

TEXAS



**Technology Students
Association**

**UNIQUE TO TEXAS EVENTS
UTE's**

2018-2019

**CHANGES HAVE BEEN MADE:
NEW CATEGORIES HAVE BEEN ADDED &
SOME CATEGORIES HAVE BEEN MERGED/DELETED
DO NOT USE
PREVIOUS YEARS
RULES BOOKS!**

Texas TSA On-site events use the rules as listed for each event. The event judge may explain additional regulations and procedures that effect the operation of the contest before the events take place.

Hot Rod CO₂ Car Competition

Hot Rod CO ₂ Car Competition	Entries Per Region	Classification #	
		Middle School	High School
Wood	3	MU100	HU100
ABS Plastic	3	MU101	HU101

Rules for this contest and procedures may be found on the Texas TSA Website after Sept. 15th.

2019 - Hot Rod / Classic Gasser 2021 - NHRA Funny Car
2020 - 70's muscle cars 2022 - Top Fuel Dragster

*Hot Rod Competition (HRC) provides technology students with another opportunity to use their knowledge and skills in problem solving and the fun and excitement of racing competition. The goal of HRC is to encourage students to design and build realistic looking ¼ mile Hot Rod Car models. The project has been carefully planned to allow students to create realistic scale models of dragsters, funny cars, pro-stock cars and trucks and still have a chance to win races. **The vehicle should be built of several parts or sub-assemblies rather than carved out or 3D printed as a single unit.***

SPECIFICATIONS:

LENGTH: 8 to 12 inches

WIDTH: 2 ⁵/₈ to 3 ³/₄ inches at the widest point on the car.

HEIGHT: (above the race surface) MINIMUM: 3 inches MAXIMUM: 3 ³/₄ inches

WEIGHT: (not including CO₂ cartridge) MINIMUM 100 GRAMS

POWER PLANT CHAMBER

WALL THICKNESS: MINIMUM 1/8 inch around the CO₂ cartridge

DEPTH: MINIMUM 1 ⁷/₈ inches MAXIMUM 2 ¹/₈ inches

CENTER: Power Plant Chamber Center to Race Surface: 1 ¹/₈ to 1 ⁷/₈ inches

GUIDE LUGS: MINIMUM: 2, must be spaced at least 4 inches apart.

REQUIRED EQUIPMENT: Front mounted engine with side exhaust pipes (Note: Some Gassers exhaust through the front bumper).

OPTIONAL EQUIPMENT: Driver, pinstripes, decals or stickers, engine wiring and anything else to enhance the realistic look of the truck.

RULES: 1: Hot Rod must be powered by one 8 gram CO₂ cartridge.

2: Hot Rod must fit onto a standard CO₂ track.

3: If a car fails the initial weigh in, the race officials may provide student with an opportunity to bring the racer up or down to weight limits.

4: Any racer deemed unsafe by judges will not be raced.

5: All parts must be made of either wood or plastic. Glass and/or metal parts will be deemed unsafe. Exceptions: axles may be metal, plastic or wood.

6: All decisions of weight, size limits, or safety are the responsibility of the judges. Judges decisions are final.

7: In order to qualify for judging and placing, a car MUST remain in safe and operable condition after all racing and be capable of safely racing again.

Hot Rod CO2 Car Competition (continued)

DOCUMENTATION: Student must submit plans/blueprint, no larger than 11" X 17", of all of the parts, sub-assemblies or final car with appropriate dimensions.

JUDGING:

50% Appearance: Quality of craftsmanship + authenticity of appearance to plans/blueprint. Awarded 1st through number of valid entries.

50% Race Results: Points will be awarded based upon race times.

Each Hot Rod will be awarded 1st through the number of valid entries for both appearance and race results. The lowest combined score wins 1st Place, the second lowest combined score wins 2nd Place, and so on. In case of a tie, the car with the better appearance and documentation will place higher.

