

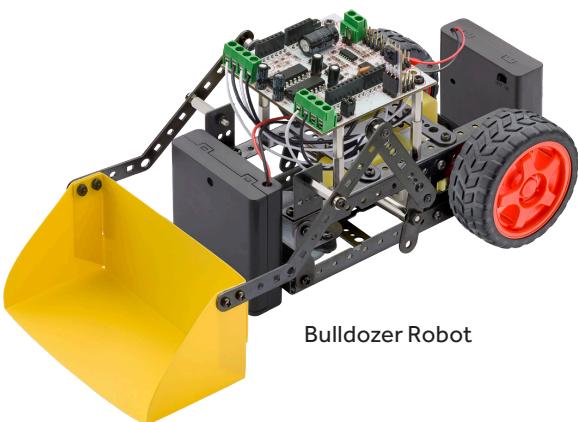
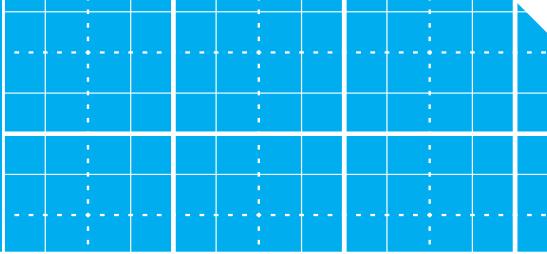


Make: it

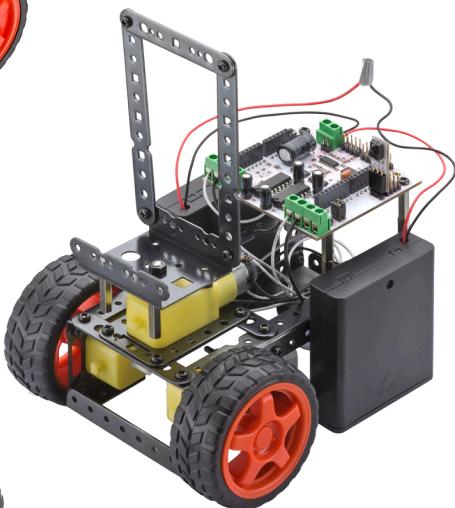
Robotics Add-On Project Kit 1

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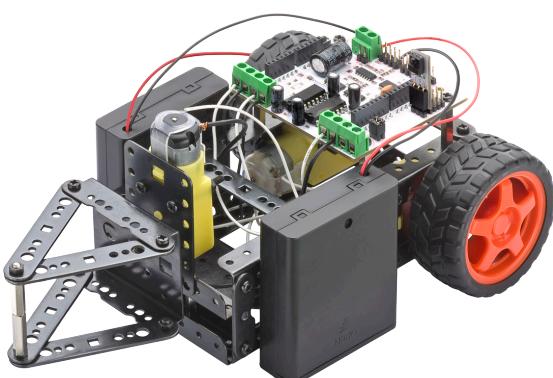
User's Guide



Bulldozer Robot



Surveillance Robot



Drilling Robot

We hope you enjoy your Make: it Robotics Add-On Project Kit 1 from RadioShack.
Please read this user's guide before working with your new robotics kit.

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Getting Started

Using parts from the Make: it Robotics Starter Kit and this Make: it Add-On Project Kit 1, you can build the following robots and program them using your Arduino Uno R3 (not included):

- **Surveillance Robot:** Use the video function of your smartphone to peek into the next room.
- **Bulldozer Robot:** Pick up and drop off small items.
- **Drilling Robot:** Drive around the room while you "bore" into things.

Note: For an enhanced experience, plug in the IR sensor included in this kit, and control your robots with your home remote control (not included) or the Make: it Robotics Remote Control (not included).

Many online resources as well as books like *Make: Getting Started with Arduino* and *Make: Arduino Bots and Gadgets* (available at your local RadioShack store and RadioShack.com) can help you learn about Arduino programming.

Warning!

- Adult supervision and assistance are required.
- **CHOKING HAZARD** — This product contains small parts and functional sharp points on components. Keep away from children under age 3.
- Read and follow all instructions in the user's guide before use.
- Retain this user's guide for future reference.

Battery Notes

- Use only fresh batteries of the required size and type. Do not mix old and new batteries, different types of batteries (standard, alkaline, or rechargeable), or rechargeable batteries of different capacities.
- Dispose of batteries promptly and properly. Do not burn or bury them.
- If you do not plan to play with the robot for an extended period of time, remove the batteries.

Caution!

- The wires are not to be inserted into socket outlets.
- As an extra precaution, check this product regularly for signs of wear or damage.
- Ensure all wiring connections are correct before inserting batteries and switching on the product. Failure to do so may result in damage to components and the product.
- Ensure all wires are correctly connected to the battery terminals and other connectors. If the circuit does not work, make sure the plastic insulation of the wire is not obstructing the connection to the connector.
- When you have finished playing, remove the batteries and switch off the unit before you disconnect the wires. Do not apply any components or parts to the unit other than those provided with this kit.
- **To prevent overheating and damage, do not short-circuit the battery terminals and connectors. Do not block or cover the motor or other moving parts.**

Package Contents

This Make: it Robotics Add-On Project Kit 1 requires parts from the Make: it Robotics Starter Kit.

Parts			
			
Black Tip Motor	Motor Plate	Motor Adapter	IR Sensor
Columns			
			
13-Hole Bent Angle Bar (2)	Fastener Strip (2)	Bulldozer Blade	
Nuts			
			
Column B		M3 Nut (15)	
Screws			
			
M3 × 6 Screw (15)	M3 × 28 Screw (2)	M2 × 5 Screw (2)	

Required Tools

- No. 1 Phillips crosspoint screwdriver
- No. 2 Phillips crosspoint screwdriver

Required Accessories

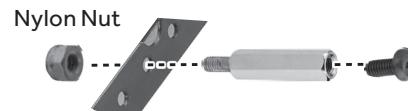
- RadioShack Make: it Robotics Starter Kit
- Smartphone or other handheld video device
- Home remote control
- RadioShack Make: it Robotics Remote Control
- AA batteries (8)
- Arduino Uno R3 board
- USB cable (type A connector to type B connector)

Note:

- Gather all the necessary components before you begin building your robot.
- You can build only one robot at a time.

