

Teacher Resources: Realityworks Hydroponic Producer System

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STEMbound Contact Information



Please contact us as soon as possible if something is missing, damaged, or you would like support or professional development with the equipment. Thank you!

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Website Quick Links		
Main STEMbound Page	Explorations Explorations Request	Consultant-led Lessons Consultant-led Request
Indoor Gardens	Rental Items Rental Requests	Partnership in Planning

You can access the above links and more at www.sourcewell-mn.gov/STEMbound.

Equipment Checklist

Item	Image	Accessories
Hydroponic Indoor Garden Producer System		<ul style="list-style-type: none"> ▪ Lab system ▪ 3 tray/shelves ▪ Plant site holder
Bottom of System		<ul style="list-style-type: none"> ● Germination Tray ● Humidity dome ● Florabloom ● Teaspoon ● pH testing kit ● teaspoon ● 50 grow cups ● 50 Rockwool cubes ● Power cord ● Seed packet ● Teacher resource binder

Set Up Instructions (Please read before using)

IMPORTANT NOTES

- Leave the Producer system plugged in all the time once rockwool has been transplanted.
- Rockwool can be reused 2-3 times if cleaned properly
- Never squeeze rockwool as it will harm the water capacity and oxygen movement.
- Begin planting new seeds 7-10 days before harvesting to allow movement of new plants from the germination tray directly to the hydroponic system.

Getting Started

1. Plan what plants to grow based on sunlight, germination, and maturation.
 - See [Realityworks User Guide](#) (website listed below) for suggestions and grow timelines
2. Begin germination tray and rockwool
 - Match rockwool pieces with number of seeds being planted
 - Soak rockwool in water for 15-20 minutes
 - Drain rockwool for 1-2 minutes
 - Place rockwool in germination tray
 - Put *one* seed into the divot in each rockwool piece
 - Place germination humidity dome on
 - Germination tray should be placed in a location that has sunlight (or hydroponic system with lights on)
 - Use spray bottle or cup to add water to rockwool when it looks dry

2-3 days *before* adding plants (once roots are showing at bottom of rockwool)

3. Prep hydroponic system(s)
 - See specific system settings on next page.
4. Add water and nutrients to the tanks. Allow water to circulate 24 hours before adding plants. Check pH before adding plants.
 - Low pH: add new water
 - High pH: add nutrients
 - Refer to planting guide for specific plant pH levels
 - If planting several different plants, a pH of 6.0 is ideal

	Water	Nutrients
Plant Producer System	Fill tank with 7 gallons	1 tsp/ gallon

- *The Plant Producer System tank holds 7 gallons (56 pounds) of water. Do NOT lift the full tank when filling and removing water. Before removing the tank, disconnect the water float and remove the pump from the reservoir. Remove the water with a pitcher or pump. Once it is to a weight that is movable by a dolly or a cart, lift the tank using proper lifting technique.*

5. Transfer seeds
 - When roots are emerging from the bottom of the rockwool, it is okay to move the seeds. Place one rockwool piece into each grow cup.
6. Check pH and water levels of system at least two times a week and adjust water/nutrients as necessary

Plant Producer settings

- The water pump runs on a 50 minute schedule: 20 minutes on, 30 minutes off
- Lights run on a 24-hour schedule (see table below). Grow light start time can be changed by pressing “Grow Light” until it beeps, then “+” and “-” to adjust. Press again to advance to the next hour/minute digit.

Light Settings	Lights ON	Lights OFF
Slow Growth	8 hours	16 hours
Normal Growth	10 hours	14 hours
Fast Growth	12 hours	12 hours

- Fans follow the set light schedule
- Unit beeps every 50 minutes when water levels is too low (2-3 gallons)

Display: Display is on in AUTO mode. Press any button for 3 seconds to turn the display on when the lights are off

Time: Press and hold for 3 seconds. Use + and – to adjust each digit. Press time to change between digits until all are set to the correct time. *Military time

Temp: shows current temperature of the room

Grow setting: choose Fast Growth, Normal Growth, and Slow Growth by pressing the Grow Setting button

Grow light: Press Grow Light button to adjust which shelves are lit based on this order:

- All three shelves lit- without “Auto” next to icon
- All lights are off
- Bottom shelf lit
- Top and middle shelves lit
- Top and bottom shelves lit
- Top shelf lit

