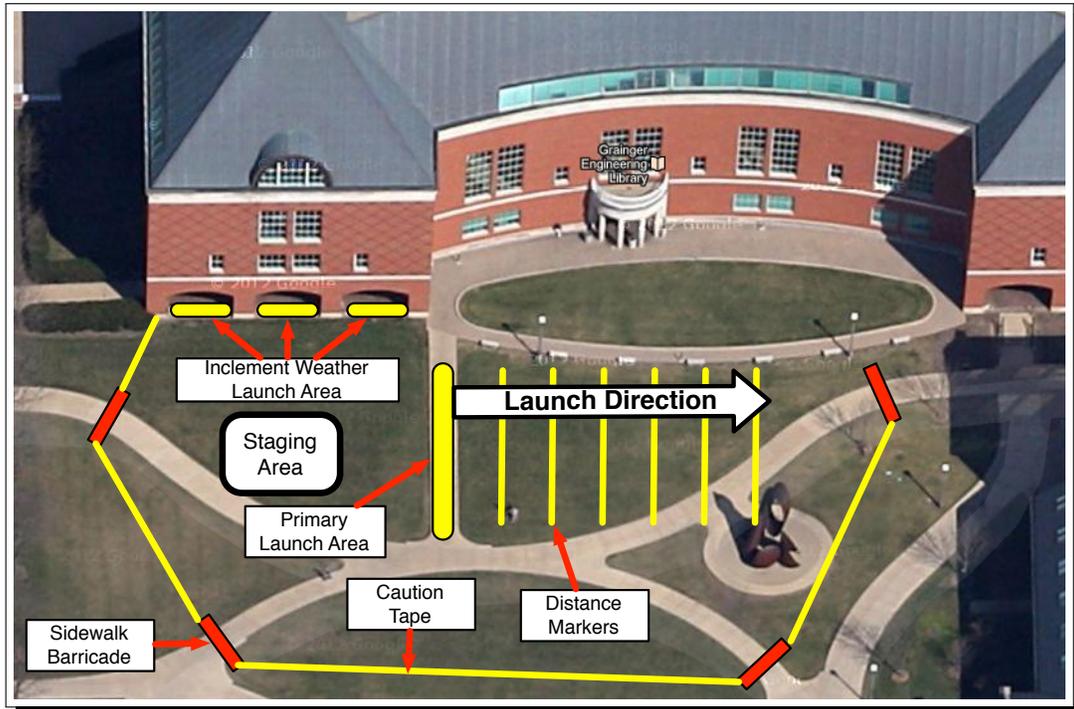




Launch Day Safety and Protocol

GE100 Introduction to ISE

September 12, 2014



Launch Area on the John Bardeen Engineering Quad
(40.112162, -88.227107)

