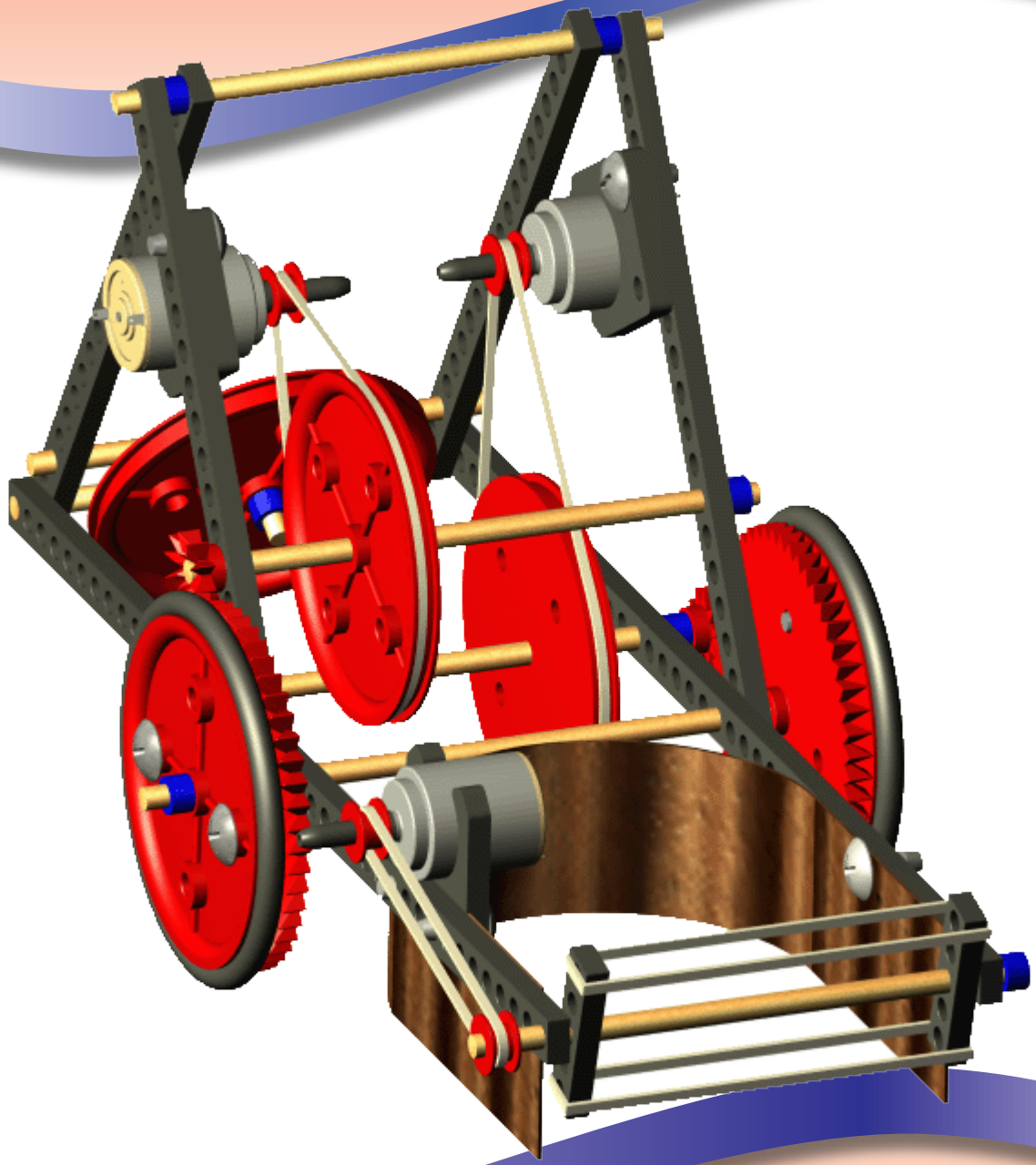
Kick-Bot

Assembly and Competition



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Individual Kick-Bot Parts List

