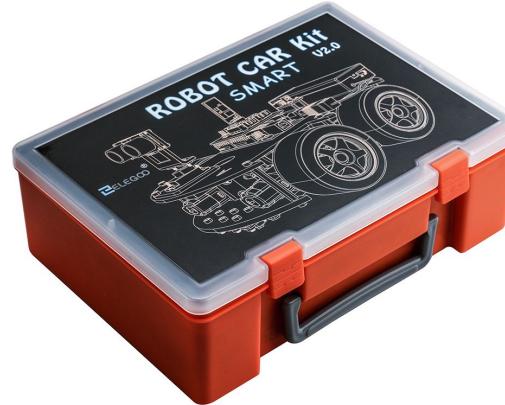


Elegoo Robot Build Instructions

5th and 6th Grade 6 Week Robotics Course
YEAR 1

Step 1: Take Inventory



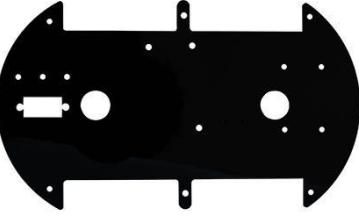
- Take every part out of the kit.

WARNING: Don't take the screws out of the individual bags. They are packaged by step.

- Mark off each part from the Inventory list as you take it out.
- Let a mentor know if you are missing a Part.

TIP: DC Connector is in the Cell Box

Chassis

	QTY	Name and Function
	1	<u>Base Plate</u> - Allows for mounting of Motor Units, Motor Controller Board, and Line Trackers
	1	<u>Top Plate</u> - Allows for mounting of Arduino UNO, Sensor Board, Battery Box, and Servo

TIP: You may take the brown protective cover off of the base plate and top plate if you wish. You won't be able to after mounting components.

Mechanical System

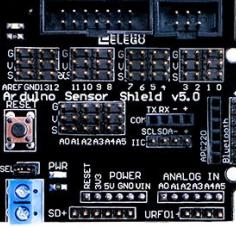
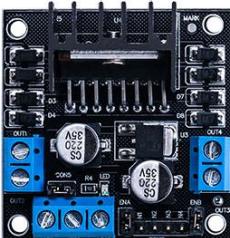
	QTY	Name and Function
	4	<u>Motor Unit</u> - Contains motor and gearbox, Allows car to move
	4	<u>Wheels</u>

	QTY	Name and Function
	4	<u>Motor Mounting Plates</u> - Attaches Motor Unit to Chassis

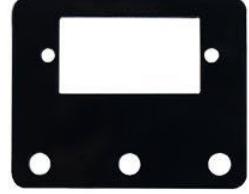
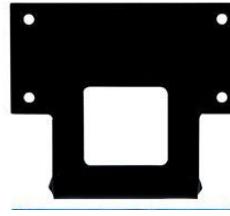
Power Supply

	QTY	Name and Function		QTY	Name and Function
	2	<u>Rechargeable Batteries</u>		1	<u>DC Power Supply</u> - Provides power to Arduino UNO
	1	<u>Battery Charger</u>			
	1	<u>Battery Box</u> - Houses Batteries on the robot			

Control System

	QTY	Name and Function		QTY	Name and Function
	1	<u>Arduino UNO</u> - The brains of the robot, receives, processes, and sends signals through input and output pins		1	<u>USB Cable</u> - Used for programming the robot
	1	<u>Sensor Board</u> - Allows for more inputs and outputs		1	<u>Ribbon Cable</u> - Individual wires used for connecting sensors and boards * Wires can be separated*
	1	<u>Motor Controller Board</u> - Communicates with the motors. It has inputs that control motor speed and direction.		1	<u>Bluetooth Board</u> - Allows for wireless communication with the robot using bluetooth

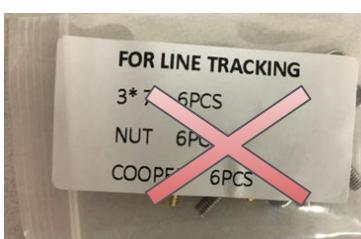
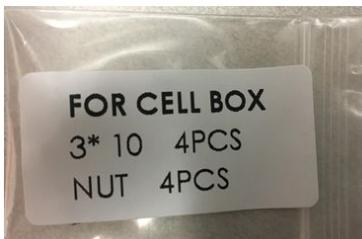
Sensors- Not Used for Year 1

	QTY	Name and Function		QTY	Name and Function
	3	<u>Line Trackers</u> - Recognizes reflective surfaces and nonreflective surfaces.		1	<u>Servo</u> - Rotates to a designated position, Used to move ultrasonic sensor back and forth
	1	<u>Ultrasonic Sensor</u> - Detects objects and measures distances using sound waves		1	<u>Servo Mount</u>
	1	<u>Ultrasonic Sensor Mount</u>		3	<u>Line Tracker Wires</u>

Sensors- Not Used for Year 1 MISC- Not Used

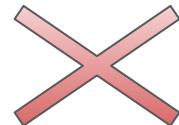
	QTY	Name and Function		QTY	Name and Function
	1	<u>IR (Infared Sensor)</u> - Allows for IR wireless communication		1	<u>Elegoo Instructions CD</u> - *We have modified and added to the Elegoo Instructions. Use at risk*
	1	<u>IR Remote</u> - Can be used with the IR Sensor to control the robot.			
	1	<u>IR Wire</u> *Longer than Line Tracker Wires*			

Hardware



WARNING: Don't take the screws out of the individual bags. They are packaged by step.

Not Used for Year 1



Step 2: Charge the Battery

The Batteries in the kits are not charged

- Place Batteries in the Battery Charger and plug into wall outlet
- It will take 2-3 hours to fully charge

WARNING: Be sure to line up the + on the charger to the + on the battery.

