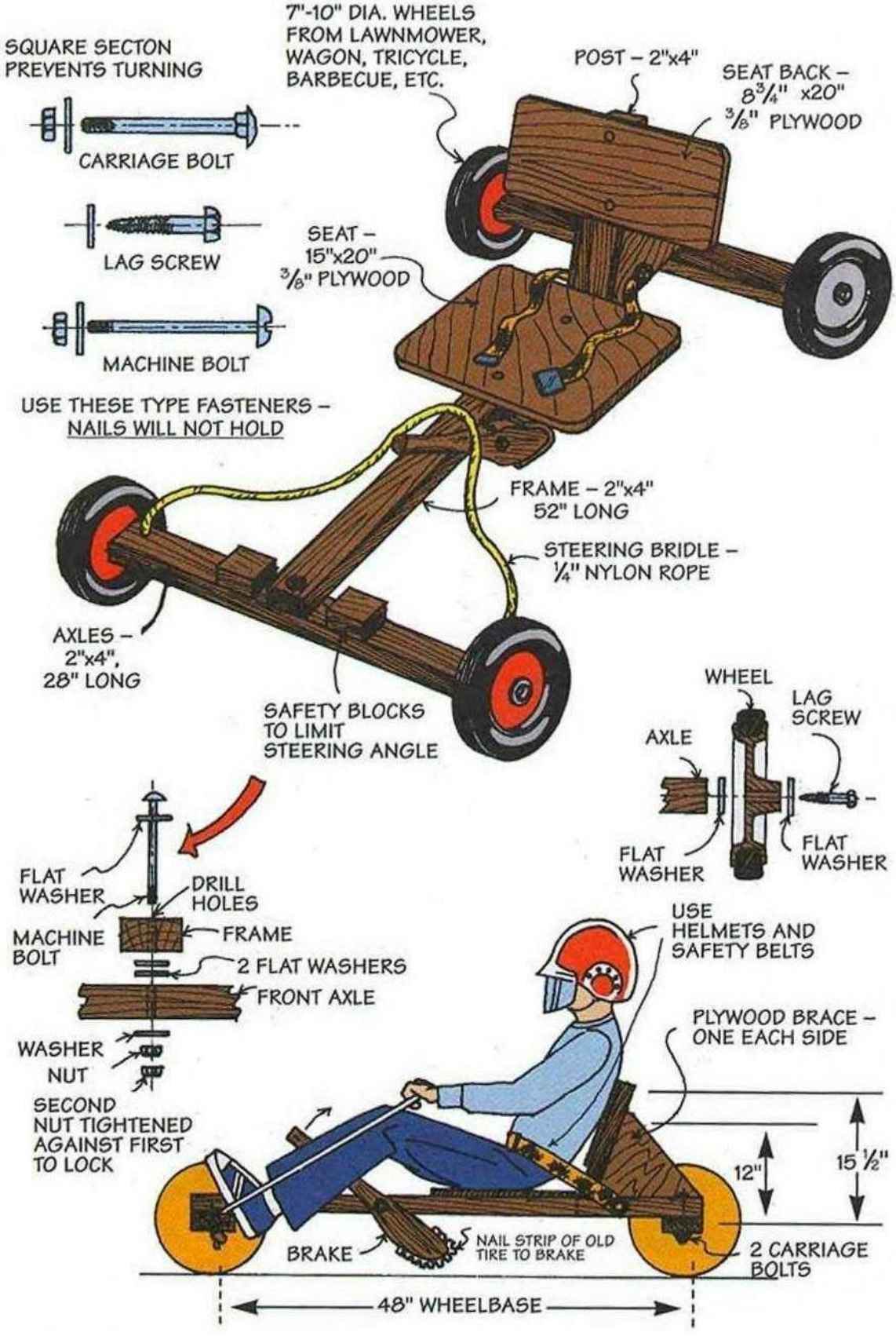
Schematic:


SQUARE SECTON PREVENTS TURNING
7"-10" DIA. WHEELS FROM LAWNMOWER, WAGON, TRICYCLE, BARBECUE, ETC.
POST – 2"x4"
SEAT BACK – 8¾" x20" ⅜" PLYWOOD
CARRIAGE BOLT
LAG SCREW
SEAT – 15"x20" ⅜" PLYWOOD
MACHINE BOLT
USE THESE TYPE FASTENERS – NAILS WILL NOT HOLD
FRAME – 2"x4" 52" LONG
STEERING BRIDLE – ¼" NYLON ROPE
AXLES – 2"x4", 28" LONG
SAFETY BLOCKS TO LIMIT STEERING ANGLE
WHEEL
LAG SCREW
AXLE
FLAT WASHER
FLAT WASHER
FLAT WASHER
DRILL HOLES
MACHINE BOLT
FRAME
2 FLAT WASHERS
FRONT AXLE
WASHER
NUT
SECOND NUT TIGHTENED AGAINST FIRST TO LOCK
USE HELMETS AND SAFETY BELTS
PLYWOOD BRACE – ONE EACH SIDE
12"
15 ½"
BRAKE
NAIL STRIP OF OLD TIRE TO BRAKE
2 CARRIAGE BOLTS
48" WHEELBASE