Note: Only Sold in 10-Packs

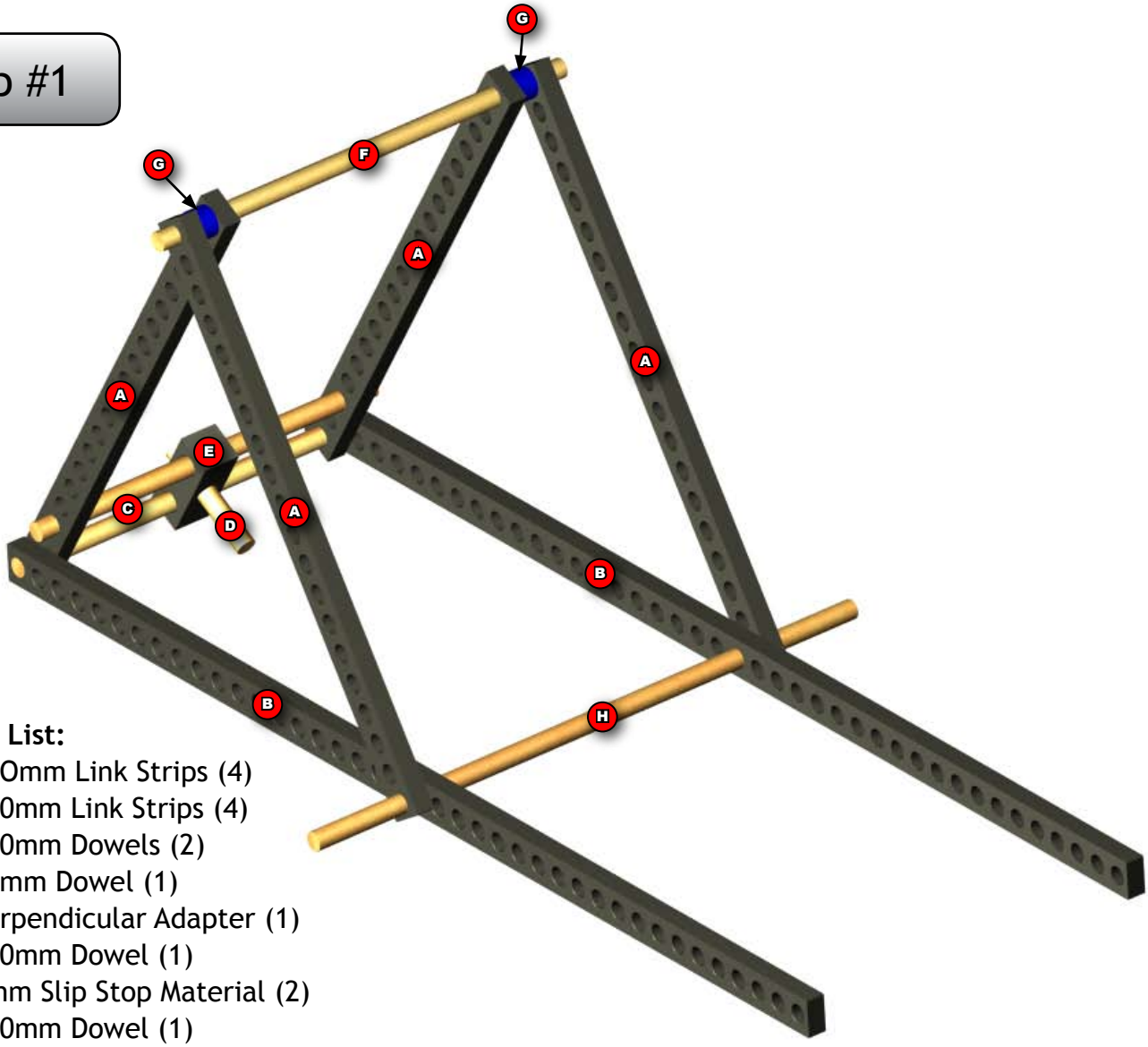
Part Description	QTY	Picture
Long Link Strips	2	
Short Link Strips	10	
Perpendicular Adaptors	3	
Long Adaptor Pins	4	
Rubber Bands	5	
10mm Pulleys	4	
70mm Pulleys	7	
10 Tooth Gears	2	
50 Tooth Gears	2	
Cardboard Sheets	3	
8 Conductor Flat Stranded Wire	2 feet	
8P8C Modular Plug	1	

Part Description	QTY	Picture
Motor Holders	3	
Motors 3-6v	3	
#12 Screws	10	
Slide Stop Material (Could be Blue or Black)	1/2 Foot	
70mm Tires	2	
Galvanized Wire	1/10 Roll	
Dowels	5	

Additional Equipment Needed	
Part Description	**QTY**
TeacherGeek **Easy Engineering Tool Pack** Ten Pack: # TG243-Q10	1
Total Controller 2.0 # TG302	2
Kick-bot Arena # TG104-KBA	1

Kick-Bot Assembly

Step #1



Parts List:

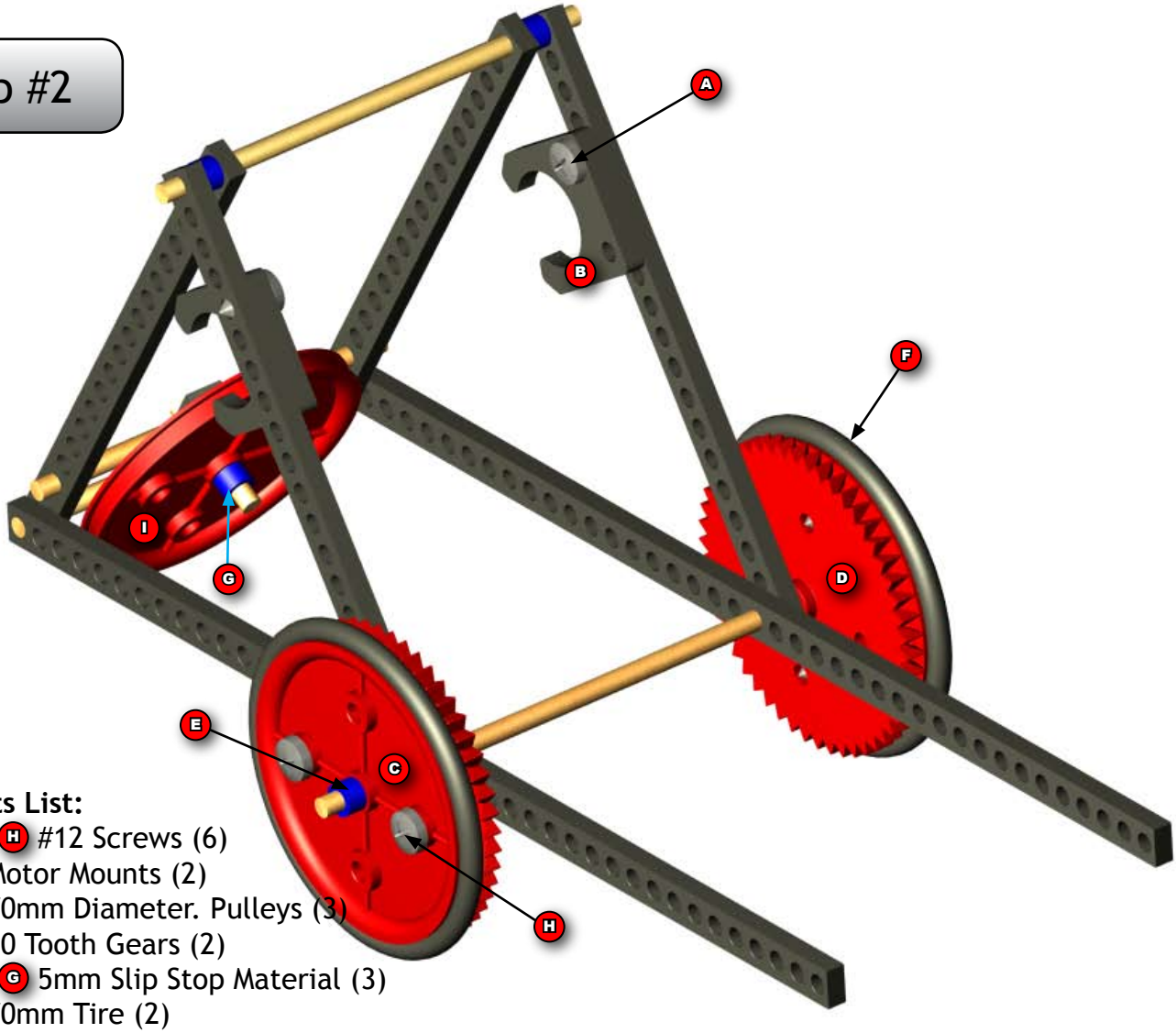
- A 150mm Link Strips (4)
- B 300mm Link Strips (4)
- C 100mm Dowels (2)
- D 30mm Dowel (1)
- E Perpendicular Adapter (1)
- F 120mm Dowel (1)
- G 5mm Slip Stop Material (2)
- H 160mm Dowel (1)

