Mini-Trebuchet Competition 2026 Guide

Goal: A trebuchet design and approach that provides a low cost and basic set-up that allows easy and achievable entry into the competition to nearly anyone or organization wanting to participate.

Competition Elements – To throw a softball from a standardized "Basic" wooden trebuchet 50-feet to hit a 4-foot stationary ground target. The best of 8 shots wins! And, recently added 2 Shots for longest Distance.

Arcade-like Elements Built-into the Competition: The set-up of the trebuchets in a circle along with the colorful, bright, festive Target that incorporates a Strobe light, Alarm Bell, and Fire Siren activated every time it is struck by a ball…Captures everyone's attention and keeps the competition FUN!

Mini-Trebuchet Contest Concept, Mini-Trebuchet Design, Arcade Style Target System, and Competition Rules/Regulations

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Mini-Trebuchet Competition Guide

Background/History: After significant on-line research, we believe that this specific design and implementation of an organized family/office friendly Trebuchet competition has not been done or offered before. This Mini-Trebuchet competition is designed to incorporate all levels of Science, Technology, Engineering, Art, and Mathematics (STEAM) and provides significant opportunities for Innovation and personalized advancements at a fairly low entry/build cost. This Mini-Trebuchet competition provides a low cost and prescribed/required basic design/set-up rules, encouraging easy and achievable entry into the competition to nearly anyone or organization wanting to participate. In fact, while allowing exotic solutions, materials, and/or potentially "costly" design features, none of those enhancements will necessarily improve or guarantee any advantages over the solid and mindful construction of the basic trebuchet design using the templates and examples provided to all participants.

In addition, this Mini-Trebuchet competition approach utilizes standard softballs as the projectiles which allows the competition to be safely and easily done at nearly any outdoor recreation venue. The proposed lay-out of the competition (a 100 ft circle surrounding a fixed 3-foot circular target) provides outstanding viewing for the participants as well as safe viewing areas for family and guests. The incorporation of an "Animated Target" with flashing lights, a loud siren and alarm bell response to "Hits" will attract attention to the competition and provide direct feedback and encouragement to the teams. Finally, the 4-foot target size, trebuchet design, and 50-foot distance to the target was designed specifically to produce on-target shot-success rates that should exceed 50% for average teams, which will keep the competition both Active and FUN for participants and observers!

GOAL: Provide the infrastructure, Templates and rules for a successful Family, Office, School, or Organization Mini-Trebuchet Competition!

Competition Elements – To throw a standard size softball from a required "Basic" wooden trebuchet 50-feet to hit a 4-foot stationary ground target and 2 chances to throw the ball the longest distance.. A sample "Basic" wooden trebuchet design is provided in a template to ensure a common framework is available, but not required, and the competition rests on Team's derived/developed features like the throwing arm, counter-weight designs, cradle characteristics and the team's familiarity of their specific trebuchets.

Arcade-like Elements Built-into the Competition: The set-up of the trebuchets in a circle along with the colorful, bright, festive Target that incorporates a Strobe light, Alarm Bell, and Fire Siren activated every time it is struck by a ball is designed to capture everyone's attention. In addition, the basic sample trebuchet design was intentionally created to make hitting the Target very achievable with the goal that each team would be able to set-off the Target multiple times during their part of the 10-shot competition.

Sample Basic Trebuchet Framework:

- **Sample Basic Trebuchet Design Provided**: Provides a common templated structure that is capable of satisfying the competition but is not required. It provides newer teams with opportunities to modify, improve, innovate specific features and parts while ensuring all teams have a fundamental trebuchet design. A team's success is directly tied to their own refinements, reliability considerations, and control of the many variables involved in tossing the softball consistently and repeatably, while providing every team with a common set of design, operational, and material constraints.

- **Affordability**: The "Basic Sample" trebuchet frame consists of five common construction 2X4's cut to prescribed dimensions described in the provided templates and built to a provided set of plans/instructions. This frame can be built with typical "garage" tools like hand saws, drills, screw drivers and wrenches. Frame fasteners will be "suggested" in the template, but modifications and changes are allowed.

- **Transportability**: The "Basic Sample Mini-Trebuchet" design was put together to be transportable in most SUV's and Trucks. However, with minor changes to the connectors (Bolts, Nuts, Screws, Nails) used on the common wood backbone, it would be very easy to utilize nuts and bolts that can be removed to easily breakdown the trebuchet to fit in most sedan trunks.

