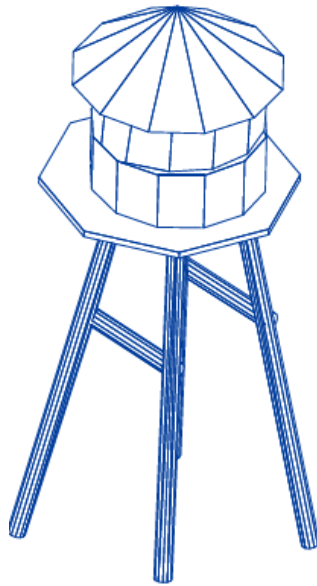


2027 KC Model Water Tower Competition

Design. Build. Compete.



Registration Packet

Grades 4-6 | Free to Participate

Registration Deadline:

November 20, 2026

[Online Registration](#)

Competition Day:

Wednesday, April 21, 2027

10:00 a.m.-12:30 p.m.

4700 E. 63rd St., Kansas City, MO



About the Competition

The KC Model Water Tower Competition is a hands-on STEM challenge for students in grades 4-6. Students design and build a working model water tower, then test their ideas through a real engineering competition. Find out more [here](#).

Participants will apply engineering and problem-solving skills to create a tower that:

- Holds water without leaking
- Stands safely on its own
- Fills and drains efficiently
- Uses materials efficiently
- Shows creativity and thoughtful design

Who May Enter?

Participation is free and open to students in grades 4-6 from public, private, and homeschool settings.

- Students may compete individually or in teams of up to six students.
- More than 30 teams may register.
- A maximum of four teams may register per class.
- Up to 30 teams will be selected for the final competition.

Registration and Project Submission

Register online: [At this link](#) by November 20th, 2027

Submit your completed Model Water Tower: [Submission Link](#)

- Submit a photo and
- A short description of their model
- By **February 12, 2027**

Important Dates

Registration Deadline	November 20, 2026
Project Submission Due	February 12, 2027
Finalists Notified	March 10, 2027
Competition Date	April 21, 2027
Competition Time	10:00 a.m.-12:30 p.m.

Build Your Model Water Tower

Model Water Towers may be of any design and constructed from any materials but must meet the required measurements in the table below.

A water tower has three main parts:

1. Elevated water tank
2. Riser pipe
3. Supporting structure

Required Design Standards

Footprint	The base must fit within a 1 ft x 1 ft square.
Tank height	The bottom of the tank must be at least 1.5 ft above the base. Maximum hydraulic height is 2.5 ft.
Tank volume	The tower must hold between 1.0 and 2.5 gallons of water.
Tubing	Use the provided 3/8-inch tubing. The tubing must reach the base of the tower.
Vent / lid	The tank <u>must</u> have a vent or removable/transparent lid so judges can see when the tank is full.
Leaks	The tank and piping should not leak.
Stability	The tower must stand on its own during filling, draining, and testing.
Materials	Any materials may be used. Creative and recycled materials are encouraged.

Provided Tubing

KC Water/MO-AWWA will provide the required 3/8-inch tubing to registered teams. Teams may pick it up at a designated location, or arrangements may be made to deliver tubing to participating schools. Details will be provided after registration.

Before You Submit Your Project

Test your tower with water.

Confirm that it meets the size requirements, stays upright without support, does not leak, and can be filled and drained through the provided tubing.

How Your Tower Will Be Judged

Towers will be evaluated in four categories. Penalty points are added when a tower does not meet a required standard. The team with the **lowest** total score wins.

1. Structural Efficiency

How strong and lightweight is your tower? Judges compare the empty weight of the model with the height of the tank and the amount of water it holds.

Structural efficiency is the ability of the tower to support a maximum load of water at the required height (1.5-2.5 feet) using the minimum amount of material (weight).

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, the better.

This is shown with the following formula:

$$\text{Structural Efficiency} = \frac{\text{Weight of tower when empty (pounds)}}{\text{Average tank height (feet)} \times \text{Amount of water the tower can hold (gallons)}}$$

Remember the tower should be between 1.5 feet and 2.5 feet high. A more structurally efficient tower will have a better structural score. Remember, the towers with the lowest total scores win.

2. Hydraulic Efficiency

How quickly can your tower fill and drain? Judges will fill and drain one gallon of water through the provided tubing. Each tower will be tested twice, and the average time will be used for scoring.

Hydraulic efficiency is the amount of **time it takes** the judges to fill and drain the model with one

(1) gallon of water.