Assembly Instructions:

1. Layout the horizontal link strips B as shown.
2. Insert Dowel H leaving 90mm between the horizontal link strips.
3. **Make subassembly C D E**
   - a. Slide the perpendicular adapter E onto the 100mm dowels C
   - b. Insert the 30mm dowel D into the perpendicular adapter E as shown
4. Connect the 150mm link strips A to subassembly C D E
5. Insert the lower 100mm dowel C to the horizontal link strip B
6. Form two triangles using the remaining 150mm link strips A be sure to insert the slip stop material between the two 150mm link strips

Kick-Bot Assembly

Step #2



Parts List:

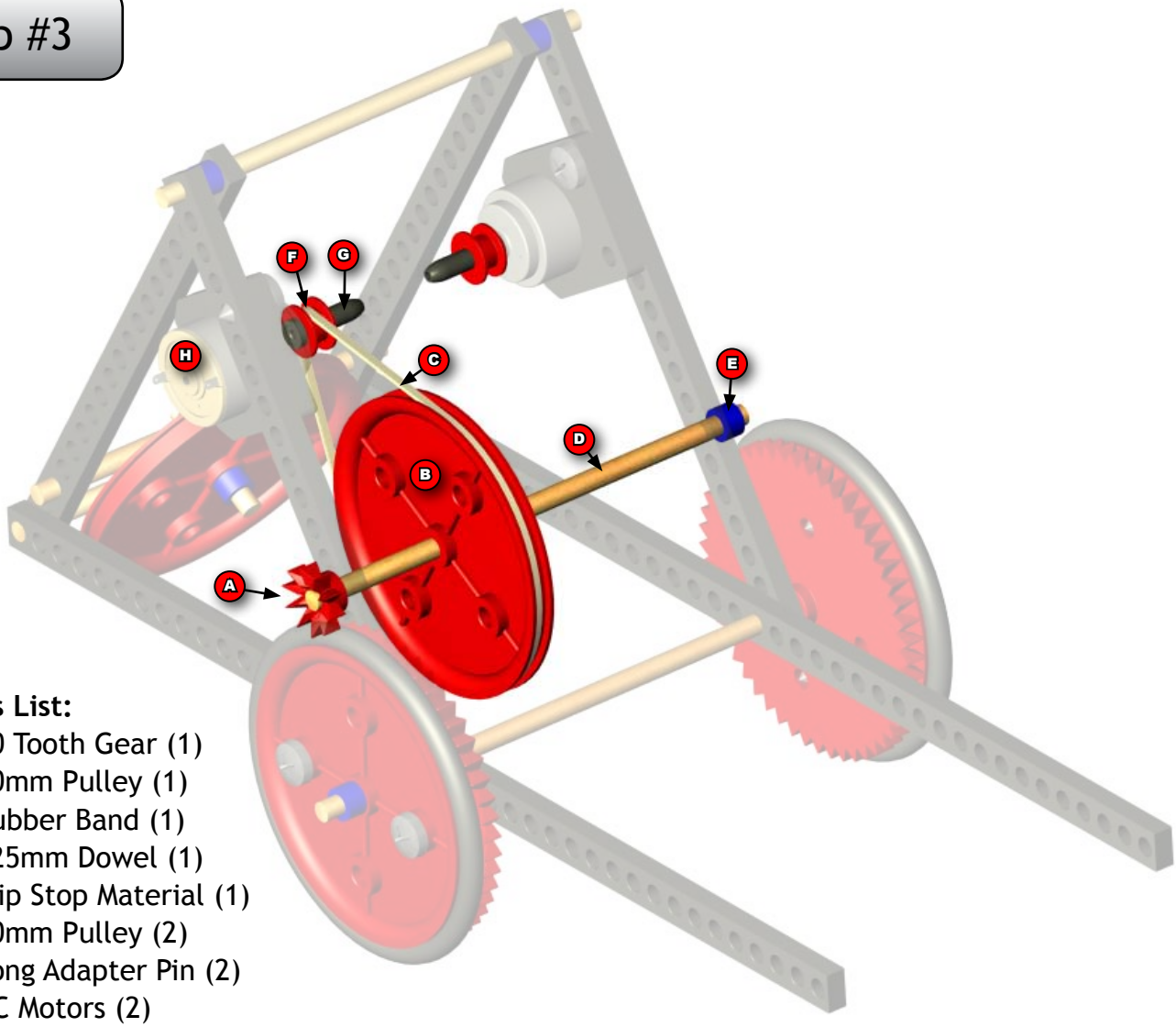
- A & H #12 Screws (6)
- B Motor Mounts (2)
- C 70mm Diameter. Pulleys (3)
- D 50 Tooth Gears (2)
- E & G 5mm Slip Stop Material (3)
- F 70mm Tire (2)
- I Rear sliding wheel

Assembly Instructions:

1. Make Gear-Wheel Assemblies (2)
   - a. Snap the 70mm Tire F onto the 70mm Pulley C
   - b. Fasten the wheel assemble to the 50 tooth gear D using two #12-1/2” Screws H
   - c. Ream the center hole of the assembly using a loose fit reamer.
2. Slide the Gear-Wheel assembly onto the dowel as shown above. It should rotate freely.
3. Press the slip stop material E onto the dowel.
4. Fasten the motor mounts B using #12-1/2” Screws.
5. Ream 70mm pulley I using the loose fit reamer.
6. Place the 70mm Pulley I onto the bearing block using a 5mm section of slip stop material.