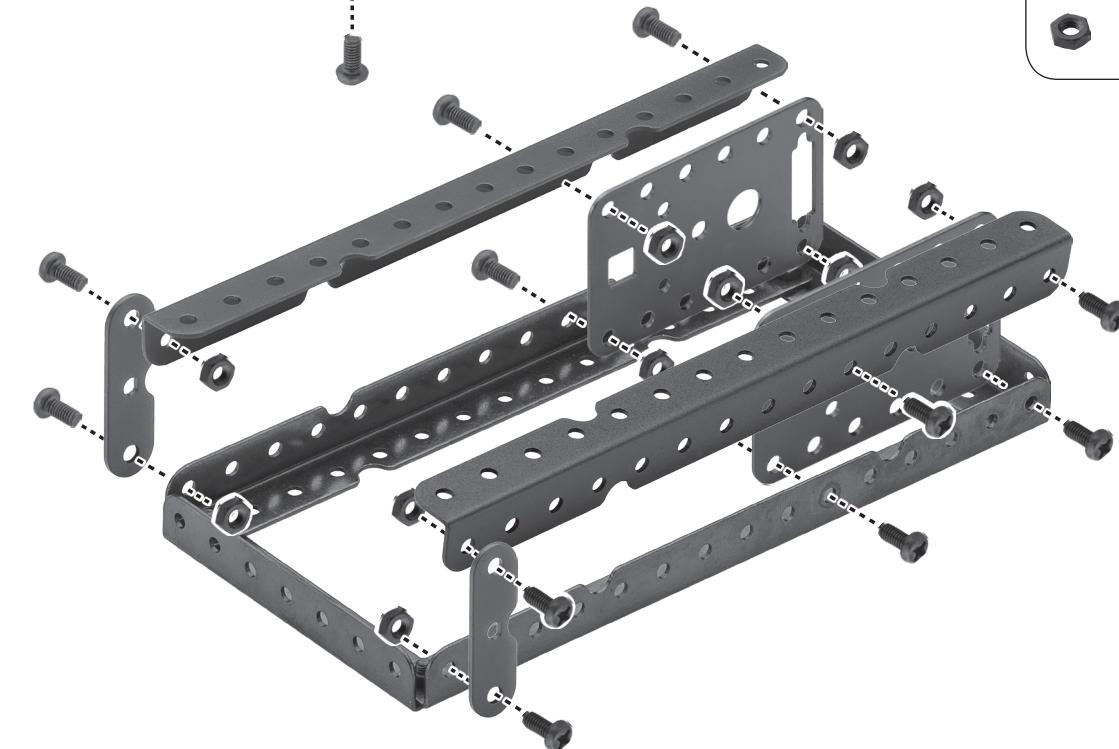
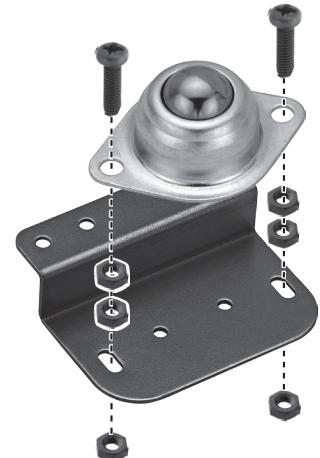
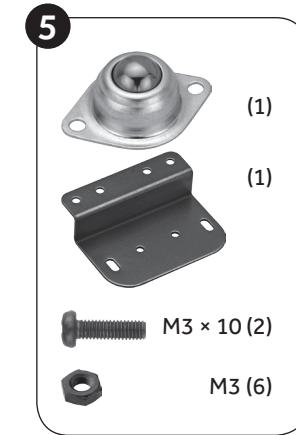
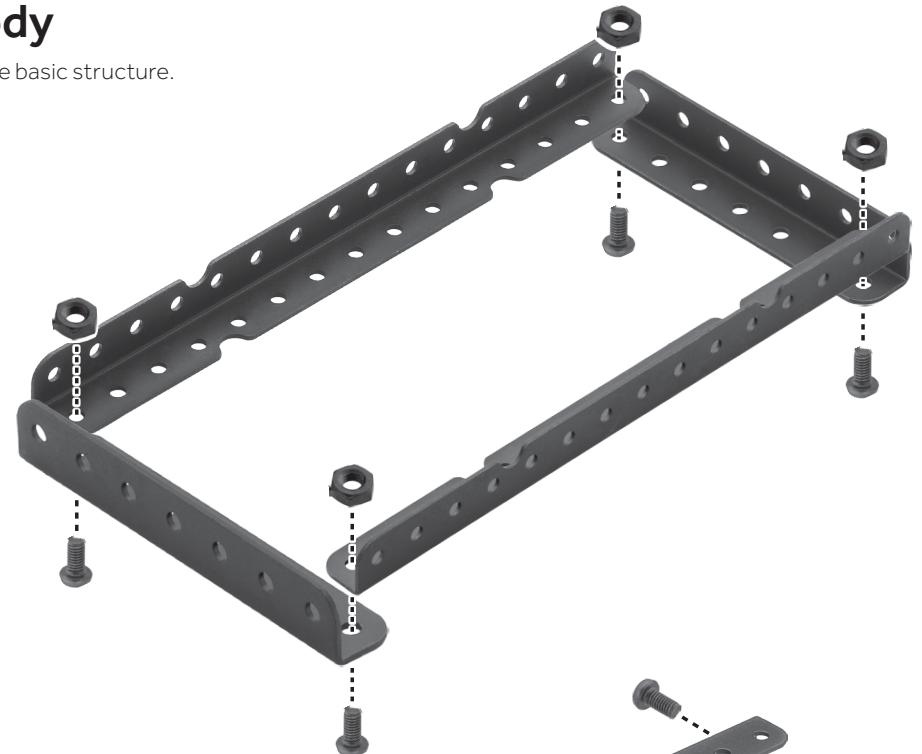
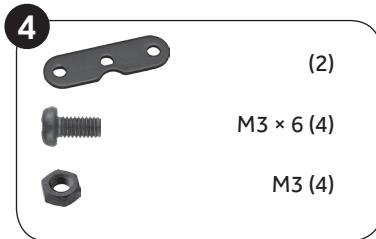
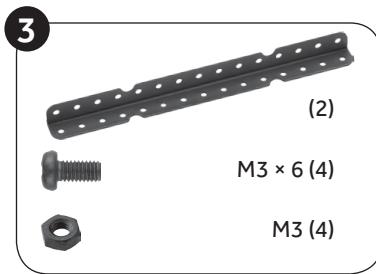
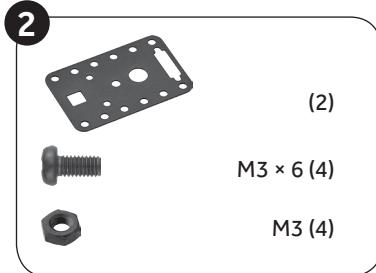
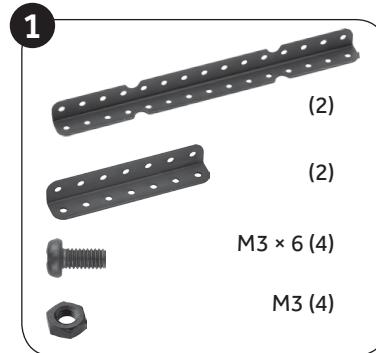
Helpful Hints

