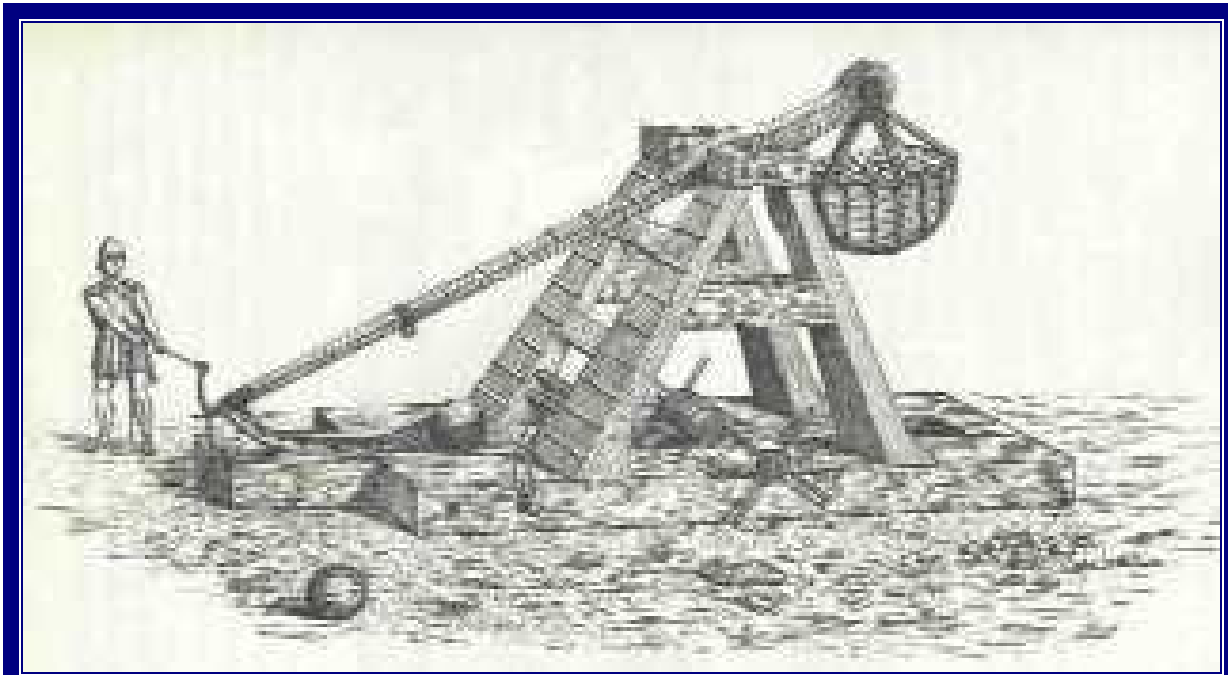


“TEXAS TSA
TREBUCHET DESIGN CONTEST”



[HTTP://WWW.REDSTONEPROJECTS.COM/TREBUCHETSTORE/TREBUCHET_HISTORY.HTML](http://www.redstoneprojects.com/trebuchetstore/trebuchet_history.html)

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“THE CHALLENGE”

- A TEAM OF UP TO FOUR STUDENTS SHOULD BUILD A TREBUCHET THAT IS CAPABLE OF LAUNCHING WATER BALLOONS AT A 3-METER X 3-METER TARGET.
- ALL TEAM MEMBERS MUST ATTEND THE SAME SCHOOL, AS WELL AS BEING T.S.A. MEMBERS.
- FOR SUPERVISION AND GUIDANCE, ALL TEAMS MUST HAVE A COACH WHO IS A T.S.A. ADVISOR/TEACHER.
- THE DEVICE MUST BE DESIGNED AND BUILT DURING THE CURRENT SCHOOL YEAR.
- A COACH CAN ENTER, AND HELP WITH MORE THAN ONE TEAM.
- ONLY THOSE TEAMS THAT REGISTER WITH THE TEXAS TSA CONTEST DIRECTORS, USING THE FORM ON THE TEXAS TSA WEBSITE, WILL BE ALLOWED TO COMPETE. **REGISTRATION MUST BE COMPLETED BY MARCH 1ST 2009.**
- EACH TEAM WILL BE ALLOWED TO SHOOT 10 WATER BALLOONS AT THE TARGET. (*ALL BALLOONS ARE TO BE SUPPLIED BY THE CONTESTANTS AND CAN BE ANY STYLE OR SIZE OF BALLOON. BALLOONS CAN BE 'DOUBLED'.*)
- AFTER THE COMPETITION, ALL TEAMS FROM EACH CLASS (HIGH SCHOOL/JUNIOR HIGH) MUST PLACE THEIR DEVICE AND NOTEBOOK ON DISPLAY, AT THE DESIGNATED AREA FOR THE TREBUCHETS.
- THE DEVICE MUST BE FULLY DISABLED, AND THE LAUNCH MASS REMOVED, WHILE ON DISPLAY. THIS WILL PREVENT ANY ACCIDENTAL LAUNCHES.
- THE DEVICE MUST REMAIN ON DISPLAY THURSDAY, AND FRIDAY OF CONTEST LIKE ALL OTHER PROJECTS.