TIP: Battery Charger Lights

BLUE if batteries are inserted correctly and NOT plugged into wall

RED when batteries are inserted correctly and plugged into wall

BLUE again when batteries are fully charged, inserted correctly, and fully charged

Step 3: Attach Mounting Plates to Gearboxes

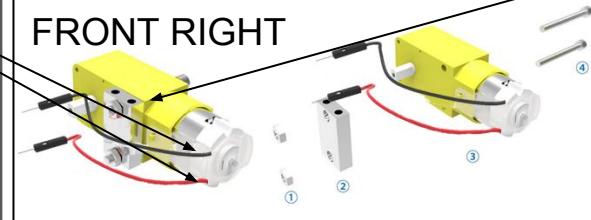
- Attach the metal mounting plates to the yellow gearboxes

WARNING: Pay attention to the orientation of the holes on the metal mounting plates and the positioning of the black and red wires.

FRONT LEFT



FRONT RIGHT



BACK LEFT



BACK RIGHT



- ① M3 nut
- ② Aluminium Block
- ③ DC speed motor
- ④ M3 hex screws 3*30mm



Motor Units Setup

WARNING: The motors look the same, but they are different.

All motors (silver portion) face away from the center of the robot.

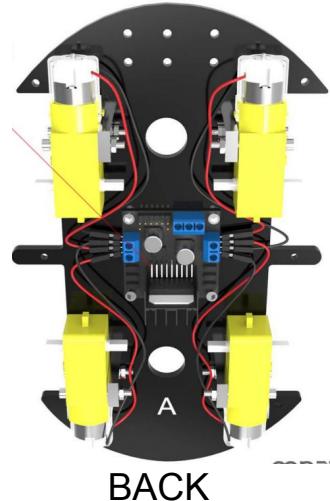
FRONT - Red wires on top

BACK -- Black wires on top.

FRONT

(NOTICE THE 3 SETS OF HOLES)

LEFT

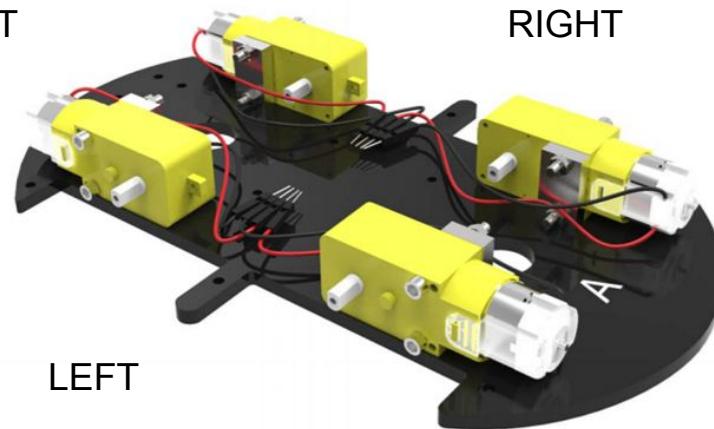


FRONT

RIGHT

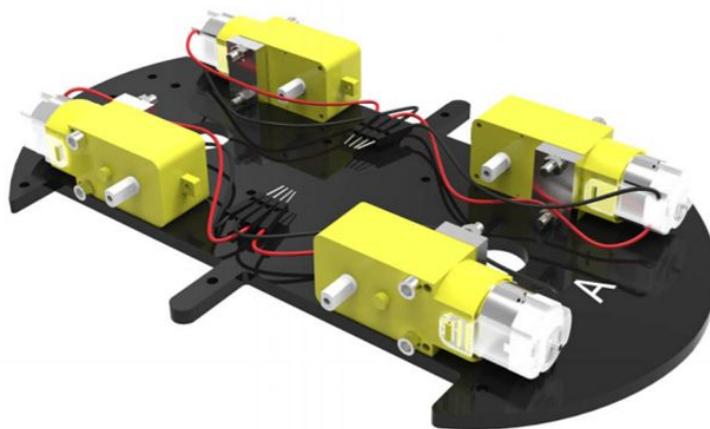
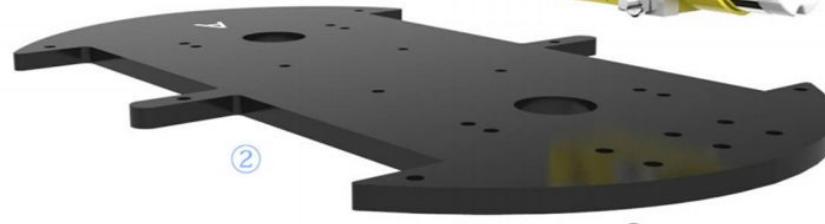
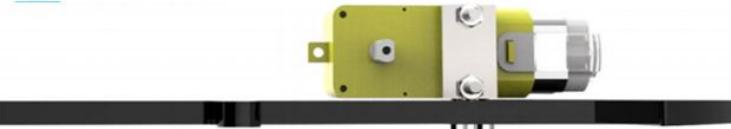
②

