

**WITHLACOCHEE DISTRICT 2023**

## A NOTE FROM THE DISTRICT

Ultimately, the success or failure of this event will come as a direct result of the involvement of as many of our dedicated leaders as possible – shared leadership and shared responsibility. To that end, we will be conducting an ongoing development process of these rules and standards for the benefit of ALL units.

It is the desire and goal of the Withlacoochee District to have 100% participation from all Packs and for the “best of the best” to attend. The all-aluminum PWD Track used for this event has been continually fine-tuned to be as close to “perfect lanes” as possible. Endorse the use of these rules at your Pack Event, and insure that all Scouts within your Pack know there are Pinewood Derby Events to participate in at the Pack and District Levels. Let us insure that all of the Scouts who desire to participate have the opportunity to participate.

**NOTE:** The Race Day methods and procedures described are specific to the Withlacoochee District PWD. They are not the ONLY way to conduct a PWD Event, and you should check with your District or Pack PWD Committee to learn how those events will be conducted.

### **THE PRIMARY FOCUS OF THIS EVENT GUIDE IS AS FOLLOWS:**

1. Provide the **FIRST TIME** Derby Organizer and Participants guidance for having a fun and fair event.
2. Establish a fair, consistent baseline for construction and preparation of PWD cars.
3. Provide consistency across the board from Pack Level races through District Level races, with the intent of insuring that the PWD car that is built within the rules for a Pack Race is able to qualify for additional events without modification of the PWD car.

### **HIGHLIGHTS OF APPROVED 2023 RULES CHANGES:**

- The District will be racing each den level at the District Pinewood Derby this year. This means you can have 18 racers at the district race – 3 from the Lions, 3 from the Tiger Cubs, 3 from the Wolf Cubs, 3 from the Bear Cubs, 3 from Webelos and 3 from the Arrow of Light den.
- Arrow of Lights that have crossed over can still come back and compete in their category.
- Starting this year, scouts will have an opportunity to run their car down the track prior to the start of the races. Each scout will be given two tickets that will allow them to take their car to the starting line and run it down the track **BEFORE** checking the car in at registration.

## WHAT DO SCOUTS LEARN FROM THE PINEWOOD DERBY?



The Pinewood Derby is a parent-scout project. Please feel free to give guidance and assistance as your Scout builds their Pinewood Derby car. This is a chance for your scout to be part of a team and to enjoy the spirit of friendly competition with their peers. This project and event is also an opportunity for your Cub Scout to enjoy the satisfaction of building their own car from the resources provided. A special note to all parents and scouts: While everyone is trying to win, it's always a good idea to remember the Cub Scout Motto "Do Your Best", and some of the basic ideas behind good sportsmanship as they relate to the Pinewood Derby. The Three Primary Principles of this Project:



- ❖ Scouts learn the **design** and craft skills necessary to build a car.
- ❖ Scouts learn the **physics** of car-building techniques (within the established rules) needed to compete in the Derby.
- ❖ Scouts learn the appropriate personal conduct while participating, winning, and NOT winning in the Pinewood Derby (this is called **sportsmanship**).

*The first thing to remember about sportsmanship is that everyone's skills are different. You may be good at something like singing or drawing, but not as good at something else like basketball or computers. Parents have different skill levels, too. This doesn't mean that you are a good person one time and not good another time. You can always be a good person, whether or not you have good car-building skills. Remember, you and your friends are individuals first and racers second. This idea is often called having respect for others.*

