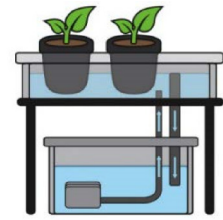


Hydroponics, Aeroponics, Aquaponics



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Slides Topics/Links

- 2 **Hydroponics:** the growing of plants in nutrient solutions with or without an inert medium to provide mechanical support
Aeroponics: Plant roots are suspended in air and are misted with the nutrient solution in short intervals, controlled by a pump and timer
Aquaponics: A system in which the waste produced by farmed fish or other aquatic animals supplies nutrients for plants grown hydroponically, which in turn purify the water

Why write about hydroponics?

- Water culture of all kinds is really hot right now
- People of all ages and income levels are trying it – especially millennials
- Systems and how-to's are available online, in hydroponics shops and nurseries, and big box stores
- As populations increase, we need to find more sustainable methods of food production like these
- It's not new, but with new importance and new applications.

- 4-5 **About Hydroponics /Why Hydroponics? /Challenges:** www.maximumyield.com/hydroponics-pros-and-cons-of-hydroponic-gardening/2/3049

6-8 **Best Plants for Hydroponics:**

Edibles – greens, herbs, strawberries, scallions, radishes, tomatoes, cucumbers, peppers, beans
Houseplants – begonia, coleus, fiddle-leaf fig, geranium, ivy, philodendron, spider plant
Other – cannabis, hops!

9 **Hydroponic system components:**

- Grow light or sunlight
- Grow tray
- Reservoir
- Submersible pump
- Air pump
- Growing medium
- Nutrient solution

Liquid/Hydro Systems

- 11 **Kratky Method:** (passive hydroponics): www.maximumyield.com/the-kratky-method-is-a-simple-and-fun-way-to-grow/2/2996
- 12-16 **Deep Water Culture:**
Home-made deep water system (about \$35) www.youtube.com/watch?v=dcxCgP8TEaQ; Oxyclone propagation system www.oxyclone.com/; AeroGarden Harvest Elite with Gourmet Herb Seed Pod Kit (\$159.99) and Aerogarden Farm Plus (2@ \$559 plus coupling kit) www.aerogarden.com; Bright Farms www.brightfarms.com/
- 17-19 **Nutrient Film Technique:**
Image from www.theaquaponicsource.com; www.inhabitat.com; www.oldsoulsfarm.com/
- 20-23 **Aeroponics:** Tower Garden <http://www.towergarden.com/>; Home-made aeroponics system (about \$55) www.gardenpool.org/online-classes/how-to-make-a-simple-aeroponics-system;

Media Systems

- 24-26 **Wicking systems:** Same as self-watering pots! EarthTainer and InnTainer™ step-by-step assembly instructions: www.gardenpool.org/online-classes/how-to-make-a-simple-aeroponics-system; Coming soon to Ikea www.digitaltrends.com/home/ikea-now-sells-hydroponic-gardens-coming-to-us-2/
- 27-31 **Drip systems:** Waterfields www.waterfieldsllc.com; Eighty Acres Farm www.eafarms.com; Eighty Acres Farm Infographic: www.eafarms.com/vertical-farming/
- 32 **Ebb and flow:** How a bell siphon works <https://www.youtube.com/watch?v=gFokOynqOqQ>
- 33-39 **Aquaponics:** Back to the Roots Water Garden 2.0 (\$99.99) www.backtotheroots.com/products/watergarden; Greenacres Foundation www.green-acres.org; Half-barrel aquaponics; Cincinnati Hills Christian Academy [www.hortidaily.com/article/44532/US-\(OH\)-STEM-Aquaponics-at-Cincinnati-Hills-Christian-Academy](http://www.hortidaily.com/article/44532/US-(OH)-STEM-Aquaponics-at-Cincinnati-Hills-Christian-Academy); Cincinnati Zoo and Botanical Gardens www.blog.cincinnati-zoo.org/2013/08/28/fishy-business-at-the-base-camp-cafe/; O2Urban Farms <http://o2urbanfarms.org/>
- 39 **Managing a Hydroponics System:**
- Maintain water temperature between 65 and 75 degrees.
 - Monitor and adjust pH as necessary.
 - Monitor nutrient levels.
 - Change the nutrient solution in the reservoir when necessary (every few weeks/months).
 - Drain and clean the system after finishing a grow cycle.
- 40 **Lettuce Example:** BlueLab EC, pH pens (\$130 for both) www.getbluelab.com *Hydroponic Food Production* by Howard M. Resh, Woodbridge Press, 2013 and <http://howardresh.com/>
- 41 **Organic hydroponics?** Yes, for now . . . stay tuned for updates!
- 42 **Hydroponics on the rise:** www.futuremarketinsights.com/reports/aquaponics-market
- 43 -> **Hydroponic Trends 2018:** www.researchcorridor.com/hydroponic-farming-market/
- Vertical Growing, especially in urban environments
 - Microgreens grown hydroponically
 - Sustainable Systems = Aquaponics; community aquaponics
 - Living Harvest = harvesting lettuce, greens, and herbs by pulling them out of the system and selling them without cutting. Advantage is the prolonged shelf life, since damp roots continue to feed the plant.
 - Multi-seeding = two or more seeds of lettuce, basil, and/or greens of contrasting colors planted into the same plug
 - Restaurants and grocery stores incorporating hydroponic systems into business models, such as: www.hydromasta.com.au; www.inhabitat.com/ikeas-space10-is-creating-on-site-aquaponic-farms-for-restaurant-supply/

Story Ideas:

More Resources:

Grower's Guides by Johnny's Selected Seeds: <http://www.johnnyseeds.com/growers-library/introduction-hydroponic-growing.html>; and <http://www.johnnyseeds.com/growers-library/vegetables/hydroponics-trialing-about-johnnys.html>
Cornell Controlled Environment Agriculture: www.cornellcea.com