- For screw and nut connections at 90° from each other, partially tighten each screw before fully tightening both.
- When installing columns into nylon nuts, insert an M3 × 6 screw into the end of the column and screw tight into the nylon nut. Hold the column with an adjustable wrench (not included) and unscrew the M3 × 6 screw from the column.



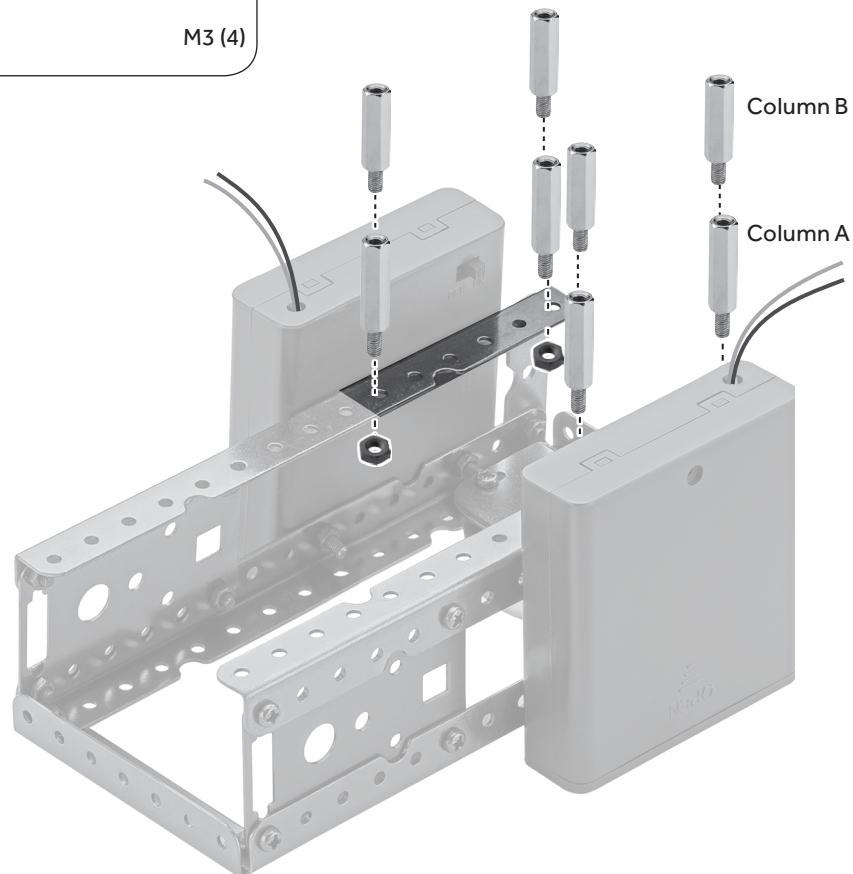
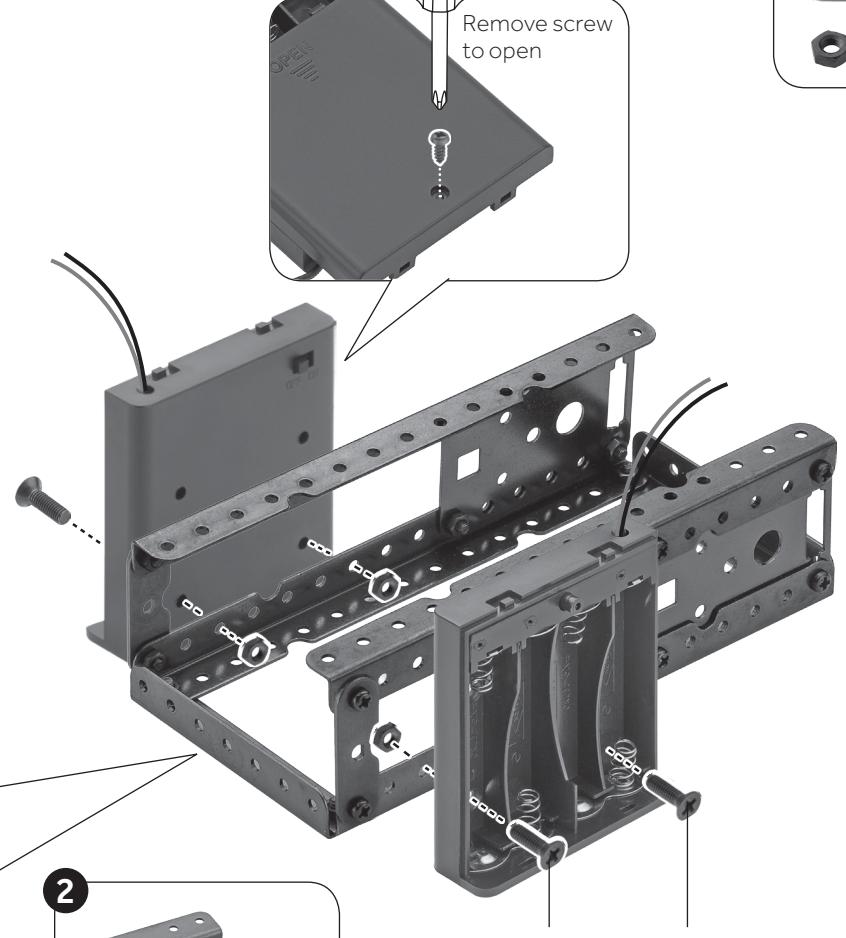
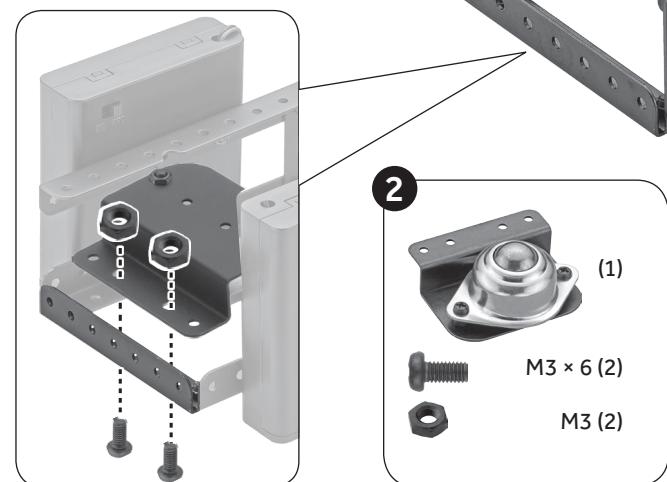
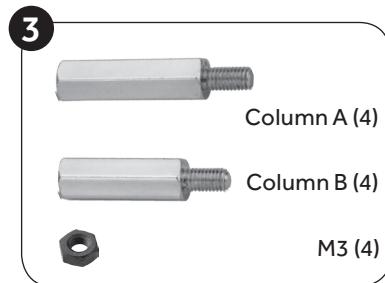
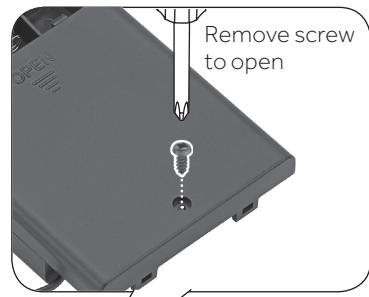
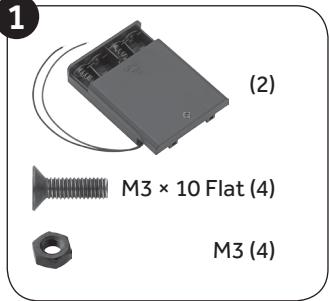
Project Kit 1 Robot Body