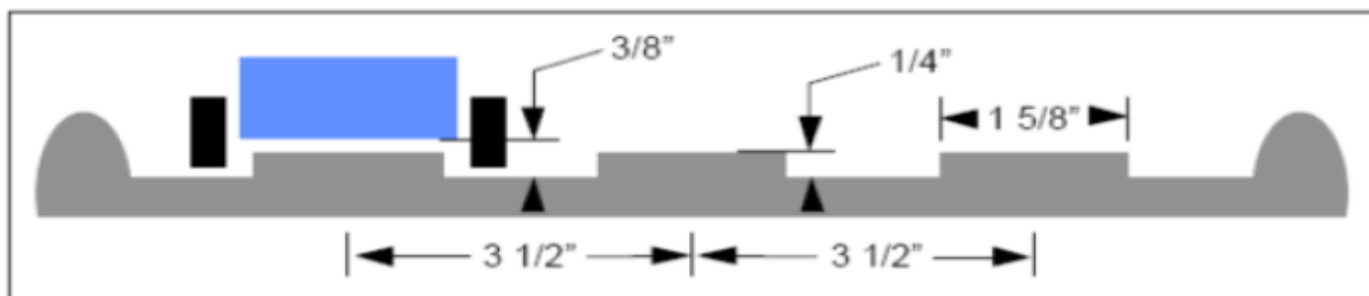
*The second thing to remember is to follow the rules. Without rules, there would be no Pinewood Derby. You will never know if you are really good at doing something unless you follow the rules. This is often called being honest.*

*The third thing to remember about good sportsmanship is that there are winners and non-winners. You accept this when you choose to compete. There may be times when*

*you win and feel happy, and times when you lose and feel unhappy. Being a winner is easy, and losing is sometimes hard. If you win, you must not brag or gloat. If you lose, you must not feel jealous or bitter. To be a good sportsman, you must be able to say "I did my best" and be satisfied with the results.*

## PWD Dimensional Specifications

- A. Maximum Width – 2  $\frac{3}{4}$  inches
- B. Maximum Length – 7 inches
- C. Minimum Width Between Wheels – 1  $\frac{3}{4}$  inches
- D. Minimum Clearance Between Car Body and Track –  $\frac{3}{8}$  inches
- E. The car must be able to travel freely under the Finish Line Gate which is approximately 4  $\frac{1}{2}$ " high.
- F. Any concerns with clearance will be tested on the actual track



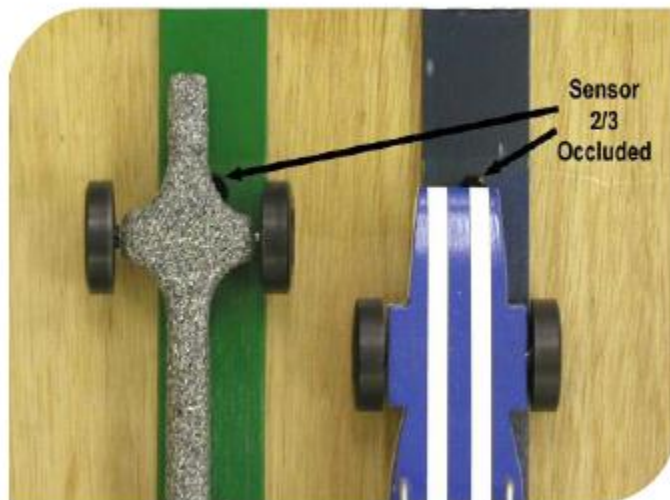
- G. The entire car, including decorative add-ons, must fit into the inspection box pictured at right, which measures at 7" x 2  $\frac{3}{4}$ ". All portions of the car must fit into the box with the door closed



- H. PWD Design Restrictions: "Front" end of the PWD car: Depending on the track, the front end of the PWD car will rest against a starting pin. The inspection box also simulates this pin and the front of the PWD car must not extend beyond this pin. Therefore, please do not design a car with a very pointy front end or any design that allows it to extend beyond the starting pin.



I. PWD Design Restrictions – Narrow Nose Designs: Finish line sensors register your completed run only after they are approximately 66% occluded. Look at the photo closely. The car on the left has clearly won the race by a significant margin, but might possibly register second or even third. You should design a full width front wing if you are planning a narrow car. There will be no adjusting the finish order as all participants have the opportunity to prevent this issue.



J. PWD design restrictions-high nose (aka “barge nose”) cars: “Speed” techniques have historically included trying to take advantage of manually operated starting pins. In theory, contacting the starting pin higher than other cars would provide a small “head start” as the pin is rotated newer starting gates are spring loaded, minimizing the effects of any delay which could be created. This also excludes sticky substances on the front of the car designed to stick the starting pin.



