**CHEMICAL CAR**

**EVENT DESCRIPTION:**

Team members design and construct a chemically powered vehicle within certain size constraints. The teams will be told at the time of the competition the distance that the car must travel. Entries deemed unsafe by the judges will be disqualified. The winner will be determined by a combined score, for traveling the correct distance, and for creativity.

**PRELIMINARY ROUND:**

An abstract must be submitted before the deadline. Only selected participants will be allowed to participate in the main competition. This abstract should describe how the car is powered by the chemical reaction, the unique features of the car and the safety features in the design. In addition to the abstract the following documents must also be sent:

• Material Safety Data Sheets (MSDS) for each chemical used.

• Evidence, if any, of creativity in the propulsion system design and the appearance of the vehicle.

**TECHNICAL SPECIFICATIONS:**

Vehicle Drive System:

An objective of this contest is a demonstration of the ability to control a chemical reaction.

The only energy source for the propulsion of the car is a chemical reaction.

**Vehicle Design Component:** Vehicles entered into the competition must have a significant and demonstrable student design component, particularly with respect to the vehicle drive system, and the starting and stopping mechanisms. The vehicle must be powered and stopped by controlling a chemical reaction. Any vehicle that is purchased from a vendor without major modifications to its operation will be disqualified. For example a team could not purchase a fuel cell car and race this car without any modifications.

**Size of Car:** All components of the car must fit into a box of dimensions no larger than 40 cm x 30 cm x 20 cm. The car may be disassembled to meet this requirement. If the judges are uncertain whether the car will fit inside the box when dissembled, they may request that the team demonstrate that they can do this. There can be no mechanical or electronic timing device(s) to stop the chemical reaction or stop the car. In addition, a timing device cannot utilize what is normally considered as an instantaneous reaction.

**No brakes:** No mechanical force can be applied to the wheel, gears, driveshaft, etc. or ground to slow or stop the car. The car must be an autonomous vehicle and cannot be controlled remotely. Pushing to start the vehicle or using a mechanical starting device is not allowed. “Bleeding” the time off at the starting line is prohibited.

**No commercial batteries** (for example, AA batteries) are allowed as the power source. Commercial batteries are allowed for specialized instrumentation (e.g. detectors, sensors)

**ROUNDS:**

Each car will be given two opportunities to traverse a specified distance. The distance will be given to each team one hour prior to the start of competition. The distance will be between 5-20m. Teams are allowed to adjust "fuel" or reactants used in the car's chemical reaction in different trials.

**Course Layout and Distance Measurement:**

The car will start with its front end just touching the designated starting line. There will be a designated finish line. The distance will be measured with respect to the front most point of the car. The goal of the competition is to have your car stop closest to the specified finish line which would be clearly marked in an arc of constant distance from the starting point. The physical site will dictate the exact course layout. See Figure for an example of the course layout. A vehicle that goes outside the course will have its distance measured from the start point till where it went out of bounds and as a penalty a distance of 2-3 m will be subtracted from the total distance travelled. “Outside the course” is defined as having the entire vehicle outside the side tape boundaries of the course. The tape is considered as part of the course.

**CRITERIA OF JUDGEMENT:**

* Chemical reaction / power source (40%)
* Design creativity and unique features of the vehicle (30%)
* Environmental and safety features (30%)

Appropriate documentation on the design of your vehicle must be available for inspection by the judges at the competition. Team members must be present during judging to answer questions from the judges.

EXTRA POINTS:

Extra points will be awarded if vehicle is driven by a biological reaction or any green reaction.