- **Innovative Trebuchet Characteristics**: In addition to building the base trebuchet, examples can be provided showing potential throwing arm, sling, and weight designs/options that if used will make a well-built competitive trebuchet. However, innovative solutions and the fine tuning of your design to improve reliability, reproducibility, and reducing areas of internal friction have proven to be a key part of the formula for winning this competition.

Potential/Optional "Modifications" outside of the sample wooden frame/backbone (These are not the only modifications that could be used just some ideas used by others as examples….):

- Throwing Arm Materials/Design
- Throwing Arm Pivot Materials/Design (wood, Threaded Rod, Bearings etc.)
- Counter-balance weight system design and materials
- Softball throwing Cradle Materials/Design
- Use of ropes/wire/string for connecting Throwing Arm with the Sling
- Innovative Trigger design (However must be deemed Safe!)
- Ways to adjust/Refine throwing distance (add weight, move trebuchet, adjust rope/wire length)

Competition Rules:

- The height of the Swing-Arm Pivot axis shall not exceed 36 inches from the ground when the ball is released.
- Each team will be provided with a "designated" 10-foot long X 4-foot wide area/box which their trebuchet must be deployed/set-up in.
- Teams will be given adequate time to practice and dial-in their trebuchets with the live target.
- Each team will come to the competition with their own standard weight softball, which they will keep and use exclusively during the competition.
- Numbers will be drawn by each team and the one with the highest number will lead-off the competition and launch their trebuchet softball. After the first shot, the competition will proceed in a clockwise direction.
- When it is a team's turn, they need to be ready and have 3-minutes to launch their softball or will lose that turn. No make-ups are allowed.
- Each team will be given the opportunity to launch ten softballs and the team with the most target "hits" will be the winner. Ties will be managed through a "back-and-forth" shoot-off, one shot at a time until one team hits the target, and the other does not.
- Only a "Direct" hit from the trebuchet throwing arm to the Target is considered a successful Hit. Shots that bounce before hitting the Target will not count even if they inadvertently set off the Target Alarm/Siren system!
- Trebuchet propulsion force must only be gravity powered. No physical pushing or shoving of the counterweight is allowed. No springs, bands, pneumatic, hydraulic, torsion or "powered" designs are allowed! Launch initiation and release controls can use alternate power sources.

Judging the Competition and Award Categories:

- **Awards will be given for the following categories:**
    - Accuracy (number of times their softball hit and triggered the Target.)
    - Most Enthusiastic Team
    - Art; Overall look of the trebuchet (colors, "furniture" finish, Teams Theme)
    - Cool, Unusual, and/or Wow-Factor!
    - (New) Last 2 shots for longest Distance

Safety:

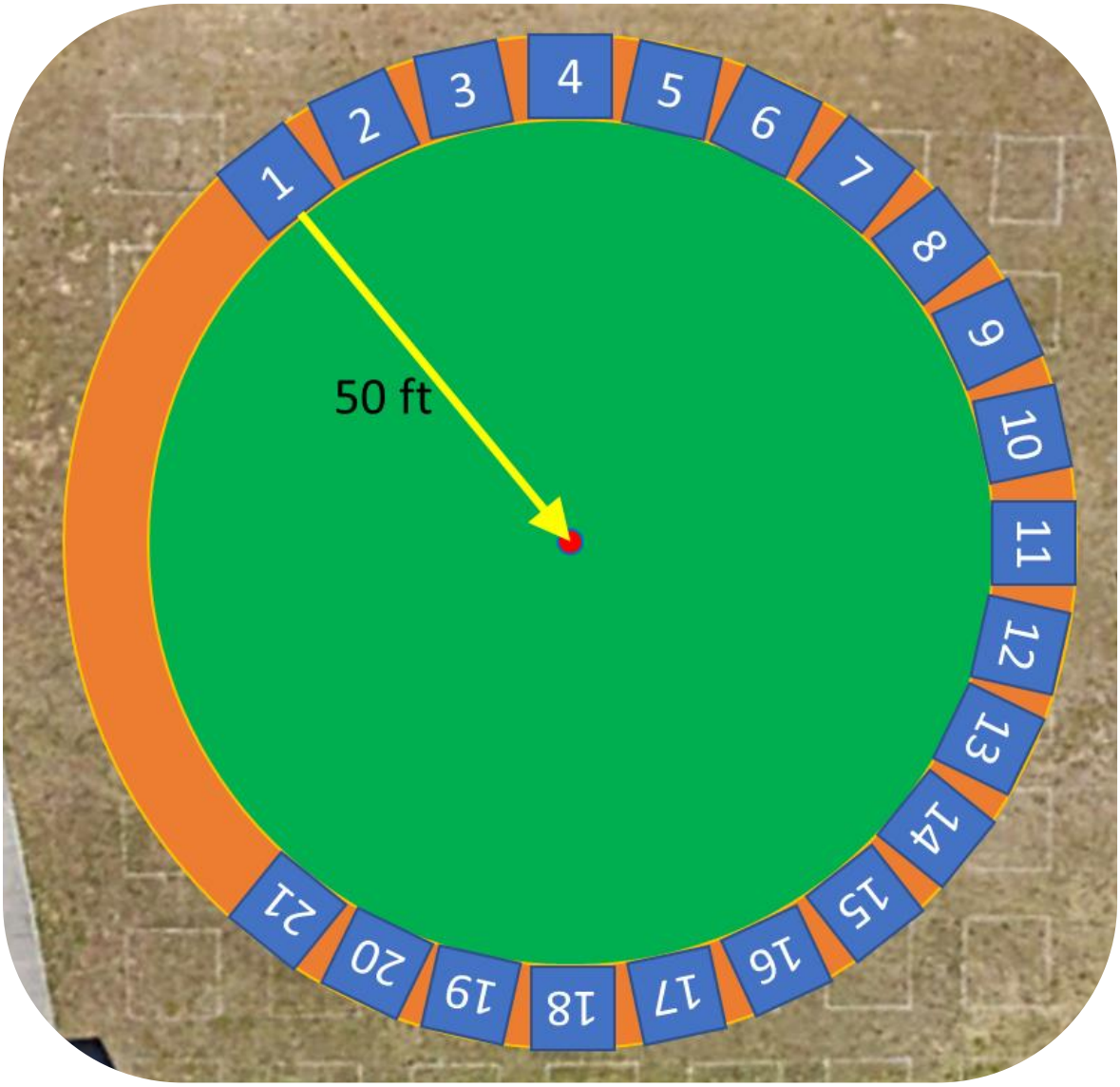
- Trebuchets will be inspected by a designated Safety lead at check-in and deployment to ensure safe and reliable operations. The Safety representative will determine if the trebuchet is safe and operated properly. The directions and requirements of the Safety representative will be followed at all times.
- Trebuchets should have a safety (tiedown loop) to stop the launch mechanism from prematurely firing.
- The Trebuchet must have a trigger mechanism that allows the operator to fire the softball from at least five feet away from the trebuchet.

Basic <u>Sample</u> Trebuchet Design: Made with 5 Standard 2X4's and common 2 ½ X 9 and 3 ½ X 9 exterior wood construction screws. Total cost at Lowes – under $50.00.

Completed Trebuchets with addition of innovative throwing arm, weights, softball sling, and launch slide base (The design of these elements are not prescribed and left to the teams to design). However, a simple set of designs/templates will be provided to teams that want starting points/ideas.

4-Foot Target with Electronics Box and Siren/Bell/Battery:

Example of a Deployment: Plenty of room for the competition and easy access to view! Up to 21+ participants possible.

