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- **1st place cars get 1 point**
- **2nd place cars get 2 points**
- **3rd place cars get 3 points**

To avoid penalizing cars which progress to later rounds, and are therefore in more races, **point totals for each round start from scratch.**

In case of a tie for 1st place, the tied lanes will show a solid “On” light and the remaining lane, if any, will indicate a 3rd place finish (1st and 2nd places are taken).

For races other than finals and run-offs, the 1st place points are assigned to the cars tied for 1st place. For finals and run-offs, the judges can decide to re-race the cars in the same lanes (without the 3rd car) as many times as are necessary or they may decide to conduct a sequence of races where the cars alternate lanes and accumulate points. **Single-run “Sudden Death” races are to be avoided because lane-to-lane track variations should not decide the winner.**

In case of a tie for 2nd place, the 1st place finisher is indicated by a solid “On” light and the other two cars have flashing lights indicating a tie for 2nd place. In a “points accumulation” race, the tie is allowed to stand with the tied cars receiving 2nd place points.

Race Procedures

General:

1. The race will be conducted so that each participant’s car races at least **3 times**. If there are fewer than 100 cars entered, each car will race at least **6 times**.
2. A “heat” is a set of races where each car races once.
3. A “**points**” scoring system is used with a “pairing” scheme so that each car races on each of the 3 lanes against (almost always) different cars.
4. Two (2) identical, wood, natural curve, three-lane tracks can be used. They are trimmed in either Blue or Gold paint - thus the **Blue Track** and the **Gold Track**.
5. There will be at least two (2) “**divisions**”: the “Blue” division, and the “Gold” division. Cars are assigned to a division when they are registered.
6. “Recipe” variations may be in order:
 - a) Low Turnout - Fewer than 40 cars: Use a single track to make the racing last longer so that more time is spent on racing than on waiting.
 - b) High Turnout - More than 90-100 cars: Add enough divisions so that the race results can be tabulated on a single page in each division. If the time available for a Championship Series gets short, select the top finishers from each division to run in the Championship series. Use small run-off groups where possible.
7. Each track is equipped with through-the-track, high-resolution industrial optical sensors connected to a programmable controller. Race results are indicated by bright lights on top of the “car catcher” at the ends of the tracks. One light over each lane. The lights are visible from anywhere in the room. The lights indicate:
 - a) 1st place - On
 - b) 2nd place - Flashing
 - c) 3rd place - Off

Scoring:

A “lowest is best” scheme is used to simplify record keeping. The points earned are equal to the “place” in the finish of a race.

Pairings:

Stickers & Numbers:

Sets of colored stickers are used to identify the cars throughout the event. **Three (3) stickers with the same number and of the same color are used for each car.** The color indicates the “division” that the car is to be raced in. **The number is used in sequencing the cars during the racing and is also used to help identify which end of the car is the front. (The numbers are “right side up” when read from the front of the car. This aids the starters when loading cars into the starting gate.)**

When a car is registered, weighed, and inspected, the car is assigned a number as shown on the colored sticker placed on the car. One of the two (2) other stickers of the same color and with the same number are placed on the registration form to associate the car number with its owner identification. The third sticker is given to the car owner to be used as a “claim ticket” after the event in case there is a dispute as to who owns which car.

The stickers are usually numbered before the event to speed the registration process. **When the stickers are numbered, the bottom of the number must be clear or a line should be used to indicate the base of the sticker.** For example, the numbers “6” and “9” could be misread when either is upside-down. By underlining the numbers, it is clear which way the number should be oriented. To avoid ambiguity, it is usually good practice to underline all numbers on the stickers.

A set of same-color stickers is needed for each “set of heats” - including any runoffs or “finals”. For example, Blue stickers go on cars to be raced in the “Blue” division, Gold or

Yellow stickers go on cars in the “Gold Division” and White stickers, numbered independently, for the finals where cars from each division will race against each other. This is because the “pairing tables” use the sticker number to set the race order. **The original stickers are not removed at any time** but the white stickers can be removed and replaced if there is to be more than one “round” or set of finals.

If you will be racing each rank of scout in a separate division, then you need at least 6 colors of sticker - 1 each for Tiger, Wolf, Bear, Webelos 1, and Webelos 2 and a separate set for the race-offs or finals.

Pairing Method:

There are a variety of car-pairing schemes used for derbies. An internet search for “Pinewood Derby” will lead to the hundreds of sites containing details and discussions of the merits of each. The methods fall into two general categories:

- “Elimination”, slower cars are eliminated after some number of races.
- “Points”, cars accumulate points based on how they finish in individual races.

