

GEORGIA INSTITUTE OF TECHNOLOGY
George W. Woodruff School of Mechanical Engineering
ME 2110 - Creative Decisions and Design, Fall 2019
Studio #1 – Catapult Design, Build, Test

Assigned: Week 1 (in studio)

Due: Week 2 (at the start of studio)

Studio Description: This week you will work in groups of three to four students to design and build a catapult with the objective of maximizing launch distance and under the constraint of weight. You are provided with the following building materials: 50 popsicle sticks, 1 roll of tape, 10 rubber bands, 2 dowel rods and a ping pong ball. The assignment will consist of two trials as described below. Each catapult is to be built using only the materials listed above. You will have two trials. You may iterate on your first design in the second trial. The catapult will be tested and the average of 5 launches measured in each trial. The catapult must be located behind the starting line and may be affixed to the ground using tape if needed. You will be responsible for cleaning up all materials, including the removal of all tape. You must return all undamaged, non-consumable materials (e.g., popsicle sticks, rubber bands, dowel rods, ping pong ball) free of tape. Appropriate personal protective equipment (PPE) – safety glasses – is required during construction activities and will be provided during studio.

Trial 1: You have 45 minutes to make a catapult. You should spend 15 minutes planning your catapult (not building) and 30 minutes building it. *Do not start construction of your catapult during the 15-minute planning period.* After 45 minutes, the instructor will measure the launch distance of each catapult. Distance will be measured from the starting line to the approximate position on which the ball falls. After your instructor has recorded its distance, you will have 10 minutes to make any notes, take pictures and clean-up your first catapult. The final metric of interest is the average distance divided by the number of popsicle sticks used. This number is to be maximized

Trial 2: This is a repeat of Trial 1 under the same conditions described above in terms of time and materials to be used. Now you have some understanding of what worked and didn't work in your first approach and can undergo a design iteration to explore and/or refine your team's approach.

Deliverable due at the end of this studio: A draft report (one per team) following the guidelines described below. This is to be reviewed and critiqued by your instructor and TA with your team in studio. In this report, you should (i) briefly restate the goal of the study, the aspects of the problem and its requirements and materials used/given, (ii) describe the approach taken, (iii) describe the results and (iv) describe future modifications that can be taken to improve results. In describing the approach taken and results, you will need to generate figures that communicate your design. These should have adequate labels to support textual descriptions you provide. Comment on relative performance compared to that of your section. Use technical wording where possible.

Deliverables due at the beginning of studio next week: An updated report (one per team) that takes into consideration the comments provided to you by your instructor and TA.

Report Guidelines: The summary should be a maximum of one page in length, using 12-point font, 1-inch margins and single-spaced. A cover page should be provided and is not included in the page limit. Figures/tables should be attached on subsequent pages and are also not included in the page limit. Figure captions should be provided for all figures and go below the figure. Table captions for any tables are to be placed above the table. Figures and tables must be cited in sequential order in the text and all figures/tables must be cited. Use page numbers at the bottom of each page. See the textbook for further guidelines on proper formatting and writing style for reports and technical writing. All reports should be uploaded to Canvas before the deadline.