CO2 RESEARCH RACER

RESEARCH RACER	Entries Per Region	Classification #	
		Middle School	High School
Wood	3	MU102	HU102
ABS Plastic	3	MU103	HU103

The intent of the Research Racer is to allow students the freedom to experiment with different materials, shapes, and ideas when building and designing this CO2 vehicle.

SPECIFICATIONS:

LENGTH: Minimum 6 inches

WIDTH: Must fit within a single lane of a standard CO2 car track.

WEIGHT: (not including CO2 cartridge) MINIMUM 28 grams MAXIMUM 58 grams

POWER PLANT CHAMBER

WALL THICKNESS: MINIMUM 1/8 inch around the CO2 cartridge

DEPTH: MINIMUM 1 ⁷/₈ inches MAXIMUM 2 ¹/₈ inches

CENTER: Power Plant Chamber Center to Race Surface: 1 ¹/₈ to 1 ⁷/₈ inches

GUIDE LUGS: MINIMUM: 2, must be spaced at least 4 inches apart.

RULES: 1: Racer must be powered by one 8 gram CO2 cartridge.

2: Hot Rod must fit onto a standard CO2 track.

3: If a car fails the initial weigh in, the race officials may provide student with an opportunity to bring the racer up or down to weight limits.

4: Racer body must be supported on the track by devices other than the guide lugs used to attach the vehicle to the track. (Examples: Wheels, springs, paperclips, Teflon, etc.)

5: Any racer deemed unsafe by judges will not be raced.

6: All parts must be made of either wood or plastic. Glass and/or metal parts will be deemed unsafe. Exceptions: axles may be metal, plastic or wood.

7: All decisions of weight, size limits, or safety are the responsibility of the judges. Judges decisions are final.

DOCUMENTATION: Student must submit plans/blueprint, no larger than 11" X 17", of all of the parts, sub-assemblies or final car with appropriate dimensions.

JUDGING:

50% Appearance: Quality of craftsmanship + authenticity of appearance to plans/blueprint. Awarded 1st through number of valid entries.

50% Race Results: Points will be awarded based upon race times.

Each Hot Rod will be awarded 1st through the number of valid entries for both appearance and race results. The lowest combined score wins 1st Place, the second lowest combined score wins 2nd Place, and so on. In case of a tie, the car with the better appearance and documentation will place higher.

RC VEHICLE

Every participant must have a Texas TSA Event Personal Liability Release Form to participate.

	Entries Per Region		Classification #	
			Middle School	High School
RC Vehicle - Electric	3		MU104	HU104
RC Vehicle - Gas	3		MU105	HU105

The course will be an on-road race. Cars will be raced then they must be exhibited for awards. Race results will be posted. For additional information contact: Contest Director

The purpose of the RC OR REMOTE CONTROLLED race is to showcase the learning activities of students building radio controlled cars and the components that make up this type of transportation system.

RULES:

- 1: The race will be divided into heats by classification. Each heat will have approximately four cars each.
- 2: The winner of each heat will advance to the next round. The number of teams entered will determine the number of rounds.
- 3: Each round will consist of a four-minute race.
- 4: The final round will consist of an eight-minute race with a required pit stop for all cars. (Battery change for electric cars or refueling for gas cars at some point during the race).
- 5: A car must be operational and on the track at the end of a race or it will be disqualified.
- 6: Any driver who has the same or more laps in a round as the round qualifiers will also advance to the next round.
- 7: All radios/controllers must be impounded, except when contestants are racing, until all races are over. Failure to return your radio/controller to the impound area will mean disqualification from the contest.
- 8: Someone from your race team must corner marshal at all times.
- 9: Participants may use two or four wheel drive vehicles.

ROCKET LAUNCH

Every participant must have a Texas TSA Event Personal Liability Release Form to participate.