K. PWD design restrictions -quick start bar / 'cheater' bar: Some older tracks had low starting pins, allowing a car to be designed where a portion of the front of the car extended out farther than the pin, essentially allowing the car to start "closer" to the finish. This design shown below could exhibit the same characteristics as a narrow nose design by not registering correctly at the finish line. Additionally, all portions of the PWD entry must be behind the starting pin to be approved for racing.





- L. PWD design restrictions – moving parts: Any additional items, weights, decorations, pieces, or elements added to your PWD car must be permanently attached and not movable during the races. The only elements of your PWD car which are permitted to move (beyond the entire car) are the wheels. Doors, drivers, hoods, trunk lids, flaps, mufflers, weights, etc. are all examples of added items.



- M. PWD design restrictions – race day inspections: Scouts will be submitting their PWD cars for a visual inspection during the registration process. The derby cars will be checked for any liquids, loose parts, magnets, inappropriate construction, wheel weights, and any other violations. Appropriate pit areas will be provided for any last minute modifications needed.

- N. PWD design restrictions – Race day modifications: Pinewood derby event staff could require that your car be modified and/or staged backwards if it is found to be too difficult to accurately stage by the starter, or if there is a concern that the nose design could result in finish line errors. Once a determination is made, the PWD car will be raced. If you are given the opportunity to adjust the front of your car, and you choose not to do so, be advised that there are no appeals of heat results. Pinewood derby event staff will only rerun heats if there is interference between two cars or cars are found to have been staged in the incorrect lanes for that heat.
- O. PWD design restrictions – The use of wheel bearings, washers and bushings are prohibited.

## PWD Weight Specifications

- A. **Method of measure:** Scouts will have their PWD car weighed on the *official event scale* used for the event, in ounces. Only race officials shall come in contact with the *scale*.
- B. **Official racing weight certification:** Due to the resolution of the official scale, official weight of the car may be 5.0 ounces maximum. If a car is determined to be over 5.0 ounces, the entrant will have the opportunity to adjust the weight until it is 5.0 ounces or less. Cars that are less than 4.5 ounces will have the *option* of adding more weight up to 5 ounces.
- C. **Weight placement and types:** Before painting the block, you will want to add enough weight to bring the block, wheels, axles, and any accessories to about 4.9 ounces. Do not go over this weight; it is easier to add weight than to take it away, especially if you plan ahead. The best car designs typically have the center of gravity (balance point) such that most of the weight is over the rear wheels. A center of mass 1 to 1.25 inches in front of the rear axle is readily achieved and gives good performance. A rear bias places more of the downward force on the rear wheels and less on the front wheels.



## PWD Materials Specifications:

- A. PWD blocks: The PWD car shall be constructed from a pinewood block, as defined by the contents of the official BSA pinewood derby® car kit item: 17006. See the following webpage for official description:

<http://www.scoutstuff.org/official-pinewood-derby-car-kit.html>. This material shall make up the primary core of your PWD car, as defined as the element of your design which is attached to the axles as a single piece of pinewood. Additional decorative materials can be attached to the primary core, so long as the overall dimensions conform to the race rules, and all portions of the PWD car are behind the leading edge of the starting pin.



- B. Precut blocks: There are a variety of precut blocks available at different hobby and craft shops in the area and on the internet. There are also plastic bodies available to bolt over the block. The Withlacoochee District **does not** allow these types of bodies to be used in the construction of your car and the Race Officials will do their best to exclude them from the competition.



- C. Placement of axles: Known inconsistencies exist with the alignment and location of precut axle slots. Forcing derby car builders to use these pre-cut slots prevents a fair baseline for derby cars overall. As a result, derby contestants may choose to not use the pre-cut axle slots. If you relocate your axles, the PWD car must still conform to the minimum underbody clearance of 3/8" in addition to no portions of the car extend beyond the starting pin. You may recut your axle slots or you may drill new axle holes. You must also maintain the 4 3/8" distance between the front and rear axle locations (the wheelbase). Shortening of the wheelbase *will* be allowed, though it is not encouraged.