“THE SPECIFICATIONS”

- THE DEVICE MAY BE MADE OF ANY MATERIAL DESIRED. ONLY TRUE TREBUCHETS WILL BE ALLOWED, WITH A FALLING MASS FOR POWER, AND A SWINGING ARM FOR THROWING. FOR EXAMPLES REFER TO THE FOLLOWING WEBSITES:

[HTTP://WWW.RIPCORD.WS/PLANS/PLANS.HTML](http://www.ripcord.ws/plans/plans.html)

[HTTP://WWW.TREBUCHET.COM/](http://www.trebuchet.com/)

- THE DEVICE CAN HAVE A DROPPING OR SWINGING MASS FOR THE ENERGY SOURCE.
- THE DEVICE CAN NOT WEIGH MORE THAN 75 KILOGRAMS, SWINGING MASS INCLUDED.
- A CERTIFIED WEIGHT TICKET MUST BE IN THE DOCUMENTATION FOLDER FOR EACH DEVICE. (*DEVICES WITHOUT WEIGHT CERTIFICATIONS WILL NOT BE CONSIDERED FOR AWARDS.*)
- THE DEVICE MUST FIT INTO A SPACE THAT IS 2 METER BY 2 METER BY 3 METERS HIGH. (2M X 2M X 3M)
- THE DEVICE MAY, OR MAY NOT HAVE WHEELS. (*A TEAM OF 4 STUDENTS SHOULD BE CAPABLE OF LIFTING THEIR TREBUCHET.*)
- THE DEVICE MUST BE LAUNCHED BY PULLING A LINCHPIN ATTACHED TO A ROPE OR CHAIN THAT IS A MINIMUM OF 2 METERS IN LENGTH.
- THE TARGET WILL BE A 3 METER BY 3 METER SQUARE, LOCATED AT THE DISTANCE SPECIFIED BY THE TEAM SHOOTING.
- THE DEVICE MUST PASS A SAFETY INSPECTION BY DEMONSTRATING THAT IT CAN SUCCESSFULLY LAUNCH A BALLOON WITHOUT PARTS 'FLYING OFF' AND/OR TORQUE ITSELF INTO SUBMISSION.
- THE DEVICE MUST BE A TRUE TREBUCHET WITH A FALLING MASS AS AN ENERGY SOURCE, AND A SLING THAT DOES THE LAUNCHING.

“THE COMPETITION”