Note: All rockets are limited to one engine with size no greater than an "A83"

	Entries Per Region	Classification #	
		Middle School	High School
Rocket (Student Built /Designed)	3	MU106	HU106
Rocket (Kit)	3	MU107	HU107

Kit Rockets: Rockets for this classification will be built from a commercially produced kit. The student will assemble the rocket following the instructions supplied with the rocket. Rockets that are purchased already assembled and ready to fly are not allowed in this classification. Documentation will include: Assembly Instructions supplied with kit. The appearance (area 1) will be compared to the instruction sheet for correctness of construction. No appearance score will be given without the instruction sheet.

Clarification: Extruded and plastic fins are allowed as long as they are individual pieces and not a prefabricated unit. There must be clear evidence that each fin is separately affixed onto the rocket body. No fin rings.

Student Built/Designed Rockets: Students must design and build the rocket for this classification from scratch. The student must build the body tube, the nose cone, the fins and the recovery system, without using parts from rocket kits. The only commercially made rocket part that can be used is the engine mount. Documentation: Students must have a drawing of the rocket. The appearance (area 1) will be compared to the drawing for correctness of construction.

Rockets considered unsafe by the contest judge will not be flown.

Judging Criteria:

- Area 1 — Appearance - weight, strength, shape, surface, smoothness, and color.
- Area 2 — Flight - lift-off, no gyration, steady climb.
- Area 3 — Recovery - separation, chute fully deployed, or streamer lands nearby.

Three judges will award points from 0 to 5 on each of three areas. A perfect score is 45 points. Each judge will evaluate without consultation. The decision of the judges will be final. In case of a TIE, in the top 3 entries, students will fire rockets again. In case of bad weather, the state winners will be judged on appearance only.

NOTE: Rockets must be test-fired prior to the contest.

Instructions:

1. Only one student on the launch pad.
2. Students must wear safety glasses or goggles while preparing rocket for flight.
3. Student has a 5-minute limit from "GO" to "BLAST OFF".
4. Pick up wadding and old engine casings and dispose of them properly.
5. Points will be awarded accordingly.

DRONE COMPETITION

		Classification #	
		Middle School	High School
Drone Competition	3	MU108	HU108

Contest Concept: Ol' TEX is on a hike out in Big Bend National Park. Something bit him or scratched him and he is having a severe allergic reaction. Your team's objective is to fly an Emergency Epinephrine Injector out to him using a drone. Your team must determine a way that you can remotely drop the "Injector". This includes a way to attach the "Injector" to your drone and drop it to Ol' TEX. Your drone will be flying through some narrow canyons and crevices of varying altitudes in order to reach Ol' TEX. And he is down in a narrow arroyo that requires the drone to drop the "Injector" from an altitude of 6 feet or higher. Good luck! Ol' TEX is depending on you!

CONTESTANT & SAFETY REQUIREMENTS:

S1: ALL drones must have propeller guards/shrouds that at a minimum enclose ALL propeller arcs on the outside of the drone.

S2: The Drone Contest Director may call for an Emergency Stop at ANY TIME if they determine that a drone is unsafe due to unsafe equipment or due to unsafe piloting.

S3: Teams must consist of a minimum of two (2) student members with a maximum of three (3) student members.

S4: ALL team members MUST wear OSHA approved (Z87.1) CLEAR safety glasses at all times.

S5: ALL team members MUST wear OSHA approved hard hats at all time during the contest. Texas TSA will NOT supply hard hats. Teams without hard hats will not be allowed to fly.

S6: ALL team members MUST have a signed Texas TSA Liability Release form physically with them at the Drone Contest. Not having the Texas TSA Liability Release form.

S7: Each team and their drone will be inspected prior to flight to insure compliance with all safety rules.

S8: ALL drone controllers MUST be powered off and turned in to the Contest Director at the beginning of the contest. No other drones will be allowed to be turned on during the Contest to insure that there is no interference between the current pilot and the current drone.

S9: There will NOT be any opportunity for practice flights prior to the beginning of the Drone Contest.

