Designing the Car

While aerodynamics play a big part in designing a car for speed, with a surface area as small as that on a Pinewood Derby car, the aerodynamics are a minimal factor. The biggest key here is to minimize turbulence by designing a car that has a smooth underside and a lower profile in front. While the classic wedge shape earns points for aerodynamic simplicity, it's also one of the most overused designs as well. Be original! As you design your car, encourage creativity.

Placing the weight
Simple physics dictate that the further back weight is located on the car, the greater the potential energy available to speed the car toward the finish line. Be careful not to back load the weight too much or the car's front may actually raise up off the track and cause your Pinewood Derby racer to crash.

If you're unsure about the weight, try a balance test. Set your car on a pencil or other small fulcrum to test the center of balance. It should be within an inch of the rear axle.

Make sure you secure the weight onto the car. Any loose pieces may disqualify your car.

Friction
Reducing friction is the key to generating speed. More than any other factor, friction is the single most important aspect to consider in creating a fast car. Try placing your wheels on their axles and giving them a spin. You should notice that some wheels spin longer than others. Try different combinations of tires and axles to maximize spin times. The idea is to limit the surface area between the wheel and nail to minimize friction.

Friction also occurs between the wheel and track.
Is there a way to design your car to reduce friction?

General Tips and Tricks
Rate your wheel/nail combinations. Place the best wheels in back, where friction is greatest due to weight placement.

Don't make the car too thin. I have seen cars shatter after crossing the finish line on their first run because the car's design removed too much wood.

Wheel alignment is just as important on a Pinewood Derby car as it is on your own. Try rolling your car across a smooth, level surface and look for drift. Adjust the nails to eliminate it.