

# Trial/Pilot Event

Contact the organizers of your tournament to find out what trial/pilot events will be held.

## BALLOON LAUNCH GLIDER

1. **DESCRIPTION:** Teams will construct and fly monoplane gliders that will be launched from a balloon to achieve a maximum flight time.

**A TEAM OF UP TO:** 2

**IMPOUND:** No

**TIME:** 8 minutes

2. **CONSTRUCTION:** Prior to the tournament, participants may construct and test up to two gliders that may be constructed from published plan(s), commercial kits and/or a student's design. All gliders must meet the following specifications:
  - a. Gliders must be constructed only from wood, foam, paper, plastic film covering and glue. The major components (e.g., wing assembly, tail assembly or fuselage) may be attached together using thread, music wire, malleable wire, paper or plastic tubes, and/or rubber bands. Kits may be used however; they may not contain any pre-glued joints or pre-covered surfaces.
  - b. Any dense material may be used for ballast.
  - c. Total mass of the glider must be at least 2.0 grams throughout the flight.
  - d. **The glider must be a monoplane (one wing) not exceeding a maximum horizontally projected wing span of 48.0 cm, a maximum wing chord (straight line distance from leading edge of wing to trailing edge, parallel to the fuselage) of 10.0 cm, a maximum horizontally projected stabilizer span of 28.0 cm, and a maximum stabilizer chord of 9.0 cm.**
  - e. Each glider must be labeled in such a way as to be easily identified by the event supervisor. At least one vertical surface on the glider (such as a fin) must be covered in an opaque, non-white material so it can be identified at the top of its flight.
3. **THE COMPETITION:**
  - a. The event must be held indoors. The room dimensions (approximate length, width and ceiling height) should be made available to teams in advance of the competition. Directors and supervisors are urged to minimize the effects of environmental factors such as air currents (e.g., doors, fans).
  - b. Only contestants and judges will be allowed in the event area while teams are competing. 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. Teams violating this rule will be disqualified. A separate area shall be provided for spectators.
  - c. Each team should present a flight data log at check-in. To be complete the log must contain a minimum of 4 parameters recorded for each of ten or more test flights flown prior to the competition. The minimum parameters recorded must be:
    - i. Approximate height of balloon at glider launch
    - ii. Glider mass at launch
    - iii. Flight time
    - iv. Any other parameter selected by the team. The same parameter must be recorded for each
  - d. **At the Regional level only:** The Event Supervisor will provide one helium inflated Mylar balloon (30-40" when pre-inflated) turned on its side without a platform-launching device/perch attached, so that a glider can balance on top.
    - i. A light line (e.g., fishing line) more than long enough to reach the ceiling of the site will be attached to the base of the balloon. It is recommended that the line be attached to a fishing reel for rapid recovery and to prevent tangles.
    - ii. The balloon provided by the event supervisor will not be available for practice flights. Teams may not modify the balloon provided by the event supervisor.
  - e. **At the State and National level:** Teams must provide their own Balloon Launching Rig (inflated balloon, line(s) and launching perch such as pleated paper or balsa platform).



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- f. Teams may bring and use their own Balloon Launching Rig **and helium** during practice and official flights **at any competition**.
  - g. **Helium will not be provided at any competition.**
  - h. Judges may limit the number and location of balloons at any given time during the event.
  - i. At the Event Supervisor's discretion, practice flights may occur throughout the event but will yield to any official flight. Multiple practice flights may occur at the same time. No practice flights will be permitted in the last half-hour of the event.
  - j. A self-check inspection station may be made available to competitors for checking their gliders prior to being checked by the judges.
  - k. **Students will check-in with their event materials (gliders(s) and log) for inspection immediately preceding their official flights.**
  - l. Teams may make up to a total of 3 official flights using one or two gliders.
  - m. Teams will be given an 8 minute "Flight Period", starting when their first official flight begins, to launch their official flights. Any flight beginning within the 8-minute period will be permitted to fly to completion. Participants may make adjustments/repairs to the gliders between flights however; time for such adjustments/repairs will be part of the 8-minute flight period.
  - n. The judges will measure and record the "Time Aloft" to the nearest tenth of a second for each flight. Time Aloft begins when the glider leaves the Balloon Launching Rig and stops when any part of the glider touches the floor or when the judges determine the flight has ended.
  - o. The Event Supervisor may permit other official flights during the flight of another team's glider.
  - p. Steering the glider during flight is prohibited. In the unlikely event of a collision with another aircraft, a team may elect a re-flight. The decision to re-fly may be made after the glider lands. The eight-minute period does not apply to such a flight.
  - q. Resource links may be found at <http://www.soinc.org/events/blg/>
4. **SCORING:** The winner is the team with the longest Time Aloft for **two** flights. **The best two flights will be added together and that will be the overall score.** Ties will be broken by the **third** longest time.
- a. Teams with incomplete flight logs will have 10% of the flight time deducted from each flight.
  - b. Teams without flight logs will have 30% of the flight time deducted from each flight.
  - c. Teams that violate a rule under "CONSTRUCTION" or "THE COMPETITION" that does not have a specific penalty will be ranked after all teams that do not violate the rules.

**National Science Education Standard:** Content Standard E: All students should develop abilities of technological design and understandings about science and technology.

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