S10: All team members MUST remain in the designated areas at all times during the flight. The Pilot must be in the Pilot Box at all times during that team's flight. Additional team members MUST remain in Team Box areas at the back corners of the Designated Contest Area. In the event that the drone crashes or is instructed to land, team members may NOT leave the Team Boxes until told to do so by the Contest Director.

S11: Teams waiting to compete will be instructed where to wait by the Drone Contest Director at the beginning of the contest.

Team Scores and therefore Final Placing will be determined by a combination of two things: FLIGHT TIME and DROP ACCURACY.

Flight Time - You must fly your drone through the canyons and arroyo of "The Course"

1a: **The Course** consists of a pathway of 10 "windows" that the drone must transit while in route to the "target".

1b: **"The Course"** consists of a pathway of **10 "windows"** that the drone must transit while in route to the **"Target"**.

1c: Each team's **Flight Time** will begin at lift-off of the drone and ends when the **"Injector"** hits the target on the floor/ground.

1d: The **"Windows"** will be made of 1.5" PVC pipe and measure 60" (5 feet) square.

1e: There would be 3 different heights of window as measured from the floor to the bottom of the window: a) 6" from floor, b) 36" from floor, and c) 72" from floor.

DRONE COMPETITION (continued)

1f: If a drone flies outside of the designated contest area, the pilot **MUST** land the drone immediately in a safe area. In this event, that flight is over. The team will be allowed one additional flight opportunity to complete the "The Course". The Designated Contest Area will be clearly marked and will be shown to all team members prior to the beginning of their first flight.

1g: Drones must maintain a safe distance/altitude from the ceiling of the venue in order to avoid damage to the Convention Center. This distance will be 20 feet maximum above the floor of the Convention Center and may be lower depending upon venue.

1h: In the event that the "Injector" is dropped prior to flying through the 10th window, that flight is over. The team will be allowed one additional flight opportunity to complete the "The Course". If the "Injector" is dropped after flying through the 10th window but outside of the Drop Zone, the team will receive a ZERO for their Drop Accuracy score.

1i: All Flight Times will be placed in rank beginning with the shortest Flight Time and going in increasing order to the longest Flight time. The shortest Flight Time will be given a numerical score corresponding with the number of Drone Contestants – ie: If there are 16 Drone Contest entries, the shortest Flight Time will be given a numerical score of 16, the 2nd shortest flight time will be given a numerical score of 15, the 3rd shortest flight time will get a score of 14 and so on and so on.

1j: Failure to transit/fly through any window will result in a time penalty of 10 seconds being added to a contestant's contest time

1k: Failure to transit/missing 3 or more windows will result in an automatic disqualification of that flight.

1l: In the event that the drone drops the "Injector" from lower than 6 feet, there will be a penalty of 10 seconds added to that team's Flight Time.

1m: At any time, the Drone Contest Director may call for an emergency stop. In this event, the Drone Pilot **MUST** immediately stop their drone and safely land at the closest safe location.

1n: In the event of a tie, the teams that tie will both receive the score of the appropriate highest non-used placing and the score placing below that will be eliminated – ie: If the 4th place shortest flight time out of 16 entries is a tie between two teams, both teams will receive a placing score of 13 points. No score of 12 points will be awarded for a 5th place time. The next awarded time will be 11 points for 6th place flight time.

DROP ACCURACY - The objective is to drop the "Injector" as close to OI' TEX as possible. The farther that OI' TEX has to move to the Injector, the worse a contestant's score is on this segment of the contest.

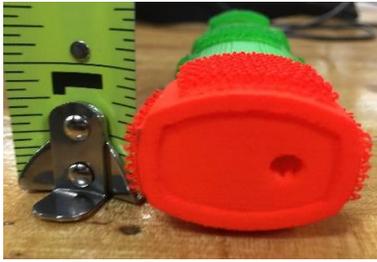
2a: The "Injector" must be dropped from a height of 6 feet. A horizontal square of 1.5" PVC pipe that is 5 feet 6 inches by 5 feet 6 inches (5' 6" x 5' 6") that stand 6 feet tall will mark the top of the drop zone.

