



WARNING boxes like this one contain information related to the health or safety of the Scout or **ENFORCABLE** rules clarifications the violation of which may lead to disqualification of the Scout from competition.



Information Boxes like this one contain non-enforceable rules clarifications, guidance or useful information. Contents of an information box may not be used to determine the eligibility of a Scout or Car.

1 AUTHORITY

- 1.1. These rules govern the **Michigan Crossroads Council Cub Scout Pinewood Derby Championship** (Race) and shall be the sole governing authority for the qualification of participants, and the format and conduct of the race.
- 1.2. Each Constituent Pack (Pack) may establish and enforce its own set of rules for local use.



While each Pack may set its own rules for races held at the Pack Level consider the following when establishing your rules:

- Cars built according to a more restrictive ruleset than the Council will be less competitive and at a disadvantage at the Council Level.
- Cars built according to a more permissive ruleset than the Council rules found to be in violation of Council rules will be disqualified from competition at the Council Level.

2 GENERAL ELIGIBILITY

- 2.1 To race in the Michigan Crossroads Council Championship, participants must build their car during the current academic year and meet one of two membership requirements for that year.
 - 2.1.1. Registered as a Cub Scout.
 - 2.1.2. 5th Grade Cub Scout (Arrow of Light) who bridged (joined) Boy Scouts
- 2.2 The Scout must be registered to represent the “driver” of the car.



Traditionally we ask that each Pack send the top 3 racers from each rank. However, the Race is open to any registered Scout who believes they have a competitive car and wishes to compete at the Council level.

We encourage 5th graders who have not had a chance to race at a District or Council level Event to come and join the fun!

- 2.3. The car must have been built for the current Academic year. **NO REPEATS** or **REPAINTS**. Cars may not be purchased from a third party.
- 2.4. Cars may not be purchased from a third party.
- 2.5. Third parties offering services for compensation may not be engaged for the purposes of tuning, building, build assistance, painting, parts modification or other such performance enhancements as determined by The Committee.
 - 2.5.1. This rule shall not be interpreted to include pack/district/council level builder’s workshops, communal maker/hackerspaces or voluntary consulting or build assistance or the voluntary loaning of tools.



3. CAR BODY

- 3.1. The portion of the car into which the axles are inserted must be made of pine wood.
- 3.1.1. Additional stable materials such as plastic or metal may be used for car construction. All such additions must be firmly attached, non-moving, and meet car size specifications.



If you **lack** the tools, resources or skill required to cut out a car from a stock block of wood or **have no idea** what it takes to build a championship pinewood derby car then we encourage you to attend a workshop hosted by your den, pack, district, or council.

If you **HAVE** the tools, resources or skill to cut out a car from a stock block of wood, **AND KNOW EXACTLY** how to build a winning car, then we encourage you to **RUN** a workshop hosted by your den, pack, or council. **Remember, building and tuning a car WITH the adult is a major part of the Pinewood Derby. Local Maker/Hacker spaces** operate on a membership basis like a gym or health club to provide access to tools and a broad range of skills technical expertise and are a GREAT way to expose your Scout to STEM learning opportunities.

Alternatively, you may purchase a pre-shaped block and assemble it with approved wheels and axles. **The youth advances and not the specific car.** An independent inspection will be conducted prior to the Council Race. This means that it is unnecessary for packs to maintain custody of a Scout's car after their pack race.

- 3.2. The car must comply with the dimensional specifications outlined below:
- 3.2.1. Length: Not to exceed 7.00 inches
- 3.2.2. Width: Not to exceed 2.75 inches
- 3.2.3. Height: Not to exceed 4.00 inches
- 3.2.4. Weight: Not to exceed 5.00 ounces
- 3.2.5. Clearance: Not less than 0.375 inches below the portion of the body positioned between the wheels AND no part of the car other than the wheels shall touch the track.
- 3.2.6. Stance (Width between inner edge of wheels): Not less than 1.75 inches AND Wheels must clear center guide rails.



