

CATAPULT GLIDER

DESCRIPTION The object of this event is to design, build and test two catapult-launched gliders designed for the highest time aloft. This event challenges students to build gliders that fly at a relatively high-speed at launch, yet transitions to a very slow descending orbit.

A TEAM OF UP TO: 1 OR 2

APPROXIMATE TIME: 5 Minutes

IMPOUND: NO

CONSTRUCTION SPECIFICATIONS: Each glider may be constructed from published plan(s), commercial kits and/or a student's designs, as long as the following specifications are satisfied.

Materials for Glider Construction:

- 1) Only wood construction (Balsa is recommended) except for the adhesive and clay ballast.
- 2) A maximum of 5 grams of clay, to be used for ballast.
- 3) Catapult-Hook: maximum 20mm long, 5mm high at back edge (rubber loop contact edge)

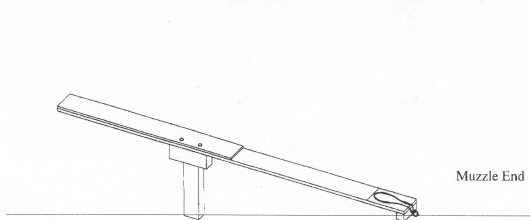
Glider Specifications:

- 1) Fuselage: maximum 300mm long
- 2) Wings: Span may not exceed 300mm
- 3) Chord may not exceed 74mm wide

Catapult Specifications:

- 1) The event supervisor will supply catapults to time flights at tournaments.
- 2) Catapults can be made from hardwood or plywood
- 3) Catapult "Deck" dimensions: 10-20mm thick x 45mm wide x 700mm long (marked at 350mm as a glider stop limit) with a handle at about 400mm from the muzzle end and a loop of rubber 1/16" thick x 1/16" thick x 3" long, when attached relaxed to a screw eye with a maximum opening of 7mm which is attached to the center of the Deck at the muzzle end.

CATAPULT DRAWING



THE COMPETITION:

- 1) At the Supervisor's discretion, test flights may occur throughout the contest but will yield to any official flight. No test flights will occur in the last half-hour of the event. Multiple gliders may fly at once. Inspection station(s) will be made available to students for checking their gliders.
- 2) To qualify for competition, each team must provide a plan copy for each glider design and one official flight card (see sample below) documenting previous test flights at home school. Each glider will be inspected and compared to plans for wingspan, chord, fuselage length and cat-hook.
- 3) Each team will be given 5 minutes to make 5 official flights with either glider for high time aloft. The top two flight times will be summed for an overall flight score.
- 4) Students will be given a launcher, load it with their glider and stretch the rubber. A maximum pull is when the cat-hook meets the wooden stop (on launch deck). The timer will give an OK to launch. Student may aim and bank the glider as they wish but angle must be higher than horizontal.
- 5) Timing begins at release and stops when glider touches the floor or when it comes to rest on an obstruction. As an example, Gliders that slide down a wall will be timed until they actually stop moving. Students must make any repairs in the time allotted.
- 6) Times will be made by rounding off to the nearest tenth of a second.

SCORING: The winner is the team with the combined best two flight times of individual gliders. Ties will be broken by highest single flight time.

Flight Card: This card can be designed to include the following: Date, Student Name, Glider Designation, Flt #, Time Aloft, Adjustment made, Comments, Coach's Sign-Off

OPTIONAL-Glider on-site construction suggested materials: If State Director's choose to build gliders on-site, wood blanks and clay will be supplied to the students. Each team will provide its own fixtures, jigs, tools and glue and will be responsible for their use and disposal. Minimum of 3 hours will be allotted for construction.

- 1) Wing Blank maximum (pre-construction) *1/16" thick x 74mm wide x 300mm long.
- 2) Fuselage Blank maximum (pre-construction) *1/8" thick x 13mm wide x 300mm long.
- 3) Stabilizer/Fin Blank maximum (pre-construction) *1/32" thick x 500mm wide x 150mm long.
- 4) Catapult Hook (cat-hook), *1/8" thick x 5mm high x 20mm long - hook may be tapered only towards the fuselage nose. Cat-hook must be glued to the bottom of the fuselage, flush with nose of glider. 1/32" thick balsa reinforcement(s) may be placed cross-grained to secure cat-hook to fuselage. *Note: Thickness dimensions are English not metric

Catapult Construction Suggestions:

- 1) Laminate a piece of wood (10mm thick x 45mm wide x 700mm long) to a second piece of wood (6mm thick x 45mm wide x 350mm long), aligning the pieces at the handle end and gluing them face-to-face (see drawing).
- 2) The handle is 20mm thick x 30mm wide x 150mm long and is attached by screws to 15mm thick x 30 mm wide x 75mm long block using a middle-lap joint. The 75mm long block then is screwed to the laminated main catapult deck beginning at 400 mm from muzzle end.
- 3) The loop is 1/16" thick x 1/16" thick x 3" long when attached (relaxed) to a screw eye with a max opening of 7mm.
- 4) The Screw eye is attached to the center of the Deck at the muzzle end.