Homegrown Hydro Project Guide

intel FUTURE SKILLS

PROJECT OVERVIEW:

Design and construct a way to grow plants without soil, instead using the household materials of your choice.

Project Intro Video: Homegrown Hydro

Inspirational Video: Hydro-ponic Gardening

PROJECT CATEGORY:
Global

DIFFICULTY LEVEL:
Intermediate

TIME RANGE:
45 - 90 minutes

ESSENTIAL SKILLS/ MINDSETS THAT YOU MAY LEARN:
Design Thinking
Iteration
Prototyping
Simple Machines
Collaboration

TOOLS AND MATERIALS:
- 2-liter bottles
- Sponges
- Pea gravel or other small rocks

Optional Supplies
- Styrofoam
- Submersible pump
- Tubing of various diameters and lengths

AT HOME SUBSTITUTIONS:
- 2-liter soda pop bottles work best for this project. However, any vessel that can hold water will work just fine. Look around the house for recycled containers that can be used as a water reservoir. Choose a container that you can punch holes into or otherwise modify for your hydro-ponic system.

MATERIAL PURCHASE LINK:
http://tiny.cc/Intelbuylist

Project Steps

Dream it!

Did you know you can grow plants without soil? This process is call hydro-ponics, and your challenge today is to build a soilless plant of your own using common materials you can find at home (or in the recycling bin).

1. To start, watch the Project Intro and Inspire-To videos to learn more about the types of hydro-ponic systems you can build. [:10]

Draw It!

2. Sketch out a few ideas for your system. Use the "Think About It" section to guide your decision-making. [:05]

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Build It!

3. Gather your supplies and start building your hydro-ponic system. [:15]

4. Test, troubleshoot, and iterate to make your homegrown hydro system the best it can be. [:05]

5. Choose your inert growing materials (typically clean rock, pieces of sponge, or other non-soil alternatives). [:05]

If time allows, test out different growing mediums to see what will work best for your seeds.

6. Tweak your design until you have a leakproof hydro-ponic system you can start growing plants in.

Share It!

7. Show off your hydro-ponic system, request feedback, and get ready to plant your seeds. [:05]

8. Clean up, find a sunny spot for your soilless garden, plant your seeds, and watch them grow! [:05]

Expand it!

If you liked building a simple hydro-ponic system, then you should try to make a bigger, better one. Did you know you can grow plants and fish in the same system? Or, maybe you want to grow plants by spraying the roots with nutrient-rich water? Below are some terms to get you started as you continue exploring the exciting world of soilless gardening.

- Aquaponics: The growth of fish and plants together.
- Aeroponics: The act of misting plant roots with water and nutrients.
- NFT (Nutrient Film Technique): This is the process most commercial growers use, where a continuous film of nutrient water circulates around the system.

DASH OF DESIGN:

Design thinking is a system that helps to solve problems using iteration and prototyping. Watch our video to learn how you can use design thinking as you start to build your homegrown hydro-ponic system.

THINK ABOUT IT:

What type of hydro-ponic system would you like to build?

- What materials do you have on hand that you can use to build your system?
- Will your system need a pump, or will you water it manually?
- What type of plants would you like to grow? Will you grow big plants or small plants—and how will this affect your design?

DID YOU KNOW?

Disneyland's Living with the Land exhibit houses a giant hydro-ponic "tomato tree," setting the record for the world's most productive tomato plant in 2006. The tree produced 32,000 tomatoes in a 16-month period!

PRO TIPS:

There are lots of different ways to grow plants without soil. Look at our list below (organized from simplest to hardest) to decide what system is best for you.

- *Passive Raft System:* Build a floatable seed-holding device and float it on your nutrient rich water.
- *2-Liter Self-Waterer:* Simply cut a 2-liter bottle in half, invert the top, and nest it into the bottom (the water reservoir). Fill the top with sponge and pebbles, and then plant your seeds.
- *Pipe and Bottles:* Create a pipe array that holds upside-down bottles. Drill holes into the caps, add a pump and an overflow valve, and voila!

See the "Helpful Resources" section for more information and links.

HELPFUL RESOURCES

- Different types of hydro systems explained simply: **simplyhydro.com/system**
- A quick and simple overview of soilless gardening options (great for younger participants): **kidsgardening.org/garden-how-to-hydroponics**
- Hydro-ponic nutrients explained: **youtu.be/tI2K45je-Rw**

NEED MORE HELP AND INFORMATION?

Contact us at: **intelfutureskills@intel.com**

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