHT WILL DAMAGE YOUR EYES!**

**Step 6:** Remove transparency mask and turn sandwich over. Press and twist hose fittings into the substrate holes and attach a piece of hosing to both.

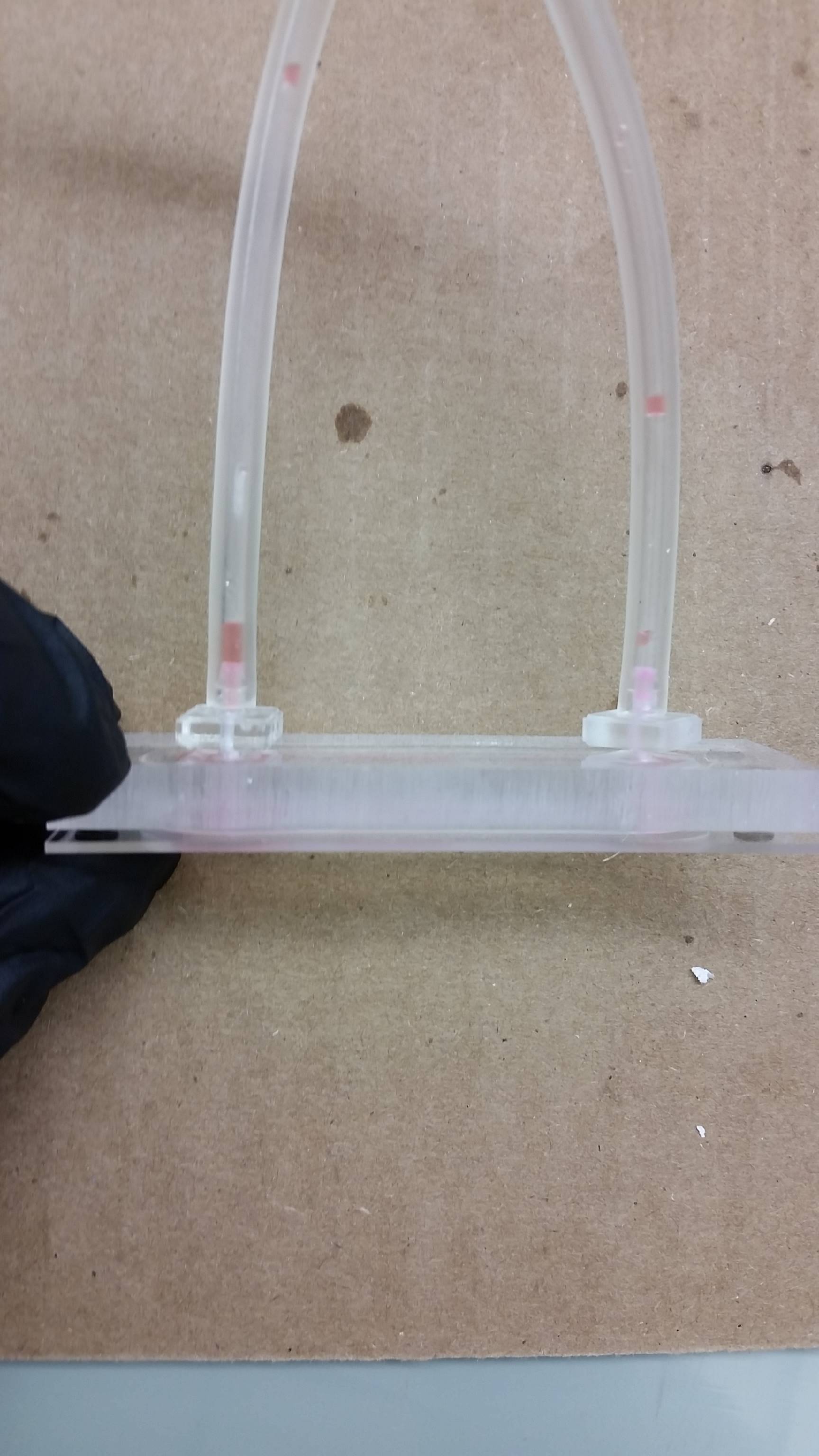


Figure : Hoses and fittings

**Step 7:** Fill beaker with approximately 20 ml of acetone and submerge one hose end. Draw acetone through the channel using the syringe to clear out (etch away) the uncured Loctite 3108. **DISPOSE OF ACETONE/LOCTITE 3108 MIXTURE IN DESIGNATED WASTE BOTTLE.**



Figure 5: Drawing acetone through channel

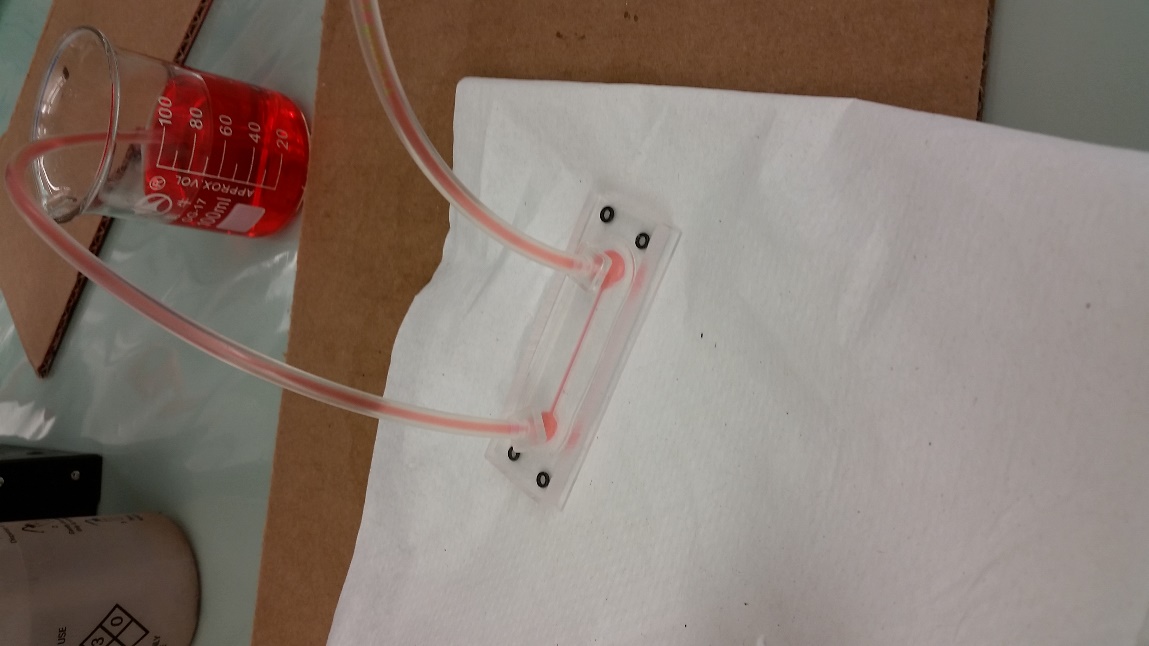
**Step 8:** The acetone can be cleared out by drawing water through the channel. Add food coloring to the water to see channel operation.

Figure 6: Water and food coloring

**Clean up:** Clear channel by removing hose from colored water and drawing air through channel with syringe. Dispose of excess water/food coloring mixture in the sink. Clean workspace of any spilled fluid.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_NOTES\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_