**MICP Project**

**Setting up a syringe column**

Be sure to have on hand the following (amounts shown assume that you will be setting up two syringe columns for your testing):

* Pegboard (1) with supporting legs (2)
* Syringes (2) (modified -- with the tips cut off)
* Syringe plungers (2) (remove the rubber plunger tip from one of the plungers)
* Tubing (2)
* Rubber stoppers (2)
* Soil to be tested
* Lab notebook
* Labeling tape
* Sharpie marker
* Mineral oil
* Small alligator clips (2)
* Twisty ties (6+)
* Distilled water (or water from whatever water sources you will be using)
* Tray (to put testing frame into in case the columns leak)
* Green scrubbie (Scotch Brite scour pad -- plain and untreated)
* A small kitchen funnel (not required but useful!)
* Scissors
* Small 60 ml measuring cup

**Checklist for assembling the testing frame:**

* Assemble your testing frame by sliding one of the short ends of the pegboard into the slots on each of the two legs. Each leg should be placed about one inch from the corner of the pegboard.
* Use twisty ties to connect the legs to the pegboard (so that the legs don’t fall off if you lift the pegboard)

**Checklist for assembling one syringe column:**

* Using the cut end of one of the syringes and a sharpie marker, trace two circles on your Scotch Brite scour pad (try to make them as close together as possible so that you will be able to do this many times in the future for future tests)
* Use your scissors to cut out the circles -- what you are trying to do is to cut circles that will fit snugly inside the syringe. It’s better for your circles to be too large (you can always trim them to a smaller size). If your circles are too small, your soil will spill out between the edge of the green scrubbie and the side of the syringe.
* Check that your green scrubbie circles will fit tightly into the syringes. Trim if needed.
* Insert the plunger with the rubber tip into the syringe (inserting from the uncut end of the syringe - the end that is closer to the 60 ml mark)) until the plunger is at the 50 ml mark.
* Add a small amount mineral oil (perhaps one or two teaspoonfuls) into the syringe from the cut end and rotate the syringe so that the oil coats all the exposed surface evenly from the cut end to the location of the plunger
* Drain out the excess oil from the syringe
* Keeping the syringe oriented with the cut end down
  + remove the plunger with the rubber tip from the other end of the syringe
  + insert a rubber stopper firmly into the cut end of the syringe
  + Insert (from the top of the syringe) one scrubbie circle using the blunt end of a pencil or a similar object to place the scrubbie circle directly on top of the rubber stopper
  + Insert a piece of tubing approximately ¼ to ½ inch into the exposed end of the rubber stopper (be sure that this feels like a tight fit and keep in mind that different pieces of tubing might be slightly different sizes)
  + Using twistie ties, attach the syringes to the pegboard frame so that the lip on the uncut end of the syringe rests on the top edge of the pegboard and so that you can read the ml markings on the syringe once after it has been attached. It’s best to attach the syringe at two locations -- one near the top of the syringe (the uncut end) and one near the bottom (the end with the rubber stopper)
* Using the funnel, slowly pour soil into the syringe until the top of the soil is level with the 50 ml mark on the syringe. (Do not use a paper funnel -- that tends to create more of a mess. If you don’t have a funnel, pour the sand slowly from a small container.)
* Using the eraser end of a pencil or something similar tap the top of the soil surface to make it level and add soil if needed to bring the top of the soil level with the 50 ml mark on the syringe
* Insert a green scrubbie circle on top of the soil surface. Use the eraser end of a pencil or something similar to gently press the scrubbie circle down on the soil surface if needed.
* Take the free end of the tube that exits the rubber stopper and insert it through a hole in the pegboard next to the syringe.
* Use an alligator clip on the tubing on the back side of the pegboard to ensure that the tubing doesn’t come out and fall to the bottom of the testing frame.
* Place the testing frame into your tray.
* Use the marker and labeling tape to create a label for the syringe that clearly identifies the syringe and the treatment you expect to apply to that soil.
* Create an entry into your lab notebook that fully describes the column assembly process. You can print and use this checklist as part of that entry.

You are ready to add your first stimulation treatment. During that first treatment, check for any leakage at the base of your column. You should be able to make adjustments to stop the leakage.

Repeat process for a second syringe column if needed.