

Physics Boat Races

Semester 2 Final Project

Races: May 30th, 2019

Objective:

Build a boat that can make it one length across the pool. The boat can be made only of:

- Cardboard – As much as you want
- Acrylic or other waterproof paint (NO SPRAY PAINT permitted on campus)
- Duct Tape and/or Packing Tape
- No Power Tools permitted on campus (per OSHA regulations and California Ed Code)

Rules and Regulations:

SAFETY FIRST! You are fully responsible for any damage done to the campus, pool or other people.

1. Boats can be built in teams of 2 or 3 students.
2. The boat must be powered by two students' arms. (No paddles)
3. The paint used must be waterproof. If you do not want to use paint, you have the option to use colored duct tape to decorate your boat.
4. The maximum dimensions of the boat are 2m x 1m x 0.8m (This is probably too big).
5. Your group will be assigned a race time with your class period. You must be ready to race at that time.
6. Your boat must have a school appropriate theme. Be creative and have fun with this.
7. Your boat is due in class the day before the race. It will be inspected for materials and hazards. The waterproof paint will also be checked. The paint must be dry. If your boat fails any part of the inspection, you will not be permitted to race.
8. You must break down and dispose of the boat in the assigned dumpster after the race

Your boat will receive zero points if you use non-approved materials, if you do not properly dispose of your materials or if damage is done to the pool or campus. You are responsible for any damage done while building or racing the boat.

The Contest:

- The goal is to cross 1 length of the pool with two people in the boat.
- The races will take place on **May 30th** during lunch. You will probably get wet, so come prepared.
- Invite your parents, siblings and friends to watch your race!

GRADING RUBRIC – 100 point lab/project

Objective: This project is to design a cardboard boat for adequate buoyancy and maximum velocity and to demonstrate an understanding of the Physics principles behind the design and performance of a boat.

I. Performance: Distance – 25%

25 points: Travels completely across the pool without sinking.

15 points: Travels part of the way across the pool before sinking.

5 points: The boat sinks within three meters of the start.

II. Construction and Design - 25%

25 points: Neat construction. Excellent attention to detail. Unique design & creativity.

20 points: Good construction and assembly and good attention to detail.

15 points: The boat holds together, but looks like a last-minute project. Basic design.

10 points: The boat doesn't hold together, and looks like a last-minute project.

5 points: Poor construction and assembly. No attention to detail. No apparent creativity.

III. Overall Participation & Clean Up - 50%

50 points total: You may earn up to 50 participation points. Zero credit is awarded each day that you are not on task (due to lack of materials, senioritis, laziness or any other reason) or unexcused. You must be working on or directly in front of the amphitheater stage during class time or you will be marked absent. To receive these points, your boat must be properly disposed of after the race.

IV. Extra Credit Opportunities (Maximum of 20 points)

1) Fastest Boat (per class)

- a. **10 points** for the fastest boat
- b. **5 points** for the 2nd fastest boat

2) Best themed boat (per class)

- a. **10 points** for best theme
- b. **5 points** for 2nd best theme

3) Teacher/Administrator/Faculty/Staff Member in the boat

- a. **10 points** - You can replace one student during the race with a teacher/faculty member. The teacher/faculty member must be presented with this packet, understand the rules and agree to participate. Should the teacher/faculty member "bail out", "flake" or otherwise not show, be prepared to race without that person.

4) Be an assistant during the races (you may sign up for ONE of these)

- a. **10 points** – **Certified swimmers** are needed to be in the pool to help with swimmer safety and to remove boat debris after each race.
- b. **10 points** – **Race organizers, Time keepers & Data recorders**
- c. **10 points** - **Clean up** – Remove all trash from the pool area & into large trash bins
- d. **10 points** – Take quality **photos and/or videos** and provide them to Mr. Greenberg within 24 hours of the race

You must be an assistant FOR THE ENTIRE EVENT (except for your own race) to receive credit.