

SPEED CAR INSPECTION SHEET & DESIGN SCORING SHEET

Car Number: _____

STATION #1: Design Inspection:

Judge's Initials: _____

___ Car length not greater than 60 cm ___ Designed space for battery mount

___ Car width not greater than 30 cm ___ Original motor (not modified)

___ Car height not greater than 30 cm ___ At least one wheel driven by motor

___ Original solar panel (not modified) ___ No radio control device

_____ **Passes Inspection** _____ **Fails Inspection**

Mass of race car factor (measurements in grams):

$$\frac{\text{Standard Mass} - \text{Mass of car}}{2} = \frac{230 \text{ grams} - (\text{_____}) \text{ grams}}{2} = \text{_____ points}$$

STATION #2: Roll Down Test:

Judge's Initials: _____

Kinetic / Potential Energy Ratio Factor:

$$\frac{\text{Kinetic Energy}}{\text{Potential Energy}} = \frac{1/2 mv^2}{mgh} \times 50 = \text{_____ points}$$

STATION #3: Interview: The following is a list of design consideration questions. You will award points for answers on a **1 to 10 basis**. You are attempting to evaluate how well students can explain the design of their car. You can use the following questions or construct your own. Just be sure to ask one question in each of the categories.

1. Chassis Design _____ **points**

Evaluate if the students have attempted to keep the mass of the chassis down but also keep it strong and aerodynamic.

- a) What did you consider when you built the chassis?
- b) What was the most important thing you considered when you build the car chassis?
- c) What changes did you make to the basic materials that were given in the race car kit? Did you use any materials that you found on your own and if so what material and why?

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2. Transmission Design _____ points

Evaluate if the student's understand why they chose the gear configuration they did. Evaluate student's concepts in the motor/gear configuration especially the concept of friction in the design.

- a) How or why did you choose the gears that you did?
- b) Why did you attach the motor and gears in the position your chose?
- c) Did you have any problems with the drive gears and if so how did you solve them?

3. Solar Array Design _____ points

Evaluate the student's concepts relating to the orientation of the solar panel.

- a) How has your design accounted for the fact that the sun's position changes during the day? Can your panel be moved? How many ways can it move (be adjusted)?
- b) What is the best angle for your solar panel and why?
- c) Which is more important in your design, the best sun catching angle of the panel or the aerodynamics of the car? Why?

4. Friction or Antifriction Design _____ points

Evaluate the student's understanding of the role of friction in the design, the friction trouble spots and solutions.

- a) What specific things have you done in your design to reduce friction?
- b) Where is the greatest friction in your racecar?
- c) What is friction and how does it effect your racecar?

5. Craftsmanship and Innovation (10 points possible) _____ points

Axles, gears, bumpers, motor and solar panel mounts, etc. are all of high quality and well implemented. Design ideas are unique and liable to improve the car's endurance and speed.

Total Station #3 (Interview) Points: _____

TOTAL POINTS FOR STATIONS 1 + 2 + 3 = FINAL SCORE _____

Judge's Initials: _____