2015-2016 Texas Charter School Academic & Athletic League
Science Olympiad Competition

I. Rounds & Divisions

TCSAAL Science Olympiad contestants will compete in one (1) state level competition. Consistent with TCSAAL events, entries will be divided into two divisions by grade: i) 6th – 8th grades, and ii) 9th – 12th grades. Divisions will compete exclusively of one-another and individual students can compete amongst older division grades, but cannot compete amongst a younger division, nor can they compete in both divisions.

II. Fees

Entry fees are set at $150.00 per team. There is only one (1) type of entry for the TCSAAL Science Olympiad, which registers a team of one (1) to four (4) participants in three (3) competition events, as well as an *Overall Competition* event. Campuses are unlimited in the number of team entries allowed, and are not required to organize their teams in any quantitative fashion [i.e. campuses are permitted to register four (4) individual participants as four (4) different teams, should they choose to do so].

III. Events & Rules

The TCSAAL Science Olympiad will consist of group events. Participation in all events is necessary for eligible competition for overall placements and awards (see *Awards* below). Order of events will be released with a schedule prior to the competition.

A. Timed Project: Mousetrap Vehicle

i. Mousetrap Vehicle: Teams are to construct a mousetrap vehicle. The vehicle must power itself by virtue of a mousetrap, and the aim is to achieve the greatest displacement possible along a fixed, straight track.

This event will be a traditional mousetrap vehicle competition, in which teams are provided materials and are expected to design and build a vehicle propelled solely by the momentum created by the physical reaction of a mousetrap spring within a maximum time of forty-five (45) minutes. Teams will be provided their materials at the beginning of the round.

ii. The materials themselves will consist of only:

A. one build-it-yourself kits, the contents of which can be reviewed or purchased for practice (TCSAAL will provide kits for teams at competition) at the following website: http://www.docfizzix.com/products/parts-supplies/supp700df.shtml. Teams will use the "Build your own mousetrap car kit" from Doc Fizzix. Teams can use the kit to build the mousetrap vehicle however they choose. Teams are not required to use all of their materials.

B. And 9 oz of super glue.

iii. At the end of forty-five (45) minutes, teams will submit their car for testing.

A. The vehicle will be tested along a room-length track, ideally a lengthy hallway; the dimensions of which are to be determined as location is secured.

a. Participants will be signaled to release the vehicle from the center-point of the starting line.

b. Participants' vehicles will then travel until momentum has been exhausted and the car remains at rest.

c. At this point the total displacement traveled of the furthest back part of the vehicle (not including the 6" lever arm extending from the mousetrap) from the center-point of the starting line will be measured.

d. Participants will have two trials, with the furthest distance ranked among their competitors.

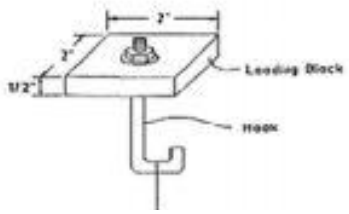
e. Distance will be measured, with the greatest distance being awarded the highest ranking, the second greatest distance being awarded the second highest ranking, and so forth.

f. The top twenty (20) ranking will be given points towards the *Overall Competition*, with the 1st, 2nd, 3rd,…etc. highest ranking being awarded 20, 19, 18,…etc. points, with the twentieth (20th) highest ranking ratio being awarded one (1) point, and all ratios ranked eleventh (21st) and beneath being awarded zero (0) points.

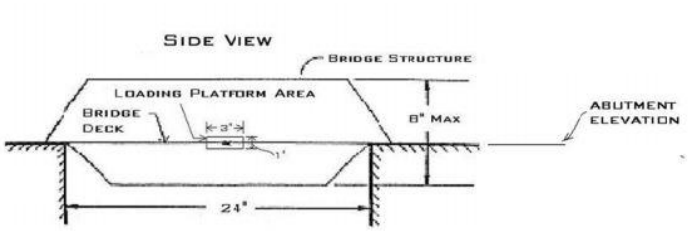
B. Timed Project: Balsa Bridge

i. For this competition, teams will be expected to build a suspension balsa wood bridge capable of spanning a 24" (twenty-four inch) gap while supporting a wooden 2" x 2" x .5" wooden plank that contains an eyehook or s-hook, and hanging from this hook a traditional plastic 5 gallon paint bucket. Teams will all begin this project at the same time and they will be given forty-five (45) minutes to construct their balsa bridge.