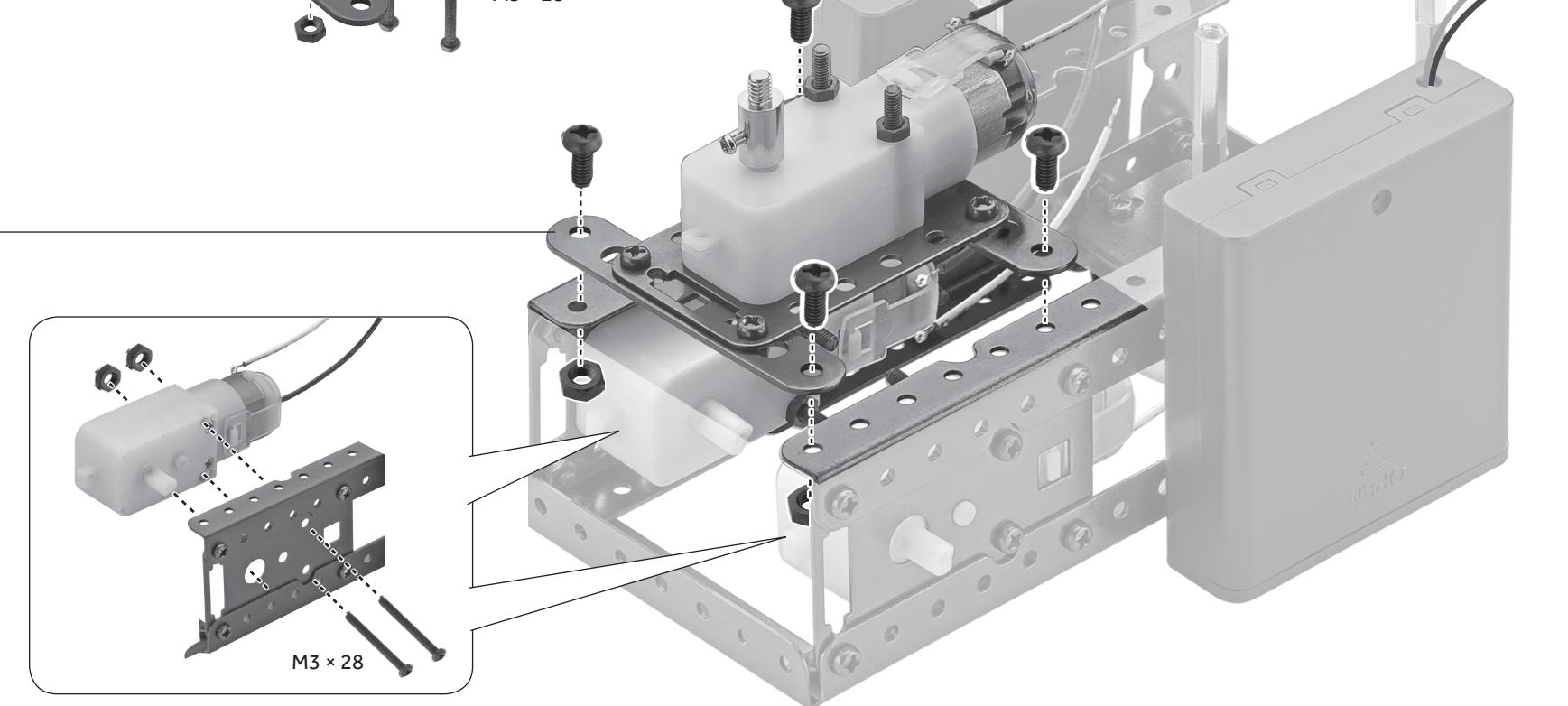
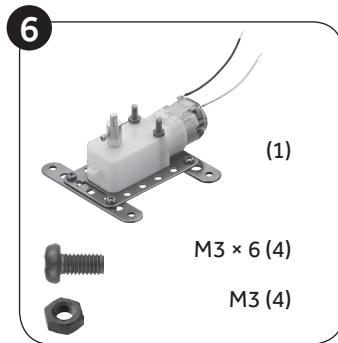
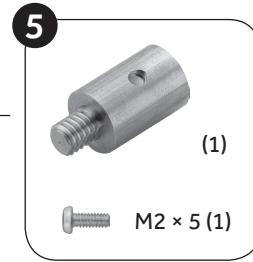
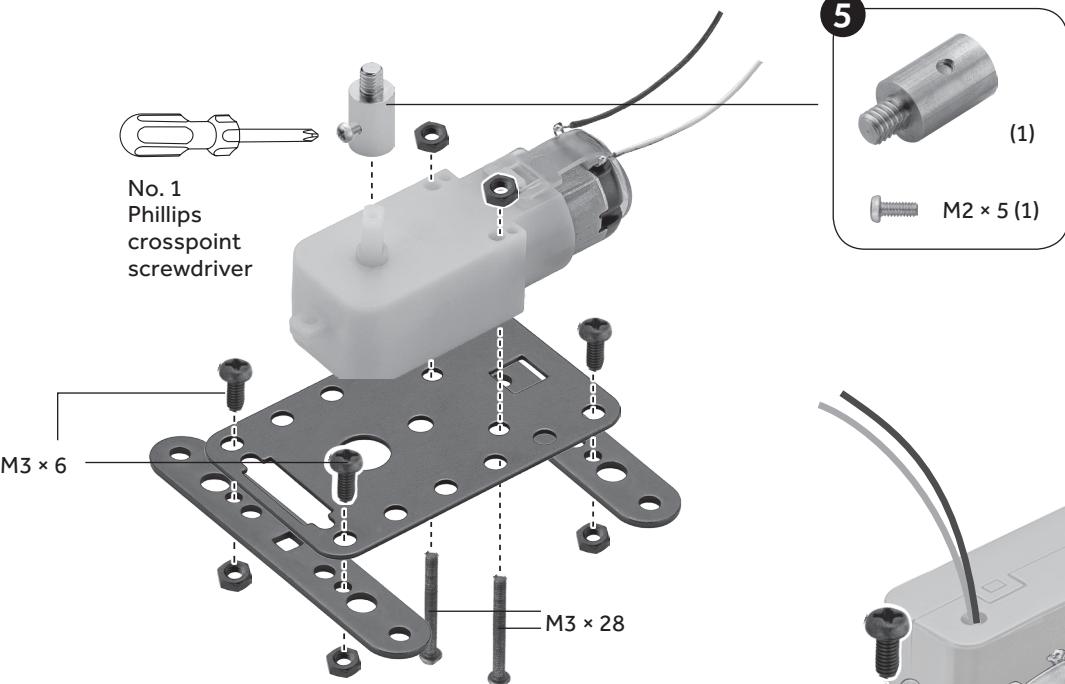
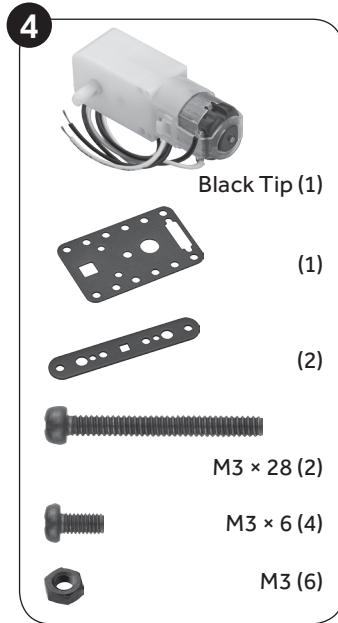
The robots in Project Kit 1 start with the same basic structure.