- D. **Wheels:** All 4 wheels must make contact with the track during racing and inspection. No extra guide pins, rollers or wheels designed to ride against or upon the guide strip will be allowed. Race officials will be inspecting all cars and all cars will be subject to approval with regards to this construction element. Also, no additional wheels may make contact with the track surface. This includes semi-truck style cars with 6 wheels. Additional wheels may be installed as decorative features as long as they do not make the car longer or wider than the previous mentioned dimensions.

- E. **PWD axle specifications:** Axles used on your Pinewood Derby car must be official BSA axles available at Michaels Stores, Lowes or the Scout Shop. This translates into a prohibition on axles created to appear similar to official axles, but are manufactured from a different raw material and shaped to conform to the dimensions of the official BSA axles.



- i. **No chrome, nickel plated, graphite coated axles permitted**
- ii. **Axles cannot be grooved or slotted**

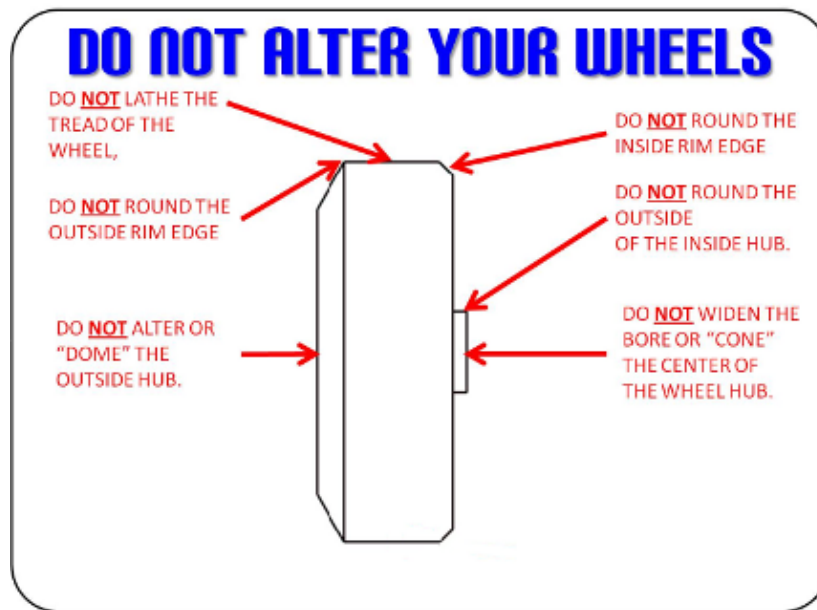


- iii. **This is not to say that you cannot purchase axles: Several vendors such as Michaels Store, Lowes and the Scout Shop sell official BSA axles made by Revell. These axles do not have the crimp marks and burrs that are present on the kit axles. These are approved for use, dramatically simplify construction of your PWD entry, and generally make life easier for builders.**

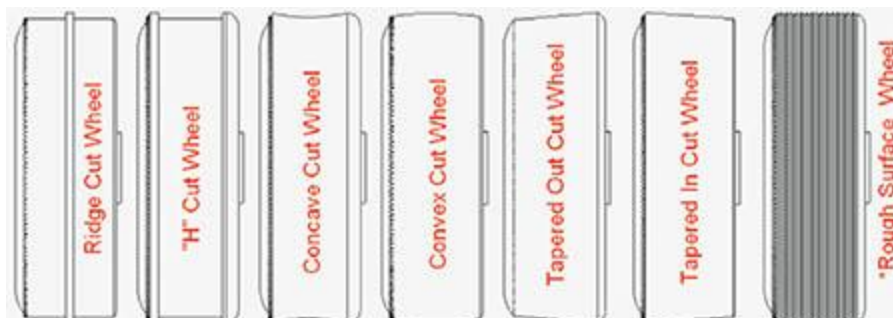
- F. **PWD axle lubrication specifications:** Only dry lubricants may be used such as graphite and white Teflon. Be advised that your PWD entry will be inspected on race day to insure that lubricants do not have the potential to foul the track or the performance of other cars, lubricants may only be applied within the designated "pit area". This area will have protective tarps to prevent graphite or Teflon from staining and damaging the carpeting within the event venue.