Kick-Bot Assembly

Step #3



Parts List:

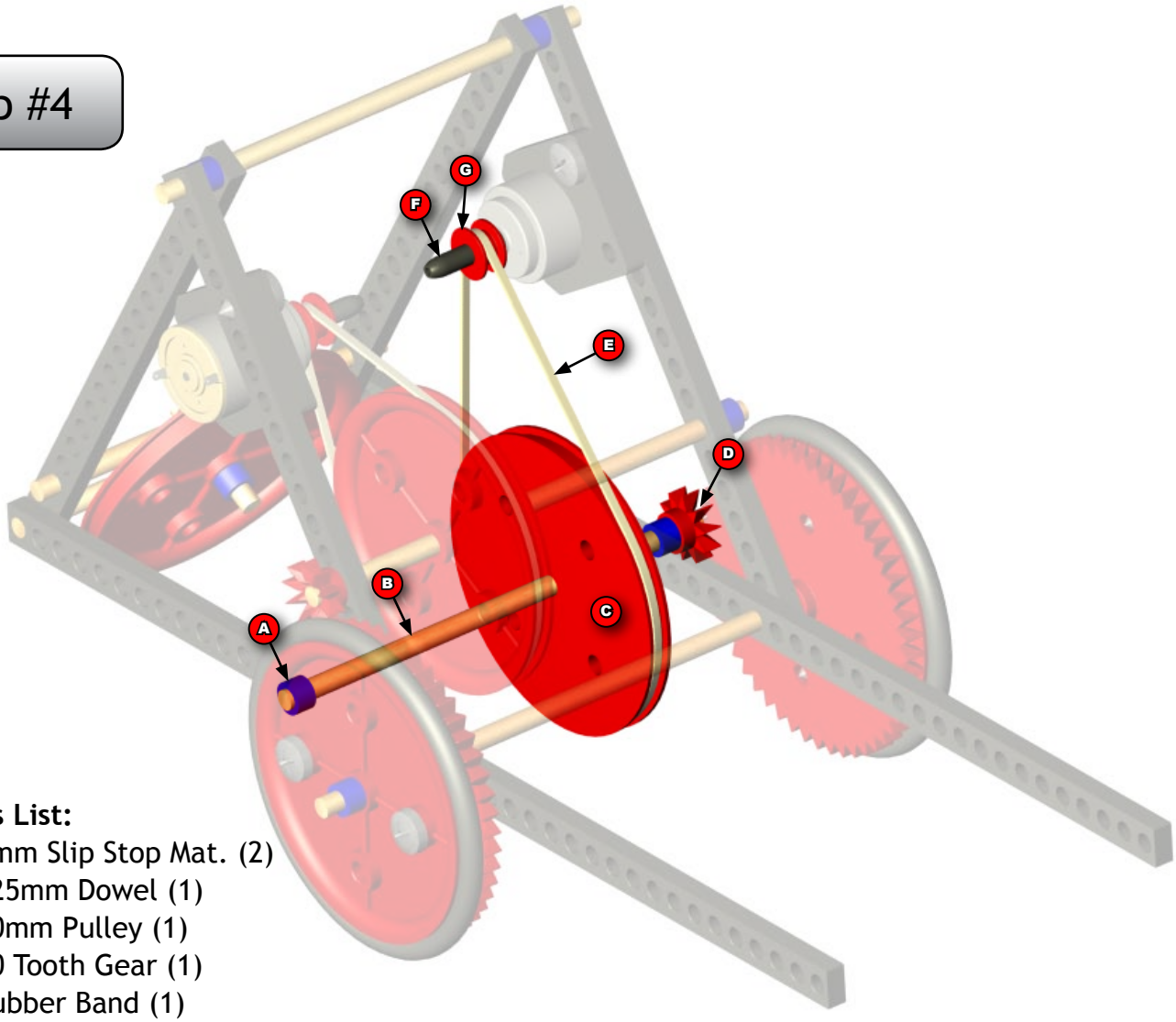
- A 10 Tooth Gear (1)
- B 70mm Pulley (1)
- C Rubber Band (1)
- D 125mm Dowel (1)
- E Slip Stop Material (1)
- F 10mm Pulley (2)
- G Long Adapter Pin (2)
- H DC Motors (2)

Assembly Instructions:

1. Insert DC Motors H into motor holders.
2. Press adapter pin G onto the shaft of the motor.
3. Push 10mm pulley F onto the adapter pin G.
4. Use Loose Fit Reamer to ream both holes in link strips to allow dowel D to rotate freely.
5. Place the 10 tooth gear A onto dowel D
6. Slide 70mm pulley B onto dowel D
7. Stretch rubber band C between pulley B and pulley F
8. Press slip stop material E onto dowel D to prevent the axle from moving from side to side.

Kick-Bot Assembly

Step #4



Parts List:

- A 5mm Slip Stop Mat. (2)
- B 125mm Dowel (1)
- C 70mm Pulley (1)
- D 10 Tooth Gear (1)
- E Rubber Band (1)
- F Long Adapter Pin (1)
- G 10mm Pulley (1)

