2020 Model Water Tower Competition Registration Packet
Attention Middle School Teachers:

Your local region of American Water Works Association, Region IX, is proud to announce the 2nd Annual 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. We are pleased to invite your child to participate with other Region IX middle school students in this unique competition.

This competition requires students to design and build a water tower with specific size and height requirements. The judging takes place on February 22, 2020. The competition will be held at Avalon Middle School at 5445 King Arthur's Way Milton, FL 32583 and will start at 9:00 AM. The models are judged based on 4 categories including: cost efficiency, hydraulic efficiency, structural efficiency, and design/materials ingenuity. Cash prizes will be awarded to the top three overall winners. All of the specific requirements for the water tower model judging are defined in the Judging Handout, and their associated scoring factors are listed within this packet.

Each student will receive a packet that includes all necessary information to successfully enter and build a water tower model. The Water Tower Model Competition Registration Forms must be completed, signed by the team advisor, and returned to the teacher or mailed to the MWTC Chair below by December 6, 2019. 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.

- **Classroom Registration** - Teachers have until the morning of December 6, 2019 to return their student registration forms to Sarah Deavenport either by email or mail to the address shown below.
- **Model Building** - will occur by students in their spare time up until the Judging Day.
- **Judging Day – February 22, 2020.** Location is Avalon Middle School. Registration is held from 9:00-9:30 am. Students arriving after 9:30 am will not be eligible to compete. 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 Sarah Deavenport at 850-941-7280 (sarah.deavenport@jacobs.com).

Sincerely,

Sarah Deavenport, P.E.  
Jacobs  
FSAWWA Region IX Secretary  
Model Water Tower Competition Chair  
25 W Cedar St, Suite 350  
Pensacola, FL 32502

Alicia Keeter  
South Walton Utility Co., Inc.  
FSAWWA Region IX Chair  
SWUCI General Manager  
369 Miramar Beach Dr.  
Miramar Beach, FL 32550

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

**General**

- The 1st Annual Model Water Tower Competition will be held as follows:
  - When: Saturday, **February 22, 2020**
  - Time: Check-in is between 9:00 – 9:30 AM
  - Where: **Avalon Middle School Cafeteria**

- There is no cost to enter. To participate, arrive at the check-in with the following materials:
  - Bring your completed **model water tower**.
  - Bring a copy of your completed **Registration**, a blank form is attached.
  - 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 innovate materials are an old broom stick from your garage as a support structure, a gas can as a tank, or any other atypical items that you might find laying 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. The lowest scores win (similar to a golf score!). Judges’ decision is final and non-refutable.

Judging will be based on **four criteria** – structural efficiency, hydraulic efficiency, cost efficiency, and design ingenuity. Understand and achieve these criteria to do well! They are explained below.
**Structural Efficiency**

Structural efficiency is calculated by dividing the weight of the model when it is empty by the average height of the tank times the amount of water it holds. The lower this number is the more structurally efficient is the tower’s design. This is shown with the following formula:

\[
\text{Structural Efficiency} = \frac{\text{Weight of the tower when empty (pounds)}}{\text{Average tank height (ft)} \times \text{Amount of water the model holds (gal)}}
\]

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 the judges 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 tank will be drained by letting the water flow out of the tank by gravity only. The less time it takes to fill and drain the tank through the connector the better. The tank must have a vent or a cover so the judge can see into the tower during filling. Coverless towers will not be considered vented. Each tank will be tested (filled and drained) twice and the average of the two fill and drain times (in minutes) will equal the hydraulic efficiency score. The hydraulic efficiency formula is as follows:

\[
\text{Hydraulic Efficiency} = \frac{\text{First Test (fill and drain)} + \text{Second Test (fill and drain)}}{2}
\]

**Cost Efficiency**

Cost efficiency measures your ability to save money while building your model. Bring receipts for all items purchased for your model. Points will be assigned as follows (the lower the score the better):

- $ 0.00 - $ 5.00: 1 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

List all items used in your model and their costs on the Materials List Form. This form is required 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. A penalty of 1 point will be given for each missing receipt for items purchased specifically for tower construction. A 3 point penalty will be added to the student’s score if the Materials list form is missing. No receipt is necessary for recycled items; however, the items must be accounted for on the materials list form. The cost of

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Design Ingenuity

Ingenuity (ɪnˈɡiːnjuɪ) is how much imagination and skill were used in your model. Water professional must often use ingenuity; they use skill and imagination to solve difficult problems. The judges will look at several items:

- Craftsmanship (is the model sturdy, do the parts fit together nicely)?
- Imagination (are the design and materials unique)?
- Artistic merit (does the model have creative ideas, colors or themes)?