The following **guidelines** are intended to help you construct a car with the necessary clearance for most tracks. If any question arises about a car's clearance during check in, race inspectors may place the car on the track to verify that only the wheels can touch the track.

- **Car bottom:** to clear a filled center rail, the bottom of the car should be no less than 3/8 (0.375) inch from the point where the wheels touch the track.
- **Fenders:** Fenders or other body parts may extend below 3/8 inch from the track surface. Remember the guide rail width so the fenders do not rub.
- **Weights:** To aid in a safe stop at the end of the track, we recommend that you insert weight inside the body or place it on the top of the car. Avoid placing thick (over 1/8") weight on the bottom of the car as that may destabilize the car on the stop section.

- 3.3. Front: the leading edge of the car must be no more than 1.00 inches above the wheel lane of the track and be at least 0.50 inches wide at the center of the car. **NO NARROW POINTED FRONT ENDS.**
- 3.3.1. When placed in the starting position, no portion of the car may protrude beyond the starting pin.



This rule ensures the car rests securely against the starting pin when placed in the starting position and is wide enough to trigger electronic finish lines.

Another way to say this is no needle nose cars and no cars with a high front end.

The needle nose makes it hard to align for a straight start and often does not trip the electronic sensor until enough of the car has passed to cover the hole.

The raised front end or raised wire is only effective on tracks where the starting pins are released by hand and not spring driven. The tracks used for the council race are spring driven and the pins drop faster than a car can start.

- 3.4. The front most and rear most wheels must be positioned directly across the body from one another and shall comply with the limits set by rules 3.ii.1. and 3.ii.c.
- 3.5. Each attached wheel must not be angled(canted) more than 20 degrees from vertical.
- 3.6. Cars must have a minimum of 4 wheels.
- 3.7. Each wheel must be attached to the car's wood chassis with a legal axle.
- 3.8. A minimum of 3 wheels must touch the track surface.



Although at least 4 wheels are required, **it is not required that all 4 wheels touch the track surface.** It can be difficult to get all 4 of the wheels to touch.

The rationale for 4 wheels is that it ensures the car will stay on the track and not slide off the center rail and collide with another car.

- 3.9. Wheels must be free to contact the body of the car.
 - 3.9.1. Washers placed on the axle or attached to the body are prohibited.
 - 3.9.2. Any legal material permanently attached to the side of the car shall be considered a part of the car body.



Body treatments to help reduce friction ARE ALLOWED.

Body treatments (between wood chassis and wheel) may be things like sprayed on graphite paint, Teflon tape, other slippery materials/waxes applied to the body.

- 3.10. The following items are prohibited from inside of the body or out:
 - 3.10.1. Springs or suspension of any kind (including leaf springs integral to body design)
 - 3.10.2. Starting Devices (i.e., a design feature intended to allow the car to be propelled by or released prematurely from the starting gate)
 - 3.10.3. Non-gravity Assisted Propulsion Devices
 - 3.10.4. Electronic or lighting devices that are unable to be deactivated prior to the race and which may interfere, with race electronics
 - 3.10.5. Liquids, wet paint, sticky substance, or powders of any kind (other than axle lubrication)
 - 3.10.6. Glass or other excessively fragile objects or materials
 - 3.10.7. Loose objects or objects which are intended or capable of moving during a race or routine handling of the car.

4. WHEELS

- 4.1. Cars shall utilize current BSA or BSA licensed wheels.
- 4.2. All lettering, numbering, fluting (i.e., the small bumps on the outside edge of the tread), spokes, and other OEM markings on both inside and outside of wheel must remain complete and be visible with the wheel on the car.
 - 4.2.1. Any covering of the interior of the wheel shall be permanently attached to the body of the car, must be transparent, and must not interfere with the mechanical inspection of the wheel.
 - 4.2.2. Any interior wheel weights must be permanently attached to the body of the car and



must not interfere with visual or mechanical inspection of the wheel.