The available schemes differ in their attention to:

- “fairness”, ranging from
 - single race per car, to
 - every car races every other car from every lane.
- time required to conduct the race.

The scheme used here is a “points” system where each car races an arbitrary set of other cars from each of the track lanes. The pairing tables avoid having cars race the same opponents. **For 3-lane tracks, the cars accumulate points over 3 races with the car in a different lane for each race and against different opponents.** The advantages are that a large number of cars can be handled in a short amount of time and spectator interest is maintained because it’s not immediately obvious which cars are out of contention.

The basis for this scheme starts with tables of car numbers and a method for pulling 3-car sets from the tables. For example, a 21-car race table would start as shown below and the first race would be the first diagonal as shown in the table (actually it ends up being the cars 2, 9, and 17 in the first race but the concept is similar).

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21

A computer program is used to generate pairing tables which start out similar to the one shown above but with additional scrambling and manipulation to make for a better competition and an easier to manage race. For example, the scrambling avoids cases where a car is needed in sequential races - which slows racing while the car is retrieved from the finish line and

returned to the starting line. Facing the same opponent twice is also avoided.

Car Sequencing

Pre-race:

Before the racing begins, cars are moved from the registration area and organized on a “sorting table” with other cars with the same color sticker.

Usually, 8-foot long 2x4’s, which are about the same thickness as the lane strips on the track, are used to keep the cars off their wheels and in their correct “sort” position. This works especially well if the 2x4’s have “stabilizers” on the ends to prevent them from falling over while the cars are on them.

Sometimes the 2x4’s are instead used to separate the lanes on the table instead of supporting the cars - this is O.K. so long as the table is clean and the cars don’t roll out of order.

Thirty-nine (39) cars fit on a set of three (3) 2x4’s or an 8-foot table. When space for more cars is needed, the floor can be cleaned and used for car sorting.

Sorting for Heats:

A pairing sheet for the number of cars on the sorting table shows the desired order and lane assignments for the cars for a set of heats.

Organize the cars using the number stickers in the order indicated on the pairing sheet with the sticker number being readable from the front of the car. In some cases, there will be “holes” in the way the cars are arranged which will be filled in with cars already sorted into earlier races. An example of how the sorting table would look for a 9-car division is shown.

Race>	1	2	3	4	5	6	7	8	9
Lane 1	2	3	1	5	6	4	8	9	7
Lane 2	5	6	4	8	9	7	2	3	1
Lane 3	9	7	8	3	1	2	6	4	5
Heat>	1	1	1	2	2	2	3	3	3

During the racing, the car-carrier removes cars from the left end of the table (which should be nearest the track), loads them onto a tray or box which has the lane-numbers marked, and carries the cars to the starting line.

Similarly, the “finish line” car carrier is bringing cars back to be positioned for the next heat. For example, car 5 from lane 2 in the 1st race is positioned as the 1st car in lane 1 for the 2nd heat.

Finals, Runoffs, & Rounds:

When results from earlier rounds are available and indicate run-offs, qualifying rounds, or finals, the scorers provide a list of cars to be grouped and raced. If cars from different “color” divisions are being combined, the list from the scorers must also indicate each car’s original sticker color. E.g. “Blue 8” and “Gold 5”.

The car sorters re-organize the cars into new sets using a fresh set of “white” colored stickers numbered sequentially. These stickers should not be placed so as to obscure the original colored sticker. Remove any old white stickers and discard before placing a new one.

The white stickers are for car-sorting purposes only, scoring is tracked using the original colored stickers.

- **Scorers should not use the white sticker numbers at all.**
- **Sorters should not use the colored sticker numbers for any purpose after the initial set of heats is complete.**

Cars are sorted and raced normally (using the new “White” division).

Race Operations:

In each division, the following scheme is used:

1. The 1st row of cars are taken from the “sorting table”, and
 - a) Loaded into a carrying tray with the lane numbers marked to retain the lane assignments, and
 - b) Delivered to the “Starter” who loads the cars onto the track starting gate in the correct lane.
2. The “next” scout is called up to the starting line and instructed on the starting gate operation.

The scout should be given a chance to operate the gate one or more times before the cars are loaded for the race. They have a double-action feel which makes them easy to hold closed but resist being brought back up (that can cause the gate to interfere with the cars).

The scout is also instructed to do a “**Ready, Set, Go**” or other yell to start the race. Variety helps but the scouts are often too excited at being at the center of attention doing such an important task to add their creative input to the yell.