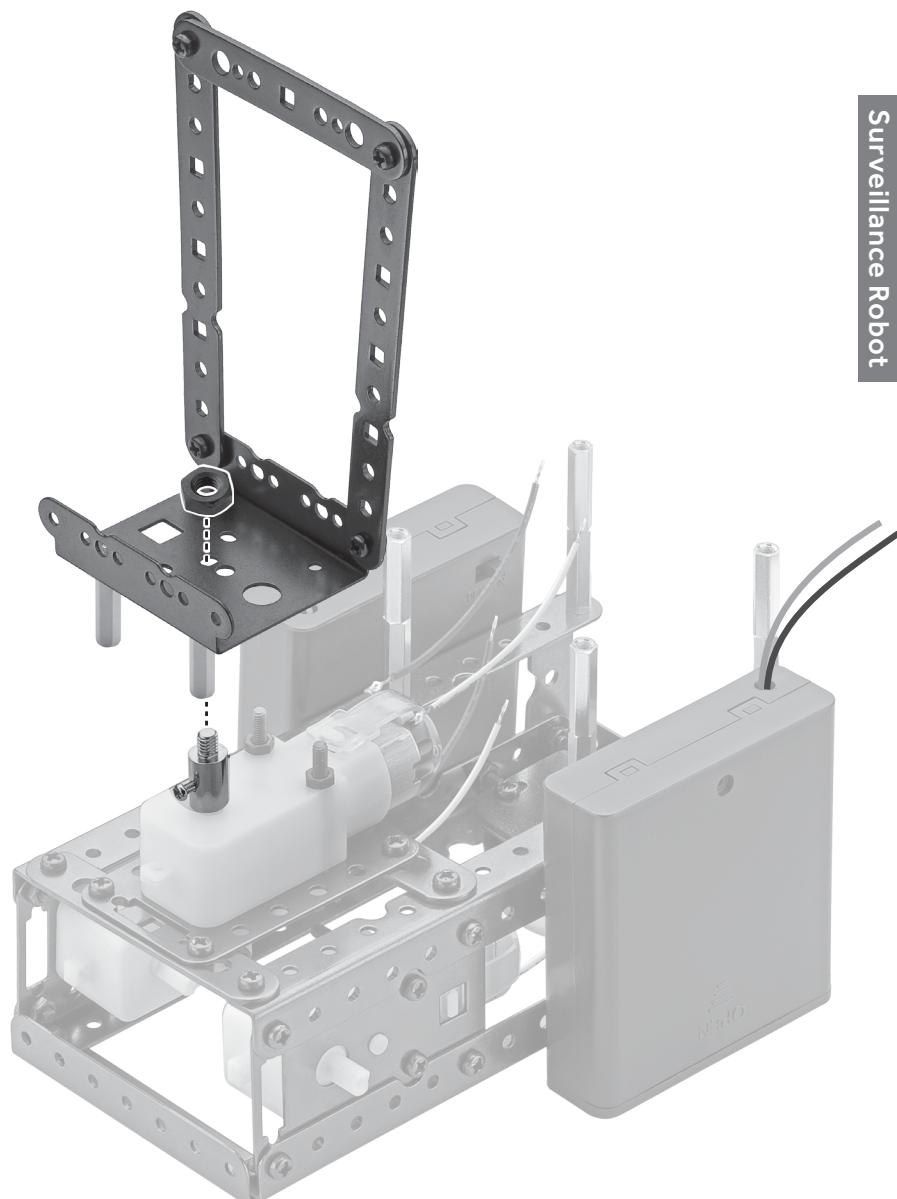
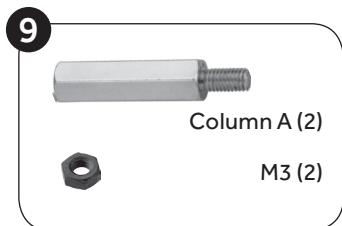
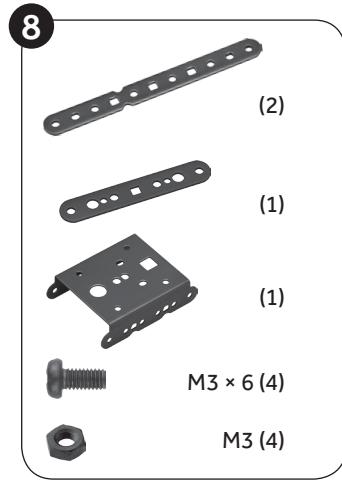