2b: The "Injector" is a 3D printed model. It is printed in 3 parts and those parts are glued together with cyanoacrylate glue (SuperGlue).

2c: The "Injector" will have the 4 long axis sides covered with the "hooks" of a hook & loop system (Velcro). The surface of the "Target" will be covered with the "loops" of a hook & loop system (Velcro). This will help minimize bouncing of the "Injector" when it impacts the Target.

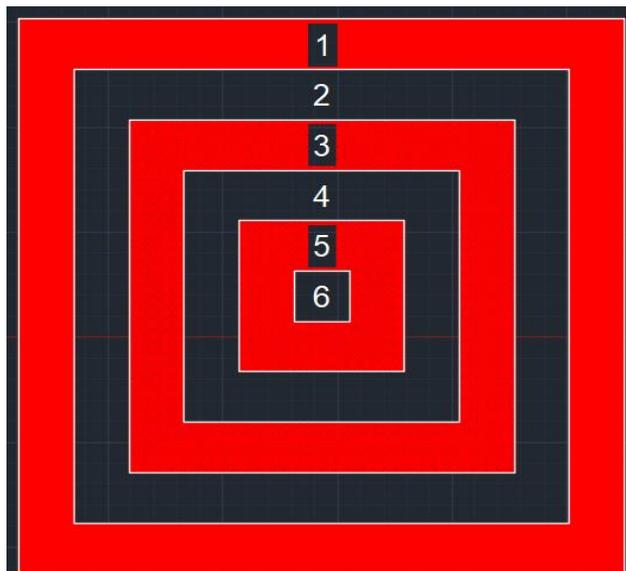
2d: The "Injector" will be provided by the Contest Director. No other "Injector" will be allowed. For reference purposes, the "Injector" will weigh between 45 grams and 55 grams

DRONE COMPETITION (continued)



Note: The "Injector" measures 6 inches long, 1 1/16 inches thick/tall and 1 3/8 inches wide. Competitors must devise a method to carry and release the "injector". Weight = 45g to 55g

2e: The Drop Zone Target would consist of a square measuring 5 feet 6 inches (5' 6" x 5' 6") with concentric squares within it at 6" intervals. The center square or "bulls eye" would award a contestant 6 points. Each square outward would be awarded one less value. See the diagram below:



DRONE COMPETITION (continued)

2f: Touched/covered by the payload – ie: If a drop results in the “Injector” coming to rest with most of it in the “5 point” area but a small portion is resting in the “4 point” area – the contestant will receive 4 points. If the payload sticks over from one square to another, the points earned are for the lowest valued square.

2g: The points are awarded for where the payload stops/comes to rest – **NOT** where it hits when dropped from the drone.

FINAL SCORING/PLACING: The two point scores for each team are combined to give a FINAL SCORE. The team with the highest score wins. Teams will be ranked according to FINAL SCORE descending from highest to lowest. This ranking will determine 1st Place, 2nd Place, etc

In the event of a tie, the team with the best Flight Time wins. If still tied, the team with the best Drop Accuracy wins. For First Place ONLY – If still tied, there will be a head to head fly-off competition to determine the winner. Both Flight Time and Drop Accuracy will again be used to determine the winner.

TEXAS TSA CATAPULT CONTEST

Every participant must have a Texas TSA Event Personal Liability Release Form to participate.

Catapult Rules:	Entries Per Region		Classification #	
		2	Middle School MU109	High School HU109

1: The "Catapult" shall be of an "Onager" type. **NO TREBUCHET DESIGNS PERMITTED.**

The power for launching can be derived either from torsion or spring action (surgical tubing, bungee-type cords/bands, rubber strips, etc.

<http://www.mywizards.com/catapults/onager/>

2: Team of up to 4 students. Limit 1 team per chapter. Limit 2 entries per region.