3. At the finish line, the **track judge verifies that the indicator lights correctly indicate the finish order.** Lights have been known to burn out after being kicked or fallen upon.
4. At the finish line, cars are taken from the track and **placed into a carrying tray with the “finish order” numbers marked** (1, 2, 3). The finish order is indicated by the lights on top of the car catcher at the ends of the tracks. The track judge verifies the car positions in the carrier.

5. When the cars have been loaded into the carrying tray, the judge can reset the indicator lights and electronics.
 - a) The judge and starter make eye contact and **signal a “Thumbs up” when the next race can begin.**
6. The cars are taken to the scorer’s table and the finish order/points are recorded for each car number.
7. The cars are returned to the “pairings” table to be assigned their positions for a later race.

Race Plan:

This section describes the overall flow of the day’s racing. The goal is to maintain a high level of involvement and excitement in all of the scouts and spectators, race the cars as many times as possible, and minimize interruptions or “dead time” needed to compute results, etc.

Two tracks reduces the “crowd depth” around the tracks because the crowd is split into 2 groups but both groups can view the action on the other track. The occasional movement of people to the other track adds to the action of the event.

With 2-tracks, electronic finish lines, optimized pairings, and numbered car carriers, throughput is about 4 races per minute given sufficient, even inexperienced, staff.

Scoring (and the scouts at the starting line) become the bottleneck and experience there helps a great deal. Thus, 50 entrants in two (2) 25-car divisions, three heats each can be completed in about 35 minutes plus time for calculating results. **When there are more than about 45 cars in a division, the scoring slows down** because the tables become cumbersome and it is difficult to find the correct place to enter the results once there is more than 1 screen or piece/side of paper to deal with. Using computers, 50-car divisions become manageable because the proper data entry place is usually just a page-up or page-down away and the sorting by points is very fast.

So... Here’s the plan.

Cars are separated at registration into “Blue” and “Gold” divisions up to 50 cars each. If there are more than 100 cars, additional divisions/colors will be added. If pre-event registration indicates that more than 2 divisions will be needed, the additional divisions will be started at the registration area so that the divisions will be similarly sized.

Trophy Run Series...

1. **Run division races where cars accumulate “points”.**
2. **Tally results for each scout rank across all divisions.**

Example: Tiger Cubs in the Blue Division are tallied along with Tiger Cubs in the Gold Division.

3. **Get the top three in each rank based on point totals.** Conduct race-offs as needed to get the top 3 finishers.

For example, Say there are 2 Tiger cars with 3 points

each (won all 3 races) and 7 Tiger cars with 4 points (one 2nd and two 1st). Then the Tigers with 4 points have a race-off amongst themselves to decide which car goes into the “top 3”.

The cars are assigned “white sticker” numbers and raced in the regular way a 3-heat set is done. Cars which fall out of the “tie” are eliminated from the “top 3” competition and the other cars are re-stickered and another set of heats is run. This continues until the “top 3” is complete.

4. **Run the top-3 against each other in a 3-race set**, again accumulating points.

Since it is possible and even likely that the top 3 cars have not faced each other head-to-head, the point standings from previous races are not used to establish 1st, 2nd, and 3rd place within the top-3.

The cars are raced in a 3-race head-to-head competition where the cars alternate lanes and accumulate points. Neither a separate set of stickers nor the pairing tables are used for these races, just rotate lane assignments and keep track of points.

At best, the 1st, 2nd, and 3rd place standings will be clear from the 3-race set. Two-way ties are settled between the 2 cars.

At worst, this will produce a 3-way tie (6 points each) in which case, move to the other track and do it again.

Championship Series

If there are more than 2 divisions being used, or the event is running late, this step may be skipped or shortened.

The District Championship series has three purposes:

1. Establish the top-30 qualifiers for the Council Derby, and
2. Provide an excuse for more racing,
3. Give “hope” to **all** participants.

Before starting this series, ask for a commitment from the scouts/parents regarding the Council Derby. Add as many cars to the “top” category as there are “no interest” answers from the top-30 point finishers. We want to send as many as possible to the Council event. **Thus, where it says “top-30” in this section, take it to mean the (top-30 + whatever number of cars are needed to be able to send 30 to the council race).**

To skip it, simply sort the points from the original “Trophy Run Series” and pick the top 30. If “ties” run across the “30” barrier, ask the scouts in the top-30 to declare their interest in the council race, move the barrier down for each “no interest” response. Unresolved top-30 “ties” could be decided by a run-off of those tied in points. Then have race-offs as needed among the top ranked cars to establish the top-3 and then

head-to-head races to get definitive 1st, 2nd, and 3rd place overall standings.