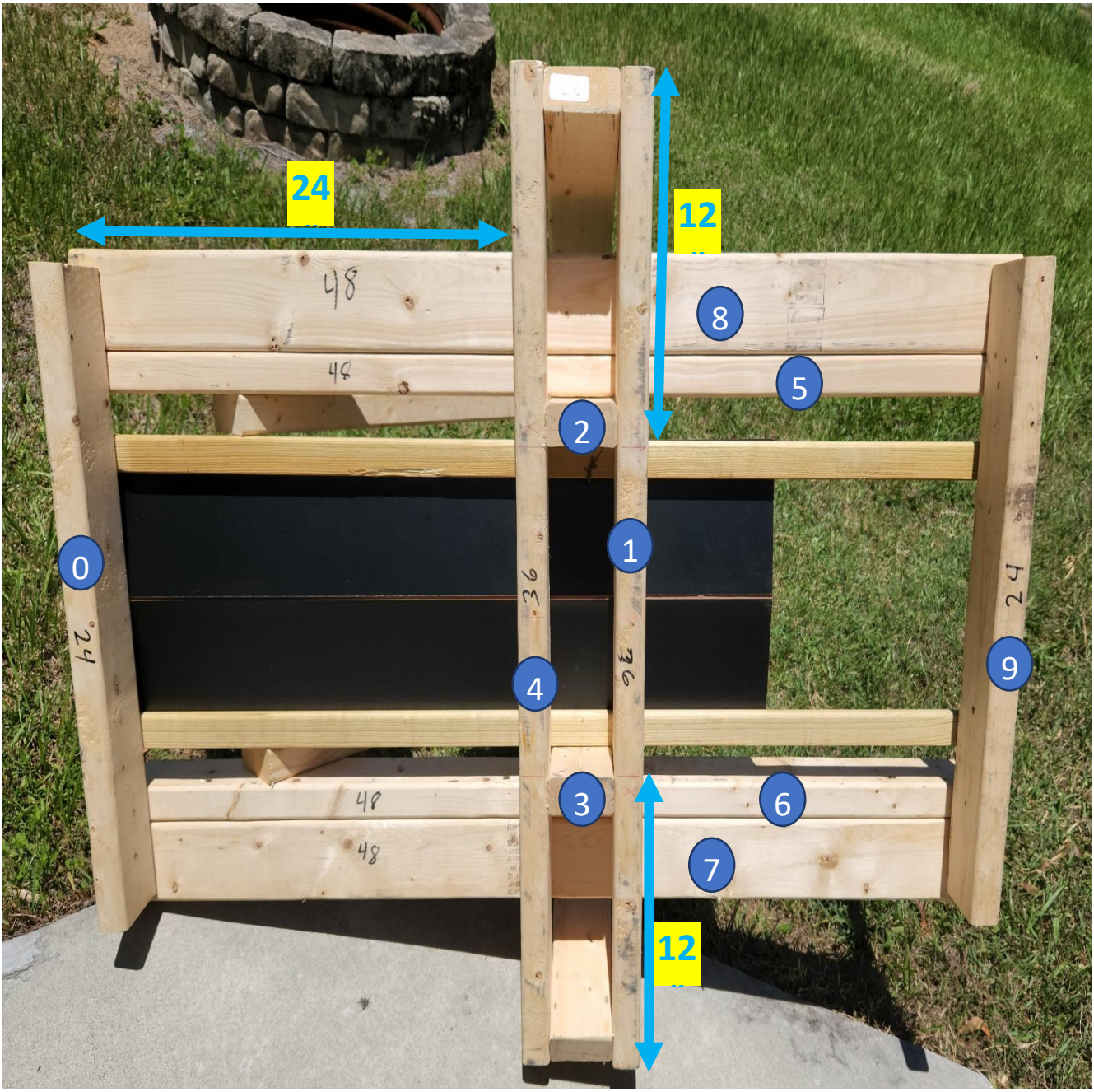


Note, There are infinite ways to build a Mini-Trebuchet, here is just a common one that has been successful in the past…But, the Sky is the limit!

<u>Optional Sample Trebuchet Build Instructions</u>

Required 5- 2 X 4s Cut to various lengths needed to build the Basic Trebuchet Base

Optional Sample Trebuchet Build Instructions



Order:

(1) - 36”

(2) - 34”

(3) - 34”

(4) - 36”

(5) - 48”

(6) - 48”

