

2.7-2.9 Water Town

Summary

Students construct their main project in Civil Engineering: the design of a water distribution network, or Water Town, that will simulate the way in which culinary water is provided to residences and businesses in a community.

Learning Objectives

After this class, students will be able to:

- Explain how water distribution networks function.
- Explain how the design of a distribution network affects the resulting flow rates of water through the network.

Materials

Each student team will need the following:

- Constructed bottle and remaining tubing from previous activity.
- 10 ft. of $\frac{1}{4}$ in. Polyethylene flexible tubing
- (10) $\frac{1}{4}$ in. Straight couplers
- (10) $\frac{1}{4}$ in. "T" couplers
- (4) $\frac{1}{4}$ in. Elbows
- (8) $\frac{1}{4}$ in. Valves
- 32 x 24 x $\frac{1}{2}$ in. Oriented strand board (OSB) base
- 16 in. of 2x4 Riser
- (20) $\frac{1}{4}$ in. Staples
- (6) $\frac{3}{4}$ in. Staples
- Water Distribution Network Construction and Testing Worksheet

Other equipment needed in the lab:

- PVC pipe cement
- Teflon tape
- Drill and wood screws for attaching 2x4 riser to OSB base
- $\frac{3}{4}$ in. spade bit
- Hammer
- Utility knife
- Table vice for holding board to which the water tower bottle is attached or other method for holding water tower at desired height
- Duct tape
- Tape measure
- Graduated cylinders (500 ml or 1 L)
- Stop watch or other timing device

Developed through a partnership between the University of Utah College of Engineering and Granite School District

Time

240 minutes

Procedure/Pacing

There are three days allotted for this activity.

1. On Day 1, students should be primarily designing and constructing their water distribution network.
2. On Day 2, students should finish construction and begin to take measurements.
3. On Day 3, students should complete measurements and any adjustments to their water town. They should work through the reflection questions on the worksheet.

In-Class Assignment

Assignment 2.7i: Water Distribution Network Construction and Testing Worksheet

Resources

Sprinkler Line Assembly:

- <http://youtu.be/lwKcMSDXHig>

Water Towers:

- <http://people.howstuffworks.com/water.htm>
- <http://wonderopolis.org/wonder/how-do-water-towers-work/>

Water Distribution Networks:

- http://www.who.int/water_sanitation_health/dwq/en/piped3.pdf
- http://www.samsamwater.com/library/TP40_21_Water_distribution.pdf

Homework

None.

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