LEFT



BACK

Step 4: Attach Motor Units to Base Plate



① Motor units

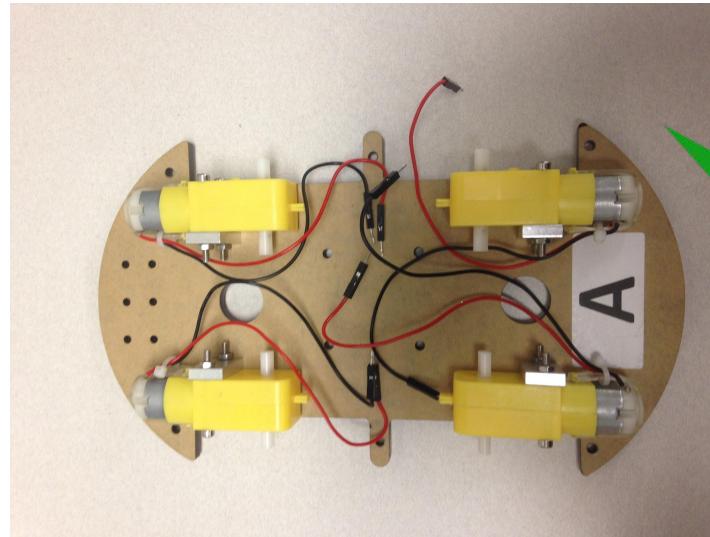
② Acrylic plate

③ M3 hex screws 3*10mm



End of Week 1

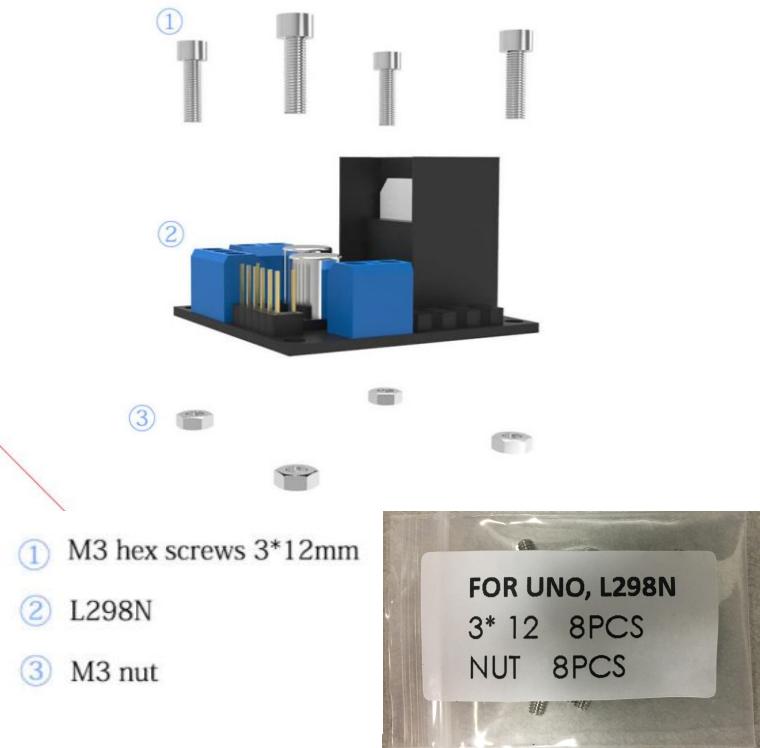
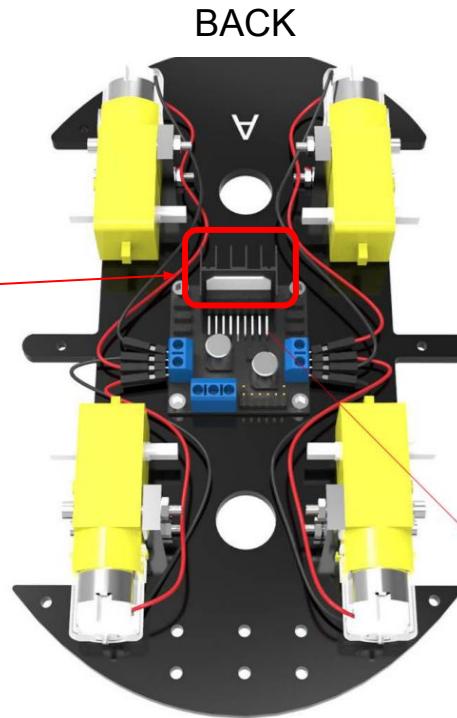
Please show your robot to a mentor to ensure that the motors are mounted correctly. Then you may move ahead if you wish.



Step 5: Mount Motor Controller L298N

WARNING: Pay attention to the direction of the Motor Controller. The fins should be facing backward.

TIP: Detailed wiring diagram on next page.



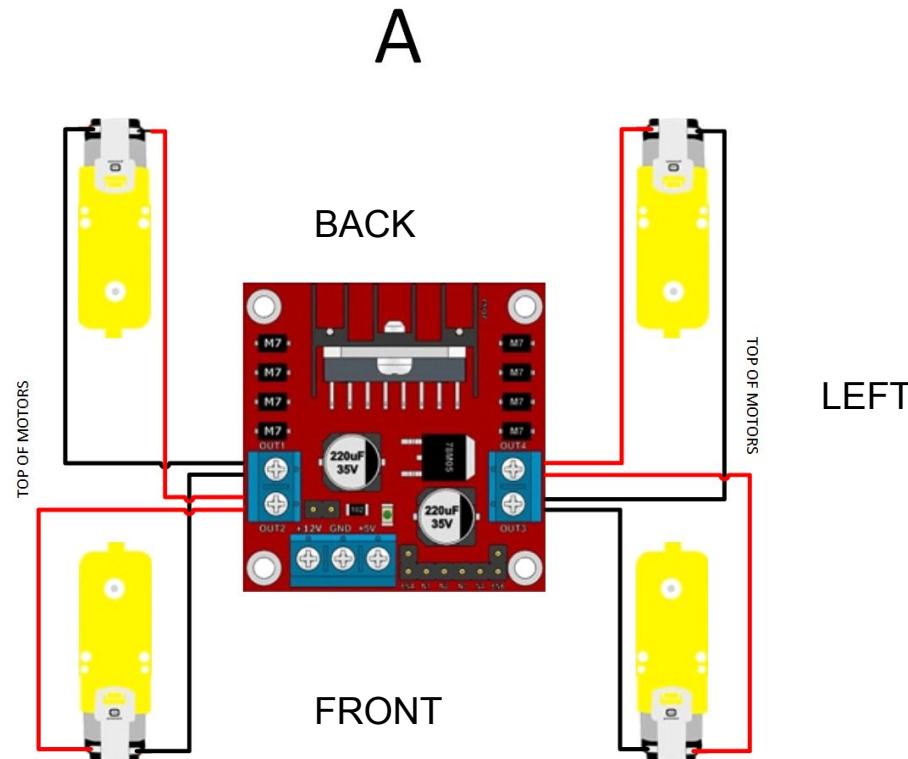
Step 6: Motor Wiring

- Left motor controller ports
(2 red in back, 2 black in front)
- Right motor controller ports
(2 black in back, 2 red in front)

WARNING: All motors (silver) face away from the center of the robot.

