



Building a Hydroponic Fen

- Step 1.** Gather a water pump, an inner tray and an outer tray. The inner tray should be about 4 inches deep. The outer tray should be slightly deeper than the inner tray. Ensure that the water pump and inner tray can nesting inside the outer tray
- Step 2.** Drill holes at the bottom of the inner tray for water drainage
- Step 3.** Install the tray cover, water pump and inner tray
- 1) To make the tray cover, trace the shape of the outer tray onto a one-inch foam board and cut. Trace out the shape of the inner tray in the center of the foam board and cut.
 - 2) Place supporting blocks inside the 4 corners of the outer tray to level the surface of the tray cover with the edge of the outer tray. We used Lego blocks as our supporting blocks. The tray cover prevents evaporation of the liquid nutrient medium.
 - 3) Place the water pump inside the outer tray and mark the tray cover of where a slot should be cut to fit the water pump; cut the slot
 - 4) Fit the water pump securely into the slot that was cut in the tray cover and leave the pump's output water tube, which will become the incoming water tube for the inner tray, and pump's power cord outside of the outer tray
 - 5) Put supporting blocks for the inner tray inside the outer tray and align them with the 4 inside corners of the tray cover
 - 6) Place the inner tray inside of the outer tray; adjust the height of the supporting blocks to ensure the water incoming end of the inner tray is slightly higher, so water can flow from one end of the inner tray to the other end of the tray
- Step 4.** Fill the inner tray with 1 - 2 inches of glass rocks. The thickness the layer depends on the depth of your inner tray
- Step 5.** Cover the glass rocks with a filter cloth. We used fine linen cloth.
- Step 6.** Place a layer of coarse coconut fibers on top of the filter cloth
- Step 7.** Cover the coarse coconut fiber layer with a layer of the fine coconut fibers
- Step 8.** Place seedlings on top of the fine coconut fibers at least an inch apart and cover them with additional fine coconut fibers. Each shoot should be almost poking out with all the roots and rhizomes covered.
- Step 9.** Place the tray under a growth UV light, connect the water pump with the water source, watering the tray. Keep a fan running near by the tray simulate the nature breeze. This will help strengthen the plant structure of the young leaves and prevent molding.
- Step 10.** Mix the medium solution, fill the out tray and turn on the water pump for the first time watering of the seedlings

Future Design Considerations

We have experienced slight degree of molding. For future design, we are considering to use [plastic bug netting material](#) instead of fine linen as the filter layer. Use sterilized wool or glass fibers, instead of coconut fibers.

For any information and help, you can contact the *Endangered Species Program* at the *New Hampshire Academy of Science*: <https://www.nhacadsci.org/contact>