To shorten it, poll the owners of cars in the top-30 and have race-offs among those whose point total crosses the top-30 barrier until there are only 30. Then have race-offs as needed among the top ranked cars to establish the top-3 and then head-to-head races to get definitive 1st, 2nd, and 3rd place overall standings.

Championship Qualifying Round:

This should be used if there are fewer than 100 cars or if there is plenty of time left.

The point totals from the “Trophy Run Series” will likely have a large number of cars tied on points where the top-30 line would be drawn. If not, go “up” a point to include cars which would be presumed to already have earned a place in the top-30.

Then, **re-sticker the cars which fall below the cutoff** using either “white” or colors if more than one division will be used. Run the races to accumulate points and qualify for the top-30. Now every scout has hope and an opportunity to get into the “championship” round. Notice that the very fastest cars will not be racing in these races which can make it very exciting.

Race-off as necessary to fill the top-30 slots.

Championship Round:

This round can have awards for the top-3 finishers or it can simply be for “bragging rights” if the budget is tight.

Re-sticker the cars using “white” stickers and run the races to accumulate points with run-offs as needed to establish the top-3.

As described earlier, run the top-3 against each other in a 3-race set, again accumulating points.

Since it is possible and even likely that the top 3 cars have not faced each other head-to-head, the point standings from previous races are not used to establish 1st, 2nd, and 3rd place within the top-3.

The cars are raced in a 3-race head-to-head competition where the cars alternate lanes and accumulate points. Neither a separate set of stickers nor pairing tables are used for these races, just rotate lane assignments and keep track of points.

At best, the 1st, 2nd, and 3rd place standings will be clear from the 3-race set. Two-way ties are settled between the 2 cars.

At worst, this will produce a 3-way tie (6 points each) in which case, move to the other track and do it again.

The Top 3 always race-off head-to head in a 3-race set, once per lane so that lane-to-lane track variations do not determine the results.

Race Exceptions:

1. Unsportsmanlike conduct and any conflicts, rule violations, car axle or wheel or other rule challenges, or problems during the race will be referred to the Event Chair whose decisions are final.
2. **Starter interference and false starts:**
Re-run the race without recording results of the first attempt. This includes cases where the scout or starter bumps the bottom of the cars with the starting gate.
3. **Car falls off track:**
The race is stopped and is considered to have not been started. The car owner has 3 minutes in which to inspect and repair the car. If repairs were needed, the car owner has an additional 2 minutes to pass weigh-in/rework and inspection again.

If the car can not be raced after this time, the race is run without the car in its lane and it gets 3rd place points. If the car is made ready before it's next race it will be inspected and weighed before being entered into the normal sequence.

If the car was damaged by some action of another car, another person, or problems with the track, additional time will be allowed. The races which would have the damaged car in it are not run in the normal sequence. The scorers will keep track of the car numbers and lane assignments for each race that the car misses while being repaired. When the set of heats is otherwise complete, the scorer will call the car numbers and lane assignments for the races which have been postponed for the sake of the damaged car. If the car can not race, the races will proceed without it and it gets 3rd place points.
4. **Track problems:**
If the track technicians determine that the problems can be corrected in a timely manner, the racing on that track is stopped until repairs are completed.
 - a) Bumps in section joints
 - b) Finish light bulbs
 - c) Popped-up screws, etc.
5. **Track judge disagrees with electronic finish lines**
Calibrate/Adjust the detectors and re-run the race that caused the judge to detect the problem.
6. **Spectator interference**
 - a) All stand and give a "foeey - foeey - foeey" cheer to the offending party.
 - b) Re-run the race.
7. **Lane-to-lane car interference.**
 - a) If due to car design problem or breakage, consider the offending car "damaged" and allow the owner 3 minutes to effect repairs.
 - b) Re-run the race.

Pinewood Derby Rules

The following rules are similar to those to be used for the Greater Cleveland Council Pinewood Derby. We will be using these rules so that the cars from our Derby will be able to race in the Council Race.

1. All cars must pass racing specifications (rules supplied with the Car Kit).
2. Only "GRAND PRIX" style racers are permitted. Car size will not exceed 2³/₄" x 7" Body (width x length).