- The judges will fill the tank by pumping water through the **3/8 inch tube**.
- 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 tube the better.
- **The tank must have a vent or a cover so the judge can see into the tower.**
Coverless towers will not be considered vented.
- Each tank will be tested (filled and drained) twice and the **average** of the two fills and drain times (in minutes) will equal the hydraulic efficiency score.

The hydraulic efficiency formula is as follows:

$$\text{Hydraulic efficiency} = \frac{\text{First Test (fill and drain time)} + \text{Second Test (fill and drain time)}}{2}$$

3. Cost Efficiency

How efficiently did you use your budget? Teams list all materials used and the cost of new materials. Recycled/reused materials are encouraged and are marked with an R on the Materials List Form. **Bring receipts** for all items purchased for your model. Points will be assigned as follows (the lower the score the better):

Cost Efficiency Score

\$0 - \$5.00	1 point
\$5.01 - \$10.00	2 points
\$10.01 - \$15.00	3 points
\$15.01 - \$20.00	4 points
More than \$20.00	5 points

Do not include tax or the cost of glue, nails, screws, general adhesives, or decorative items in the tower cost.

4. Design Ingenuity

How creative and well-made is your design? Judges will consider craftsmanship, imagination, creative use of materials, and artistic merit.

Ingenuity (**in·ge·nu·i·ty**) 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)?

Competition Rules and Penalties

The following penalties are added directly to the tower's total score. Judges' decisions are final.

Requirement	Standard	Penalty if not Standard
Footprint	Base fits within 1 ft x 1 ft	2 points
Tank height	Meets 1.5 ft minimum and 2.5 ft maximum	2 points
Tank volume	Holds 1.0-2.5 gallons	2 points
Leaks	Tank and piping do not leak	2 points
Vent / lid	Tank has a vent or removable/transparent lid	1 point
Provided tubing	Uses the supplied 3/8-inch tubing	1 point; may be unable to compete if connection cannot be made
Receipts	Receipt provided for each newly purchased structural item	1 point per missing receipt, maximum 3 points
Materials List	Completed form brought to competition	3 points
Structural stability	Tower remains stable without being held	2 points

Awards

Awards will be presented to:

- 1st Place
- 2nd Place
- 3rd Place
- People's Choice Award

Materials List Form

Individual or
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/reused materials are used.

MATERIAL

COST

TOTAL

* Use additional sheets if necessary to list all materials.

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, Missouri AWWA and KC Water 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.*

Competition Day Checklist

When and Where

Wednesday, April 21, 2027

10:00 a.m.-12:30 p.m.

4700 E. 63rd St., Kansas City, MO

Bring With You

1. Completed model water tower, dry and ready for testing
2. Completed Materials List Form
3. Receipts for newly purchased structural materials
4. Participation Release Form for each student

Final Check

- ☐ Base fits within 1 ft x 1 ft
- ☐ Tank is within the required height range
- ☐ Tower holds 1.0-2.5 gallons
- ☐ Provided 3/8-inch tubing is installed
- ☐ Tank has a vent or removable/transparent lid
- ☐ Tower is stable and does not leak

Questions?