3: All team members **MUST** be present during launching/competition time.

4: Projectile is a hollow plastic practice golf ball (approximate weight of 14.5 grams each). Each team will be given a container of 3 dozen plastic golf balls as their ammunition. No further ammunition is allowed and no "re-firing" of projectiles that miss the target.

5: All team members **MUST** wear OSHA approved safety glasses at all times during the competition.

6: Each team will get 5 practice launches. A total of 3 minutes will be given for firing test shots and adjusting of catapult.

7: All catapults must be placed directly on the firing line with the front of the catapult being "ON" the line.

8: Teams will receive their "ammunition" from the Contest Coordinator. Upon receiving their ammunition and clearance to "FIRE", each team will have 1 minute (60 seconds) to launch as many shots as possible. The goal is to accumulate as many point as possible in the net target. Teams must cease fire at the end of one (1) minute.

9: The center of the scoring net will be approximately 15' from the firing line.

10: The scoring net will consist of 3 concentric squares. The center square (inner target) will measure 10 inches by 10 inches. The middle square (middle target) will measure 24" by 24 inches and will have the 10" square centered within it. The outermost square (outside target) will measure 40" by 40" and the other two target squares will be centered within it.

11: Scoring is as follows:

Center Square/Inner Target = 5 points

Middle Square/Middle Target = 3 points

Outermost Square/Outer Target = 1 point

12: Ammunition (plastic golf balls) **MUST** enter the target the target on the fly. No "bounce in" points will be allowed/awarded.

13: Ties will be broken as follows: a) the team with the highest score and least amount of ammunition pieces in the target. B) the team with the shortest time recorded to score the most points.

14: Team members must collect all ammunition once the time limit is up and return it to the judges.

Physical Limits of Catapult

1: Size Limits: 24 inches wide by 24 inches long by 24 inches tall (with swing arm in vertical position)

2: Base of the catapult must accommodate the provided ballast. Ballast will be in the form of one 50 lb. bag of playground sand as commonly found at Home Depot/Lowes. The ballast will be provided by Texas TSA.

3: The catapult must be made entirely from PVC pipe, with the exception of the launch mechanism, firing mechanism, fasteners, and safety items. These items may be wood or metal and must be constructed in a safe way, so as not to damage the device during launching, the testing area, or cause harm to others.

4: The catapult must operate completely within the given area. The launch arm may extend beyond the front and rear of the catapult only while launching.

5: The catapult may have any type of spring mechanism to power the launch arm. All parts must be contained within the 2 foot cube maximum footprint prior to launch.

6: The total weight of the catapult may no exceed fifteen (15) pounds.

7: All parts of the catapult must begin behind the launch line prior to launch. Parts may extend past the launch line during and after launch.

TEXAS TSA CATAPULT CONTEST (continued)

Physical Limits of Catapult (continued)

8: The following materials may NOT be used:

A: Glass

B: Flammable, corrosive, or explosive materials

C: Compounds that produce odors or gases.

9: The catapult must have a pull cord that is a minimum of five (5) feet long. The pull cord MUST be the mechanism to activate the launching of the catapult.

10: When the catapult is on display/not in performance mode, it must be fully disabled and unable to be readied to launch.

11: The launch arm must have a cup/basket to hold the projectile. No moving cradle or moving basket or sling may be used.

12: Teams may fire/launch ONLY one projectile at a time. No multiple "shotgun" launches allowed.

Catapult Go/No Go Checklist:

1: Safety Glasses?	YES	NO
2: Catapult is ballast ready?	YES	NO
3: Does catapult meet size limits?	YES	NO
4: Is catapult made from correct materials?	YES	NO
5: Does catapult launch with pull cord?	YES	NO
6: Is the pull cord 15 feet long or longer?	YES	NO
7: Does the catapult have a safe launching mechanism?	YES	NO
8: Is the catapult safe to operate?	YES	NO

TSA ELECTRONIC FLIGHT CONTEST

Every participant must have a Texas TSA *Event* Personal Liability release form to participate.