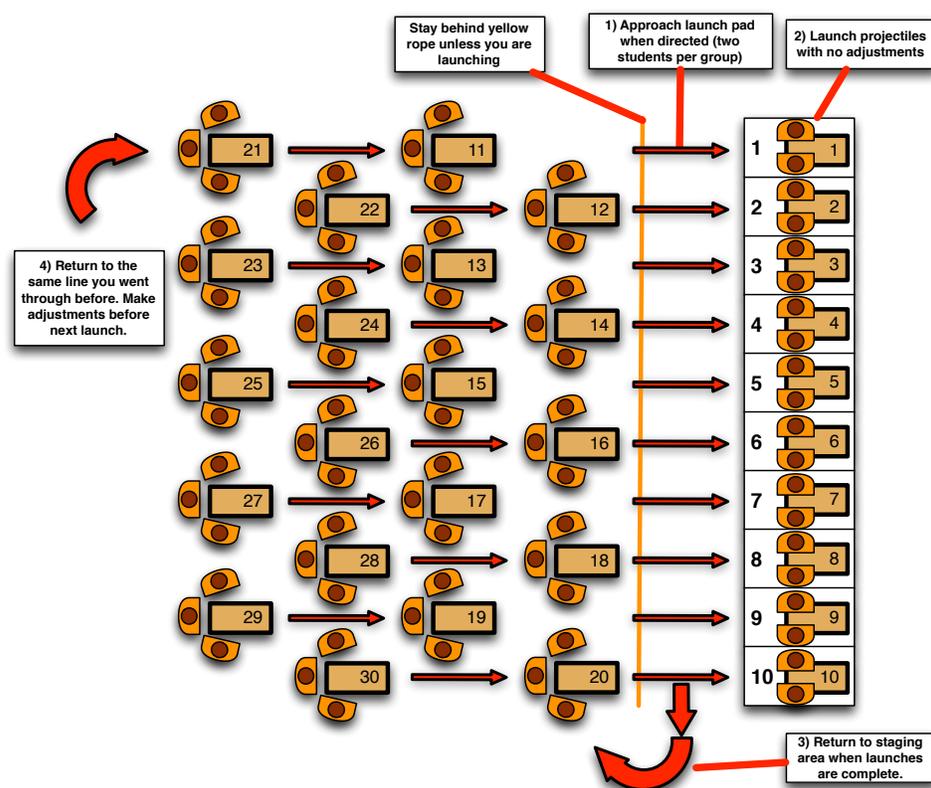
1. Safety Instructions

1. **Make sure that at the time of trebuchet launch, no person is leaning over/or is in close proximity of the rotating arm.**
2. **Only use the provided soft clay projectiles.**
3. Trebuchets must be inspected by a TA/ELA before launching, ensuring that:
 - (a) Knots, pin joints, bolts, and other connections are secure.
 - (b) The finger is adjusted so that the projectile is not launched backwards. Also, the finger bolt must be secure enough to prevent rotation of the finger.
 - (c) Trebuchets must be re-inspected after each modification.
4. There will be approximately one staff member for every 3-4 project groups.
 - (a) Staff members (ELAs/TAs) will be wearing yellow vests so that they are easy to identify.
 - (b) Staff members will be available to help answer questions in addition to inspecting trebuchets.
 - (c) Design decisions (fulcrum location, finger angle, wheels/no wheels, sling length) are up to the student group; staff members will allow students to make these decisions on their own, but supervise to ensure safety.
5. Do not launch if any person is in front of, behind, or leaning over the trebuchet. Ensure that no body part of any person is in the path of trebuchet + sling movement.
6. The sidewalks on the Bardeen Quad will be blocked at four locations, and caution tape will be used to block off the landing zone. Staff members will be standing watch at each sidewalk barricade to ensure pedestrians do not enter the landing zone. Students are not to enter the landing zone without permission.
7. Two staff members at the east end of the launch zone will each have a green flag. When they see that the landing zone is clear of people, they will raise their flag. **Do not launch unless both green flags are raised.**

2. Launch Day Protocol

We will hold two launch days: one after you have designed your trebuchet experiments, and another after you have adjusted your design using the computer simulation. When you arrive at the quad please **locate your trebuchet** and move to the staging area behind the appropriate launch pad number. As shown in the figure below, all groups whose number ends in 1 lines up behind launch pad number 1, all groups whose number ends in 2 lines up behind launch pad number 2, and so on. Three groups will rotate through using the same launch pad.

Ten groups can be launching simultaneously, but **only two students** from each group are allowed at the launch pad. All other group members must wait in the **staging area**. Group members can take turns being the ones to launch the trebuchet. All people in the launch area **must wear safety glasses**. Each group will be issue two safety glasses. These can be shared within the group.



Between turns make your necessary adjustments in preparation for the next test. Have your trebuchet inspected before the next launch. When it is your turn to launch and you move your trebuchet to the launch pad, you will be given 1-2 projectiles. Be sure to record your design and distance for each launch. When launching, double check to make sure that the green flags are up and the field is clear to launch. Do not make adjustments on the launch pad, you can do it only in the staging area. Once you are done launching, please exit the launch pad (with your trebuchet and toolbox) by walking south, towards Engineering Hall, behind all of the other teams, and then return to the staging area.

2.1 On the Launch Pad

1. Have your trebuchet inspect each time before you move to the launch pad.
2. Ensure no one is in front of, behind, or above the trebuchet.
3. Verify that both green flags are raised.
4. Load the projectile and loop the sling around the finger.
5. Rotate the throwing arm back as far as possible.
6. While holding the arm in position, place the projectile on the base toward the front such that there is no slack in the sling.
7. Shout, “launch” so that people know you are launching.
8. Let go of the throwing arm, taking care to stay out of the path of the rotating arm and sling.
9. Watch your nano-pumpkin sail!
10. Observe and record distance.

2.2 Trebuchet Competition

The group that achieves the longest range will be recognized in class after the second launch day, and at the Engineering Open House trebuchet demonstration. We are especially interested in the trebuchet design (the four variable values) that achieves this distance, so please record each design that you test.