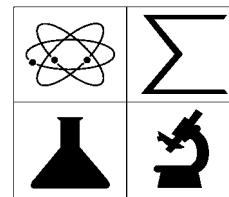


# MESA DAY CONTEST RULES 2003-2004



## Balsawood Glider

<b>LEVEL:</b>	Senior High School
<b>TYPE OF CONTEST:</b>	Team
<b>COMPOSITION OF TEAM:</b>	1 - 2 students per team
<b>NUMBER OF TEAMS:</b>	3 teams per Center
<b>SPONSORS:</b>	Jesus Valadez, CSUN MESA Center in collaboration with UCLA Linda Robertson, UCLA MESA Center

**OVERVIEW:** Students will design and build a glider made of balsawood, which will travel the longest horizontal distance in the air. The glider will be launched by means of rubber bands. The competition will be held out doors.

**MATERIALS:** The following are the ONLY materials that may be used to build the glider.

- Balsawood
- 2 U.S. quarters
- 1 metal paper clip (any size)
- Glue, any type
- Tape, any type
- Tissue Paper
- Paint, stickers, decals, markers and ink may be used as decoration and/or identification

**RULES:** Any violation of the following rules will result in disqualification.

1) No ready-made kits are allowed. Each glider must be constructed, launched and repaired by students. Please see Attachment A for definitions of a glider.

2) The following are the ONLY materials that may be used to build the glider.

- Balsawood
- 2 U.S. quarters
- 1 metal paper clip (any size)
- Glue, any type
- Tape, any type
- Tissue Paper
- Paint, stickers, decals, markers and ink may be used as decoration and/or identification

Any glider that incorporates additional materials not mentioned above will be disqualified.

- 3) The glider must have a carved/sanded notch or paper clip launch-pin to facilitate launching with a rubber band. If a launch pin is used it must be constructed from a metal paper clip, any size.
- 4) The glider must carry a payload of two (2) U.S. metal quarters (25-cent pieces).
- 5) Student's name, center, and school must be clearly readable on the glider.
- 6) The glider must be competition ready when turned in for inspection at MESA Day. This includes, but is not limited to, having the launch-pin and the quarters securely attached.
- 7) Each glider will be launched by means of a simple rubber band slingshot\* (or a string of rubber bands looped together), which the students are to select and bring with them to MESA Day. Rubber bands will not be provided at MESA Day. Tourniquets and other types of hollow rubber tubing are not acceptable. Students can use any type and as many rubber bands as they choose as long as the above restrictions are met. \*Please see Attachment B.
- 8) The glider must be launched horizontally (this means that the glider cannot be launched at an angle) from the top of a table that is approximately 30" x 72" x 29". The front edge of the table will be defined as one of the approximately 30" sides of the table. This front edge must face the intended flight path and be used as the launching point. Each glider shall be launched by means of a simple rubber band catapult (a string of rubber bands linked together) which students are to select and provide. Three 1 1/4" cup hooks will extend from the front of the table from which students will attach the catapult to launch the glider. Students may choose to use either the center hook (B) only or the two outside hooks (A and C) to launch the glider. See Attachment B for hook placement.
- 9) The distance traveled will be measured from the launching point (front edge of the table) to where the glider first hits the ground (or any obstacle that may be present), along a straight horizontal line perpendicular to the edge of the table. If the glider breaks in the air and several pieces fall to the ground, the distance will be measured to the nearest payload (quarters) from the launching point.
- 10) Contestants should optimize their gliders to perform well regardless of the conditions they may encounter at their respective MESA Days. Any air currents from any sources will be considered part of the natural vent flow. All contestants will launch their gliders in the same direction.

#### **JUDGING:**

- 1) Once an entry has been registered it may not be altered or repaired to meet technical inspection.
- 2) No part(s) of the glider may be removed or added after the specification check has occurred. After the first launch, repairs to the glider will be allowed. No backup gliders will be allowed. No tools or materials will be supplied at MESA Day.
- 3) Each team will be allowed two (2) non-consecutive runs of which the better run will be used. Competitors should be in line and waiting their turn. Each glider must be ready for competition when called. The glider should be launched within 30 seconds of being called or contestants will forfeit that run. A stopwatch should be provided to the judges for timing contestants.

- 4) From the front edge of the table, a recommended 30' of width and the available length of field should be cordoned off to initially allow for a clear, unobstructed flight path. Spectators should not be allowed within the cordoned area at anytime during the competition. Any person outside of this area will be considered an obstacle and a re-launch will not be permitted if the glider strikes someone outside the cordoned area. **Glider flight will not be restricted to the cordoned area.** The cordoned area is merely there as a buffer from the audience.
- 5) In the event of a tie, a "fly-off" will be conducted to determine the winner. There will be one run per glider in a "fly-off".