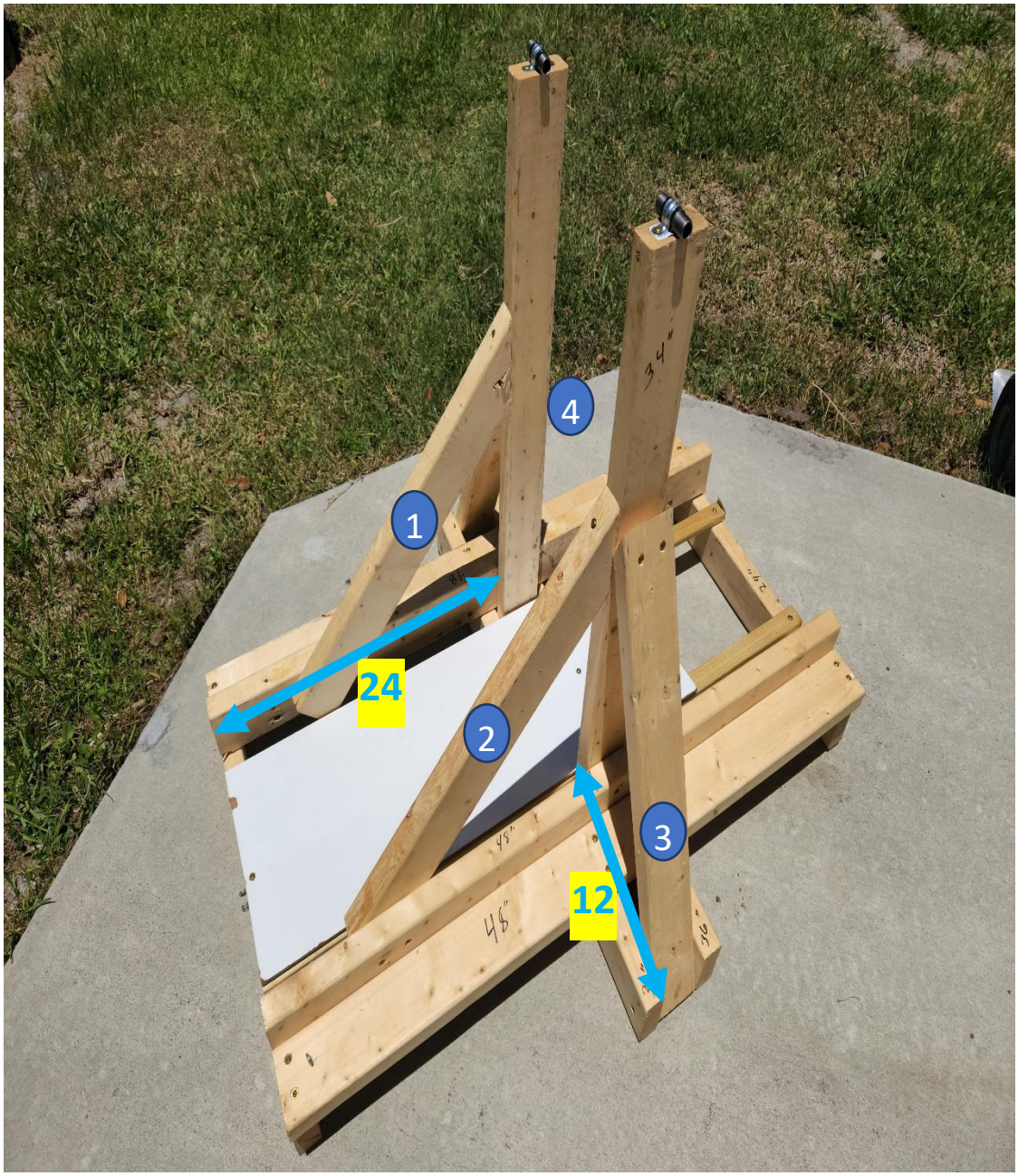
(7) - 48”

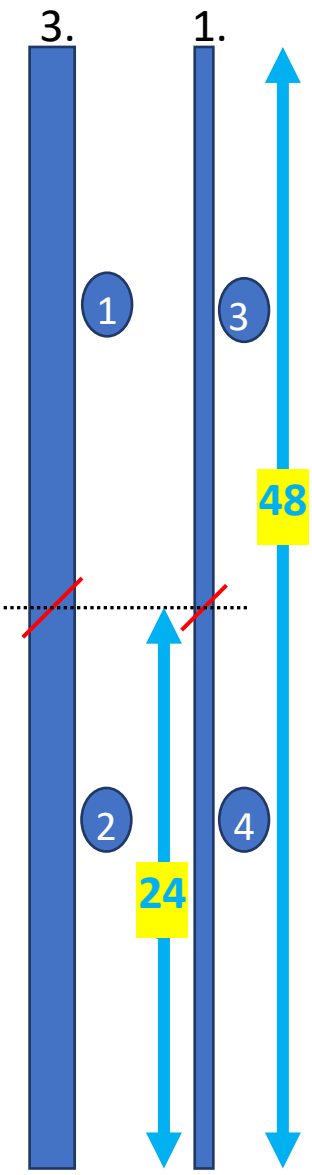
(8) - 48”

(9) - 24”

(0) - 24”

Optional Sample Trebuchet Build Instructions





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