Fans: turn fans off and on; cannot change speed of fans

Water flow icon: spins when the pump is running

Grow light icon: reflects which shelves are turned on. “Auto” when it is on the growth setting schedule

Water level icon: flashes when reservoir is low

Fans icon: spins when the fans are on and stops when they are off

Factory reset: Press “+” and “-” for 5 seconds and listen for beep

Planting guide

Type of Growth	Florabloom
Seedlings/cuttings	¼ tsp per gallon of water
Mild Growth	1 tsp per gallon of water
Aggressive Growth	3 tsp per gallon of water
Transition to Bloom	2 tsp per gallon of water
Blooming/Ripening	1 tsp per gallon of water

Planting and Harvesting Cheat Sheet			
Plant	Direct Light Needed	Germination (days)	Days to Maturation
Cabbages	Yes	4-10	65-85
Cucumbers		6-10	55-65
Green Beans		7-14	80-100
Kale	Yes	3-10	55-80
Leeks	Yes	7-12	80-90
Lettuce	Yes	4-10	35-65
Radishes	Yes	3-10	50-60
Swiss Chard	Yes	7-10	55-65
Tomatoes		6-14	55-90

pH Range for Different Hydroponic Crops	
Plant	pH Range
Cabbages	6.5-7.5
Cucumbers	6.0-7.0
Green Beans	5.5-6.0
Kale	6.0-7.5
Leeks	6.0-6.8
Lettuce	6.0-6.5
Radishes	6.0-7.0
Swiss Chard	6.2-6.8
Tomatoes	5.5-6.5

System Cleaning- system must be cleaned prior to pick-up

Cleaning Producer System

- Turn off power and unplug the cord from the wall outlet.
- Remove rockwool from grow cups.
 - Rockwool may be reused 2-3 times if planting again
 - **Upon equipment retrieval, ALL rockwool should be removed.** Rockwool will not break down in a landfill. Rather than throw rockwool away, it is recommended to break it up into pieces and work it into your garden or potting soil to help increase water retention.
- Drain water from the system:
 - For the producer system remove the tray covers from all three shelves.
 - Beginning with the top tray, use a paper towel to push the water into the drain. Continue with the same process for the middle and bottom shelves.
 - Disconnect the water float and remove the pump from the reservoir.

- Remove the water with a pitcher or pump. Once it is to a weight that is movable by a dolly or a cart, lift the tank using proper lifting technique.
- Clean the tanks and tray covers with warm soapy water from a bucket. Do not pour soap/bleach directly into the reservoir. Bleach can be used to clean the hydroponics system, but it is suggested to use less than a ¼ capful of bleach for every 1-2 gallons of water. If bleach is used, wait an additional 24 hours before filling the tank with water.
- Rinse thoroughly to remove the soap and bleach (if used).
- Remove all visible green algae that may have accumulated from the previous harvest.
- Cloth dry or let air dry.
 - If replanting, let new water circulate or sit for 24 hours before adding any plant life.

FAQ

Troubleshooting Hydroponic Lab System	
Problem	Solution
Plants are not growing well.	Check the pH of all tanks used. Ensure water temperature and pH are within range. Add water or nutrients as necessary
Water is leaking onto the ground	In side panels, check all tubing is connected and securely on each nozzle. Ensure pump is securely attached to tank in bottom reservoir. Follow the
How many seeds in each rockwool cube?	Use the tweezers to place only one seed per rockwool cube.
I think something is broken.	Call or email Tech Mobile to set-up maintenance.
Can rockwool be reused?	Yes! Rockwool cubes can be reused 2-3 times if cleaned properly. Wash off the rockwool in a sink after the plant has been removed and remove any roots or algae that may have formed from the nutrients and moisture. Do NOT squeeze the cubes of rockwool when wet. If you need to remove some of the water from the cubes, simply shake them gently.
How do I get more rockwool?	Tech Mobile supplies 50 rockwool cubes that can be used 2-3 times if cared for properly. Any additional rockwool will need to be supplied by the school.

Extension Resources

- Realityworks User Guide:
<https://www.realityworks.com/wp-content/uploads/2019/12/1053610-01-Hydroponics-User-Guide-WEB.pdf>
- Hydroponic curriculum and support documents: www.realityworks.com/hydroponics-downloads