FRONT -- RED ON TOP
BACK -- BLACK ON TOP

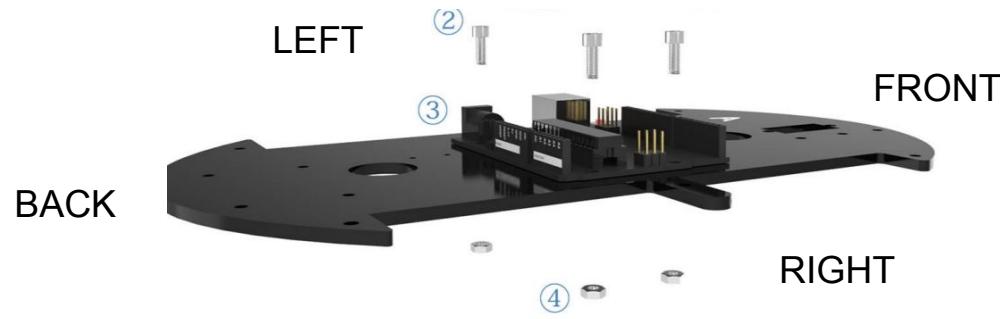
RIGHT



Step 7: Install Arduino

- You are now working on the Top Plate
- Place 3 screws in 3 of the 4 corner holes of the Arduino board.

WARNING: Silver plug is on the front left side of the car (toward the “A”)



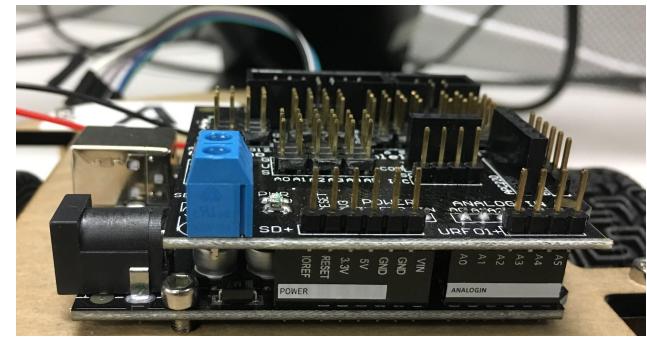
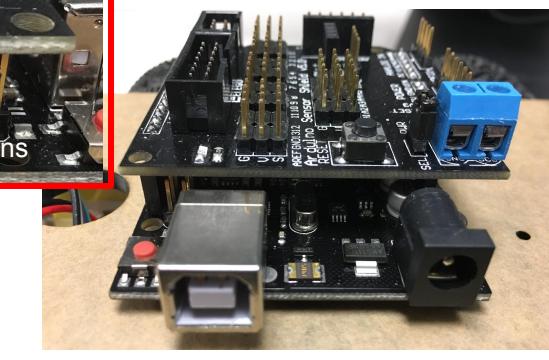
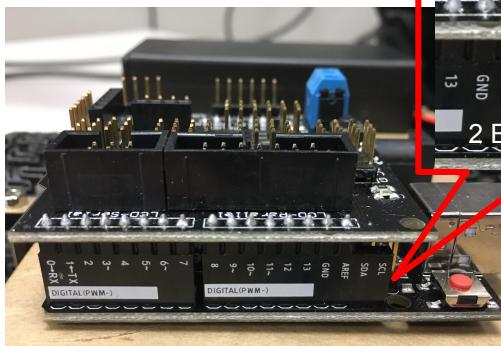
- ② M3 hex screws 3*12mm
- ③ UNO R3 board
- ④ M3 nut



Step 8: Install Sensor Board

- Place the sensor board onto the top of the Arduino, matching the blue connector with the DC power jack

WARNING: The extension board should be place all the way to the left so that the furthest right 2 pins are left empty



Step 9: Wire Motor Controller to Sensor Board

TIP: Run wires through the hole in the top plate.

Green - 10 (Sensor Board), ENA (Motor Controller)

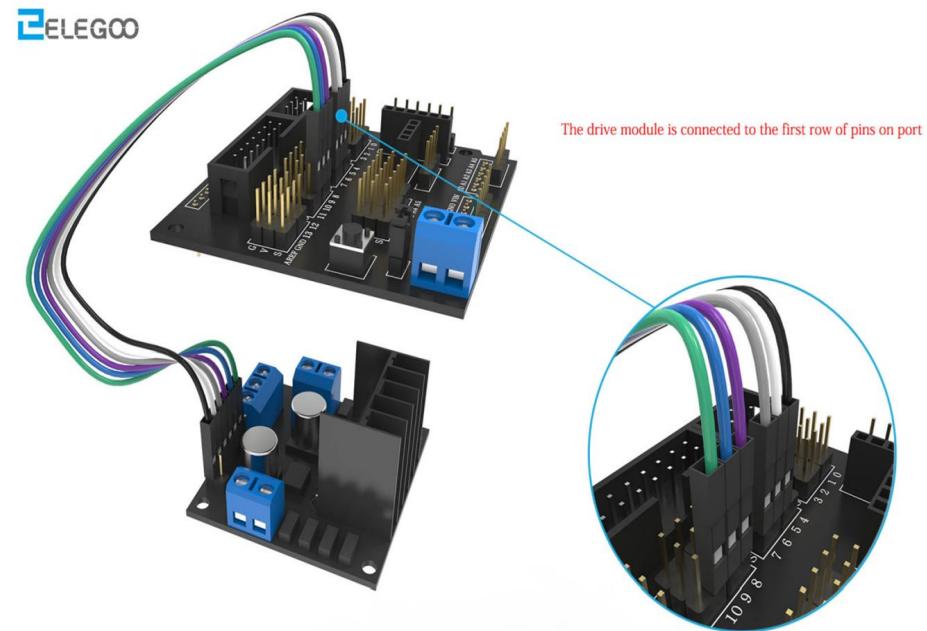
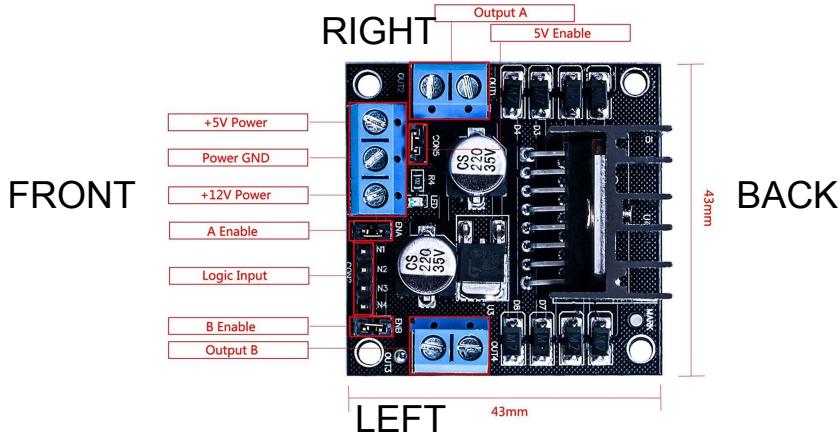
Blue - 9 (Sensor Board), IN1 (Motor Controller)