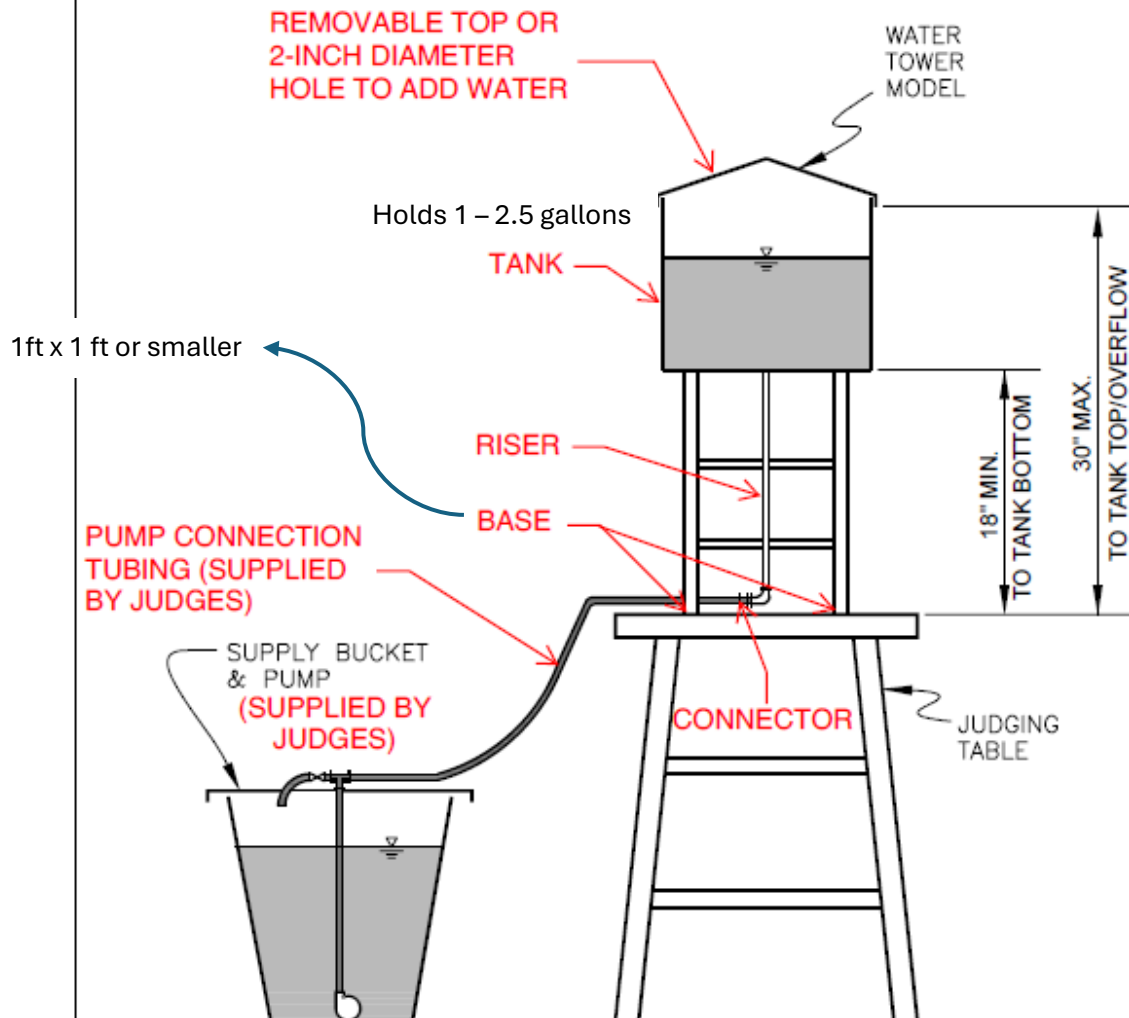
Liên Nguyễn

KC Water Laboratory

Office: 816-513-7011

Email: lien.nguyen@kcmo.org

MODEL TESTING



Score Card Example:

Model #: _____

Station 1. Registration	Team Name:
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Station 2. Dimensions	Weight of Model Empty		Pounds
	Weight of Model when full of water		Pounds
	Height at Bottom of Tank		Inches
	Height at Top of Tank		Inches
	Is Footprint less than 1ft ² ?		Yes / No
	Does tank have a vent or removable lid?		Yes/No

Station 3. Materials	Total Amount Spent		\$
	Is there a materials list?		Yes / No
	How many new materials are without a receipt?		Number

Station 4. Hydraulics	Time to fill and drain 1 gal. (a)		min:sec
	Time to fill and drain 1 gal. (b)		min:sec
	Are there visible leaks?		Yes / No
	Is the model stable?		Yes/No

Judges Form Example

Judge # _____

Instructions for judges: Score from 0.1 – 0.5 in each category. The following are general guidelines. Interpretation of these guidelines is up to the judge. Judges decision is final!

Score	Craftsmanship	Imagination	Artistic Merit
0.1	Among the best in the division. Model is sturdy. Pieces fit together firmly and precisely. Intricate pieces reflect excellent craftsmanship.	Among the best in the division. Design is unlike other models. Material selection is unique and unlike other models.	Among the best in the division. Model is painted. Design is reflected with a theme. Artistic intent is clear and maybe demonstrated in several ways. Artistic merit represents the team's own work.
0.2	Model is sturdy. Intricate pieces demonstrate good craftsmanship.	Design is very imaginative. Material selection is unlike most other models.	Model is painted (or decorated). Theme is clearly demonstrated. Art work is mostly of the teams' own work.
0.3	Pieces fit together snugly. Model is sturdy. Model may not have intricate pieces that reflect exceptional craftsmanship.	Design and materials are both unique.	Model is painted several colors, which reflect some artistic intent. Art work may / or may not be created by the team.
0.4	Model stands on its own. Pieces may not fit together precisely. Excess glue may be present or fasteners may stick out.	Attempt is made to use unique materials or design. Design may or may not work well.	Model is painted or decorated. Theme may not be clearly identified.
0.5	Model is structurally unstable.	Materials are commonly used. Design is commonly seen.	Model is not painted completely and does not reflect an artistic intent.