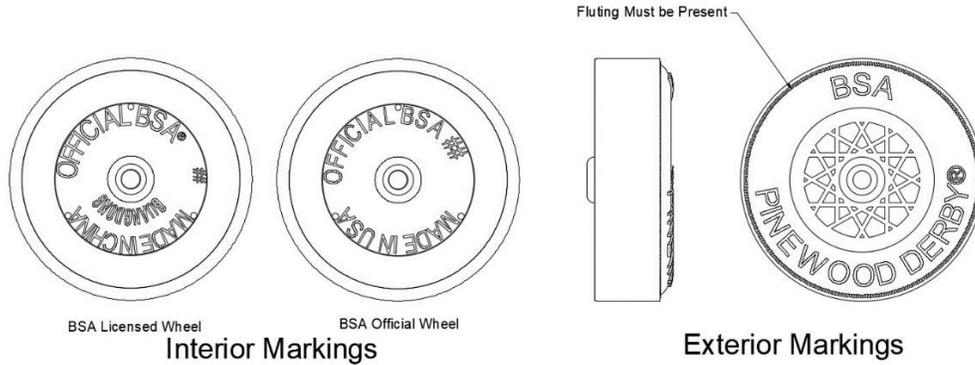


Figure 1 Required Wheel Markings



Any covering of the interior of the wheel must meet ALL the following requirements:

- Shall be attached to the body of the car Shall not be attached to the axle
- Shall be transparent (clear) or configured with a slot that allows FULL VISUALIZATION of the interior of the wheel by rotating the wheel for interior inspection.
- Provide sufficient clearance that accurate measurements may be taken of the wheels using appropriate measuring devices (i.e., Calipers, Micrometer, etc.)

- 4.3. Wheel dimensions must NOT deviate from the following dimensions:
- 4.3.1. Maximum Exterior Diameter: 1.170 Inches
 - 4.3.2. Maximum Width: 0.360 inches
 - 4.3.3. Minimum Tread Thickness: Unmodified wheel – 0.010 inches
 - 4.3.4. Minimum Sidewall Thickness: Unmodified wheel – 0.005 Inches
 - 4.3.5. Minimum Weight: 2.5g
- 4.4. Wheel modifications to the exterior profile of the wheel, including but not limited to the following, are prohibited:
- 4.4.1. Rounding of the tread surface
 - 4.4.2. Grooving, H cutting, or V cutting the tread surface
 - 4.4.3. Drilling holes in the sidewalls or tread area
 - 4.4.4. Filling wheel tread with any type of material