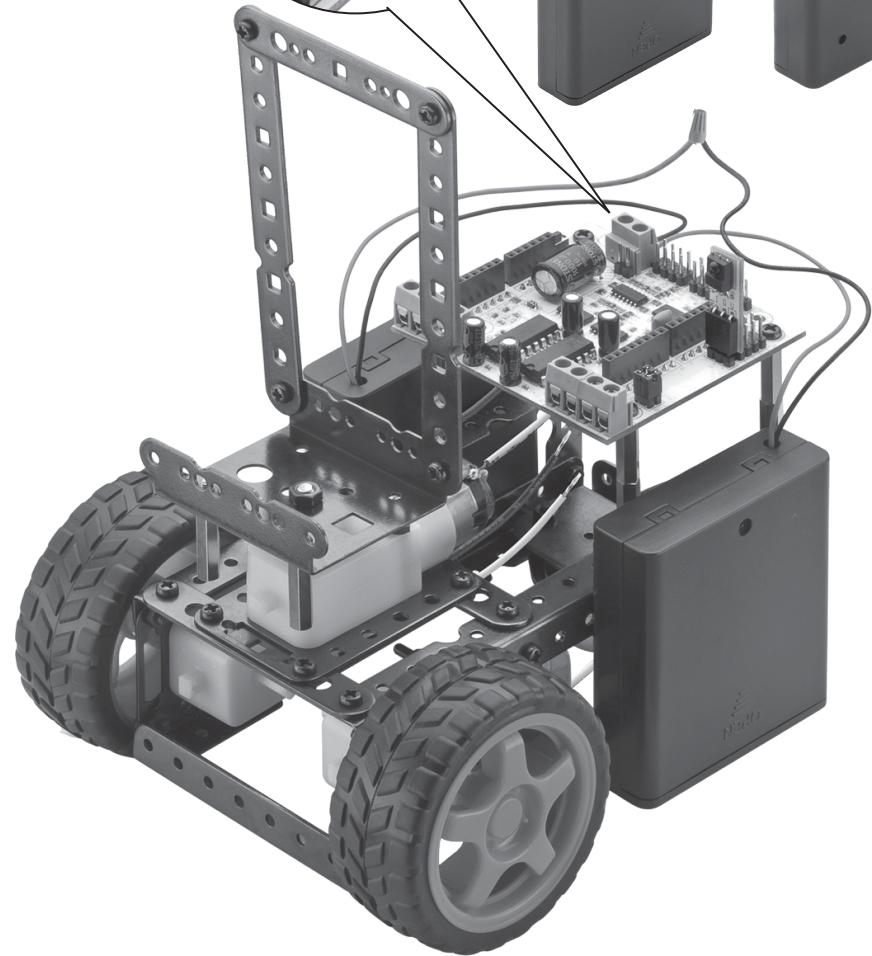
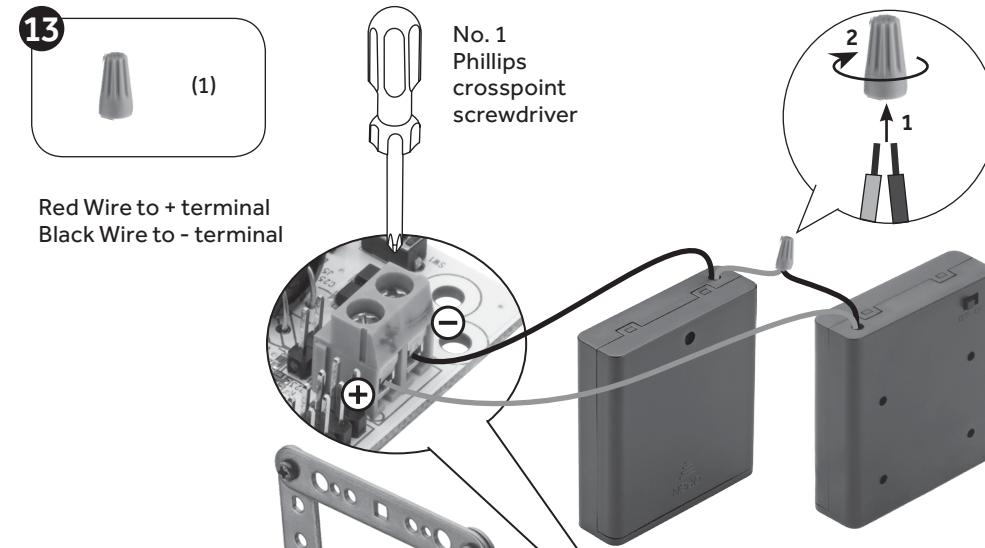