Supplies and Tools Needed:

Quantity	Description	Tools you will need
4	8" wheels	Power drill
1	2'X4' 3/8" or 1/2" plywood	3/8" and 5/16" wood bit
2	8' 2X4's	Wrenches or socket set
1	2"X2" surveyor's stake	Screwdriver
4	3/8" X 6" lag screws (for wheels)	Tape measurer
1	3/8" X 4" hex bolt (for front axle)	Wood glue
1	3/8" X 4" lag screw (for brake)	Power or hand saw
2	5/16" X 4" carriage bolts (for rear axle)	
13	3/8" washers	
1	3/8" lock nut	
2	5/16" washers	
2	5/16" lock washers	
2	5/16" nuts	
32	#6 X 1 1/2" wood screws	
4	#6 X 2" wood screws	
1	6-7' 1/4" rope	
1	seat belt (from salvage yard)	
1	2" X6" piece of rubber (from old tire)	

Important Rules:

1) Car frame must be made from 2 x 4 lumber
2) Wheels must have solid rubber tires (no inflatable tires)
3) Maximum wheel diameter: 10 inches
4) Maximum length of the car: 5 feet
5) Maximum wheel base: 4 feet.
6) All cars must have a seat with braced backrest as well as a rope fastened to the front axle, so the Scout can comfortably steer with both his feet and hands
7) Seats must be equipped with a strong safety belt securely fastened to the main frame of the car
8) Cars must be equipped with a handbrake, with its rubbing surface faced with a rubber material such as a strip of an old tire
9) No extra weight may be placed on the Cubmobile
10) For the Scout's safety, they must wear long pants, a long sleeve shirt, shoes that completely cover the feet, and a bike helmet.

Hints:

1) Use roundhead 1/4-inch bolts to hold frame. Screws are a second choice. Nails are not suitable, because they may work lose.
2) If threaded axles are used, the nuts should be secured with cotter pins or wire to keep them from working lose
3) During a race, the two 2-by-4-inch blocks fastened 1/4 to 1/2 inch from the centerboard will limit the turning radius for safety. It is very important to test this before the race!

Step-By-Step Instructions:

1) Cut one 2 X 4 52" for main frame.
2) Cut two 2 X 4's 28" for axles.
3) Make an "X" on each end of each axle, and drill a hole at each "X" intersect, 6" deep using a hand electric drill (5/16" wood bit works well).
4) On front axle 2 X 4:
   a) Drill a 5/16" hole on each end near the back for the rope.
   b) Drill a 3/8" hole at center of 2 X 4.
   c) Attach (2) 2 X 4 blocks to front axle, on either side, 2-1/8" from center hole, use glue and #6 X 2" screws; this will limit steering, for safety purposes.
5) At front of main frame 2 X 4, drill a 3/8" hole (center 1-5/8" from front)
6) Attach front axle to frame using 3/8" X 4" hex bolt, 4 washers, and lock nut or 2 nuts (tighten enough to allow steering)
7) Align back axle 2 X 4 at right angle with back of main frame 2 X 4, clamp if possible. Drill (2) 5/16" holes through axle and main frame. Attach main frame to back axle using 2 carriage bolts, 2 washers, 2 lock washers, and 2 nuts. If this is to be a permanent attachment, also glue.
8) Cut out seat and back rest from plywood.
9) Cut one 2 X 4 12-14" in length for back rest support (bevel slightly about 5 degrees if possible).
10) Attach back rest support (bevel end down) to main frame using glue and 2 screws (#8...2-1/2") at an angle. Position of this support depends on size of boy, have scout sit on 2 X 4 frame to estimate position.
11) Cut out 2 triangular shaped pieces of plywood and attach to either side of backrest support and main frame with glue and screws (#6 1-1/2"); drilling a small pilot holes helps.
12) Attach seat and back rest using glue and screws (#6...1-1/2").
13) Cut 2 X 2 surveyor's stake to 14-16" at an angle, cover end with rubber using nails, drill a 3/8" hole through stake at location it will meet main frame.
14) Drill hole 5/16" into main frame at point to attach brake. Mount brake using 3/8" X 4" lag screw and washer to side of main frame.
15) Drill and attach seat belt with fasteners of choice.
16) Attach 6-7' of 1/4" rope to front axle as shown.
17) Attach wheels using washers and 3/8" X 6" lag screws. (Socket wrench helps)