

STORM THE CASTLE



DESCRIPTION: Prior to the tournament, teams will design, construct, and calibrate a device that uses only the energy of a falling counterweight to launch a projectile as far and as accurately as possible at a target. Participants must bring and wear safety spectacles with side shields. See: www.soinc.org/general/protection/

A TEAM OF UP TO: 2

IMPOUND: Yes

APPROXIMATE TIME: 15 Minutes

1) CONSTRUCTION:

- The entire device, including the projectiles and counterweight must be no more than 75cm high x 75cm wide x 100cm long when it is in the ready-to-fire position. Length is measured parallel to the direction the device launches. This restriction does not apply during or after launch.
- To operate, the device will be placed within a 2 meter by 2 meter square called the Launch Area and may not be anchored to the ground. The device must be triggered from outside the Launch Area by pulling a string, firing pin, etc. Except for the triggering mechanism, no part of the device and counterweight may extend out of the Launch Area before it is triggered or after the launch motion is complete. Any part of the device or counterweight (except for the triggering mechanism) that extends out of the launch area during the launch must return to rest within the Launch Area without assistance.
- All teams will use the same projectiles, counterweight, and target provided by the judges. The mass of the counterweight and projectiles will not be announced until all of the devices have been impounded.
 - The counterweight will consist of a 1 to 3 kg mass with a hook on top. The hook and counterweight together will have a length (measured from the top of the hook to the bottom of the counterweight) and width of no more than 15 cm. If the hook is used to attach the counterweight, the attaching point on the team's device should be made from material no more than ¼ inch thick with a hole at least 9 mm in diameter. The edge of the hole should be no more than 1 cm from the edge of the material.
 - Projectiles will have a mass of 20 to 60 grams and will be approximately spherical with a diameter not exceeding 6 cm. Dangerous projectiles should be avoided. If multiple projectiles are provided, they will be similar in size, shape, and mass.
 - The device must be constructed to accommodate the counterweight and the projectiles. Neither the counterweight nor the projectiles can be modified.
- The device, without the counterweight and projectile, may not contribute energy to the launch. Some violations of this rule are: the center of gravity of the unloaded device drops during a launch motion, the triggering process provides momentum to the launch or any other form of potential energy (compressed or stretched elastic solids, compressed air, etc.) is used. Without a counterweight and projectile, the unloaded device may not move in the direction of a launch motion when released from any position prior to where the projectile is released.

2) DATA TABLE AND GRAPHS

- Prior to the day of the competition, the team should prepare up to 5 graphs showing the mass of various projectiles (grams) or counterweights (Kg) vs. distance (meters). If they are hand drawn, they must be on graph paper. All graphs should be correctly labeled.
- Teams may be required to submit their graphs early as requested by the event supervisor. They should prepare a duplicate set to use during competition, as those submitted may not be returned.
- Graphs must be marked to identify the team submitting them.
- An Example showing how to use the graphs to position the target for a hypothetical counterweight and projectile should be included.
- Students should be prepared to answer questions about how the data was collected and how the graphs are used.

3) THE COMPETITION:

- The team's device must be impounded before the start of the event and will be released from impound when the team has finished competing. Appeals by teams will not be processed after they remove their device from impound unless it has been released by the appeals committee.
- Once teams enter the event area to compete, they may not leave the area or receive outside assistance, materials or communication until they are finished competing.