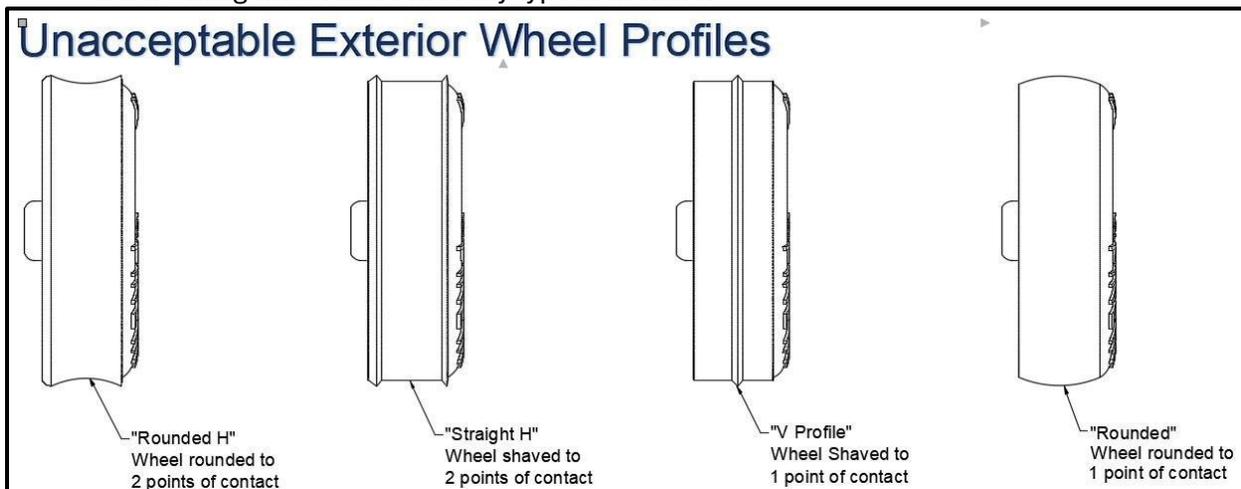


Figure 2 Unacceptable Exterior Wheel Profile



- 4.5. Wheel modifications to the interior profile of the wheel are prohibited (See Figure 3 Examples of Prohibited Internal Modifications:
- 4.5.1. Removing material from the inside of the tread surface or the inside sidewall surface.
 - Polishing the wheel bore shall not be considered removal of material.
 - 4.5.2. Filling the wheel bores and re-drilling the bore.
 - 4.5.3. Applying a polish, wax or surface treatment to the stock wheel bore shall not be considered filling the wheel bore.
- 4.6. Wheel bearings, bushings, and washers are prohibited.
- 4.7. Wheels shall not show scratches, tool marks, or other suspicious markings, beyond normal wear and tear.

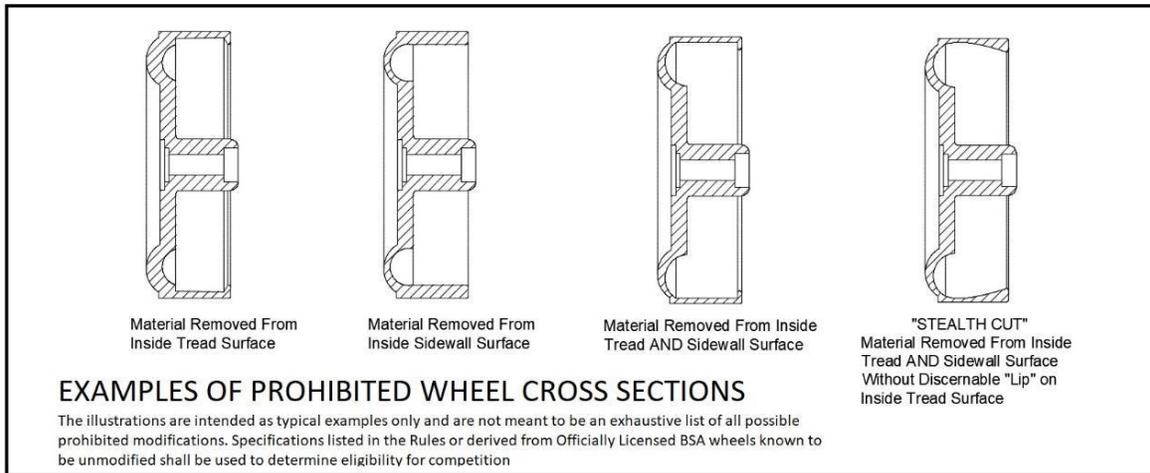


Figure 3 Examples of Prohibited Internal Modifications



Some online vendors sell aftermarket wheels manufactured from Official BSA wheels that have been lightened by removing material from inside the wheel surfaces. Per rules 4.3 and 4.5, these wheels are NOT allowed and are easily recognized at inspection. Cars with these wheels will NOT be permitted to compete. If you plan to use aftermarket wheels, confirm with the vendor that no weight is removed from inside the wheel.



The rules permit many wheel modifications so long as you observe the dimension limits and restrictions listed above. Common legal modifications include but are not limited to:

- Truing the tread surface with sandpaper, straight edge, or lathe to correct “out of round” wheels.
- Truing the inner edge of the tread surface
- Applying wheel bore treatments such as polish and wax to smooth the bore.
- Truing the tip of the inner hub

5 AXLES

- 5.1. All axles must conform to the specifications of officially licensed BSA steel axles included in the BSA Grand Prix Kit or provided with BSA licensed wheel packs.
- 5.2. Axles must be attracted to a magnet
- 5.3. Axle diameter must not be less than 0.084 inches along any portion of the axle which may contact the wheel bore (journal surface).
- 5.4. The inner surface of the axle head must appear be perpendicular to the journal surface
- 5.5. The outer surface of the axle head must maintain the domed appearance of an officially licensed BSA axle.
- 5.6. Light surface markings (e.g., scratches, ink, paint or other marking substance) are permitted
- 5.7. Axle heads shall not include any feature intended to provide an interface with a tool.
- 5.8. Axle tip must come to a point.