Purple - 8 (Sensor Board), IN2 (Motor Controller)

Grey - 7 (Sensor Board), IN3 (Motor Controller)

White - 6 (Sensor Board), IN4 (Motor Controller)

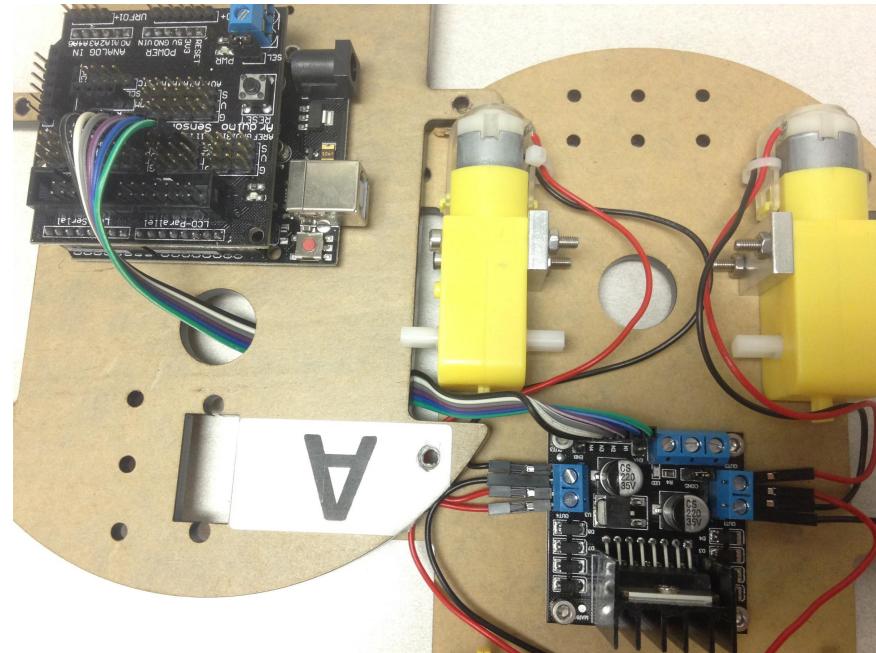
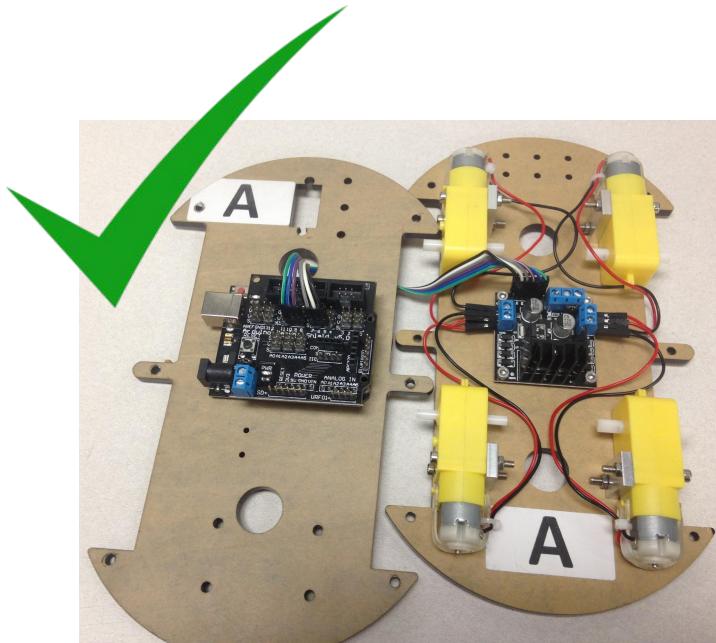
Black - 5 (Sensor Board), ENB (Motor Controller)



