

**Texas Charter School Academic & Athletic League
2012 Science Olympiad**

I. Dates & Location

The 2012 TCSAAL Science Olympiad will take place on January 7, 2012 in Central Texas. The competition will begin at 10:00 am.

II. Rounds & Divisions

For the 2012 Science Olympiad Competition, there will not be regional qualifying rounds. All entries 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.

III. Fees

Entry fees for the 2012 TCSAAL Science Olympiad will be 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].

IV. Events & Rules

The second annual 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).

A. Timed Project: Balsa Bridge

- i. For this competition, teams will be expected to build a balsa wood bridge capable of supporting workout weights. Teams will all begin this project at the same time and they will be given 90 minutes (1.5 hours) to construct their balsa bridge.
- 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 12 feet of .25"x.25" balsa wood per team provided,

- in four equally sized planks that are .25"x.25"x36". 0.22 oz (6g) of super glue will be provided to each team.
- iii. Combinations of flush, adjacent planks within the bridge are never to exceed .5" (one half of an inch) wide.
 - A. A maximum of two (2) .25" (one quarter of an inch) planks can be bonded lengthwise while running parallel with one-another, with the following exception:
 - a. Individual planks can have as many as two (2) flush, adjacent planks bonded with it, provided that the combined width created by the bond does not exceed .5" (one half of an inch)
 - b. There must be at least .25" (one quarter of an inch) of spacing between pairs of bonded, adjacent planks on any plane.
 - c. In the event that three (3) planks are bonded together flush and adjacent with one-another, the larger widths must run perpendicular to each other.
 - i. For example, notice the perpendicular combination of three (3) planks in *example subset 2*. (X=end base of balsa plank):
 1. XXX = Unacceptable
 2. XX = Acceptable
 - iv. No dimension of the bridge is to exceed 20" (twenty inches).
 - v. Bridges will have to have a top surface capable of supporting large plate-style weights.
 - A. Weights will be provided in the following varieties:
 - a. 45 lbs (forty-five pounds)
 - b. 35 lbs (thirty-five pounds)
 - c. 25 lbs (twenty-five pounds)
 - d. 10 lbs (ten pounds)
 - i. Plate weights will vary in size, but will be part of a standard weight bench set.
 - vi. Bridges will also be required to have a span capable of permitting the complete passage of a standard deck of cards in various fashions:
 - A. *Upright facing*, such that the span permits complete passage up to ~6.5cm (approximately six and a half centimeters) wide horizontally and up to ~9cm (approximately nine centimeters) tall vertically.
 - B. *Sideways facing*, such that the span permits complete passage up to ~9cm (approximately nine centimeters) wide horizontally, and ~6.5cm (approximately six and a half centimeters) tall vertically.

- vii. One (1) team member will be required to demonstrate this successful passage to competition judges and/or TCSAAL tournament administration.
- viii. Teams are required to supply one (1) team member to place the weights upon his/her team's bridge.
- ix. Eye protection must be worn while loading the bridge. Safety glasses will be provided at the competition.
- x. 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.
- xi. The total amount of successful weight placed upon the structure before the structure of the bridge has been compromised will be recorded.
- xii. *A compromise in structure* is determined by judges and/or TCSAAL tournament administration, and is defined as a structural defect that effects the bridge in one of the following ways:
 - A. Hinders the bridge's ability to stand upright unaided.
 - B. Hinders the bridge's ability to balance upright unaided.
 - C. Tilts the bridge so that weights can no longer be stacked upright.
 - D. The span has been reduced to be insufficient with the parameters set forth in *Section IV.B.vii.*, with the following exceptions:
 - a. A fallen piece of wood or section from the bridge that is no longer attached to the bridge.
 - b. A narrowing of the base of the span caused by beam force pushing inward towards the span.
 - i. The base of the span is defined as: the space between the bottom-most trusses or planks of wood nearest to the horizontal center of the passage position as presented by team members prior to testing. (see *Section IV.B.vii.a.* and *IV.B.vii.b.*)
 - ii. The height of the base of the span is as tall as the bonding limitations permit, not to exceed .5" (one half of an inch) as detailed in *Section IV.B.iii.*
 - iii. As the compromised span will not be physically measured while bearing weight, if the degree of compromise or damage to the span is not deemed to be visually conclusive by the judge or TCSAAL tournament administration to disqualify the bridge from satisfying the requirements set forth in *Section IV.B.vii.*, the weight placement will

be scored as successful and the bridge will continue with further testing.