- **AT THE TIME INDICATED IN THE SCHEDULE OF EVENTS, REPORT TO THE CONTEST AREA, AND REPORT TO EVENT COORDINATOR.**
- **THE DEVICES ARE TO BE CHECKED-IN, INSPECTED FOR SAFETY, AND ENGINEERING NOTEBOOKS GRADED BY THE JUDGES.**
- **ALL TEAM MEMBERS WILL WEAR APPROVED EYE PROTECTION DURING ALL PARTS OF THE SETUP AND LAUNCHING ACTIVITIES.**
- **THE DEVICE CANNOT BE SET UP WITH THE SHOOTING ARM LOADED AND/OR IN THE SHOOTING POSITION UNTIL IT IS IN THE LAUNCH AREA.**
- **ONLY THE TEAM MEMBERS AND JUDGES ARE ALLOWED IN THE LAUNCHING AREA.**
- **THE JUDGES WILL ANNOUNCE THE FIRST THREE TEAMS TO COMPETE. THEY WILL GET THEIR DEVICES, AND TAKE THEM TO THE ASSIGNED LAUNCH SITE. THERE WILL BE THREE TEAMS COMPETING SIDE BY SIDE IN THE FIRST ROUND OF COMPETITION.**
- **ALL PARTS OF THE DEVICE MUST START BEHIND THE LAUNCH LINE, BUT PARTS OF THE THROWING ARM MAY EXTEND OVER THE LINE DURING AND AFTER THE SHOT.**
- **ONCE THE DEVICE IS SET UP TO BEGIN OFFICIAL LAUNCHING, THE TEAM WILL BE ALLOWED ONE PRACTICE SHOT, WITHOUT THE TARGET, TO MAKE SURE THE DEVICE IS IN WORKING ORDER, AND TO CALCULATE DISTANCE.**
- **THE LAUNCH TEAM WILL THEN SELECT THE DISTANCE FOR THEIR TARGET. THIS DISTANCE WILL REMAIN FIXED FOR ALL 10 LAUNCHES. THERE WILL BE A 20-METER MINIMUM AND 65-METER MAXIMUM DISTANCE TO THE TARGET. THIS TARGET DISTANCE WILL BE MEASURED FROM THE LAUNCH LINE TO THE FRONT EDGE OF THE TARGET.**
- **AS A SAFETY PRECAUTION, ONCE THE DEVICE IS LOADED FOR LAUNCHING, NO ONE SHALL MAKE ADJUSTMENTS TO THE DEVICE.**

“THE COMPETITION (CONTINUED)”

- **IF IT'S NECESSARY TO ABORT A LAUNCH, THE FALLING MASS MUST BE SECURED BEFORE ANY ACTION IS TO BE TAKEN; THEREFORE YOU MUST HAVE A SAFETY STOP THAT WILL DISABLE THE DROPPING MASS.**
- **THE JUDGE WILL GIVE THE 'ALL CLEAR' SIGNAL TO THE TEAM MEMBER WHO IS DOING THE LAUNCHING, ONLY WHEN ALL TEAM MEMBERS ARE BEHIND THE SAFETY LINE. THE LAUNCHER WILL THEN GIVE THE SIGNAL, “THREE, TWO, ONE, FIRE!” AND PULL THE LINCHPIN.**
- **ONCE THE DEVICE IS SET UP ON THE LINE, AND THE PRACTICE SHOT IS TAKEN, A 15 MINUTE 'SHOT CLOCK' BEGINS IN WHICH ALL 10 LAUNCHES MUST BE MADE. ONLY THOSE ATTEMPTS MADE IN THE 15 MINUTE TIME PERIOD WILL COUNT.**
- **ADJUSTMENTS MAY BE MADE TO THE DEVICE BETWEEN LAUNCHES, BUT ONLY BY THE TEAM MEMBERS. THE ADJUSTMENTS DO NOT STOP THE 15-MINUTE SHOT CLOCK. THE DEVICE CANNOT BE REMOVED FROM ITS POSITION FOR THESE ADJUSTMENTS.**
- **A LAUNCH COUNTS AS ONE OF THE 10 TOTAL LAUNCHES ONCE THE LINCHPIN HAS BEEN PULLED, FOR EXAMPLE, IF A BALLOON POPS DURING THE LAUNCH (WHILE IN THE SLING, DURING THE RELEASE, ETC), THE LAUNCH WILL STILL COUNT.**

“THE SCORING”

- **THE SCORING OF THE DEVICE IS COMPOSED OF TWO FACTORS:**

1. THE DISTANCE TO THE TARGET IN METERS

2. TOTAL NUMBER OF PROJECTILES HITTING INSIDE THE TARGET AREA

- **NOTE:** IF A BALLOON FINISHES ITS FLIGHT IN THE TARGET, BUT DOES NOT BREAK IT WILL STILL COUNT AS A HIT. IF A BALLOON BOUNCES INTO THE TARGET, WITHOUT BREAKING, IT WILL COUNT AS A HIT.

- **TO DETERMINE TEAM RANKING, WE WILL UTILIZE THE FOLLOWING FORMULA:**

1. **SCORE** = (NUMBER OF HITS INSIDE TARGET AREA X DISTANCE TO TARGET IN METERS) EX. 3 HITS X 20M = 60 POINTS.