A. See image of wood plank below for example:



Bucket for weights



ii. Teams are permitted to only use liquid super glue adhesives and balsa wood planks no wider than .25" (one-quarter of an inch) There will be 15 feet of .25"x.25" balsa wood per team provided, in five equally sized planks that are .25"x.25"x36". 0.33 oz (9g) of super glue will be provided to each team.

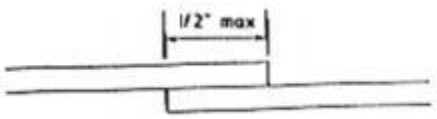
iii. Teams are permitted to provide and use their own cutting and measuring supplies, but cannot use anything beyond the provided materials in the completed bridge.

iv. Combinations of flush, parallel planks are strictly forbidden see example below:

Exceptions:

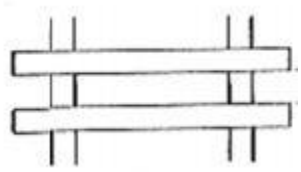
A. Flush, parallel planks that are overlapping are permitted a maximum overlap of .5" (one-half of an inch)

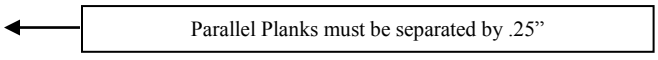
a. See image for example:



B. Parallel planks that are separated by .25" (one-quarter of an inch) space.

a. See image for example:





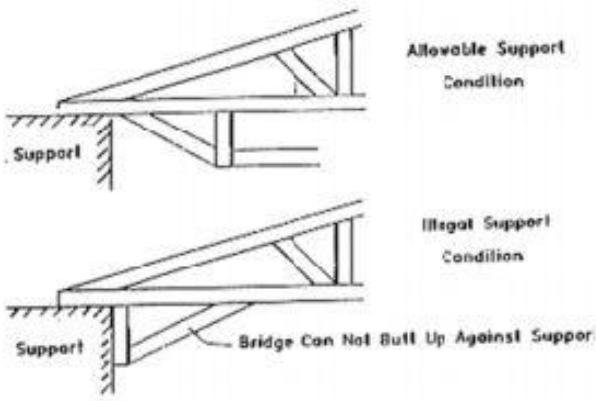
v. The width of the bridge (the measurement parallel to the bridge's span) cannot exceed 30" (thirty inches).

vi. The depth of the bridge (the measurement horizontally perpendicular to the bridge's span) cannot exceed 6" (six inches).

vii. The height of the bridge (the measurement vertically perpendicular to the bridge's span) cannot exceed 8" (eight inches).

viii. The bridge cannot butt their bridge against the support of the surface it is spanning.

A. See image for example:



ix. Bridges will be expected to support additional weights that will be added to the bucket during testing.
  A. Weights will be provided in the following varieties:
    a. 10 lbs (ten pounds)
    b. 5 lbs (five pounds)
    c. 2.5 lbs (two and a half pounds)
      i. Plate weights will vary in size, but will be part of a standard weight bench set.

x. Bridges will also be required to have a span capable of bridging two surfaces that are 2' (two feet) or 24" (twenty-four inches) apart.

xi. One (1) team member will be required to position the bridge over the span. And add the weight loading block.

xii. Teams are required to supply one (1) team member to place the weights in the weight bucket for his/her team's bridge.

xiii. Eye protection must be worn while loading the bridge. Safety glasses will be provided at the competition.

xiv. Following weight placement, a stopwatch will count to three (3) seconds. Following three (3) seconds, if the structure of the bridge has not been compromised by the weight placement, the weight placement will be scored as successful.

xv. The total amount of successful weight placed within the bucket before the bucket is no longer supported by the strength of the bridge.
  A. As opposed to previous competitions, teams will not be able to remove weights once they have been placed within the bucket.

xvi. In the event that the structure supports all allotted weight for testing, the weights will then be removed and the bridge returned to the team.
  A. Scoring will be based on which bridge holds the most amount of weight.

xvii. The top twenty (20) ranking will be given points towards the *Overall Competition*, with the 1st, 2nd, 3rd,…etc. highest ranking being awarded 20, 19, 18,…etc. points, with the twentieth (20th) highest ranking ratio being awarded one (1) point, and all ratios ranked eleventh (21st) and beneath being awarded zero (0) points.