G. PWD wheel specifications: Official BSA wheels are available at a variety of online or retail locations.

- i. Wheel diameter -cannot be reduced. The ridge (rippled) edge must remain intact on the entire wheel as well as the raised letters.
- ii. Wheel weight -cannot be reduced below 2.7 grams each. Note – this is the standard weight of BSA approved wheels available in the kit and from Revell.
- iii. Hub coning – allowed (on new wheels the coning has largely been done).
- iv. Contact patch (the outside tread) CANNOT be modified or altered to a profile that is concave, convex, grooved, H-Shaped, angled or otherwise out of parallel with the wheel bore.
- v. Wheel contact – all four wheels must make contact while the car is at rest on a level surface.



### PROHIBITED WHEEL TREAD PROFILES



## Race Schedule and Methods

### A. Official Race Day Organization

#### i. Each PWD Derby Car will Race in a Single Racing Group

1. Lion Cubs
2. Tigers Cubs
3. Wolf Cubs
4. Bear Cubs
5. Webelos (Both I and II / Junior and Senior (AOL))
6. Open Class (Available to Adults and Siblings)
7. Outlaw Class ( Available to Adults and Siblings)

ii. There is a Race Schedule that is created by the Race Software, whereby each car will race once in each lane.

iii. Each time cars run down the track it is called a HEAT.

iv. Groups of 4 PWD cars, scheduled by the Race Software, will race in scheduled heats until all PWD cars have raced once in each lane of the track.

v. The Race Track is equipped with an Electronic Finish Line that records the Official finishing order and the elapsed times (ET's) for each PWD car in a given heat, accurate to 0.001 seconds.

vi. In order to run in the proper group, all entries must be on time and registered before racing starts. (If a Scout is late, they MAY be able to run their heats with another group and have their times transferred manually. This is up to the discretion of the race officials)

### B. Official Elapsed Times Scoring System (your Pack's methods may vary)

i. Each PWD car will race once on each lane of the track for a total of 4 races.

ii. The elapsed time for each heat will be calculated for each PWD car.

- iii. All four race times will be tabulated by the software.
  - iv. The three cars from each Racing Group with the lowest combined Elapsed Times will be awarded Trophies for their Race Group
  - v. The top three finishers in each group will then qualify to compete in the Overall Grand Champion Round
  - vi. These qualifying cars will then race once in each lane of the track.
  - vii. The top four PWD cars from the Grand Champion Round with the lowest Elapsed Times will then be awarded trophies.
- C. It is important to remember that the PWD cars are NOT competing against each other in each Heat; they are racing against the clock.
- i. Please make your scouts aware of this so they understand the method.
  - ii. It is conceivable that a car may actually come in “first” in each heat and still not be fast enough to qualify for a trophy. This is because the PWD car may have only raced against the slower cars entered in their Race Group.
- D. Tiebreakers: At the end of all scheduled heats, should there be more than one PWD car that accumulates the same Elapsed Times (though not likely) based on the sum of all times accumulated, the race software will automatically apply tiebreaker calculations as follows:
- i. Total Points - The racer having the lowest total number of points will win this tiebreaker. Points are awarded to each racer based on how they finished in the heat (1st=1pt, 2nd=2pts, and so on). The racer with the least number of points will win this tiebreaker.
  - ii. Results Against Common Opponents - The racer having the better results against common opponents will win this tiebreaker. Each of the tied racer's total time against their common opponents are compared. For this rule to be applied, the number of common opponents needs to be greater than or equal to the number of track lanes, for better fairness.
  - iii. Strength of Schedule - The racer having stiffer competition will win this tiebreaker. Total times for each tied racer's opponents are compared. This tiebreaker will not work if every racer races every other racer in that group.

