

Dear Middle School Parent:

Fulton County Public Works, Alpharetta Public Works, and Fulton Science Academy Private School are proud to announce the 2016 Model Water Tower Competition. This competition provides students with a fun-filled, science oriented contest aimed at introducing middle school students to engineering and the water profession.

This competition requires students to design and build a water tower with specific size and height requirements. The judging will take place on December 15, 2016, at the Fulton Science Academy Private School, starting at 10:00 am. Students may work individually or as a team, with up to four students on a team.

The models are judged based on 3 categories: hydraulic efficiency, structural efficiency, and design ingenuity/interview presentation. Grand prizes will be awarded to the 3 Top Overall Models. All of the specific requirements for the water tower model judging and associated scoring factors are listed within this packet. Prizes will be shared between team members.

The Model Water Tower Competition Registration Form must be completed online at <http://www.gawp.org/?page=MWTCSchools> by September 16, 2016. While the individual or student team must build the models, parents are encouraged to coach and mentor their student throughout the design and build phase of their water tower model.

- **Online Registration** - Students have until September 16, 2016 to submit their student registration forms. Registration forms can be accessed online at <http://www.gawp.org/?page=MWTCSchools>
- **Model Building** - will occur by students in their spare time up until the Competition Day.
- **Competition Day – December 15, 2016, at Fulton Science Academy Private School.**
Check-In will be held at 9:30 am. Judging and final awards will occur when all towers have been processed. Lunch will be provided for all who attend.

For additional information regarding the Model Water Tower Competition, please contact one of the event organizers listed in the back of this packet. Good luck to all students!

Sincerely,

Sharon Smith
Fulton County Public Works

“From Today’s Youth Come Tomorrow’s Leaders-Let’s Lead Some to the Water Profession”

Instructions

General

- The Georgia Model Water Tower Competition will be held as follows:
 - When: December 15, 2016
 - Time: 10:00 am/check in at 9:30 am
 - Where: Fulton Science Academy Private School
- There is no cost to enter. To participate, register online before September 16, 2016, at <http://www.gawp.org/?page=MWTCschools> and arrive at the check-in with the following materials:
 - Bring your completed **Model Water Tower**.
 - Bring your completed **Participant Release**, a blank form is attached.
 - Bring your completed **Materials List**, a blank form is attached.
- Model water towers may be of any design and constructed from any materials. In fact, you will be awarded for using **creative designs** and **innovative materials**. A creative design is a water tower that will function even though it does not look like any other tower. Examples of innovative materials are an old broom stick from your garage as a support structure, an ice cream bucket as a tank, or any other atypical items that you might find lying around the house.

Objective

The objective of the competition is to make participants aware of the importance of **reliable drinking water** and the rewarding opportunities available in the **water profession**. The competition meets this objective by having students develop an idea into a functioning water tower, just like water professionals do in the real world.

Prizes will be awarded to the top three finishers and to honorable mentions. Judges' decisions are final.

Judging will be based on **three criteria** – structural efficiency, hydraulic efficiency, and design ingenuity/ interview presentation. Understand and achieve these criteria to do well! They are explained below.

Structural Efficiency

Structural efficiency is the maximum mass that a structure can hold divided by the mass of the structure. Therefore, the model tower's structural efficiency is the weight (in pounds) of the maximum amount of water the tower can hold divided by the weight (in pounds) of the empty tower. This is shown with the following formula:

$$\text{Structural Efficiency} = \frac{(\text{Weight of tower when full} - \text{Weight of tower when empty})}{\text{Weight of tower when empty}}$$

The higher this number is, the more structurally efficient the tower. This criterion is similar to what engineer's use in the real world! Remember, the tank should be between 1.5 feet and 2.5 feet high (See Drawing Provided) and hold at least 1 gallon of water but no more than 2.5 gallons!