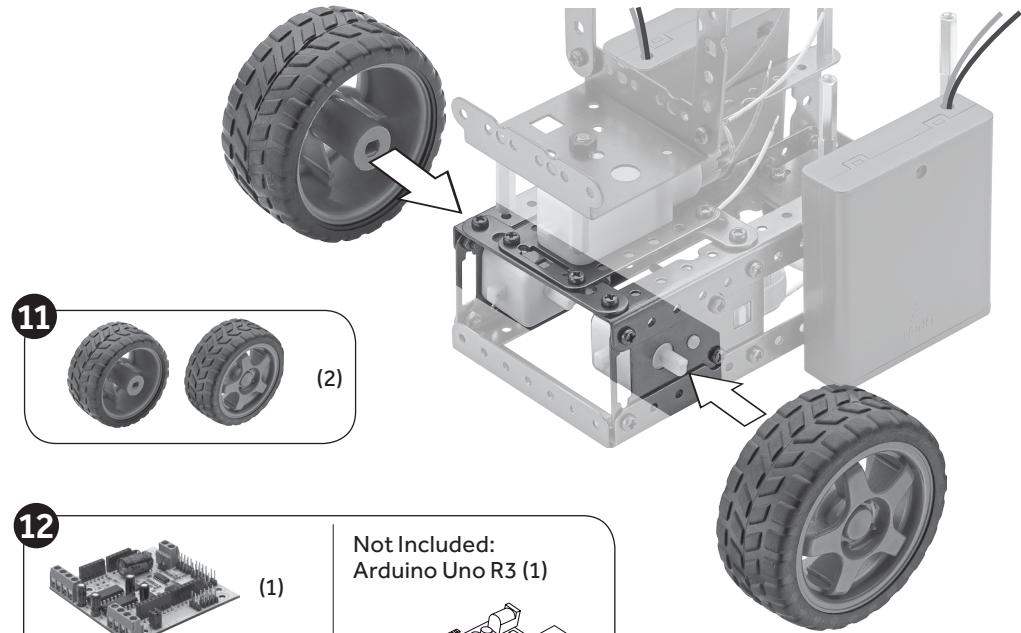
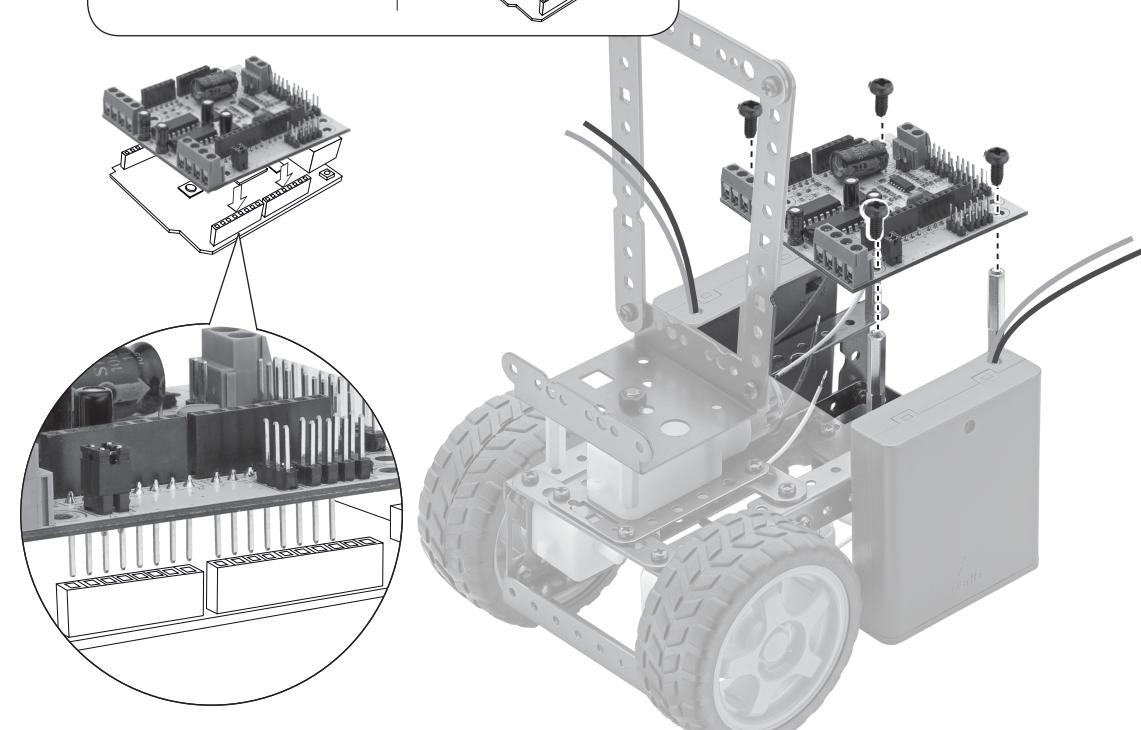
Surveillance Robot