Required Design Standards and 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 any part of the tower leaks (e.g. tank, piping, connector), then a 2 point penalty will be assessed.
- **Vent/Lid**: The tank must have a vent or removable lid so the judges can tell when it is full. Uncovered towers 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 (See Drawing for additional details). The 3/8 inch connector will be mailed to the teacher or advisor of the Team upon receipt of the registration forms. If the tower does not have this 3/8 inch connector, then a 1 point penalty will be assessed.
- **Receipts**: Bring receipts for all materials purchased for your model. A 1 point penalty will be given for each item not having a receipt (Max of 3 penalty points).
- **Materials’ List**: Bring materials list to the competition. 3 penalty points will be added to the score if a list is not provided.
- **Structural Stability**: The tower should be structurally stable throughout any part of the 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 added to the score.

Penalties will be assessed for not following the above standards and these penalties will be added to the tower’s score. These standards are demonstrated in the diagram attached to this handout.

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**Additional Information:**
For more information please contact the event organizers as follows:

Sarah Deavenport  
Model Water Tower Competition Chair - FSAWWA Region IX  
sarah.deavenport@jacobs.com  
25 W Cedar St, Suite 350  
Pensacola, FL 32503  
Phone: 850.941.7280

Alicia Keeter  
FSAWWA Region IX Chair  
aak@swuci.org  
369 Miramar Beach Dr.  
Miramar Beach, FL 32550  
Phone: 850.837.2988
**Registration**

Student/Team Name: ________________________________
School/Grade: ________________________________
Teacher or Advisor: ________________________________

****Complete this form and return to your teacher. Teachers must return form to Event Coordinator before pre-registration date (December 6, 2019). Email to Sarah.Deavenport@Jacobs.com

List the name of your team members below. Teams may have from 1 to 4 members.

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Participant Release Form

INSTRUCTIONS: Complete this form with your parent or legal guardian’s signature and return to your teacher. Teachers must return the forms to the Event Coordinator before the pre-registration deadline (December 6, 2019). Email to Sarah.Deavenport@Jacobs.com

I AM THE PARENT/GUARDIAN OF _____________________________________________

I HEREBY AUTHORIZE THE MEMBERS OF THE WATER TOWER COMPETITION COMMITTEE, A SPECIAL PROJECT OF THE AMERICAN WATERWORKS ASSOCIATION-YOUTH EDUCATION COMMITTEE 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 COMMITTEE.

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 COMMITTEE.

Parent/Guardian_(Print Full Name)__________________________________________

Parent/Guardian_(Signature)_______________________________________________

Date_________________________ Phone #___________________________________

Email ______________________

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**Materials List Form**

Team Name: 

Participants: 

Complete and bring this form and all receipts on the day of the contest. List the materials and costs used to construct your model water tower. Put an ‘R’ in the cost column where recycled materials are used.

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TOTAL

* Use additional sheets if necessary to list all materials. A penalty will be given for not bringing this form or receipts.

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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 sponsor to receive the connector. If you do not have a teacher sponsor, contact the event organizer as follows to receive a connector:

Sarah Deavenport  
FSAWWA Region IX  
Model Water Tower Competition Chair  
Jacobs  
25 W Cedar St, Suite 350  
Pensacola, FL 32503  
Phone: 850.941.7280

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MWTC Requirements

The tank must have a vent or a lid - the purpose of the lid/opening is so the judges can see into the tower.

Tank
Min Capacity = 1 gallon
Max. Capacity = 2.5 gallons

Riser pipe
Riser pipe can be any size and material, but keep in mind that the tower must be able to connect to a 3/8" OD connector

Base
From base to bottom of tank must be at least 1.5 feet

Additional notes:
Your Model must be an elevated tank design including a riser pipe, a tank, a supporting structure to hold the tank and a base.
The Maximum and minimum volume requirements INCLUDE the storage in your riser pipe.
The maximum 2.5 feet height refers to the length from the base to the hydraulic height (ie the overflow height).
3/8" OD connector will be supplied by the MWTC Chair (registration required) and is the only allowable 3/8" OD connector that can be used on competition day.

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