



Pinewood Derby Car – Step-by-Step Parent Guide- Pack 444

This guide walks you and your Scout through building a Pinewood Derby car from start to finish. It is written for first-time builders, but experienced families may find some helpful reminders too.

Before You Start – Safety First

Please review these safety tips with your Scout:

- Always wear protective goggles when cutting or sanding.
- Use a dust mask when sanding to avoid breathing in sawdust.
- Children should not use power tools without close adult supervision.
- If using lead weights, wear gloves and wash hands afterward. Do not melt lead.

Step 1 – Check Your Kit Parts

You should have: one wood block, four wheels, and four axles (nails).

Block:

- Look for cracks, chips, or damaged axle slots.
- Set the block on a flat surface and gently press each corner. It should not rock or wobble (this could mean the block is warped).
- Check that the axle slots are straight across the block. You can line up the side of a credit card with the side of the block and compare the short edge to the slot to see if it's at a right angle.

Axles:

- Look at each axle for obvious bends, dents, or rough spots. Set aside any badly damaged ones.

Wheels:

- Roll each wheel on a flat, clean surface. It should roll straight and not veer off or hop around.

Step 2 – Plan Your Car Design

This is the fun part! Sit with your Scout and sketch some ideas.

- Simple shapes (like wedges or gentle slopes) are easier to cut and sand.
- Check our Pack rules to ensure your design meets all the required specifications.
- Leave at least 1/4" of wood on each side of the axle slots so the wood doesn't crack when you insert the axles.
- Keep the front of the car flat for at least 1/2" so it rests properly against the starting pin.

Try this method: Trace the side of the block several times on a piece of paper, mark where the axles will go, and draw different car shapes inside those outlines until you find one you like.

Step 3 – Cut the Block

Once you have a design drawn on both sides of the block, you're ready to cut. Adults should do the cutting or closely supervise.

- Secure the block in a vise or with clamps before cutting.
- Use a band saw (if available) for straight, quick cuts, or a coping saw for curves.
- Follow the lines you traced on both sides of the block, so the cuts stay straight.

Take your time. A slow, controlled cut is safer and makes less work later when sanding.

Step 4 – Shape and Smooth the Car

Now you can refine the shape and make it look more like the design your Scout imagined.

- Use a wood rasp or coarse file to round off sharp corners and shape the body.
- Start sanding with a coarse sandpaper (around 80-grit) to remove saw marks.
- Move to finer sandpaper (around 150–220-grit) until the car feels smooth to the touch.
- Wipe off dust with a dry cloth or paper towel.

Step 5 – Add Weight

A heavier car (up to the legal limit, 5 ounces) will roll faster.

- You can use purpose-made weights, small metal objects, or a kit from the Scout store.
- Try to place most of the weight toward the back half of the car for better speed.
- Weights can be glued on the outside or inserted into drilled holes in the block.
- If you drill holes for weights, you can cover them with wood putty and sand smooth after it dries.
- Make sure there is at least 3/8" clearance between the bottom of the car (including weights) and the track so it doesn't scrape.

Tip: Weigh the car with all parts that will be attached (including decorations) so you don't go over the limit.

Step 6 – Paint and Decorate

Painting is where your Scout's creativity can really shine. This step may take a day or two to allow for drying time.

- Use water-based paints when possible—they're easier to clean up and dry quickly.
- For a smoother finish, apply a first coat, let it dry, then lightly sand with fine sandpaper (200–400-grit).
- Add one or two more coats as needed without sanding between final coats.
- Avoid painting inside the axle slots or the wood right around them. This area will be treated with graphite later to help the wheels spin.
- After the main paint is dry, add decals, stripes, stickers, or glued-on decorations.
- A clear coat at the end can help protect paint and decals.

Step 7 – Prepare Axles and Wheels

Smoother axles and well-lubricated wheels help your car roll faster. This part is a great fine-motor activity for older Scouts with supervision.

Axles:

- Lightly file any burrs or crimp marks on the axle shaft and under the head (an adult job).
- If you have sandpaper (400-grit and finer), you can polish the axles by spinning them in a drill and holding the sandpaper gently against the shaft.

Wheels:

- Clean any dust or bits from the wheel hub and bore (hole). A pipe cleaner works well for this.
- Many families like to add graphite to the wheel bores to reduce friction.

Step 8 – Install and Align Wheels

Now you're ready to put it all together.

- Lightly sand the wood around each axle slot and rub graphite on that area to reduce friction.
- Add graphite to the inside of each wheel hub and bore before inserting the axle. Dry graphite lubrications only.
- Gently press the axles into the slots as straight as possible. Aim for a small gap between the wheel and the car body (about the thickness of a credit card).
- Once all four wheels are on, roll the car on a flat surface 3–4 feet.
 - If the car drifts more than a couple inches to one side, you may need to adjust a front axle slightly.
 - Make small adjustments and re-test until the car rolls mostly straight.

Step 9 – Final Check Before Turn In Day

Before you head to check-in:

- Confirm your car meets Pack's rules for size, weight, and wheel/axle type.
- Make sure all wheel's spin freely and do not rub on the car body.
- Check that any decorations are firmly attached.
- Pack your car in a box or container so it doesn't get damaged on the way to check-in.

Building a Pinewood Derby car is a great chance for your Scout to learn basic tools, craftsmanship, and good sportsmanship. Have fun building together and enjoy race day!