

Eggonaut Rocket



Purpose: *To design, construct, and launch a pressure-fueled rocket containing a raw chicken egg and the rocket return to Earth with the egg in an intact, unbroken condition.*

Rule A: Scoring

A team will consist of one or two members

1. A **Design Notebook** shall have a value of 30 points and must be turned in during registration. The Notebook must include the following:
 - a. Cover sheet with appropriate information
 - (1) Group members
 - (2) School
 - (3) Mentors (if any)
 - b. Scaled drawings of rocket during design phase. Include several drawings to demonstrate developmental stages of rocket design.
 - c. Materials used.
 - d. Procedure used in construction
 - e. A table containing at least one modification made between design and final product and (1) why the change was made and (2) positive/negative effect(s) of the change.
2. The **Aesthetic Evaluation** shall have a value of 15 points and will be conducted using the following criteria:
 - a. Exterior decorations
 - b. Proportionality
 - c. Originality
 - d. Overall appearance
3. The **Performance Evaluation** shall have a value of 55 points and be determined by a successful launch of the rocket from the launch pad, and determination of the unbroken survival of the raw egg.
4. The **Rocket Mass** (weight, without fuel or egg) will be determined to serve as a tie breaker. Rocket will be massed at check-in.

Rule B: Determining Winners

1. Each team will receive a blank copy of the scoring rubric used in determination of winners.
2. The team having the greatest number of total points (Design Notebook + Aesthetic Evaluation + Performance Evaluation) shall be declared the winner.

3. The Performance will have the greatest weight (see the Scoring Rubric).
4. In the event of a tie after determination in #2, the mass of the rocket without fuel or egg will be used. The rocket with the lighter mass will prevail in the event of a tie after all other categories are determined.
5. Any team which violates any of the following design/performance rules (C-F) will be disqualified and will not be used in determining winners.
6. After the judge has given permission, the rocket will launch by pulling the triggering line.
7. After the flight, the construction team will have one (1) minute to retrieve the cone section. The cone section will not be opened until a judge tells the construction team to proceed. The construction team will then have one (1) minutes to unload the egg and present it for inspection by the judge. Failure to meet the time limits will disqualify the team.

Rule C: The Rocket

1. The rocket shall be fueled only with compressed air, water, or a combination of compressed air and water. The construction team will determine the quantity of water. No other source of potential or kinetic fuel may be used.
2. The fueled section of the rocket shall be made of a 2-liter plastic soft drink bottle with an opening of 21mm internal diameter (ID). This opening will be the rocket nozzle which, when the rocket is mounted for launch, will be the bottom of the rocket.
3. The fueled section may have a cone section attached; however, no metal parts may be used in that section.
 - a. The cone section must be capable of containing one raw, grade A, extra large chicken egg.
 - b. The construction team may determine the size and shape of the cone section; however, it must be designed so that the egg can be placed into the cone section at launch time, then sealed.
 - c. The cone section should be designed so that the egg receives maximum protection upon its return to earth. Eggs will be provided at the launch site; eggs must be loaded into the cone in the presence of a judge.
4. The fueled section may have fins attached; however, no metal parts may be attached to the rocket.
 - a. The presence of fins and the number of fins shall be determined by the construction team.

- b. Fin height, if used, shall be defined as the distance from the fueled section perpendicular to the greatest tip of the fin.
- c. No single fin shall have a fin height greater than 40% of the total length of the fueled section.
- d. Fins may not extend below the bottom of the rocket nozzle.

Rule D: The Launch Field and Launch

1. All launches will be conducted outdoors.
2. A chalked square 4M per side will be the launch site. All launches shall take place within this area.
3. The launch assembly will be supplied at the launch line.
4. The launch assembly will launch the rocket vertically, not tilted at any angle.
5. Compressed air and water will be provided at the launch line; a team member(s) will attach the rocket on the launch assembly. A judge may give assistance during the attachment to the launch assembly. A judge may give assistance during the attachment to the launch assembly if requested. A judge will fuel the rocket with air; the maximum air pressure allowed is 80 lbs psi and will be gauged by a judge.

Rule E: Number of rockets per team: Number of launches per team.

1. Each team will consist of 2 people.
2. No person may participate on more than one rocket team.
3. Each team may enter only one rocket.
4. Each team will be assigned a sequential launch number based upon registration order. Failure to be present and launch will forfeit the team's launch time.
5. Each team will be permitted one launch.
6. If a team misses its launch time slot, it may launch at the end of the competition.

Rule F: Scoring Rubric.

A copy of the scoring rubric may be obtained by downloading it from the website, www.angelinascienceandtech.com.

Eggonaut Rocket Scoring Rubric

Team #: _____

Mass of Rocket: _____

Division: _____ Middle School (Grades 6-8) Specify grade: _____

 _____ High School (Grades 9-12) Specify grade: _____

Team Members: _____

School: _____

Design Notebook (30 pts. max)	Points Awarded
Cover Sheet (0-3 pts)	
Scaled Drawings (0-8 pts)	
Materials Used (0-4 pts)	
Procedures Listed (0-5 pts)	
Modifications Table (0-10 pts)	
TOTAL DESIGN NOTEBOOK:	

Aesthetic Evaluation (20 pts)	Points Awarded
Exterior Decorations (0-5 pts)	
Proportionally (0-5 pts)	
Originality (0-5 pts)	
Overall Appearance (0-5 pts)	
TOTAL AESTHETIC EVALUATION:	

Performance Evaluation (Up to 40 pts max)		Points Awarded
Launch	Rocket took off successfully from launch pad (0-10 pts)	
	Egg unbroken, no cracks (20 pts)	
	Egg with minor crack(s), no leakage (10 pts)	
	Egg cracked with leakage, or broken (0 pts)	
Hang Time	Seconds	Points
	3	2
	4	4
	5	6
	6	8
7+	10	
TOTAL PERFORMANCE EVALUATION:		

GRAND TOTAL (max of 90 points): _____

Tie Breaker: TOTAL MASS OF ROCKET (without fuel or egg) _____

NOTE: In case of a tie, the winner will be of less mass.