



Siege Machine

A. Goal

1. Student will design and build a trebuchet catapult which will launch a projectile a horizontal distance of 4 m to hit the center of the target.

B. Specifications

1. Each student will design and build their own trebuchet.
2. Trebuchet must be lever-type which propels the projectile using the force of a falling body such as a weight. Human forces like stomping or hitting do **not** qualify as "falling body."
3. Spring or elastic launchers are prohibited - regardless of material. A spring is defined as any material that stores energy when its shape is deformed and releases energy when its shape is restored.
4. Catapult may be constructed from wood, metal, plastic, and in 2009 students are permitted to use building kits like Meccano, Lego, or Kinex.
5. Maximum catapult frame dimensions are: less than 1 m long, less than 1 m wide, and less than 1 m tall including the arm. The arm of the catapult must be less than 1.5 m in length when in "ready to shoot" position. Please note that student must consider the dimensions of the classroom door to insure catapult can be brought into

classroom for grading.

6. Projectile must be a standard golf ball.
7. All tests will be performed in the classroom; the **student** is responsible for measuring and accounting for ceiling height.
8. Distance will be measured from front-most point of catapult (established when it is set and ready to shoot.)
9. Each student will fire their catapult 3 times after a **maximum** of 2 "warm up" shots; warmup shots done at student's discretion.
10. When a projectile lands, the distance from target will be measured in decimeters where each decimeter is one percent.
11. Catapult must have student's name **conspicuously** displayed.
12. Students may not borrow catapult parts from other students nor modify their design on due date.
13. Student must dispose of catapult within 3 days of due date or grade is reduced by 10%.

C. Grading

Siege Machine: must be brought to class and must shoot 4 meters into a circle with diameter of 50 cm; grade will be determined by accuracy of three shots. Each decimeter (dm) or part of a dm as measured from the edge of the circle target will be 1 % of grade. For example, a student shooting two times into target and one time 5 cm outside edge of target will earn 99%.

$$\text{Grade} = 100 - [(\text{shot \#1}) + (\text{shot \#2}) + (\text{shot \#3})]$$

D. Due Date

Catapults are due at the beginning of class on _____.