Electric Car Bodies

The car body is designed to protect the driver from his/her car and other cars. The driver must be contained within the body of the car. A sealed body is not a requirement, but many schools have taken that approach. Look for safety guidelines in the rulebook when constructing the body.

Basic aerodynamics can add distance to your effort. At 30 mph, air resistance comes into play. Past races have been windy and drivers notice that coming out of certain corners their cars have drawn more current to maintain speed. The air is compressed as you try to shove it out of the way with the front of your car during racing. The extent to which this happens depends on two things: the frontal area and the shape of you car. You are in control of both of these. Remember, again, to keep the frontal area small. This is so that you have a smaller part of that sea of air in front of your car to push against.

The shape of the front end will help here as well. When rain falls, the droplets are sculpted into shape by the air they pass through. The front end is rounded and then it is tapered back to a point. Likewise, your car should be rounded in the front. Have you seen pictures of the solar racers? They look like raindrops going sideways. Don't allow the shape to change too quickly as you progress along the length of the car, and consider fairings on the wheels. Wheel fairings can be as simple as disks of light plastic covering the spokes.

What should the body be made of? Keep it light to remain competitive, but make sure it's strong enough to protect the driver in case of any type of accident. You can use sheet aluminum, sheet plastic, fiberglass and combinations of materials. You might want to bend materials around the car for simple bends, but do a fiberglass nose or tail for the complex double warped curves.

Make sure the body you plan is something within your capabilities and budget to build. Don't forget to enclose the bottom of the car as well (for protecting the driver and slipstreaming through the air, this is a requirement).

Calculating Drag:

F_{Drag}  $F_{Traction}$

- At a Constant Speed (Equilibrium): $F_{Drag/Losses} = F_{Traction}$
- F Traction = $\frac{T_{Wheel}}{R_{Wheel}} = \frac{T_{Motor \times Gear\ Ratio}}{\text{Radius of Wheel}}$
- Amps = f(required motor torque)
- Excess Torque = acceleration = waste

$F_{Drag} = K_D \cdot v2$

$K_D \cdot v_2 = T_{motor} \cdot$ (Gear Ratio/Wheel Radius)