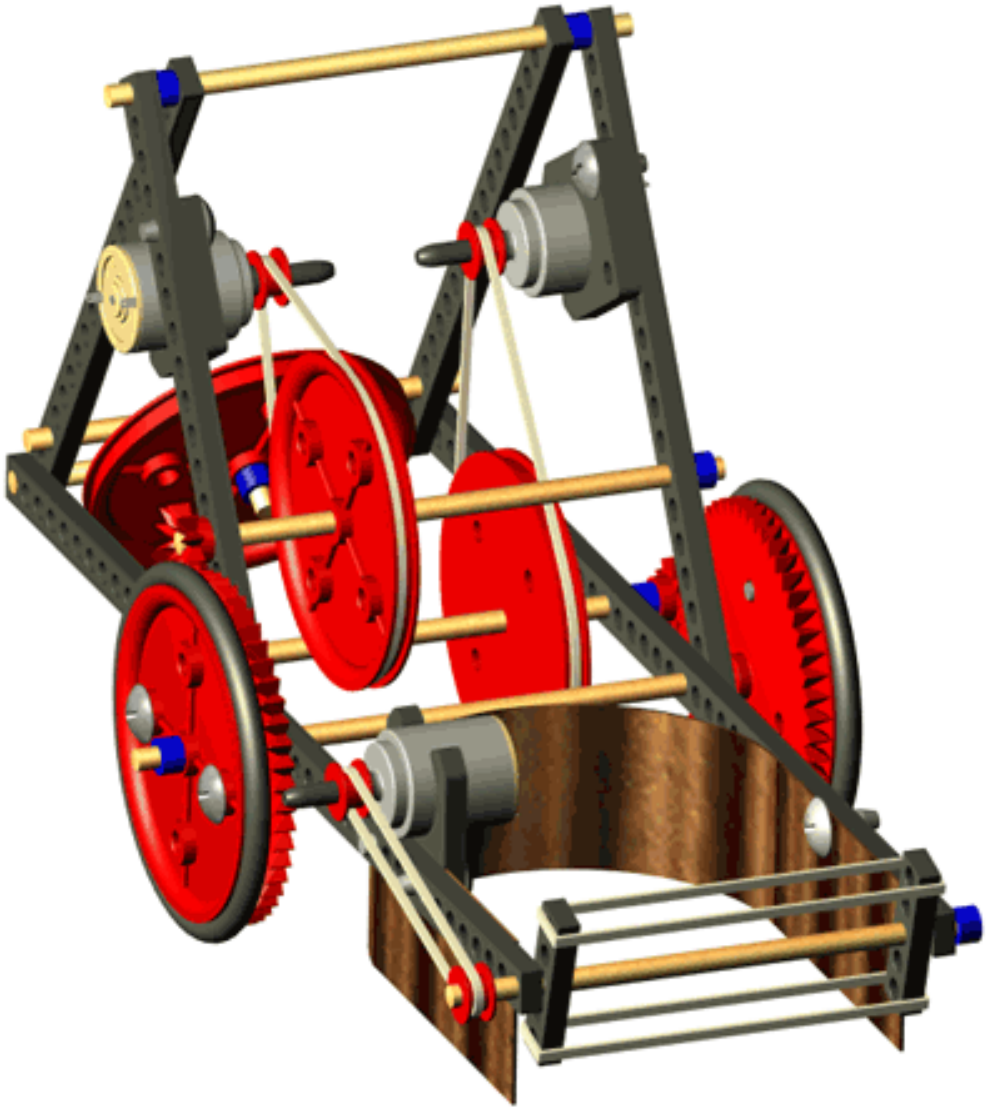
Assembly Instructions:

1. Repeat instructions from the previous page to complete the assembly. Be sure to place the extra piece of slip stop material between the 10 tooth gear and the link strip.
2. Testing and Troubleshooting:
    - a. Check for proper alignment of the rubber bands
        If not, move the 70mm pulleys to properly align rubber bands.
    - b. Do all wheels and axles rotate freely?
        If not, try reaming the holes again and checking for proper frame alignment.
    - c. Compare your Kick-Bot to the one on the cover page. Is is the same?