- E. Official dispute resolution: The decisions of the Race Officials are final.
- F. The following conditions will result in a given heat being re-run (examples, non-exhaustive list):
- i. **Timer or race software not reset and ready to process race results at the time the heat begins**
  - ii. **One or more cars are staged and then raced in the incorrect lanes, as scheduled by the race software**
  - iii. **Observed interference with the performance of one or more cars due to any objects on the track that were not seen and removed prior to the running of the heat, or thrown on the track during a heat.**
  - iv. **One or more cars touch, collide, rub, or otherwise interfere with other cars during the heat. Typically this happens as a result of a wheel coming off, or some other part detaching from the PWD car and interfering with another car.**
  - v. **If the car that interferes does not require extensive repair, the heat will be rerun immediately.**
  - vi. **If the car requires extensive repair, that heat will be rerun in rotation with the rest of the heats. Repairs will take place under the observation of the race crew.**
- G. The following conditions will not result in a given heat being re-run (examples, non-exhaustive list):
- i. **A car fails to reach the end of the track during a heat, and does not interfere with any other cars. The race software has the ability to calculate a heat where a PWD car does no finish (dnf). All dnf situations are accounted for within the timing system. (We do not wish for this to ever happen if possible. All suspect cars will be run down the track during the inspection process to insure that they are able to reach the end of the track. Adjustments to the car prior to being cleared for racing will be permitted and encouraged to insure that all cars perform well.)**
  - ii. **A car loses parts or pieces during a heat, but does not interfere with any other PWD cars. Repairs will take place under the observation of the race pits crew. Non-essential parts will not be put back on the PWD car such as drivers, windshields, graphics, etc.**



- iii. A car is run backwards as a result of design issues that prevent proper, fair staging of the PWD car for each heat.
- iv. A car is registered in the incorrect Race Group and then runs in heats with that race group. (Since we are running off of times only, the times will be manually transferred to the correct group)

### H. If there is a dispute or clarification request of any kind:

- i. Inspection officials will make a decision in an attempt to be as fair as possible to all participants.
- ii. Should a participant wish to appeal that decision, the event chairman reserves the right to deny the appeal on the basis of the decision of the inspection officials, or may choose to further discuss the matter in an attempt to better resolve the situation.
- iii. The person requesting the appeal agrees to accept the final decision regarding the matter as decided by the event chairman.
- iv. Registration and participation in this event constitutes verbal consent to the rules set forth in these documents, as well as the official rulings of event officials on the day of the event.
- v. The organizers of these events reserve the right to amend, adjust, omit, and further clarify any section of these documents as needed. Amendments to this document will be published accordingly in a timely fashion so as not to unfairly impact preparations for the event.

## Recognition

1. The most important values in Pinewood Derby competition are parent/scout participation, good sportsmanship and learning how to follow rules. The Awards Committee is responsible for recognizing and encouraging these qualities in addition to traditional racing awards.
2. Every participating Scout will receive a Pinewood Derby patch.
3. Medals/Trophies will be awarded to the first, second and third-place finishers in each division.
4. Additional awards will be made for various "appearance" categories.

## Themes

**A. Theme contest will be open to EVERYONE for competition and a single trophy will be awarded in each category.**

**B. The themes are:**

- i. **Patriotic**
- ii. **Boy Scout /Cub Scout Theme**
- iii. **Most Delicious**
- iv. **Non-Car design (Pool table, remote control, pirate ship, etc.)**
- v. **Funniest Design**
- vi. **Judges Favorite**

## Summary of Scout Rules

1. Maximum width including tires and axles must not exceed 2 3/4".
2. Minimum width of the body at the axles should be 1 3/4".
3. Maximum length must not exceed 7".
4. Some Pinewood Derby Tracks have a 1/4" high guide rail. Low hanging weights will often drag on the track. Bottom clearance should be 3/8" but will NOT be cause for disqualification.
5. The wheelbase (distance between the axles) must not exceed the distance between the precut axle slots on the standard pinewood block, i.e. 4 3/8". Shortening the wheelbase will be permitted.
6. All four wheels must be used, and all four must touch the track. No wheel shall ride upon the center guide strip. No extra guide pins, rollers or wheels designed to ride on or against the center guide strip will be allowed.
7. The car may not exceed 5 ounces as determined by the scale at the race.
8. Axles, wheels and body must be made from the official Cub Scout Grand Prix Pinewood Derby Kit, #17006. No store-bought preformed bodies.
9. The wheels may be lightly sanded or polished to remove bumps and blemishes. They must not be ground down, grooved, hollowed out, carved, cut, shaved or otherwise redesigned. Original ridges and raised letters must still be visible.
10. No magnet of any type will be allowed on any speed car
11. The race car may not be constructed or treated in such a way that the track's starting mechanism imparts momentum to the car. (For instance, this provision disqualifies cars with sticky substances on the front of the car and protrusions which may catch on the starting pin.) No part of the car may extend forward of the point where the car touches the starting post.
12. The wheels should be lubricated with graphite or powdered silicone. Oil and other liquid lubricants are prohibited.
13. Wheel bearings, washers, and bushings are prohibited.
14. The car must not ride on any kind of springs or suspension system, other than a suspension system that is actually carved from the pinewood block.
15. Loose materials are not allowed on the cars.
16. No moving or liquid weights are allowed.