- 5.9. No foreign material or object may be permanently attached to an axle.
- 5.10. Provided the alignment limits in rule 3.4 are not exceeded, bending of axles is permitted

6 LUBRICATIONS

- 6.1. Only dry lubricants may be used to lubricate the wheels.
 - 6.1.1. All lubricants must be completely dry at the time of checking in.
 - 6.1.2. Excess lubricants which may interfere with the performance of another car must be removed.
- 6.2. Cars which, in the opinion of the inspector, present an obvious risk of contaminating the track or interfering with the performance of another car due to shedding excessive lubricants, will not be accepted for racing.

7 WEIGHT

- 7.1. Lead (Pb) weight, if used, must be completely sealed and safe from all possible contact with youth.
 - 7.1.1. The parents or guardian of the Scout must ensure safe materials are used. Toxic or Radioactive materials (e.g., Lead in any form, Thoriated Tungsten welding rods) should be avoided.
- 7.2. All material used to weigh the car to the maximum allowed weight shall be in solid form.
 - 7.2.1. Weighted putty, clay or other such semi-solid material shall not violate this rule.
- 7.3. All material used to weigh the car shall be firmly attached to the body of the car.
 - 7.3.1. Semi-solid material should be fixed to the car to ensure routine handling of the car will not dislodge the material.



Please avoid Lead (Pb) in cars this year! The 2008 Consumer Product Safety Improvement Act restricts the amount of lead that may be contained in children's toys (ages 12 and under). For a 5-ounce toy, the lead limit would be 3/1000 of an ounce! Therefore, we strongly encourage you to use other material for weight. Common alternatives include zinc, copper, and tungsten. For more information see: <http://www.cpsc.gov/CPSCPUB/PREREL/prhtml09/09120.html>



It is significantly easier to **ADD** weight to a car which is too light than it is to **Remove** weight from a car built too heavy. Keep the following tips in mind when planning and building your car:

- Do not forget to account for your wheels and axles when determining how much weight to add to the car.
- Do not forget that sealing, priming and painting a car will add to the weight of a car.
- Experienced racers will leave a small area on the car accessible for "Trimming up" then build the car .25-.50 oz light prior to painting. Once painting is complete, weight can be added to the "Trim Pocket" to bring the car up to Race weight.
- Coming to inspection with the car slightly light and adding semi-solid material like weighted putty or modeling clay to a small hole drilled in the body will allow you to quickly adjust the weight of your car prior to final weigh in.

