

CATAPULT DESIGN – BASKETBALL FREE THROW

OVERVIEW

Participants design and produce a working catapult, within specified guidelines, that is adjustable and accurately propels a basketball-style stress ball toward a basketball goal. The objective is to score points by successfully launching basketballs into a hoop mounted at a regulation height for this event.

- **Backboard height:** 6’2”
- **Rim (hoop) height:** 5’4”
- **Target distance:** 8’–14’ from the front of the catapult to the base of the goal

ELIGIBILITY

- Participants are limited to two (2) teams of two (2) to four (4) individuals per chapter.
- Each team must have at least two (2) members present to launch the catapult.

TIME LIMITS

- Entries must be started and completed during the current school year.
- The catapult must be picked up at the designated time at the conclusion of the event.

ATTIRE

Casual attire is required for this event. Participants are encouraged to wear an Oklahoma City Thunder shirt; however, a school shirt or TSA T-shirt is also acceptable. Closed-toe shoes are required, and safety goggles must be worn during the performance stage of the event.

PROCEDURE

PRELIMINARY ROUND

- Participants check in their entries at the time and place stated in the conference program.
- Catapults are inspected by evaluators to determine safety compliance. Any unsafe catapult will be disqualified. Judges will make a final determination regarding operational safety.
- Teams will receive eight (8) basketball-style stress balls for scoring during a two-minute scoring stage.
- Students must bring and wear safety goggles for this stage of the event.
- One (1) team member may use a tape measure for calibrating the distance from the front of the catapult to the goal within the 8’–14’ range.
- The basketball goal will be secured in place with:



- Backboard height: 6'2"
- Hoop height: 5'4"
- A clearly marked 1-foot floor scoring perimeter around the base of the goal

G. The team will be given one (1) minute of practice to adjust its catapult for accuracy to the required distance.

H. Students must use a minimum five (5)-foot launch cord and stand at least three (3) feet away from the catapult when launching.

I. When the scoring round begins, teams will have two (2) minutes to launch basketballs one at a time to accumulate points.

- The timer begins on the first launch attempt.

J. Teams may repair a catapult malfunction, but the timer does not stop.

K. All firing must cease at the end of two (2) minutes. Shots launched before time expires but landing afterward will count.

SCORING

Basketball-style stress balls are scored where they come to rest at the end of the round.

- Stress ball passes cleanly through the hoop: 5 points
- Stress ball contacts the rim or backboard but does not score: 3 points
- Stress ball lands within the marked floor scoring area: 1 point
- Stress ball misses the target area: 0 points

Scores are not recorded until time has expired or the team declares they are finished.

TIE BREAKERS

Ties will be broken as follows:

1. Sudden-death shoot-off (no practice)

REGULATIONS

CATAPULT DESIGN & SAFETY REQUIREMENTS

A. Participants must bring and wear safety goggles during the performance stage of the event.

B. Teams must provide their own tape measure for calibration and catapult placement (minimum 25-foot length).

- C. The catapult must be no larger than 24 inches tall × 24 inches long × 18 inches wide while in the loaded position. The launch arm may extend beyond this size envelope only during launch.
- D. The catapult must be capable of launching the projectile on an **upward trajectory** sufficient to reach the target hoop height.
- E. The total weight of the catapult must not exceed fifteen (15) pounds.
- F. The catapult must be constructed primarily of PVC pipe (suggested size 1 inch or greater). PVC sizes smaller than 1 inch are discouraged due to increased risk of fracture.
- G. The launch mechanism, firing mechanism, fasteners, and safety components may be constructed of wood or metal, provided they are built in a safe manner and do not pose a risk to participants, officials, or equipment.
- H. The catapult may not include wheels or any rolling components.
- I. The base of the catapult must be designed to accommodate event-provided ballast, consisting of two (2) 25-pound Olympic plate weights.
- J. The catapult must operate completely within the designated firing range area (6 feet deep × 4 feet wide).
- K. A detachable loading or arming lever may be used during setup but must be removed prior to inspection and launch.
- L. All parts of the catapult must begin behind the launch line, though components may extend over the line during and after launch.
- M. The catapult must be launched using a minimum five (5)-foot pull cord, and all team members must remain at least three (3) feet away during launch.
- N. When the catapult is on display or not in the performance stage, it must be fully disabled and unable to be readied for firing.
- O. The following materials are prohibited:
1. Glass
 2. Flammable, corrosive, or explosive materials
 3. Compounds that produce odors or gases

PROJECTILE SPECIFICATIONS

- P. All teams will use basketball-style stress balls provided by the event.
- Q. Stress balls will have an approximate diameter of 2.5 inches (6.3 cm).
- R. Stress balls will be constructed of soft, compressible foam or similar non-rigid material.
- S. The approximate weight of each stress ball will be 2–3 ounces.

T. Teams may not substitute, modify, or alter the provided projectiles.

SAFETY COMPLIANCE

A catapult that receives a “No” for any of the following requirements will not advance to the performance stage:

- Safety goggles worn by all team members
- Catapult meets size and weight requirements
- Approved construction materials used
- Five (5)-foot pull cord present
- Safe launching mechanism
- Overall safe operation

CATAPULT – ENTRY/SCORE SHEET

TEAM ID#		TOTAL POINTS SCORED	
		TIME REMAINING (MM:SS)	

CATAPULT DESIGN

Catapult Design Safety Compliance Go or No-Go

A catapult that is marked No-Go for any of the requirements below will not advance to the performance stage of the event.		
All team members must have and wear safety goggles.	Go	No-Go
The catapult is the correct size. While in the loaded position 24” tall x 24” long x 18” wide	Go	No-Go
The catapult is built with the correct materials.	Go	No-Go
The catapult launches with a pull cord with at least five (5) feet of safety distance.	Go	No-Go
The catapult is safe to operate	Go	No-Go

OFFICIAL SCORING FORM

Shot Attempt	Missed shot 0 points	Floor Zone 1 Point	Rim or Backboard 3 points	In the Hoop 5 points
1				
2				
3				
4				
5				
6				
7				
8				

- Students must use the >5’ launch cord and be at least 3’ from the catapult when launching
- Caution must be used when loading the catapult about students leaning over the launching arm in case of a misfire.