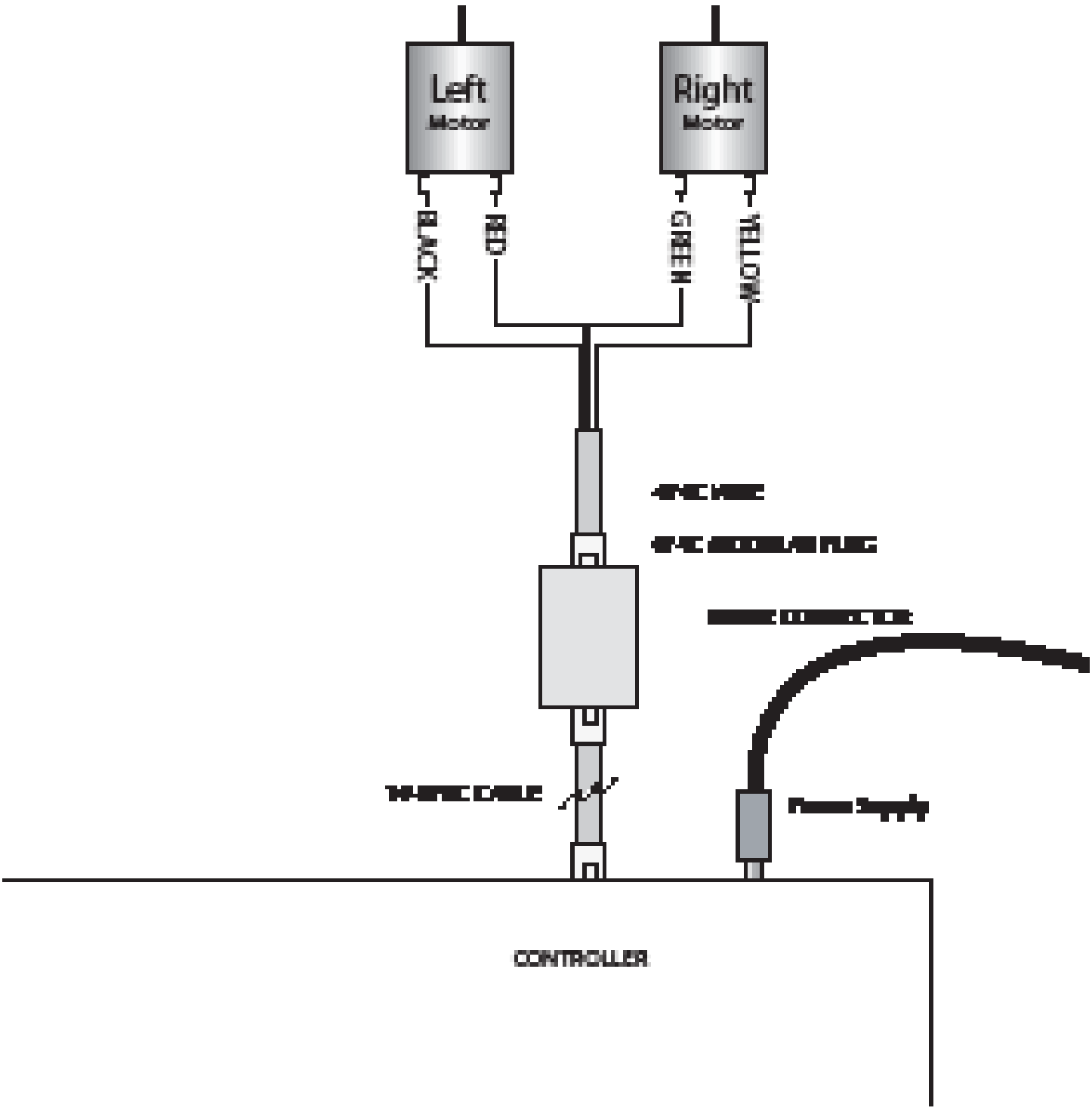
Kick-Bot Assembly

Step #5

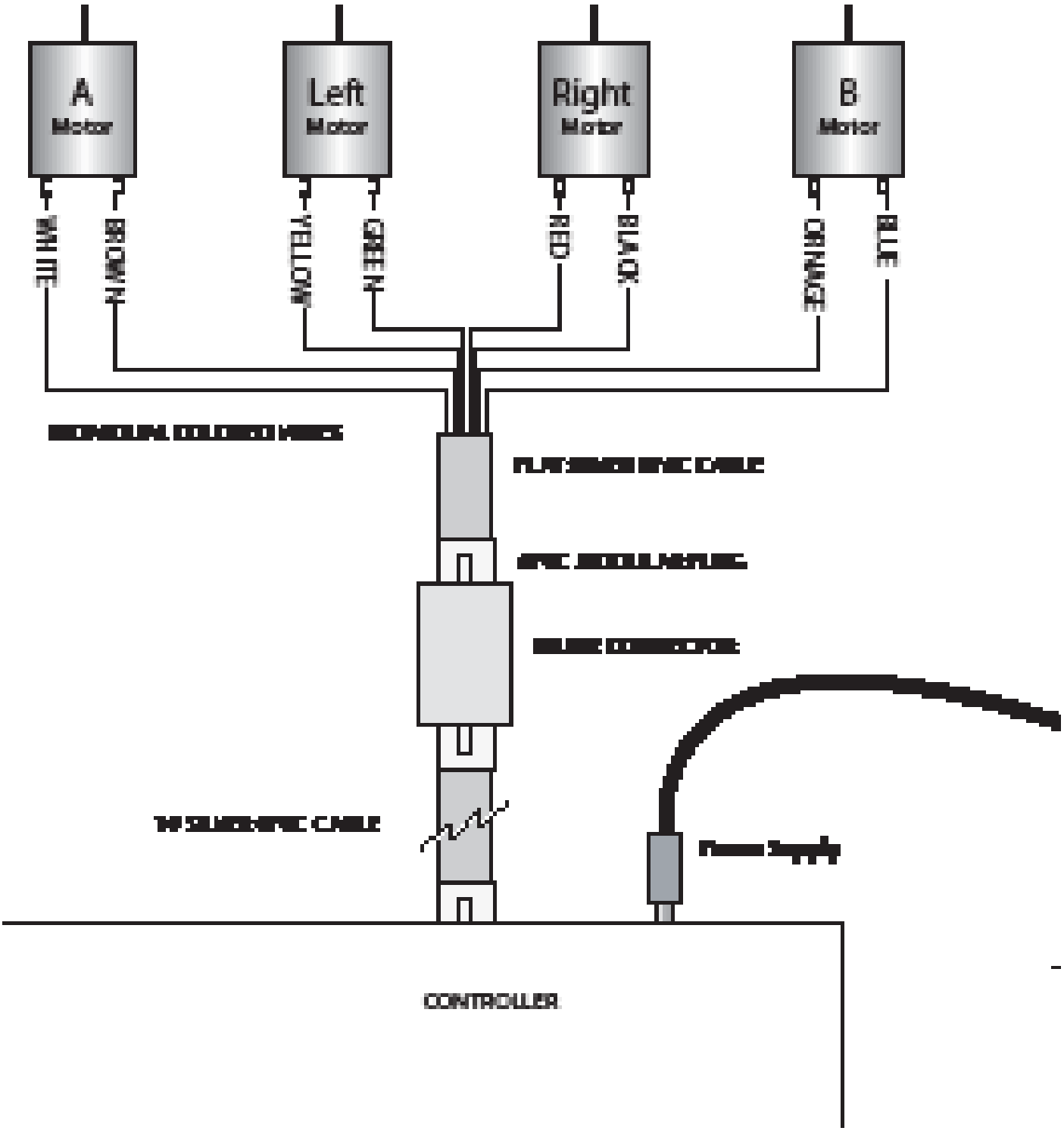
Use your creativity to finish the front of your kick-bot. You could make a plow, ball kicker, ball grabber, or any other mechanism to help you win the kick-bot competition.



