

# Electric Vehicle

# Science Olympiad 2009

School \_\_\_\_\_

Impound Time: \_\_\_\_\_

Participant #1 \_\_\_\_\_

Begin Time: \_\_\_\_\_

Participant #2 \_\_\_\_\_

End Time: \_\_\_\_\_

Picture # \_\_\_\_\_ (event staff use only)

Vehicle removal time: \_\_\_\_\_

Requirements		Yes	No
Wheel Base: $28 \text{ cm} \leq \text{WB} \leq 32 \text{ cm}$ (2e) * Measured $\parallel$ to travel direction, between rotational centers of axles			
Track/Width $\leq 20 \text{ cm}$ (2e) * Measured $\perp$ to trav dir, between outside edges of tires on widest axle			
Pointer: Stationery pointed object @ foremost point of vehicle, within 1cm of track surface, must be attached to and travel with vehicle (2f)			
Propulsion energy all stored in common commercially available batteries labeled with their value by the manufacturer (2b)			
Additional energy storage devices do not contribute to propulsion (2b)			
Batteries: $\leq 4$ individual cells @ $\leq 1.5\text{v}$ ea or $\leq 1$ pack @ $\leq 4.8\text{v}$ ea (2b) * no more than 4 individual cells or 1 pack may be used at one time * all accessible for inspection * only impounded batteries may be used (2i)			
Sighting devices: No electronics/lasers, permanently attached, fixed pos (2d) Finish line target ok if removed (4 c iii)			
Vehicle start mechanism: Uses pencil pen or similar device which is not part of and does not travel with vehicle, no touching to start (2g)			
Additional energy storage devices do not contribute to propulsion (2c)			
Vehicle braking system does not touch floor or tape (2g)			
Other rules (can't follow vehicle, get help, use un-impounded parts etc)			
<b>Team passes ALL requirements (5e)</b> YES = Tier 1 score NO = Tier 2 score			
Scoring		Trial 1	Trial 2
<b>Distance Score (5a)</b> Measured $\perp$ from start line to pointer tip, to nearest mm			
	Target travel distance (m)		
	Measured travel distance (m)		
	Difference =  (target) - (measured)		
	Score = $\frac{\text{target} -  \text{difference} }{\text{target}} * 100$		
<b>Time Score (5b)</b> Timed from switch contact to earlier of 1 <sup>st</sup> motion stop or pointer across finish			
	Predicted travel time (s) * must be $\leq 45 \text{ s}$ , no $\Delta$ for 2 <sup>nd</sup>		
	Measured travel time (s) to nearest 1/100 <sup>th</sup> sec		
	Difference =  (predicted) - (measured)		
	Score = $\frac{\text{predicted} -  \text{difference} }{\text{predicted}} * 50$		
<b>Finish Line Score (5c)</b> Radial distance from finish/center line intersection to pointer tip			
	Finish distance (cm) * must be $< 40$ , to nearest mm		
	Score = $40 - (\text{Finish distance})$		
<b>Center Line Score (5d)</b> Tape stays completely within vehicle track/width bet start & finish			
	(10 pts or 0 pts) not dependent on finish line crossing		
<b>Subtotal</b> (Time + Distance + Center Line + Finish Line)			
<b>Bonus (2c, 5e)</b> Vehicle contains no electronic components (battery & motor & switch only)			
	$\frac{1}{3} \times [200 - (\text{subtotal above})]$ enter 0 for non-compliance		
<b>Final Score (5f)</b> (Subtotal + Bonus) Circle highest			

Tiebreakers (5g): ① Best time score ② Best Distance score Tiers (5f)

**Tier 1 Score**  **Tier 2 Score**  **Place**  **Points**