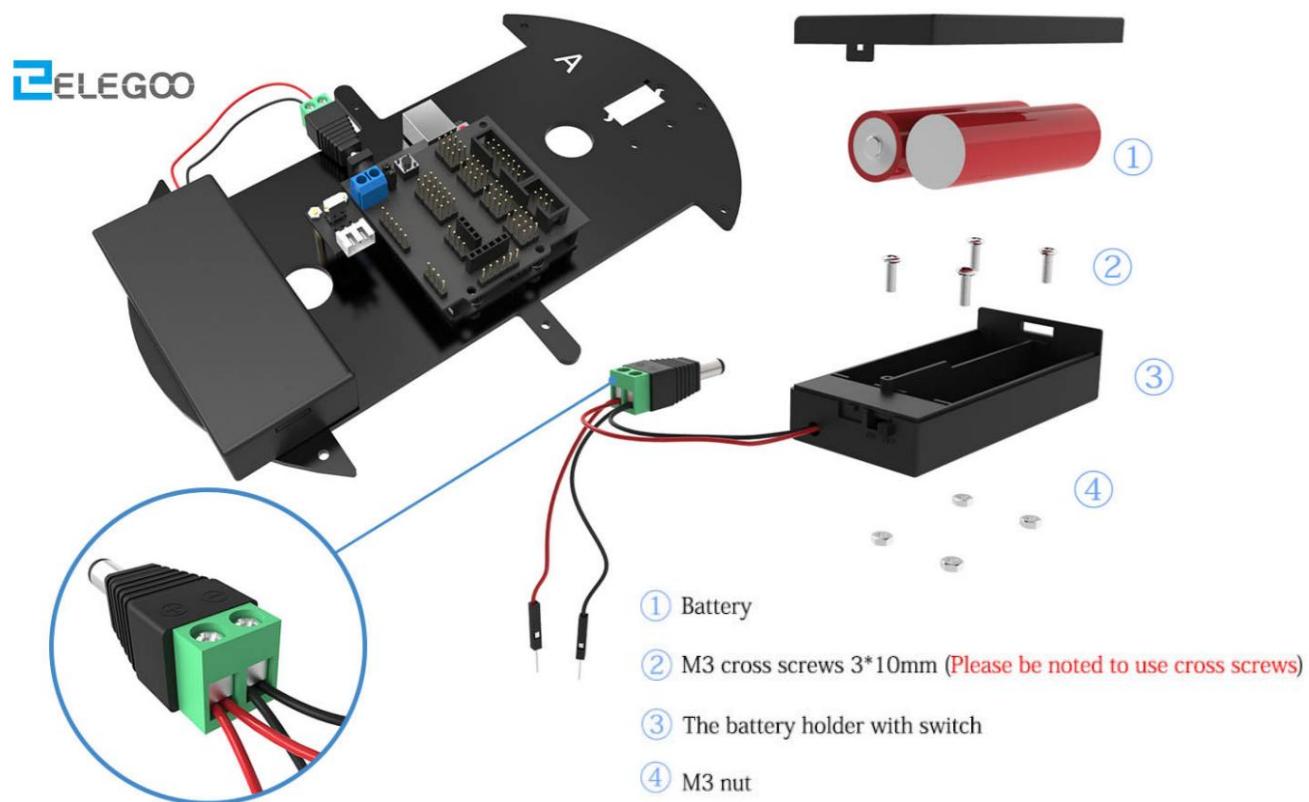
The drive module is connected to the first row of pins on port

End of Week 2

Please show your robot to a mentor to ensure that it is wired correctly.

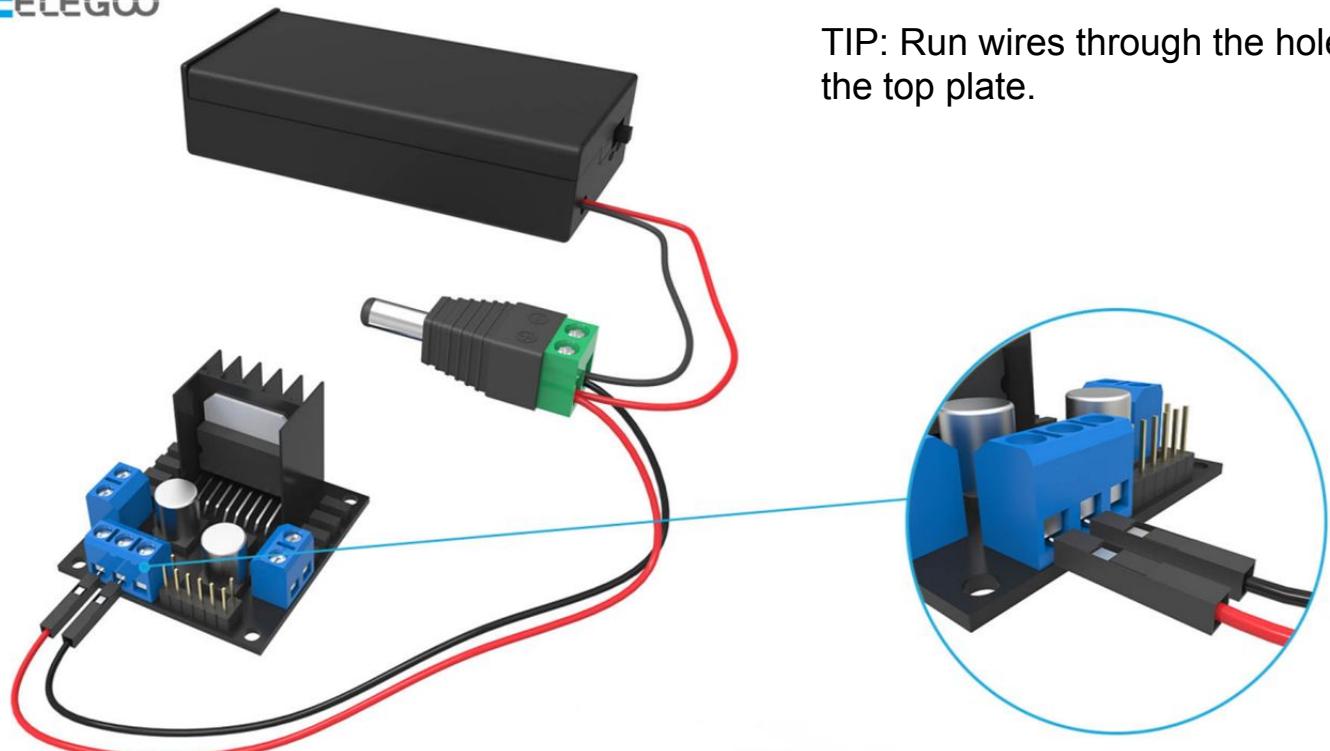


Step 10: Assemble Battery Wiring



Step 11: Complete Battery Wiring

ELEGOO



TIP: Run wires through the hole in the top plate.

