

CATAPULT CHALLENGE

Objective: Students are to design and construct a mechanical launching system resembling an ancient catapult. This will be used to fling a large marshmallow (or equivalent) a distance of 2 meters at a bull's eye target.

Purpose: This project provides the teacher an opportunity to discuss with students certain engineering and mathematical principles as they relate to the construction of catapults (i.e. gravity, velocity, trajectory, geometrical formations such as parabolas, potential vs. kinetic, torsion and material efficiency.)

Project Materials: Every group should have the following materials:

Plastic spoons
Rubber bands
Marshmallows

Paper cups
Masking tape
Meter stick

Craft sticks
Paperclips
Chalk

Rules:

1. Students must build a catapult from the materials listed above that is able to fling a large marshmallow at a bull's eye target.
2. Students may twist, bend, or break any of the materials to build the catapult.
3. Teams must demonstrate that their catapult design is "free standing: prior to launching the marshmallow. The catapult must stand freely for at least 10 seconds.
4. Only the two hands may be on the catapult at the time of launching. One hand can be used to launch the marshmallow. The other hand can only be used to anchor or stabilize the catapult during the launching. This hand cannot be used to hold the catapult materials together and cannot form a fist around the catapult.
5. Students may neither puncture nor alter the marshmallow.
6. Any hand not on the catapult must be on the launch surface.
7. Students who disturb another group's catapult are automatically disqualified.
8. Students will have two attempts at the target.

Instructions:

1. Put the students into groups two.
2. Explain to the students what the activity is describing the materials to be used and the rules of the activity.
3. Designate one person from each group as chairperson. This individual will collect the following:

- 3- plastic spoons
- 1- paper cup
- 5- rubber bands
- 1- foot of masking tape
- 5- paper clips
- 15- craft sticks

4. Once all of the groups have the materials, the students may begin the project. Students will be given 30 minutes to construct the catapult.

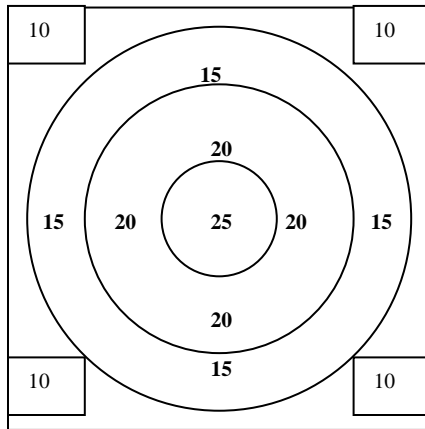


fig. 1

While students are building the catapult, you should construct the bull's eye target using the chalk and chalkboard in your classroom. The target must have three rings worth 25 points, 20, points, 15 points, and 10 points.

5. After 30 minutes, students are told that time is up and they must stop building.
6. The chairperson is to remain with the catapult.
7. Everyone else must clean up the room. Once the room is cleaned then tell the students to sit down in their groups.
8. Call on the individual groups to make their way to the bull's eye with the catapult and have them compete.
9. The teacher will then begin the discussion while monitoring the time.
10. Keep track of the group's score.