8 CHECK-INS

8.1. ALL CARS MUST BE CHECKED-IN AND IMPOUNDED PRIOR TO THE SCHEDULED RACE.

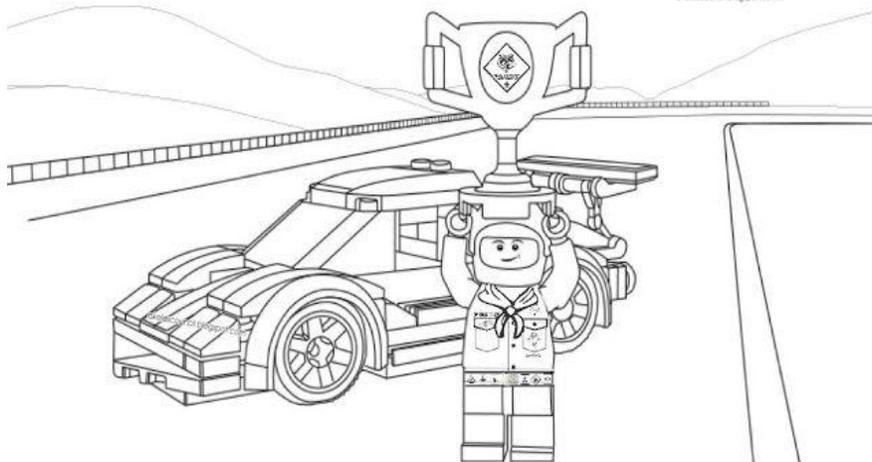
9 PRE-RACE INSPECTION

- 9.1. Each car must pass inspection by the Official Inspection Committee before it may compete.
- 9.2. An inspection form will be issued to each car upon drop off. This inspection form must follow the car through the inspection process.



- 9.3. Inspectors will be provided with training and equipment to detect and document any potential violations.
 - 9.3.1. Whenever possible the inspectors will use the provisions of the rules to determine and document discrepancies on an objective basis.
 - 9.3.2. Discrepancies documented by Inspectors will be used by the Official Inspection Committee to accept or reject a car for competition.
- 9.4. Inspectors shall make every effort to perform the inspection without any alterations to the car.
 - 9.4.1. If the design or construction of the car contains elements which may interfere with the performance of another car, including but not limited to, attached objects or decorations, weights, air dams, fenders, or other features, Inspectors will instruct racers to remove any interference.
 - 9.4.2. Except for components found to be in violation of the Rules, once a car has passed the portion of the inspection which required disassembly of the car, Racers may reassemble their car prior to being impounded.
- 9.5. Cars with complete inspection forms must be submitted to the Official Inspection Committee for Qualification and Impoundment.
- 9.6. The Race Inspection Committee will investigate any documented discrepancies and make an overall determination of a car's compliance with the Rules
- 9.7. The Committee Chair Shall designate a single scale as the Official Scale.
 - 9.7.1. In the event of electrical or mechanical failure of the Official Scale, the Committee Chair shall designate another scale as the Official Scale.
 - 9.7.2. All weights previously obtained shall be considered valid.
- 9.8. Cars submitted to the inspection committee and found to be compliant with the rules will be officially weighed.
 - 9.8.1 Only weights obtained by an Inspection Committee Representative using the Official Scale shall be used for the purposes of qualifying a car to race.
 - 9.8.2 Cars weigh in at less than or equal to 5.00 oz.
- 9.9. Per rule 9.3, Racers who have had their cars returned for adjustment must return to the end of the Impound Line and wait their turn. (N/A for virtual pinewood derby)

**EVERYTHING IS AWESOME ABOUT
PINewood DERBIES**





ACCURACY AND MEASUREMENT

Specifications in these rules have been recorded using the units and number of digits required to reflect the degree of accuracy necessary to comply with the rules. Standards of accuracy by component and unit are listed in the table below.



SIGNIFICANT FIGURES: The last digit of an instrument capable of displaying a number from 1-10 will be considered the limit of the accuracy of the instrument. Digits consisting of a fewer than 10 symbols (e.g., 0 or 5, + or-) will not be used for rounding and will be dropped (Truncated). Digits arrived at by the estimation by the operator (i.e., estimating between two lines on a ruler) shall be used for rounding.

Component	Unit	Accuracy	Decimal Places
Body	Inches	0.00	2
Wheel/Axle Alignment	Degrees of Arc	0	0
Wheels and Axles	Inches	0.000	3
Wheels	grams (g)	0.00	2
Assembled Car	US Ounces (Oz)	0.00	2
Race Times	Seconds (s)	0.0000	4

MEASUREMENT: All required measurements will be taken using an instrument with a displayed accuracy meeting the above standards or a gauge or standard calibrated to the required accuracy. Measurements with an accuracy greater than the above will be rounded up.

ROUNDING: When rounding is required, results will be recorded to an accuracy of one additional decimal place than the above requirements. If the final digit is less than 5 it shall be dropped. If the final digit is 5 or greater then add 1 to the digit to the left of the final recorded digit and drop the final digit. For example, 2.342 rounds to 2.34 while 3.14159 rounds to 3.1416.