WIRING DIAGRAM FOR 2 MOTORS USING 4P4C [TELEPHONE] WIRE AND PLUGS

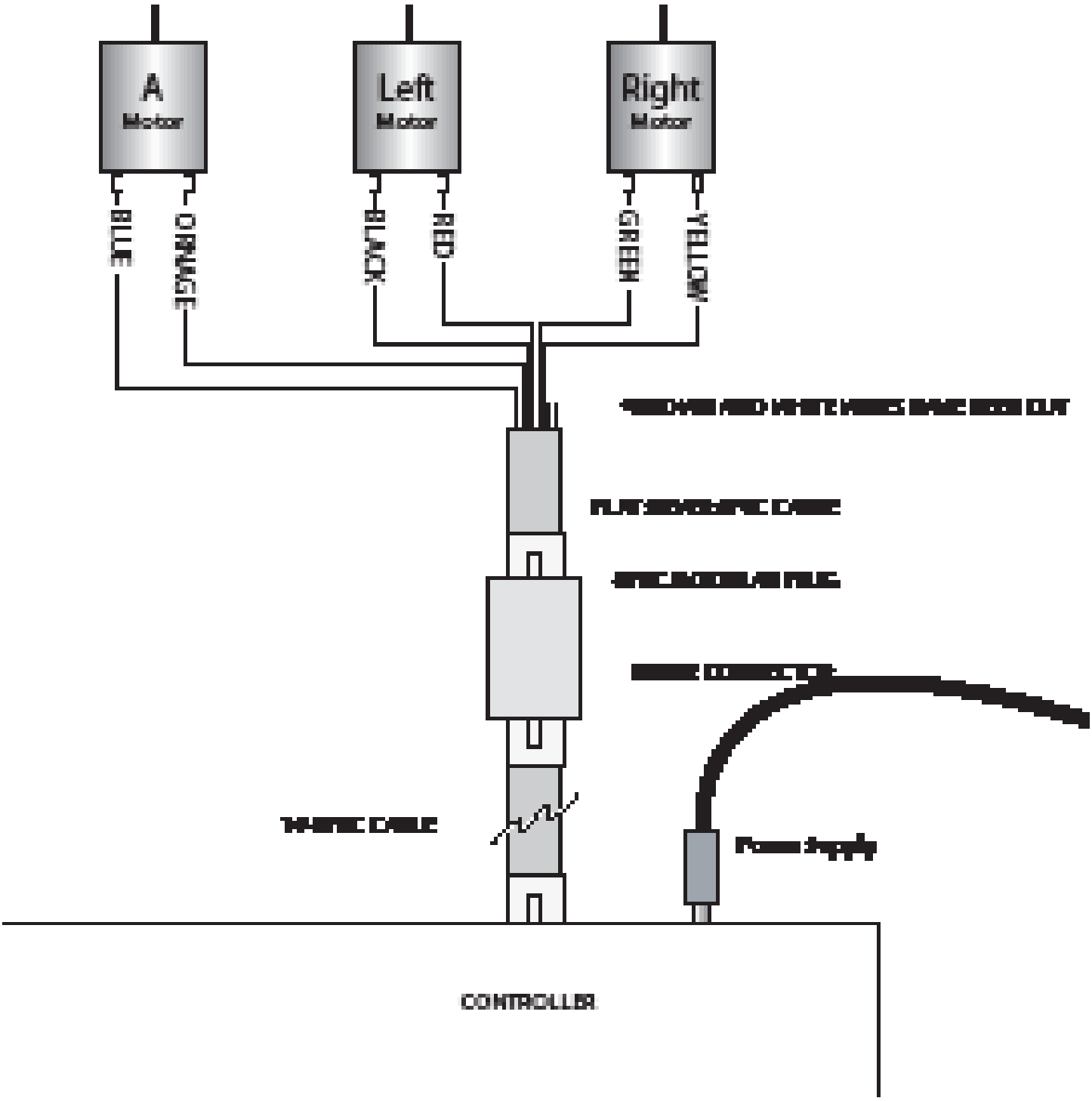


Wiring Diagram for 4 Motors Using 6Pin Wire and Plugs



Kick-Bot Assembly

Wiring Diagram for 3 Motors Using 4-Pin Wire and Plugs



Kick-Bot Competition

The Challenge

Design and build a vehicle to successfully compete in a Kick-Bot Competition.

The Competition

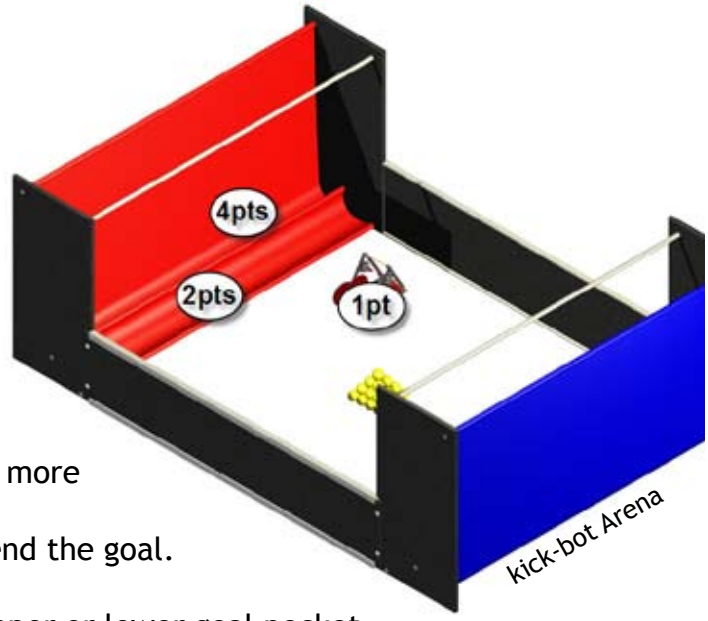
When the competition starts, two Kick-Bots and a pyramid of 14 balls sit on the arena floor. Each team must turn these balls into points by placing them into their opponent's goal, or gathering them inside their vehicle.

The team with the most points at the end of a 2 minute match is declared the winner. If teams score an equal number of points, the team with the colored "tie breaking" ball on their side is declared the winner. (Ball colored with a marker)

The Arena

A 5'x5' playing field with 2 goals on opposing sides.

Points:
Balls placed in a lower goal pocket are each worth 2 points. Balls placed in an upper goal pocket are each worth 4 points. Balls contained within a Kick-Bot vehicle, and off the arena floor, are each worth 1 point.



kick-bot Arena

Design Ideas

- A plow to gather balls and push them into the opponents lower goal pocket
- A gear/pulley configuration to give the Kick-Bot more speed or power.
- A barrier that deploys from the Kick-Bot to defend the goal.
- A mechanism to sweep balls into the Kick-Bot
- A mechanism to kick balls into the opponents upper or lower goal pocket
- A mechanism to gather and retain balls until they are kicked or pushed into a goal.