- E. The weights are in anyway protruding beneath the maximum height of the span.
 - a. The maximum height of the span is defined as: the apex or highest point of open space between the two inner-most balsa planks, directly above the horizontal center of the passage position as presented by team members prior to testing. (see *Section IV.B.vii.a.* and *IV.B.vii.b.*).
- xiii. In the event that the structure supports 500 lbs. (five-hundred) pounds, 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.
- xiv. 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 tenth (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: Paper Airplane

- i. Teams will be expected to construct two paper airplanes from allotted materials.
- ii. The materials provided include two uniquely colored sheets of 8.5" x 11" paper, one roll of scotch tape, and one container of Elmer's glue. Teams will also be provided trial notebook paper and a pair of scissors.
- iii. Each team will construct two paper airplanes within a 30 minute time limit. One paper airplane will be tested on distance while the second paper airplane will be tested on the duration of time spent aloft.
 - A. The first of these competitions will score the airplane that covers the most distance, while the second will score the airplane that stays aloft for the longest duration.
 - B. Each airplane must be constructed from no more than one sheet of colored paper provided to teams at the beginning of the competition.
 - C. Following 30 minutes, one team member will test their distance-based airplane and the distances of all teams' airplanes will be taken.
 - D. Then, one team member will test their aloft-based airplane, and the times aloft of all teams' airplanes will be taken.
 - E. The top ten (10) rankings for distance will be given points towards the *Overall Competition*, with the 1st, 2nd, 3rd,...etc. highest ranking being awarded 10, 9, 8,...etc. points, with

the tenth (10th) highest ranking distance being awarded one (1) point, and all distances ranked eleventh (11th) and beneath being awarded zero (0) points.

- F. In addition, the top ten (10) rankings for time aloft will be given points towards the *Overall Competition*, with the 1st, 2nd, 3rd, ...etc. highest ranking being awarded 10, 9, 8, ...etc. points, with the tenth (10th) highest ranking time being awarded one (1) point, and all times ranked eleventh (11th) and beneath being awarded zero (0) points.

C. Timed Project: Paper Tower

This project will be a traditional paper tower competition, in which teams are provided materials and are expected to design and build a structure with the aim of achieving the maximum height allotted by the materials provided within a fifteen minute time limit.

- i. Teams will be provided their materials at the beginning of the round.
- ii. The materials themselves will consist of only ten (10) 8.5" x 11" sheets of paper and a roll of scotch tape.
- iii. At the end of fifteen minutes, structures will be measured for heights and ranked. All structures must be free-standing without aid from other objects.
- iv. The top ten (10) ranking 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) tallest structure being awarded one (1) point, and all heights ranked eleventh (11th) and beneath being awarded zero (0) points.

D. Impromptu Timed Project

- i. Teams will be expected to compete in a timed impromptu project that will not be announced until prior to the start of the *C. Impromptu Timed Project* round.
- ii. One (1) present team member is needed in order to compete in the *C. Impromptu Timed Project* round.
- iii. The *C. Impromptu Timed Project* round will consist of no more than ten (10) minutes of timed competition.
- iv. Teams will be ranked by their performance results, with the top ten (10) ranking teams earning points, ten (10) points for the highest ranking team, one (1) point for the 10th ranked team.
 - A. In the event of a tie amongst the top ten (10) ranking teams, said teams tying will be awarded an equal number of points towards their overall team score.

V. Rankings & Awards

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.

In the event that we have a tie, there will be a final impromptu activity that the tied teams will participate in to determine ranking.