Hydraulic Efficiency

Hydraulic efficiency is the amount of **time it takes** to fill the model with 1 gallon of water and drain it back out again. The judges will fill the tank through the 3/8 inch connector. The less time it takes to fill and drain the tank through the connector the better. **The tank must have a vent so the judge can see into the tower during filling. Coverless towers will not be considered vented. Hydraulic testing will be done with cover/lid on.**

Design Ingenuity & Interview Presentation

Ingenuity is how much **imagination and skill** was used in your model. Water professionals must often use ingenuity; they use skill and imagination to solve difficult problems. The judges will look at several items:

- Engineering Design (is the model sturdy, are the materials unique, do the parts fit together nicely?)
- Interview Presentation – Each student will have no more than **5 minutes** to present their water towers to the judges and answer any questions that the judges may pose. Students should be able to verbalize engineering concepts related to their tower and speak on their competition experience. Example questions: What did you enjoy most about the competition? How did your model water tower perform? What is the relationship between venting and hydraulic efficiency?

Required Design Standards and Penalties

“From Today’s Youth Come Tomorrow’s Leaders-Let’s Lead Some to the Water Profession”

Note: Prizes will be awarded to the 3 Top Overall Models based on the lowest accumulated score. The goal is to achieve the **lowest possible score** and not to incur any penalties.

Keep to the following standards when designing and constructing your model:

- Footprint: The base of the model must fit in a square **1 foot on each side**. If not, a **2 point penalty** will be assessed.
- Tank Height: The tank must be **between 1.5 and 2.5 feet high (See Drawing)**. If not, a **2 point penalty** will be assessed.
- Tank Volume: When full, the tank must **hold between 1 and 2.5 gallons** of water. Hint: test your model to make sure the tower can hold the weight of the water! If not, a **2 point penalty** will be assessed.
- Leaks: The tank **should not leak**. If the tower leaks (e.g. tank, piping, connector), then a **2 point penalty** will be assessed. **A tower will be considered leaking if more than 10% of the water leaks during Hydraulic Testing**. If water cannot be pumped into the tower during the hydraulic testing, or if 50% or more of the 1 gallon does not drain back out of the tower, or the tower falls apart when an attempt is made to pump water into the tower, then an additional 3 point penalty will be assigned (for a maximum of a 5 point penalty).
- Vent/Lid: The tank should have a **vent** for hydraulic efficiency and a **removable or transparent lid** so the judges can tell when it is full. Uncovered or non-vented towers will result in a **penalty of 1 point**.
- 3/8 Inch Connector: The model must use the **3/8 inch connector** as supplied by the Georgia Model Water Tower Competition Committee. If the tower does not have this 3/8 inch connector, then a **1 point penalty** will be assessed.
- Structural Stability: The tower should be structurally stable throughout the entire competition. If the tower exhibits structural instability (e.g. tower has to be supported by a person during filling of water or during any part of the testing), then a **2 point penalty** will be assessed.
- Materials' List: **All materials must be listed**. This form must be turned in on the day of the event. Where recycled items are used, put the letter "R" in the cost column. You may use as many recycled materials as you wish. If the materials' list is not provided at the competition, a **3 point penalty** will be assessed.
- Receipts: **Bring receipts** for all materials purchased for your model. A **penalty of 1 point (Maximum of 3 penalty points)** will be given for each missing receipt for items purchased new specifically for tower construction. Receipts are not necessary for recycled items. However, the items must be accounted for on the materials list form
- Cost efficiency: **Bring receipts** for all items purchased for your model. The cost of glue, nails, screws, general adhesives, and items used to decorate the tower should not be counted towards the tower's total cost. The cost of the tower should **not** include tax. Penalty points will be assigned as follows:

\$ 0.00 - \$ 5.00	0 point
\$ 5.01 - \$ 10.00	2 point
\$ 10.01 - \$ 15.00	3 point
\$ 15.01 - \$ 20.00	4 point
More than \$ 20.00	5 point

Additional Information:

"From Today's Youth Come Tomorrow's Leaders-Let's Lead Some to the Water Profession"

For more information, please contact the event organizers as follows and/or school contacts:

Sharon Smith
Fulton County Public Works
(404) 612-8006
Sharon.smith@fultoncountyga.gov

Terry Porter
Alpharetta Public Works
(678) 297-6200
tporter@alpharetta.ga.us

Nevruz Turan
Fulton Science Academy Private School
(678) 366-2555 x102
nturan@fultonscienceacademy.org

Participant Release Form

INSTRUCTIONS: Complete this form with your parent or legal guardian's signature. This form can be submitted on the day of competition.