## Open Race Rules

### Length, Width and Clearance

1. Maximum width including tires and axles must not exceed 2  $\frac{3}{4}$  "
2. Minimum width of the body at the axles should be 1  $\frac{3}{4}$  "
3. Maximum length must not exceed 7"
4. Bottom clearance should be  $\frac{3}{8}$ " but will NOT be cause for disqualification.
5. Extended and shortened wheel bases are allowed.
6. Any number of wheels may be used.
7. The car must not exceed 5 ounces as determined by the scale at the race.
8. BSA axles, wheels and body should be used but may be modified within this set of rules. Only dry lubricants should be used.
9. No liquids are to be used such as mercury or water.
10. Cars must be gravity powered ONLY. No motors, CO2 cartridges, propellers or other devices that impart momentum on the car.
11. Loose materials are not allowed on the car.
12. Any cars that do not meet these requirements MAY be eligible to race in the Modified Outlaw Race.

### Weight and Appearance

1. Weight shall not exceed 5 ounces. The reading of the official scale will be considered final. The car may be hollowed out and built up to the maximum weight by the addition of wood or metal only, provided the material is securely built into the body or firmly affixed to it. No liquids or loose materials of any kind are permitted in or on the car. (i.e.: mercury, water)
2. Details such as steering wheel, driver, spoiler, decals, painting and interior details are permissible as long as these details do not exceed the maximum length, width or weight specifications.
3. Cars with wet paint will not be accepted.

## Body, Wheels and Axles

1. Axles and wheels shall be only as provided in the Official Grand Prix Pinewood Derby Kit, anything BSA regulated that is available for purchase at the Tampa Bay Scout Store will be allowed.
2. You **MUST** use the block of wood provided. Purchasing pre-made bodies is **NOT ALLOWED**.
3. Wheels may be lightly sanded to smooth out molding imperfections on the tread area. This light sanding is the only modification allowed. Beveling, tapering, thin sanding, wafering or lathe turning of the wheels is prohibited.
4. Axles may not be altered in any way except for polishing.
5. Wheel bearings, washers, bushings are prohibited.
6. The car shall not ride on any type of springs.
7. The car must be free-wheeling, with no starting device or other type of propulsion. Gravity powered only.

## Lubrication

1. Only graphite or powdered Teflon "white lube" will be allowed for lubricating the wheels.
2. Lubrication is messy! On race day all lubrication must be done at the "lube" station.

**Note:** Any cars that do not meet these requirements **MAY** be eligible to race in the Modified Outlaw race.



## **Outlaw Race Rules**

- 1. Car weight must not exceed 12 ounces as determined by the scale at the race.**
- 2. No type of ignition system may be used – this includes gas engines and model rocket engines.**
- 3. Cars must fit on the track, on the starting pin and through the timing gate.**
- 4. Cars may not be designed to intentionally separate.**
- 5. Dry lubricants only may be used.**
- 6. Cars may not be designed to interfere with other cars on the track.**
- 7. No liquids are to be used such as mercury or water.**
- 8. Cars must be safe to race – race official's judgment is/are final.**
- 9. Modified wheels, axles, and wheel bases are allowable.**
- 10. Any number or type of wheels may be used.**
- 11. Loose materials are not allowed on the car.**

**Special Thanks to the Seminole District C.F.C. for the use of some of the materials in this Guide**