	Entries Per Region	Classification #	
		Middle School	High School
Rotorcraft	3	MU110	HU110
Fixed-Wing	3	MU111	HU111

The course will be inside the building unless otherwise posted.

For additional information contact: Contest Director

The purpose of the RC OR REMOTE CONTROLLED race is to showcase the learning activities of students building radio controlled AIRCRAFT and the components that make up this type of transportation system.

REGULATIONS:

- 1: Electric motors ONLY.
- 2: 12" Maximum wingspan
- 3: Teams will consist of 1 pilot and 2 spotters.
- 4: OSHA approved safety glasses must be worn at all times by anyone in the "Flight Zone".
- 5: All radios/controllers must be turned into the judges prior to the first race. Please label your radio/controller appropriately.
- 6: Failure to return the radio/controller to the judges after each race will result in a disqualification.
- 7: Drones (helicopters with multiple rotors) MUST have Propelor Guards.
- 8: Airplane/helicopters must be operational at the end of the race in order to advance.

RULES:

- 1: Airplane/Helicopters will fly around four (4) posts in an oval pattern.
- 2: Two airplanes/helicopters will run in each heat starting on opposite sides of the track.
- 3: Each heat will last 3 minutes.
- 4: Most completed laps wins the heat.
- 5: Only completed laps will be counted unless there is a tie. In which case the team which has completed the largest percentage of the final lap will be declared the winner.
- 6: Winners from each heat will advance.
- 7: Final 2 teams will race in a 5 minute heat and must perform one (1) "touch and go" on their start/finish side during the heat.

On-Site Computer Skills Contest Non-NQE Events

Participating schools must supply all necessary software, hardware, paper, etc. All judging will be done on the contestants computer screen. Events such as animation's and presentations will be demonstrated to a judge. Limited to three participants per region in each classification. These events will only be offered one time at state contest.

Description	Entries Per Region	Classification #	
		Middle School	High School
CADD/CAM/CNC (lathe) (w/ tool path generation)	3	MU112	HU112
CADD/CAM/CNC (mill) (w/ tool path generation)	3	MU113	HU113
Animation	3	MU114	HU114
Graphic Design, Artistic	3	MU115	HU115
Multi-Media Presentation	3	MU116	HU116

WRITTEN EXAMINATION

A single general knowledge test over all areas of Industrial Technology Education. Subjects include, but are not limited to: Woodworking, welding, manual & CNC machining, manufacturing, electronics, robotics, architecture, engineering, drafting, model making, communications, desktop publishing, and photography. May include historical systems.

Students must supply a sharp number 2 pencil(s) and a hard surface, such as a clipboard, to lay the answer sheet on while marking answers. Maximum size of the surface will be 12 x 16 inches.

Testing can be over any or all categories

- Contest limit - 1 hour.

	Entries Per Region	Classification #
Middle School Written Exam	15	MU200
High School Written Exam	15	HU210

GRAPHIC SOLUTIONS

This competition will test the student's ability to solve a given problem with minimum supplies. The only items that may be taken into the contest area are: flat drawing surface, such as a clipboard, (maximum size of 12 x 16 inches), pencils and eraser. Drafting aids will not be allowed. Participants will be seated in regular folding chairs. Grid paper will be supplied.

MIDDLE SCHOOL	Entries Per Region	Classification #
Technology Problem Solving	7	MU300
Communication Technology	7	MU301
Computer Applications	7	MU302
Construction Technology	7	MU303
Energy, Power, & Transportation Technology	7	MU304
Manufacturing Technology	7	MU305

HIGH SCHOOL	Entries Per Region	Classification #
Technology Problem Solving	7	HU310
Architecture and Construction	7	HU311
Engineering & Design	7	HU312
Promotional Design and Marketing	7	HU313
Manufacturing Design	7	HU314
Information Technology	7	HU315
Bio-technology	7	HU316