I AM THE PARENT/GUARDIAN OF _____
I HEREBY AUTHORIZE THE ORGANIZERS OF THE MODEL WATER TOWER COMPETITION, A SPECIAL PROJECT OF FULTON COUNTY PUBLIC WORKS, ALPHARETTA PUBLIC WORKS, AND FULTON SCIENCE ACADEMY PRIVATE SCHOOL TO:

1. PREPARE ANY PROMOTIONAL MATERIAL SUCH AS PRESENTATIONS, SLIDE SHOWS, VIDEO TAPES, PHOTOGRAPHS AND MOVIE FILMS IN WHICH MY CHILD WILL SPEAK AND/OR APPEAR.
2. USE, REUSE, PUBLISH AND REPUBLISH THE SAME IN THE WHOLE OR IN PART INDIVIDUALLY OR IN CONJUNCTION WITH OTHER PHOTOGRAPHS , VIDEO OR FILM IN ANY MEDIUM FOR ANY PURPOSES WHOSOEVER, INCLUDING (BUT NOT BY WAY OF LIMITATION) ILLUSTRATION, PROMOTION AND ADVERTISING BY THE UTILITY.

I HEREBY WAIVE ANY MONETARY RIGHTS OR OTHER RIGHTS THAT I MAY HAVE TO INSPECT AND/OR TO APPROVE THE FINISHED PRODUCT OR THE ADVERTISING COPY THAT MAY BE USED IN CONNECTION THEREWITH OR THE USE TO WHICH IT MAY BE APPLIED. I UNDERSTAND AND AGREE THAT ALL RIGHTS, ROYALTIES AND MATERIALS WILL BELONG TO THE UTILITY.

