



WRIGHT STUFF

Read the General Rules in the manuals and on www.soinc.org as they apply to every event.

1. **DESCRIPTION:** Teams will construct and test up to two rubber-powered **monoplanes** to achieve maximum flight times.

A TEAM OF UP TO: 2

IMPOUND: No

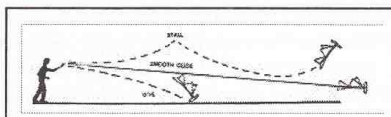
TIME: 8 minutes

2. **CONSTRUCTION:** Prior to the tournament, **teams** will construct and test up to two rubber-motor-powered, propeller-driven airplane(s) they may be constructed from published plan(s), commercial kits and/or a student's design. All airplanes must meet the following specifications:

- Airplanes must be constructed only from wood, paper, plastic film covering and glue except for the Propeller Assemblies and motor hooks. Airplanes may not use solid balsa wings or tail assemblies. The major components (wing assembly, tail assembly, propeller assembly and motor stick) may be attached to each other 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.
- Plastic or rubber o-rings may be used to attach the motor to the airplane and propeller drive. Any dense material may be used for ballast.
- Total mass of the airplane throughout the flight, excluding the rubber motor, must be 7.0 grams or more.
- The airplane must be a monoplane (one wing) not exceeding a maximum horizontally projected wing span of 40.0 cm. **There is no maximum wing chord (the straight-line distance from the leading edge of the wing to the trailing edge, parallel to the fuselage) except for bonus application (see bonus section). The maximum horizontally projected stabilizer span is 20.0 cm, and the maximum stabilizer chord (straight line distance from leading edge to trailing edge) is 6.0 cm.**
- The Propeller Assemblies may be built by the competitor(s) or purchased pre-assembled. It may include a propeller, a shaft, a hanger, **washers** and/or a thrust bearing. The propeller must be a single two-bladed commercially made plastic propeller with a maximum diameter of **20.0 cm**. Any propellers may be trimmed to meet this specification. Any trimming/shaving/twisting/adjusting of propellers is permitted to balance, reduce its mass or to change its pitch **before any flight**.
- Rubber motor(s) not exceeding a mass of **1.5 grams** (including any attachments such as o-rings) must power the airplanes and will be massed separately from the airplane. Motors may be lubricated before and/or after check-in. **Officials will retain only motors qualified during a team's inspection and they will be available to the team only for official flights.**
- Each airplane must be labeled so the event supervisor can easily identify to which team it belongs.**

3. **THE COMPETITION:**

- 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).
- Once teams enter the cordoned off competition area to trim, practice or compete, team members may not receive outside assistance, materials or communication. Teams violating this rule will be ranked below other teams. There will be a separate area designated for spectators.**
- Each team must present a flight log of recorded data during inspection. **Data will include** at least 6 parameters for at least ten test flights prior to the competition. Three required parameters to be recorded are: 1) motor size before windup, 2) number of turns on the motor at launch, 3) flight time. The team **must choose at least 3** additional data parameters beyond those required, for example, turns remaining after landing, estimated/recorded peak flight height, estimated flight path diameter, the torque at launch, etc.
- 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 **trim or practice** flights will be permitted in the last half-hour of the event.
- A self-check inspection station may be made available to competitors for checking their airplanes prior to being checked by the judges.





WRIGHT STUFF (CONT.)

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- f. The use of any type of winder is permitted.
- g. **Inspection for each team will take place immediately prior to that team's 2 official flights. Team members will present** their event materials (airplane(s), motors, and log) **during their** inspection. Flight Logs **will be** returned to the team members after inspection. The official timer will dispense each team's **qualified** motors during the team's official flights. Timers **must** follow and observe teams as they are winding their motors.
- h. Teams may make up to a total of 2 official flights using one or two airplanes.
- i. 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/trim flights during their official 8-minute period. **Teams must declare before any launches during their 8-minute flight period as whether it is an official flight or trim flight. If teams do not indicate the flight type before launch, the flight will be considered official.** Teams will not be given extra time to recover or to repair their airplane(s).
- j. **The official timer will allow the team members to select from previously approved motors for each official flight.**
- k. The judges will measure and record the "Time Aloft" to the nearest tenth of a second for each flight. Time Aloft for each flight starts when the airplane leaves the student's hand and stops when any part of the airplane touches the floor **or when the judges have determined the flight has ended.**
- l. The Event Supervisor may permit other official flights during the flight of another team's airplane once it has started its descent.
- m. Steering the airplane 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 airplane lands. The eight-minute period does not apply to such a flight.
4. **SCORING:** The winner is the team with the longest flight time for either flight. Ties will be broken by the longest time of the other flight.
 - a. Bonus:
 - i. State Tournaments Only: **10% of the flight time will be added if the airplane's wing's chord (measured from leading edge to trailing edge) measures less than 6.5 cm.**
 - ii. National Tournament Only: **20% of the flight time will be added if the airplane wing's chord measures less than 5.5 cm.**
 - b. Teams with incomplete flight logs will have **10% of the flight time** deducted from each flight.
 - c. Teams without flight logs will have 30% of the flight time deducted from each flight.
 - d. Teams that violate a "CONSTRUCTION" or "COMPETITION" rule that does not have a specific penalty will be ranked after all teams that do not violate those rules.

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

See: <http://www.soinc.org> for additional information

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