

# STEM 8-12 Mon. August 12 2-3PM

## Water Drain Challenge

**Location:** Children's Reading Room

**Materials:** Bendy Straws, 2 bottles each, Tape, Balloon = pressure to squeeze water through straw as an over half way pressure) To fill second bottle, duct tape to secure straw, shallow baking pans to keep water-messes confined

**Set Up:** Precut straw-sized hole into half of the bottles about half way down the bottle, using a razor to make a small x is simplest, set up tape in the middle of the tables with scissors. Add a small amount of dye to water so that it can be easily seen and measured.

**Engineering Concept:** Hydraulics and Engineering

**Structure:**

- 1.) Give each child two bottles, three straws and one balloon (Be sure that one bottle has a hole for the straw)
- 2.) Instruct attendees to connect the three straws-Bottom to Bottom. And bend the necks upward on either end (See Photo 1)
- 3.) Fit one end of the double straw into the precut hole in bottle one and secure with tape – be sure the straw reaches the bottom of the bottle.
- 4.) Set the other end of the straw into the top of bottle 2 and secure with tape
- 5.) Fill each bottle #1 (With the straw in the middle of the bottle) with the colored water and fit the cap onto the bottle quickly. If there are any leaks-secure with the tape and blue-stick adhesive putty
  - a. Notice how the water drips slowly into the second bottle
- 6.) Once everyone's bottles are successfully dripping into the second bottle have everyone untwist their caps slowly so they can see how the water is pulling the air into the bottle in order to push the water through the straw.
  - a. Notice how the air is pulled through the cap into the bottle.
- 7.) The challenge now begins!
  - a. The first 3 people to fill the second bottle are the challenge winners
    - I. Top prize is 15 library loot dollars plus one Raffle Ticket
    - II. Second place is 10 library loot dollars plus one Raffle Ticketf
    - III. Third place is 5 library loot dollars plus one Raffle Ticket
  - b. Note how the water stops once the same height is achieved in both bottles
  - c. Remind attendees that water has a natural ability to seek its own level no matter how far apart or broken up it is and once that has been achieved it no longer pulls the air to push itself down and now needs external force to keep it moving.
  - d. The balloons hidden ability is to add extra pressure to the water to push the last of the water through. (hint: It must be filled with air before being placed on bottle one.)