C. Timed Project:

i. Popsicle Catapult

This year's event will focus on precision. Contestants will have two launches. We will keep their best result for competition. The distance from the bull's eye(measured to the nearest eighth of an inch) will be measured to determine the most precise catapult.

For this project teams are to construct a traditional catapult device from limited materials, with the aim of projecting a Hershey kiss as precisely as possible. The contestant must build a catapult that will propel a Hershey's Chocolate Kiss 3 meters to a target. The Hershey's Chocolate Kiss will be supplied by the judges. The emphasis in this event is placed on the contestant's construction of a device that can precisely aim and propel a Hershey's Chocolate Kiss 3 meters

The target will be a bull's eye placed flat on the floor. The center of the target will be exactly 3 meters from the launch line.
Contestants will be allowed to place their catapults precisely at the edge of the launch line but not on top of the launch line.
Contestants will be allowed to make two launches. Misfires, as determined by the judges, will not constitute a "launch"
Teams will not be provided any more than the 2 Hershey's kisses provided prior to the event starting.

ii. Teams will be provided their materials at the beginning of the round.

iii. The materials themselves will consist of only twenty (20) traditional sized popsicle sticks (4.5" long x .375" wide), one (1) roll of scotch tape (3/4" X 1000"), a pair of scissors (to be used only for cutting, they cannot be a part of the catapult), two (2) 32 size rubber bands, one (1) traditional plastic eating spoon, (6g) of super glue and one (1) test Hershey Kiss, (original style). No other materials will be allowed to be used.

iv. At the end of thirty (30) minutes, the teams' catapult or trebuchet device will be tested.

v. One (1) student from each team will place their catapult at a designated point.

vi. One (1) student will then take a Hershey Kiss, and use the catapult device as a means of projecting the Hershey Kiss 3 meters to the center of the target.

vii. Participants will have two trials, with the closest to the target ranked among their competitors.

viii. Distance will be measured, with the closest distance to the target being awarded the highest ranking, the second greatest distance being awarded the second highest ranking, and so forth.

ix. The top ten (10) ranking teams will be given points towards, *Overall Competition*, with the 1st, 2nd, 3rd,…etc. highest ranking being awarded 10, 9, 8,…etc. points, with the tenth (10th) closest being awarded one (1) point, and all others ranked eleventh (11th) and beneath being awarded zero (0) points.

IV. Rankings & Awards

A. Team scores will be totaled and the top three will be ranked, with 1st place receiving the most aggregate points amongst events, 2nd place receiving the second most aggregate points amongst events, and 3rd place receiving the third most aggregate point total amongst events. There will be team trophies awarded to the teams that come in 1st, 2nd and 3rd place (in each age group). The participants of the 3 ranking teams will also receive individual medals.

B. In the event that we have a tie, there will be a tie-breaker activity that will be randomly selected from one of the following that only the tied teams will participate in to determine ranking.

i. Paper Tower Project

A. Teams are to build a tower as tall as they possibly can.

B. For this project, teams are given 10 (ten) sheets of 8.5" x 11" paper and one (1) roll of scotch tape.

C. Teams will be given five (5) minutes to complete the tower.

D. Towers must be freestanding, and cannot be taped to the floor.

E. Towers will be ranked in order of height, tallest to shortest.

ii. Aluminum Barge Competition

A. Teams are provided 1x sheet of aluminum foil.

B. Teams will be given five (5) minutes to complete an aluminum foil structure with the aim of floating and holding as many pennies above water as possible.

a. Note that teams are only permitted one attempt for the Aluminum Barge competition.

C. Pennies will be added to the barge until:

a. The structure sinks

b. The structure permits water into the compartment holding the pennies

D. Barges will be ranked in order of the number of pennies held, highest to lowest.