Parent/Guardian_ (Print Full Name) _____

Parent/Guardian_ (Signature) _____

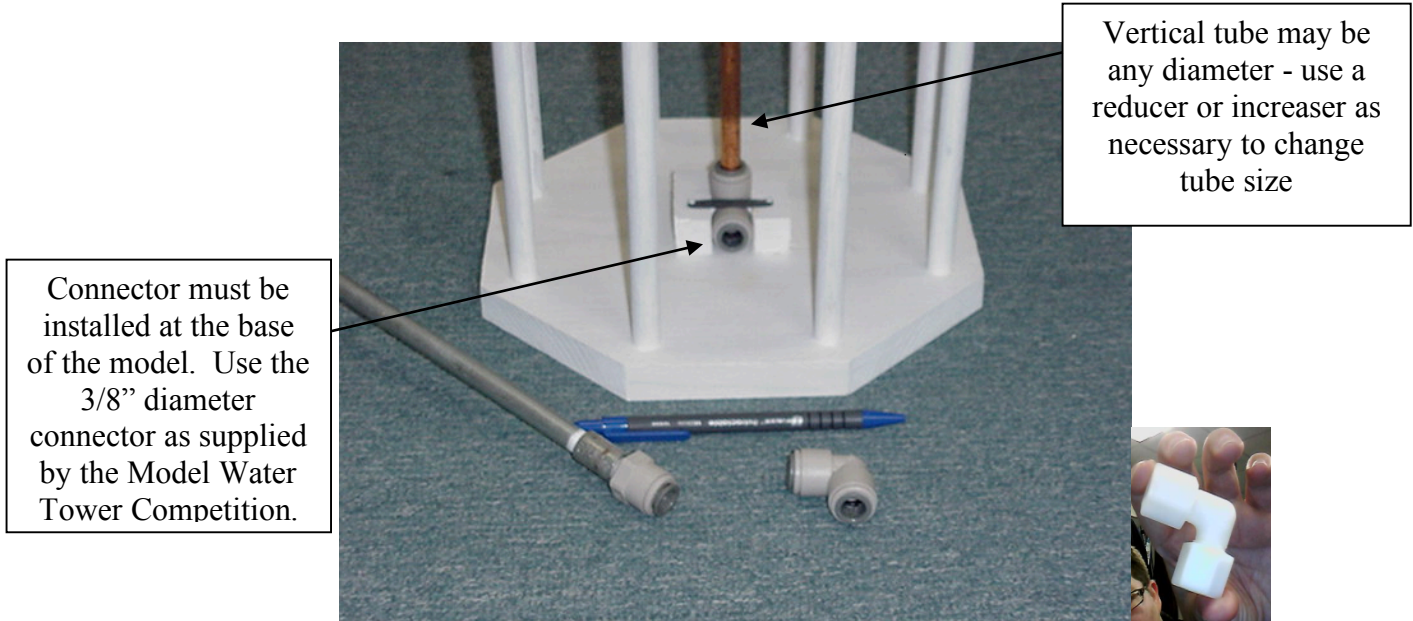
Date _____ Phone # _____

Address: _____

City: _____ State: _____ Zip: _____

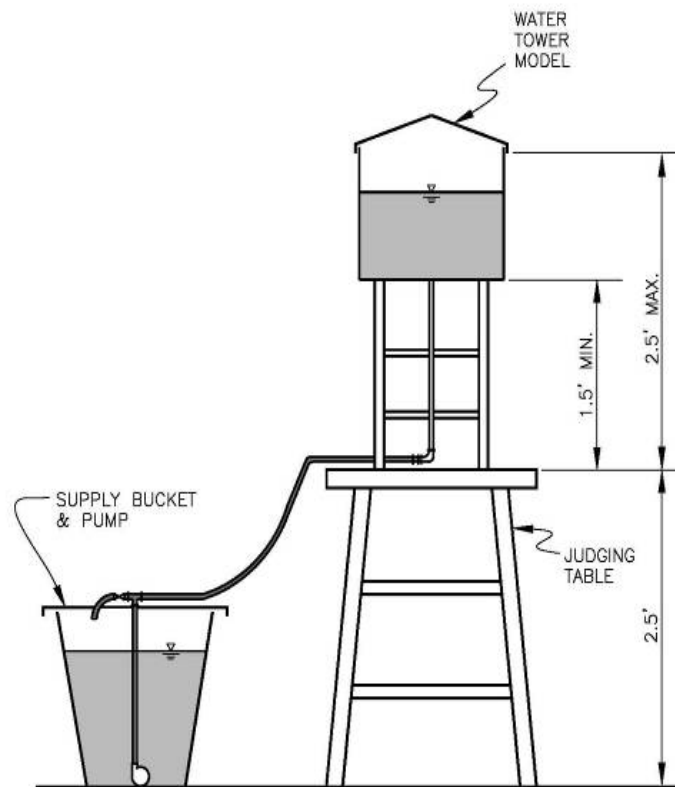
**Address information will be used for MWTC purposes only. Award money for 1st, 2nd, and 3rd place winners will be mailed.*

Model Water Tower Connector



The proper 3/8" diameter push-on connector will be provided to all registered contestants. You must use the connector given to you to avoid a penalty. Contact your teacher to receive the connector.

MODEL TESTING



“From Today’s Youth Come Tomorrow’s Leaders-Let’s Lead Some to the Water Profession”

Check List

- The base of the model fits in a square 1 foot on each side
- The tank height is between 1.5 and 2.5 ft high
- The tank has a vent
- The tank holds between 1.0 and 2.5 gallons of water
- The tank uses the 3/8 inch connector supplied
- Tank has been tested
- Receipts for all Materials Purchased
- Completed Materials List
- Signed Participant Release Form