- 9.10. For Cars which the Inspection Committee determines to be non-compliant Racers will be given the following options:
 - 9.10.1. Withdrawn from competition, Car will race at its scheduled Den Race, Race Results will be posted, but those times will not be included in any official standings and the Car will not be eligible to advance to the Grand Championship Race. (This is intended to allow Scouts to experience the race without being rewarded)
 - 9.10.2. Withdrawn from the Race, the Car will be returned, and the Scout will not be allowed to race
- 9.11. After a car has been impounded, Cars shall only be handled by Race Officials.
 - 9.11.1. The Pinewood Derby Committee Chair, Pinewood Derby Committee Members, or Race Judges are the only Race Officials who may permit a non-Race Official to handle a car during the impoundment period.
 - 9.11.2. While it is under impound, Under **NO CIRCUMSTANCES** shall any Race Official permit **ANYONE** to handle a car other than the Scout to whom the Car is registered, that Scout's Adult Partner/Parent/Guardian or a Race Official.



10 RACE RULES

- 10.1. Michigan Crossroads Council Cub Scout Pinewood Derby Championship shall consist of two separate levels of competition:
 - 10.1.1. The Michigan Crossroads Council Cub Scout Pinewood Derby Den Championship Races
 - 10.1.2. The Michigan Crossroads Council Cub Scout Pinewood Derby Grand Championship
- 10.2. Race heats shall be declared invalid and rerun under any of the following conditions:
 - 10.2.1. Race Timer or Computer network errors occur
 - 10.2.2. Rerun is prompted by the race management software
 - 10.2.3. Heat composition is found to be incorrect (Wrong car, wrong lane, wrong heat)
 - 10.2.4. Lane or track departure by a car during the first run of a heat or the first rerun after a track repair
 - 10.2.5. Discovery and repair of faulty track conditions.
- 10.3. Race heats may be rerun at the sole discretion of the Race Judge resulting from interference from the following sources:
 - 10.3.1. Race Official, Scout, or Spectator
 - 10.3.2. the venue environment
 - 10.3.3. Another Car or debris shed from another Car
- 10.4. A race **shall not be rerun** solely due to **perceived poor car performance by a single car** in a heat or series of heats.



Although at least 4 wheels are required, **it is not required that all 4 wheels touch the track surface.** It can be difficult to get all 4 of the wheels to touch.
The rationale for 4 wheels is that it ensures the car will stay on the track and not slide off the center rail and collide with another car.

- 10.5. Heats shall be rerun within five minutes of the finish of the invalid heat or as soon as all cars assigned to the heat are ready to race can be staged at the starting line whichever is sooner.
- 10.6. Race officials shall hold all races and conduct an inspection of the track under the following conditions:
 - 10.6.1. A car experiences a lane or track departure during the first rerun after a track or lane departure.
 - 10.6.2. No less than 3 cars experience a lane or track departure from the same point on the track during 3 separate heats.
 - 10.6.3. No less than 3 cars experience a finishing time greater than 0.25s while racing from a single lane
 - 10.6.4. In the absence of any track faults, the car which suffered a lane departure shall be judged the last place finisher for the heat.
- 10.7. Any track faults discovered during a mid-racetrack inspection shall be repaired and the previous heat shall be rerun.
 - 10.7.1. All cars which previously raced from lanes affected by a track fault shall qualify for an alibi run.
 - 10.7.2. In the absence of any track faults:
 - 10.7.2.1. All previous heat results shall be judged valid and used to calculate standings.
 - 10.7.2.2. Cars which suffered a second lane departure shall be treated as a DNF.
- 10.8. Cars unable to race due to mechanical problems resulting from leaving the track/lane or resulting from factors external to the car itself (collision with another car, poor track conditions or other interference) may be repaired by a Race Official.
- 10.9. Cars shall have an opportunity to make up any missed heats due to mechanical failures covered under rule 10.8
 - 10.9.1. To be eligible for any makeup heats or alibi runs. Repairs must be completed prior to the conclusion of the last scheduled heat of the Race
- 10.10. Mid Race repairs shall be limited to restoring the ability of the car to travel down the track.
 - 10.10.1. Repairs must use the original parts which have passed inspection.