The Council race rules **may** impose a maximum height of 2¹/₂". If you want to build a car that could qualify for the Council race, it **may** need to adhere to the height limit of 2¹/₂".
3. Remember to maintain a 3/8" clearance from the bottom of the car to the track. The wheels need to straddle the guide on the track; the guide is 1⁵/₈" wide. So the wheels should be at least 1⁵/₈" apart.
4. The weight will not exceed 5 oz. (141.75 grams).
5. The building instructions in the kit are very important. NO wheel bearings, washers, bushings or springs are permitted on the cars.
6. No loose materials of any kind are permitted other than free running wheels on the nail axles. Nail "heads" must be visible in wheels. Therefore, no type of wheel coverings or hubcaps may be used.
7. It is permitted to place wheels and nails in a different location than the slots provided on the block in the kit. The reason for this ruling is that many of the provided slots may not be centered.
8. Only the wheels and the nails that come with the race kit can be used. Check your nails to be sure that there are no burrs that could catch on the wheels.
9. Each car must be made from the original Pinewood block in the kit.
10. Wheel feathering (forming an edge) or wafering (thinning the wheel) is not permitted. Wheels can be sanded to remove surface imperfections, but the treads must be left flat.
11. Only powdered graphite or the dry BSA "lube" can be used to lubricate the wheels and axles.
12. All cars will be made or decorated so that the front of the car is easily identified.
13. All cars will be newly made for this year's competition. No cars raced in previous years are allowed.

Race Results Tabulation:

A PC really helps here, from an Excel spreadsheet point totals are easily calculated into a new column and the whole table can be sorted on multiple columns simultaneously to show the “by rank”, “by point total” standings. Separate worksheets can be used in a single session so that previously entered information can simply be copied for new purposes. However, the task of entering large numbers of names can be time consuming. Spreadsheets can be set up as in the example header as shown here. Some sample data is also shown.

Paper-based:

Otherwise, a paper-based system

will suffice. It is usually a simple matter to make results tabulation sheets similar to that shown below. An 8.5” x 11” sheet has room for about 45 cars per side.

It helps to have the names on the sheet with the car numbers so that car owners can be called up during the racing and the names of those involved in runoffs or finals can be announced. The scout’s rank is important if racing or awards are “by rank”. The “Division” is included because later rounds may mix cars and “Blue 12” will be tracked as being different from “Gold 12”.

If all cars in all divisions can be fit on a single sheet, use overlays and staple fresh “Results” columns over the old results to avoid having to re-enter information.

All math should be done independently by 2 people to avoid inadvertent errors.

Car #	Set	Rank	Name	Race 1	Race 2	Race 3	Total Pts	Pack
1	BLUE	2W		2	3	2	7	
2	BLUE	B		2	1	2	5	
3	BLUE	B		1	2	1	4	
4	BLUE	2W		3	1	2	6	
5	BLUE	T		3	3	3	9	
6	BLUE	W		1	3	3	7	
7	BLUE	B		2	2	3	7	
8	BLUE	B		1	2	2	5	
9	BLUE	W		2	2	1	5	
10	BLUE	B		1	1	1	3	
11	BLUE	B		3	3	3	9	
12	BLUE	B		3	1	1	5	
1	GOLD	1W		2	1	2	5	
2	GOLD	B		3	3	3	9	
3	GOLD	2W		2	2	2	6	
4	GOLD	W		1	1	1	3	
5	GOLD	B		2	1	1	4	
6	GOLD	W		1	2	2	5	
7	GOLD	W		1	1	1	3	

Race Results for Division:

Name	Pack	Rank	Div.	Car #	Race 1 Pts.	Race 2 Pts.	Race 3 Pts.	Total Pts.
				1				
				2				
				3				

Staff Positions

Volunteers are needed to help make the Derby a fun filled event for everyone. It takes a lot of people to organize and run the event.

Crew	No.	Responsibilities
Registration and Cashier	2	Verify completed registration forms, accept payments.
Inspection and Weighing	2	Weigh and Inspect cars. Determine if car complies with rules.
Registrar	1	Log cars, names, & numbers on paper or computer.
Setup	Lots	Put together floor plan Decorate, Setup track, Tables, Chairs etc.
Refreshments	2	Purchase and organize refreshments vending.
Awards	1	Find judges, determine categories (best paint, most creative, etc., gather awards (trophies, ribbons, etc.)
Publicity	1	Take pictures and write a article for publicity.
Master of Ceremonies	1	Keep the audience informed of what is going on. Keep things interesting when racing stops.
Judges for finish line	2	Verify results (We use electronic finish lines) Determine if cars or tracks need repairs.
Sequencers	4	Position cars in the proper order.
Car runners	4	Move cars from staging area to Starter Move cars from Finish line to Staging area
Starters	2	Coordinate the start of each race. Help Scouts start the race. Keep the scouts involved.
Scorekeepers	2	Tally results for the races
Cleanup	Lots	Put the place back in order.