**AWARDS:** Awards will be given for 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> place in the following categories:

- 1) **Creativity:** Ribbons will be awarded. Creativity will be judged as a combination of cleanliness in construction and aesthetic appeal.
- 2) **Horizontal Distance Traveled:** Medals will be awarded.

\* Only winners in the Horizontal Distance Traveled category shall advance to MESA Day.

**ATTACHMENTS:** Attachment A: Glider Definitions  
Attachment B: A Simple Rubber Band Slingshot  
Official Evaluation Sheet For Balsawood Glider  
Checklist for Balsawood Glider

## ATTACHMENT A: GLIDER DEFINITIONS

### What is a glider?

A glider is defined as *a heavier-than-air craft with no engine that stays aloft as a result of the aerodynamic forces acting upon it*. In form, gliders resemble ordinary airplanes, but they are extremely light in weight, have a low wing load (the ratio of weight to wing area), and have a high aspect ratio (the ratio of the wingspan to the wing width). Glider wings are much longer and narrower than those of powered aircraft.

An ordinary airplane is defined as *an engine-driven vehicle that can fly through the air supported by the action of air against its wings*. Airplanes are heavier than air, in contrast to vehicles such as balloons and airships, which are lighter than air. Airplanes also differ from other heavier-than-air craft, such as helicopters, because they have rigid wings; control surfaces, movable parts of the wings and tail, which make it possible to guide their flight; and power plants, or special engines that permit level or climbing flight.

Because a glider resembles an ordinary airplane, designs for the MESA Day competition must include the three primary parts of an airplane listed below.

#### Fuselage

The fuselage is the main cabin, or body of the airplane. Generally the fuselage has a cockpit section at the front end, where the pilot controls the airplane, and a cabin section. The cabin section may be designed to carry passengers, cargo, or both. In a military fighter plane, the fuselage may house the engines, fuel, electronics, and some weapons. In some of the sleekest of gliders and ultra-light airplanes, the fuselage may be nothing more than a minimal structure connecting the wings, tail, cockpit, and engines.

#### Wings

All airplanes, by definition, have wings. Some are nearly all wing with a very small cockpit. Others have minimal wings, or wings that seem to be merely extensions of a blended, aerodynamic fuselage, such as the space shuttle.

#### Tail

Most airplanes have a tail assembly attached to the rear of the fuselage, consisting of vertical and horizontal stabilizers, which look like small wings. Most gliders and other aircraft have a movable rudder and movable elevators for control. Gliders in this competition are not required to have these movable control surfaces on the horizontal and vertical stabilizers.

### Can my glider resemble a stealth aircraft (i.e. delta shaped or flying wing)?

All designs must meet the glider definition described above. All designs must have a visible and definite fuselage, wings, and tail assembly.

### Can my glider resemble an arrow?

The definition of an arrow is *a missile weapon shot from a bow and usually having a slender shaft, a pointed head, and feathers at the butt*. According to this definition, arrows are not gliders.

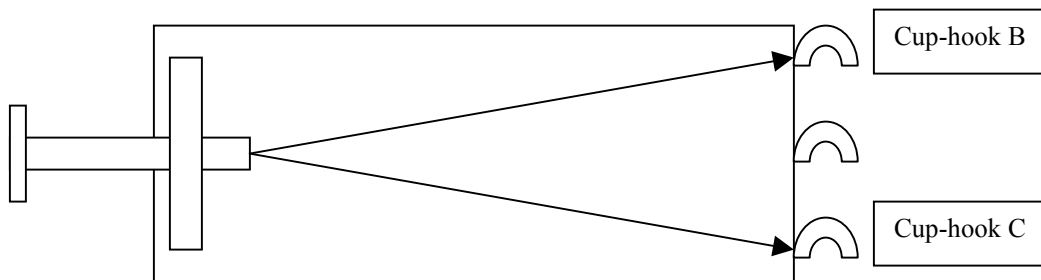
## ATTACHMENT B: A SIMPLE RUBBER BAND SLINGSHOT

A simple rubber band slingshot (or a string of rubber bands looped together) can be achieved in one of two ways.

### 1) The 1-hook method:



### 2) The 2-hook method:



## **CHECKLIST FOR BalsaWOOD GLIDER**

- Two (2) quarter payload securely attached
- Rubber band catapult
- Name, center, and school clearly labeled on the glider
- Notch or launch pin present to facilitate launching
- Repair kit (glue, tape, extra rubber bands, etc.)