Step 12: Connect Base Plate to Top Plate

ELEGOO

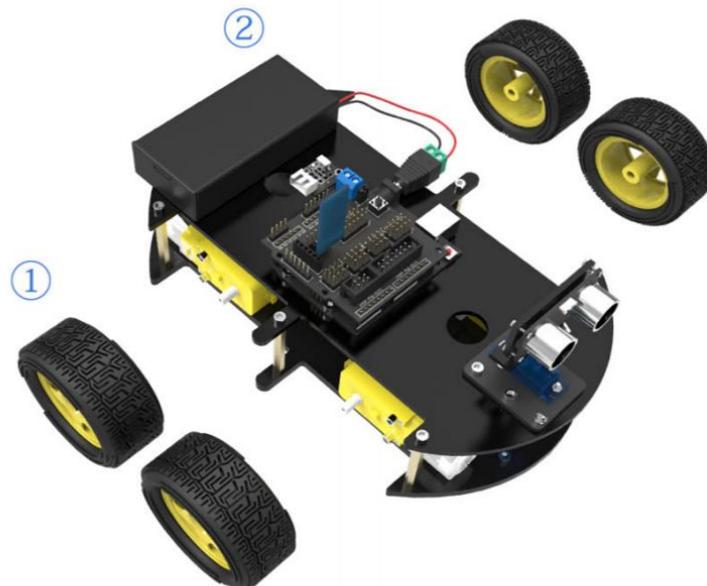


① 3*40 copper column

② M3 hex screws 3*10mm

Step 13: Install Wheels

ELEGOO

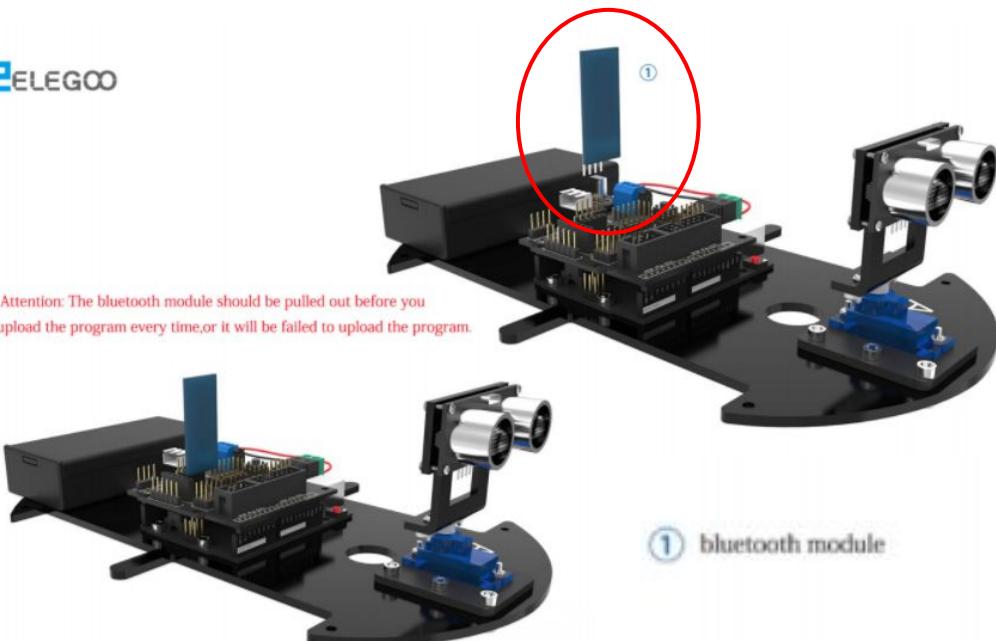


① Tires

② The main body

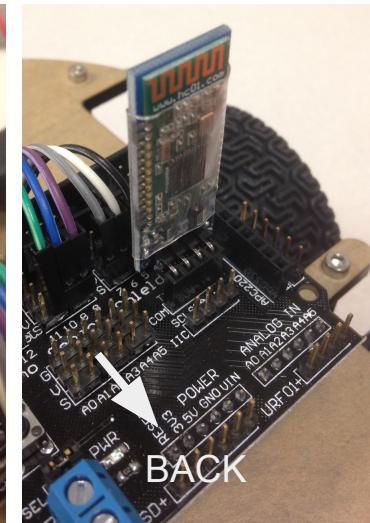
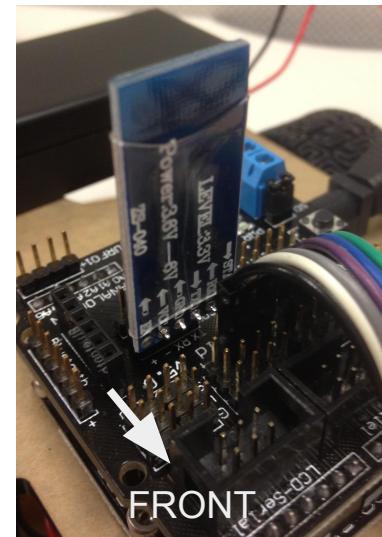
Step 14: Install the Bluetooth Board