- 10.10.2. Lubrication, tuning, changing weight, weight distribution, or attaching any parts not strictly required to restore mobility is forbidden.
- 10.11. Cars suffering mechanical failure NOT due to external factors (see rule 10.8) shall be repaired by the Race Judge.
 - 10.11.1. Cars unable to be repaired by their next scheduled heat shall be judged as the last place finisher for the remaining heats and shall be handled as a DNF by the Race Management software.
- 10.12. After the completion of the last scheduled heat, any required make-up heats or alibi runs will be conducted.
 - 10.12.1. An Alibi run shall consist of a timed run using the same lane as the assigned lane from the missed heat.
 - 10.12.2. To the greatest extent possible Alibi runs for multiple cars should be combined to compose a make-up heat.
 - 10.12.3. Results of makeup heats/alibi runs shall be used to calculate standings.
- 10.13. Standings shall be calculated based on total cumulative time as calculated by the Race Management Software.
- 10.14. The Top 10 cars from each Den Championship race will qualify to compete in the Grand Championship Race.
- 10.15. The Grand Championship race will be conducted in accordance with the rules contained in this section.

11 STANDINGS AND POST-RACE INSPECTION

- 11.1. Standings shall not be official unless certified by the Committee.
- 11.2. Provisional standings shall be used to qualify for the Grand Championship Race
- 11.3. Following the completion of the Grand Championship race, Cars finishing, or promoted to, first, second or third place from each of the Den Championship Races and or the Grand Championship Race shall be subject to an additional highly detailed post-race inspection.
- 11.4. The Pinewood Derby Inspection Committee may, at their discretion, completely remove the wheels and axles from the body of the car to permit a more detailed examination than was possible during the pre-race inspection.
- 11.5. Cars found to be non-compliant with the Rules shall be disqualified from the competition and the remaining finishers shall be promoted in the standings.
 - 11.5.1. Inspections shall be conducted until the inspection committee has satisfied themselves that the First, Second and Third place finishers from the Den Championships and the First, Second, and Third place finishers from the Grand Championships were fully in compliance with these rules.

12 TROPHIES AND AWARDS

- 12.1. **NO TROPHIES** shall be awarded until after the Grand Championship race has been completed and the official standings of all races have been certified by the Committee.
- 12.2. Once the standings have been certified by the Inspection Committee awards will be given out in the following order:
 - 1. Trophies or medals will be awarded to the First, Second and Third place for each of the Den Championship in order of rank, Lions first, Arrow of Light last
 - 2. Standings for the Grand Championship race from last to fourth place.
 - 3. Finalist Ribbons will be presented to all racers who participated in the Grand Championship race.
 - 4. Third, and Second Place winners of the Grand Championship will be announced, and Trophies presented.



5. The Michigan Crossroads Council Grand Champion will be announced and presented with the Grand Champions Trophy.

13 APPEALS

- 13.1. Any decision of a Race Official may be appealed to the Pinewood Derby Committee Chair whose decision shall be final.
 - 13.1.1. Appeals related to Scouts belonging to a Den of Wolf rank or above must be made by the Scout.
 - 13.1.2. Appeals related to Scouts belonging to a Lion, or Tiger Cub Den must be made by the Scout or the Scout's Adult Partner.
 - 13.1.3. Regardless of Rank Scouts may be assisted in the appeal process by an adult.
- 13.2. It shall be the responsibility of the Pinewood Derby Committee Chair to determine what constitutes assistance.
- 13.3. Decisions of the Pinewood Derby Committee Chair in any race matter will be final.
- 13.4. Good sportsmanship and behavior is expected. Race officials may ask anyone not following this rule to leave.