Eggonaut Program (Water Rocket Competition)

Prelaunch Test Wednesday, February 16

Competition Wednesday, February 23
(Dependent on Weather Conditions)

Final Report of Launch due Wednesday March 2.

Your mission is to design and build two water rockets that will carry an intrepid Egg to about 100 ft altitude – (1) a regular fin design and (2) a spinning rocket design and alternative system of your choice. Your design should ensure the survival of the Eggonaut, particularly on the rockets return to Earth. If the Eggonaut fails to survive you will have to include in your final report, analysis of potential fatal flaws in your rocket design. Assemble a group of 3-4 people in today’s lab. and then complete the design in Friday’s computer session.

Scoring Categories:

Payload Mass Fraction: Weight of Eggonaut
Weight of Spacecraft
Weight of Fuel

Design: Functionality
Originality

Flight Results: Time to Maximum Height
Time to Return
Distance from Launch Site

Eggonaut: Recovered Alive
Recovered Dead
Not Recovered

Bonus: Flight separation of Eggonaut Capsule for safe landing

Final Report: Requires detailing rocket development – who did what,
Analysis of design and flight

Working Groups

You need to form a group of 3-4 people. Group members need to be from the same section. On all paperwork, all teams members need to be identified.

Team Name

First item of business is you must select a team name. This helps us record the results.
Rocket Design

You must design the rocket and egg protection. Each team member needs to describe in their own words the choices made in the final report. Reasons for specific design choices (i.e. fins or no fins, number of fins, etc) must be presented.

Eggonaut

Your Eggonaut must be uncooked. The Eggonaut protection system should be well tested before launch day. Failure to clean up after an Eggonaut launch will result in a negative million points.

Rocket

The rocket is propelled by pressurized air and water and must be built around a plastic pop bottle with a standard bottleneck that must be compatible with the launch pad provided. These bottles include typical 2-liter, 1-liter, 16 and 20 ounce soda bottles. Water bottles do not do well under extreme pressure and should not be used.

Construction

Construction and choice of materials should be presented with justifications. Chose strong but lightweight materials for maximum performance and safety for those on the ground. Use your imagination on the rocket design, but rockets judged unsafe will not be allowed to launch. SHARP POINTING STICKS ARE NOT ALLOWED.

All rockets must be made from PLASTIC bottles (NO GLASS). Acceptable materials include: cardboard, cloth, rubber, paper, plastic, and tape. Unacceptable materials include: rocks, metal, nails and depleted uranium. IF ANY UNACCEPTABLE MATERIALS ARE PRESENT ACCESS TO LAUNCH PAD WILL BE DENIED.

Beware that the rocket will be under high pressure. DO NOT MODIFY PRESSURIZED BOTTLE – only add to it for the Eggonaut capsule. Weakening the bottle for example by using hot glue on the fuel container may cause a fatal failure in the system. Be original but be aerodynamic. Tip of rocket MUST be covered with some type of nose cover.

Team Duties on Launch Day

Bring Team Sign, Rocket, Water (bring extra), Eggonaut, paper towels for possible clean up, and sheet for noting performance of rocket.

Team needs to be assigned

- Launcher
- Fueler
- Timer for time to max. height
- Timer for time until touch down.

EACH TEAM MEMBER IS REQUIRED TO PARTICIPATE IN AT LEAST ONE OF THE LAUNCHES.
Eggonaut Final Report

Student Name:

Other Team Members:

Team Name:

Safety Check:

Weight of Rocket

Weight of Egg (Uncooked)

Weight of Rocket

Weight of Egg (Uncooked)

Soft Point on Rocket

Only soft materials used

Design ideas for Rocket:

Design ideas for Eggonaut:
Lessons learnt from Test Firing:

### Launch Results

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<tr>
<th>Launch 1</th>
<th>Fuel:</th>
<th>Pressure</th>
<th>Time of ascent</th>
<th>Time to return to Earth</th>
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<tr>
<th>Launch 2</th>
<th>Fuel:</th>
<th>Pressure</th>
<th>Time of ascent</th>
<th>Time to return to Earth</th>
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<tr>
<th>Launch 3 (if eggonaut still alive or if time permits)</th>
<th>Fuel:</th>
<th>Pressure</th>
<th>Time of ascent</th>
<th>Time to return to Earth</th>
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<tr>
<th>Estimated height</th>
<th>Eggonaut Recovery (Y/N)</th>
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**Conclusions for Best Launch** (e.g., best fraction of fuel to payload, critical changes to design to improve performance)