ELEGOO

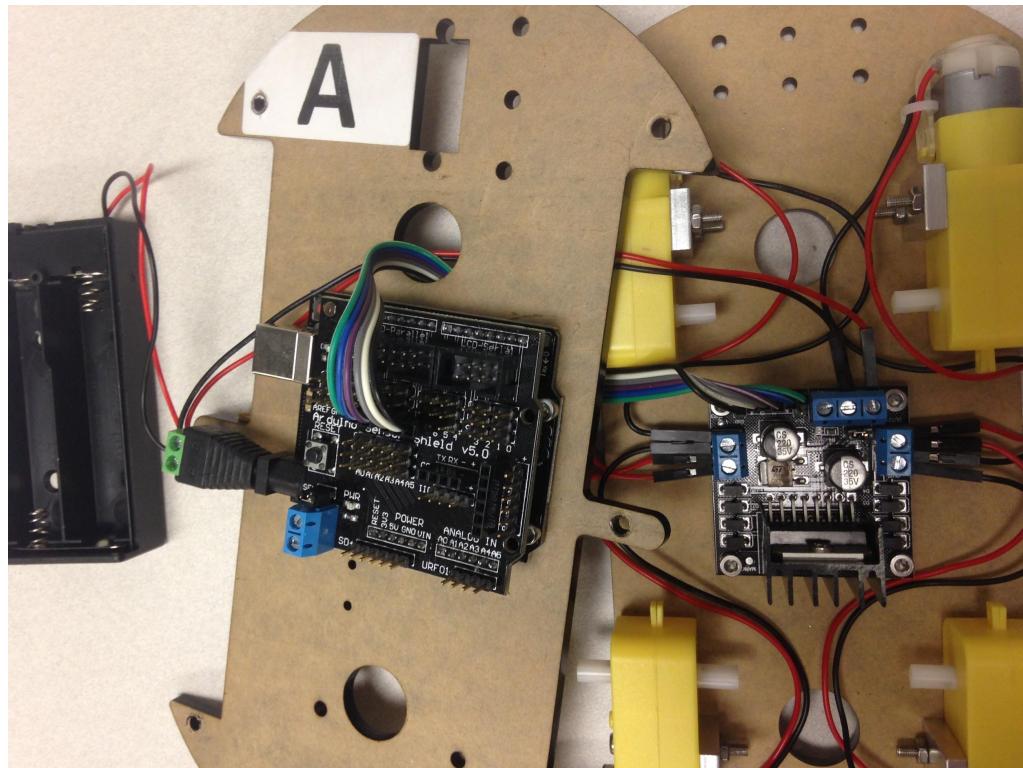
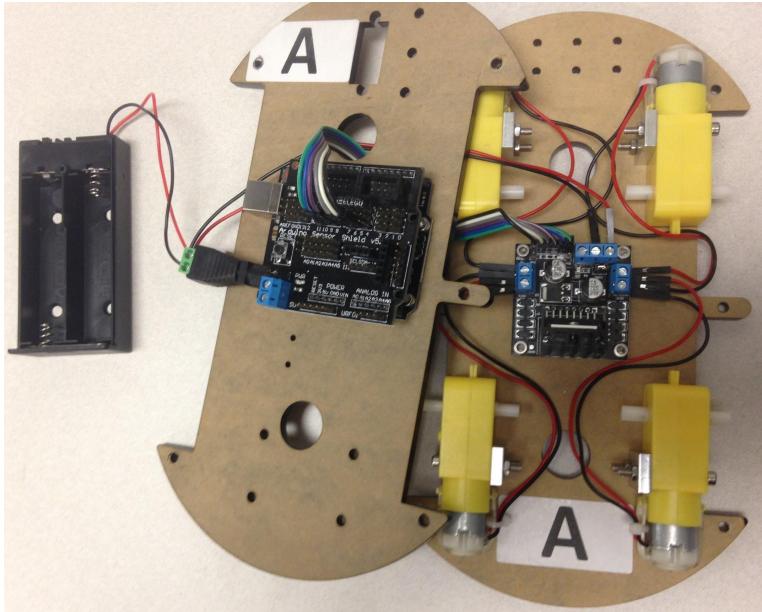


Attention: The bluetooth module should be pulled out before you upload the program every time, or it will be failed to upload the program.

WARNING: The Bluetooth Board can be installed backward. The printed label should face the FRONT of the car.



Wiring



Step 15: Upload Functionality Test Code

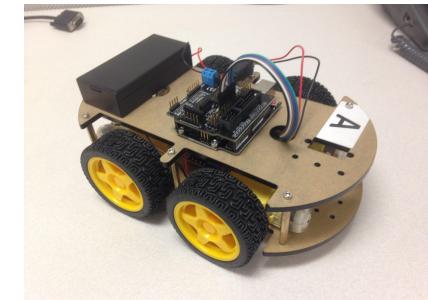
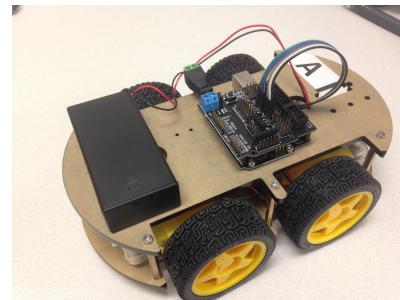
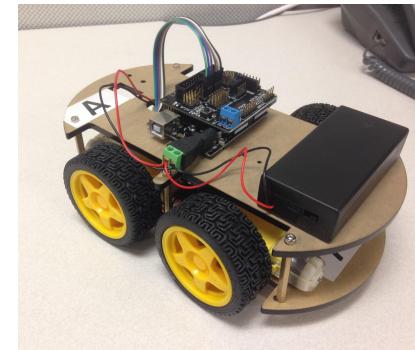
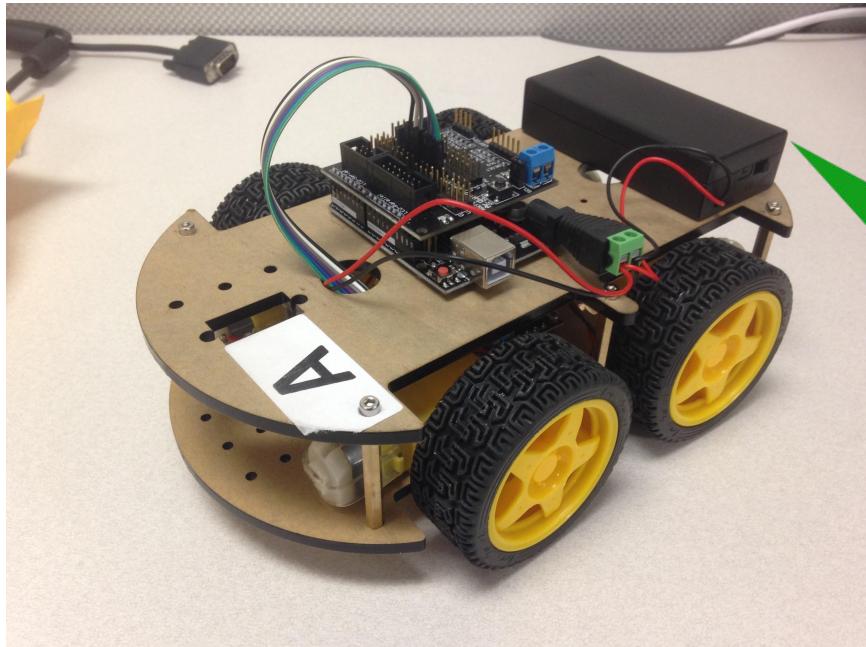
Your robot is ready to test!

Talk to a mentor and they will upload code.



End of Week 3.

In week 4 you will build a plow to push blocks in competition. Begin thinking about your design.



Week 4 Plow Design

Common parts for building the plow will be provided.

Week 5 Practice

Drive stations and simulators will be available for you to practice driving.

Week 6 Competition