

# Rotating Fling Thing

Cambridge Rindge and Latin

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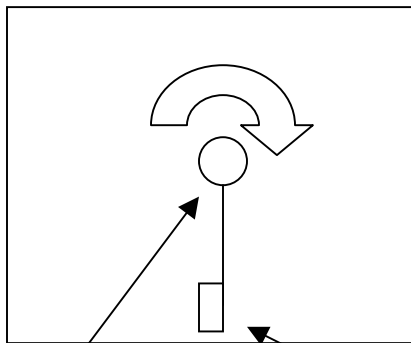
## Purpose:

Build a machine that flings a tennis ball 0-20 meters with a minimal ceiling height of 3-5 meters (depending on the launch site) that can hit several target areas at different distances.

## Machine:

The machine must rotate around an axis that is normal to a “platform”. At an angle of  $\theta=0^\circ$ , the machine will rotate completely in the horizontal (xz) plane. The machine must rotate its flinging arm through an angle range of between  $0^\circ$  and  $720^\circ$ , no more or no less, to fling the ball. It can rotate either in a clockwise or counterclockwise fashion. You should be able to change the angle of the “platform” to accommodate the range of the fling. Each team will need to fling the tennis ball two different distances on the day of the event. The restoring force used to wind up the rotating arm and give it energy must be non-electrical in nature. The maximum dimensions of the machine (when at an angle of  $\theta=0^\circ$ ) are such that they occupy a volume of  $0.5\text{m}^3$  or less. The machine may change volume (to any size) after it starts to fling the tennis ball.

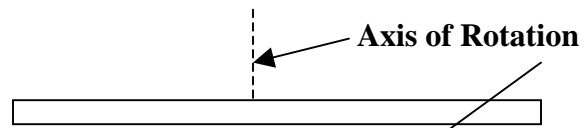
Top View



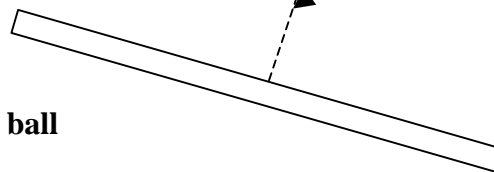
Axis of Rotation  
(rotating clockwise)

Cup to hold ball

Side View ( $\theta=0^\circ$ )



Side View (at an angle  $\theta$ )



## Event:

Teams will be lined up in random fashion to launch the tennis ball. One team will be launching a ball with one “on deck” at all times. Once a team is called, they have 30 seconds to bring the flinger to the flinging line and prepare for the first fling (violation=5pts for each 30 second interval (partial or whole) over limit). Each team will be given two chalked tennis balls and two minutes to fling the tennis balls two different distances. Teams may fling the ball as many times as possible within the two minutes with the closest distance to the target representing their team in the final standings. The retrieval and rechalking of the launched tennis balls will be upon the launching team if the team expects to launch more than one shot at each target. Scores will be calculated using the following equation:  $D_1+D_2+(|D_1-D_2|)$ ; the two distances ( $D_1, D_2$ ) from the target are added to the absolute value of the difference between the distances (accurate reproduction of fling). Smallest composite score wins.