Design Criteria

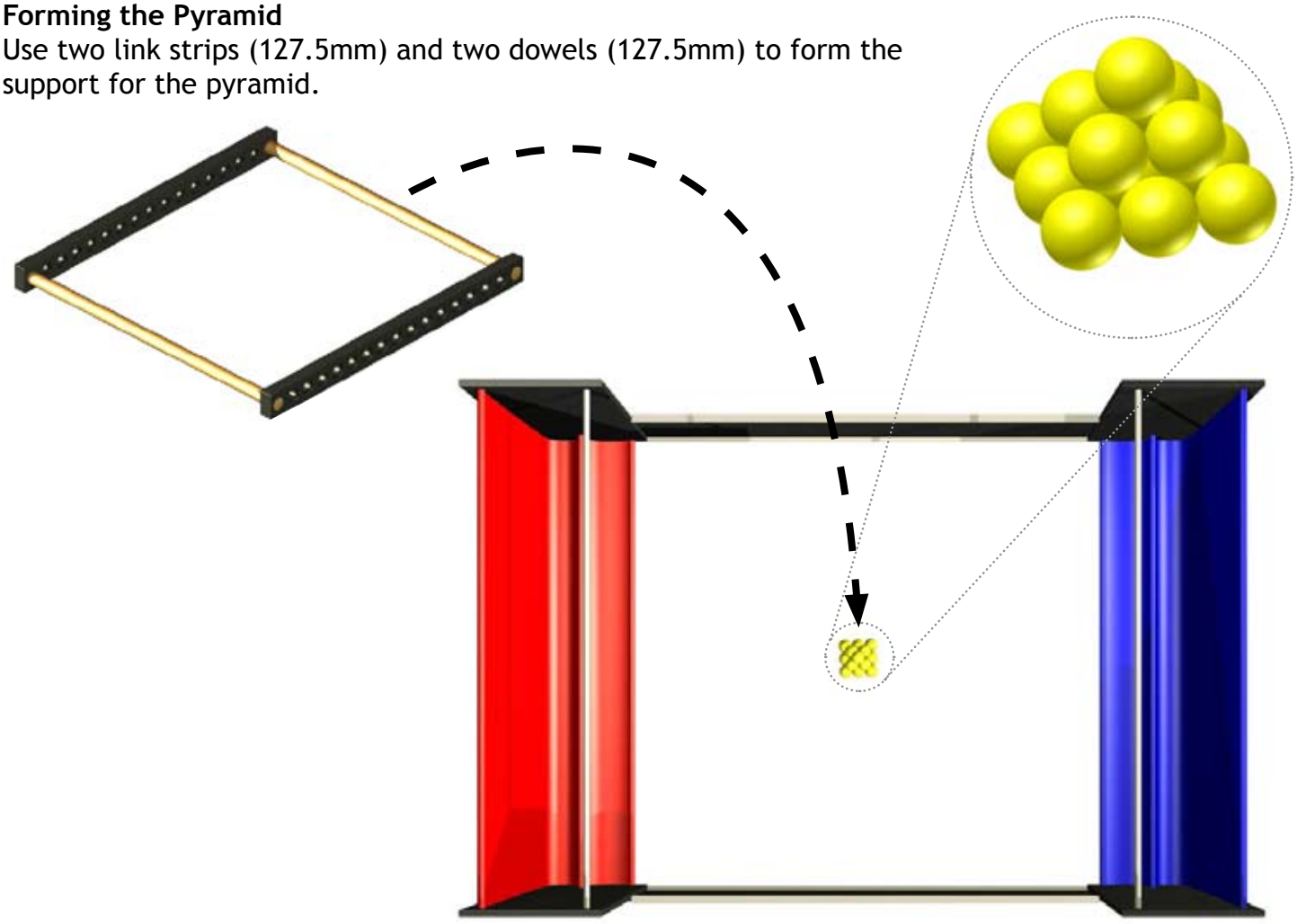
- Kick-Bots must be able to fit within a 1'x1'x2' box at the beginning of the competition. Kick-bots may unfold beyond their initial dimensions.
- Kick-Bots may not use any material, or have any mechanisms that could be considered potentially hazardous.
- Kick-Bots may not alter the arena.
- Kick-Bots may not intentionally tip over or damage the opposing vehicle.
- Kick-Bot vehicles must be entirely remote controlled. During the competition, humans may only touch the Kick-Bot to fix technical problems.
- Tether lines should be held above the Kick-Bots during a competition. Tether lines may not be used to pull a Kick-Bot or impede an opposing Kick-Bot.
- Balls that have exited the arena should be placed back in the center of the playing field.

Kick-Bot Competition

Setting Up The Kick-Bot Arena

Forming the Pyramid

Use two link strips (127.5mm) and two dowels (127.5mm) to form the support for the pyramid.



How to Keep Score:

Balls placed in a lower goal pocket are each worth 2 points. Balls placed in an upper goal pocket are each worth 4 points. Balls contained within a Kick-Bot vehicle, and off the arena floor, are each worth 1 point. Follow the steps listed below to score Kick-Bot matches.

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
21	Red	Nuts	2 2 2 2 2	4	1 1 1	17	
	Blue	Bolts	2 2	4 4 4 4 4	1	25	X

1. Write the number of each match here.
2. This indicates each team's side of the arena.
3. Write the names of both teams here
4. Write a 2 in the box for each ball that lands in the lower pocket
5. Write a 4 in the box for each ball that lands in the Upper pocket
6. Write a 1 in the box for each ball that is inside of each vehicle. (Balls touching the ground do not count)
7. Add the points from the lower, upper, and vehicle. Place the total in this box
8. Place an X in the box of the team that won the match.

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Kick-Bot Competition

Kick-Bot Competition Score Sheet

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Match #	Sides	Team Names	Balls in Lower Pocket	Balls in Upper Pocket	Balls in Vehicle	Total Score	Winner
	Red						
	Blue						

Holding a Kick-Bot Competition Tournament:

Kick-Bot Competitions are high energy, action packed events. The following steps will guide you through process of organizing a Kick-Bot Competition.

1. Write all team names on separate index cards. Shuffle these cards and then place them in a container
2. Randomly pull two index cards to determine the players in each match. When the match is finished, place the index cards in a separate bin.
3. Use the score keeping sheet to determine the total points scored by each team.
4. Place total scores on a white board, chalk board, or poster board.
5. Allow every team to compete the same number of times. You may decide how many matches are appropriate based on the amount of time you have allotted.
6. Add match scores together to determine the total score for a team.
7. The team with the highest number of points is declared the winner. Second highest point value receives second place. Third highest point value receives third place.