2. HIGHEST SCORE WINS

3. IN THE EVENT OF A TIE SCORE, THE TEAM WITH THE GREATER DISTANCE FROM THE TARGET WINS.

4. IF BOTH TEAMS HAD THE SAME DISTANCE TO TARGET, THEN THEY WILL HAVE A 5 BALLOON SHOOT OFF.

5. THE TOP FOUR PLACING TEAMS WILL ADVANCE TO THE MEDAL ROUND, WHICH WILL FOLLOW THE SAME FORMAT AS THE FIRST ROUND.

6. THE QUALIFYING TEAMS MAY CHANGE THEIR DISTANCE TO TARGET FOR THE FINAL ROUND.

“ENGINEERING NOTEBOOK”

- EACH TEAM WILL BE REQUIRED TO TURN IN AND DISPLAY A DOCUMENTATION NOTEBOOK, WHICH MUST INCLUDE THE FOLLOWING:
 - **NOTE:** WITHOUT THIS NOTEBOOK TEAMS WILL NOT BE ELIGIBLE FOR FIRST PLACE AWARD.
 1. EVIDENCE OF HISTORIC RESEARCH ABOUT TREBUCHETS, THEIR USE AND THE ART OF MAKING THEM. **(5 POINTS)**
 2. TECHNICAL DRAWINGS CREATED WITH THE ANY CADD SOFTWARE. **(10 POINTS)**
 3. PHOTOGRAPHS AND DOCUMENTATION OF THE DESIGN AND BUILDING PROCESS. **(10 POINTS)**
 4. THIS NOTEBOOK MUST BE ENTERED ON STANDARD 8.5x11 PAPERS, 12PT STANDARD FONT, AND UP TO 25 PAGES.
- THE **FINAL RANKING** WILL BE DETERMINED BY ADDING THE TWO SCORES TOGETHER, (THE CONTEST SCORE AND THE NOTEBOOK SCORE) TO DETERMINE THE FIRST PLACE AWARD.

“THE SPIRIT OF COMPETITION”

- **THE ULTIMATE GOAL OF THIS IS FOR THE STUDENTS AND TEACHERS TO:**
 - LEARN ABOUT THE HISTORY OF TREBUCHETS- (AS THEY WILL HAVE TO RESEARCH TREBUCHETS)
 - ENHANCE PROBLEM SOLVING AND TECHNOLOGICAL LITERACY SKILLS
 - USE THE ENGINEERING/DESIGN PROCESS, TO INVENT AN ORIGINAL AND FULLY FUNCTIONAL MECHANICAL DEVICE OR PROTOTYPE.
 - LEARN THE VALUE OF TRIAL-ERROR TESTING, TROUBLE SHOOTING, INNOVATION AND THE TECHNIQUES FOR TEAMWORK FOR COMPETITION
 - THIS COMPETITION IS FOR THE STUDENTS AND THEY ARE THE ONES WHO SHOULD RESEARCH, DESIGN, BUILD, TEST, AND INNOVATE THE DEVICES.
 - STUDENTS ARE EXPECTED TO UTILIZE TEACHERS, PARENTS AND PROFESSIONALS AS RESOURCES, NOT AS THE BUILDERS, OF THE DEVICE.
 - TEACHERS TO PROMOTE TECHNOLOGICAL LITERACY IN THE CLASSROOM
 - TO PROMOTE THE USE OF THE NATIONAL STANDARDS OF TECHNOLOGICAL LITERACY, AND TEKS IN THE CLASSROOM
 - MOST OF ALL, STUDENTS SHOULD HAVE FUN LEARNING THE PRINCIPLES OF TECHNOLOGY, ENGINEERING, SCIENCE, MATHEMATICS, HISTORY AND THE DESIGN PROCESS WHILE PROBLEM SOLVING.

CONTACT:

- PLEASE CALL OR EMAIL THE CONTEST DIRECTORS IF YOU HAVE QUESTIONS ABOUT ANY PART OF THIS PROCESS.
- PLEASE UNDERSTAND THAT ALL DECISIONS MADE BY THE CONTEST DIRECTORS ARE TO MAKE THE PLAYING FIELD FAIR FOR ALL.
- **GOOD LUCK** TO EVERYONE!
- WE ARE LOOKING FORWARD TO ANOTHER GREAT COMPETITION!

TERRY AND MARY ZIMMERMAN-TEXAS TSA CONTEST DIRECTORS

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