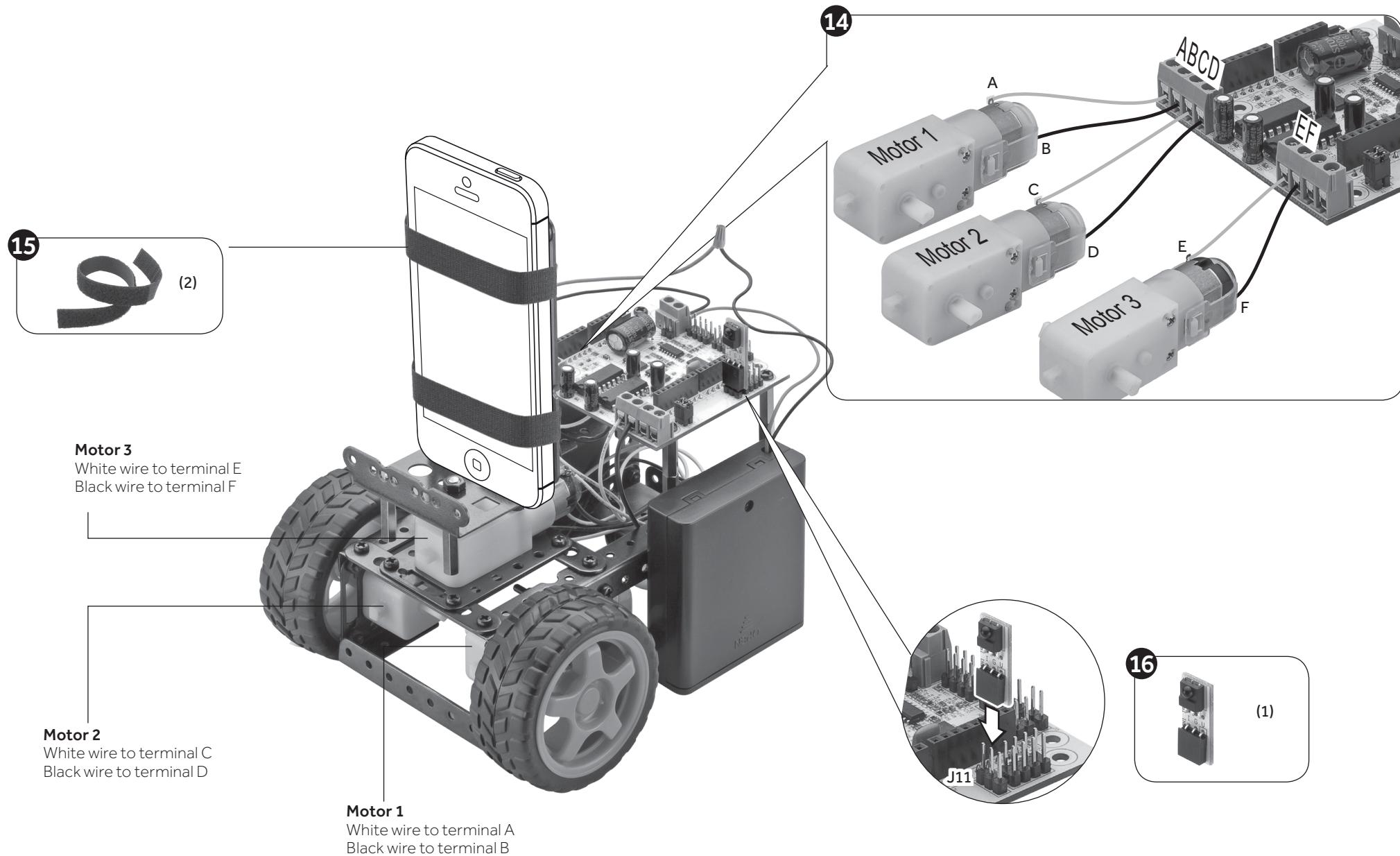
To build the Surveillance Robot, begin by building the robot base (see "Project Kit 1 Robot Body" on page 6). Then build according to the following steps.





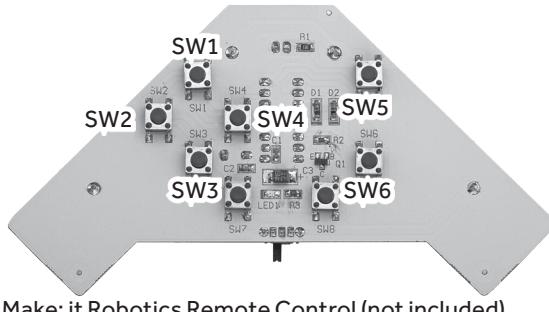






Download the Support Files

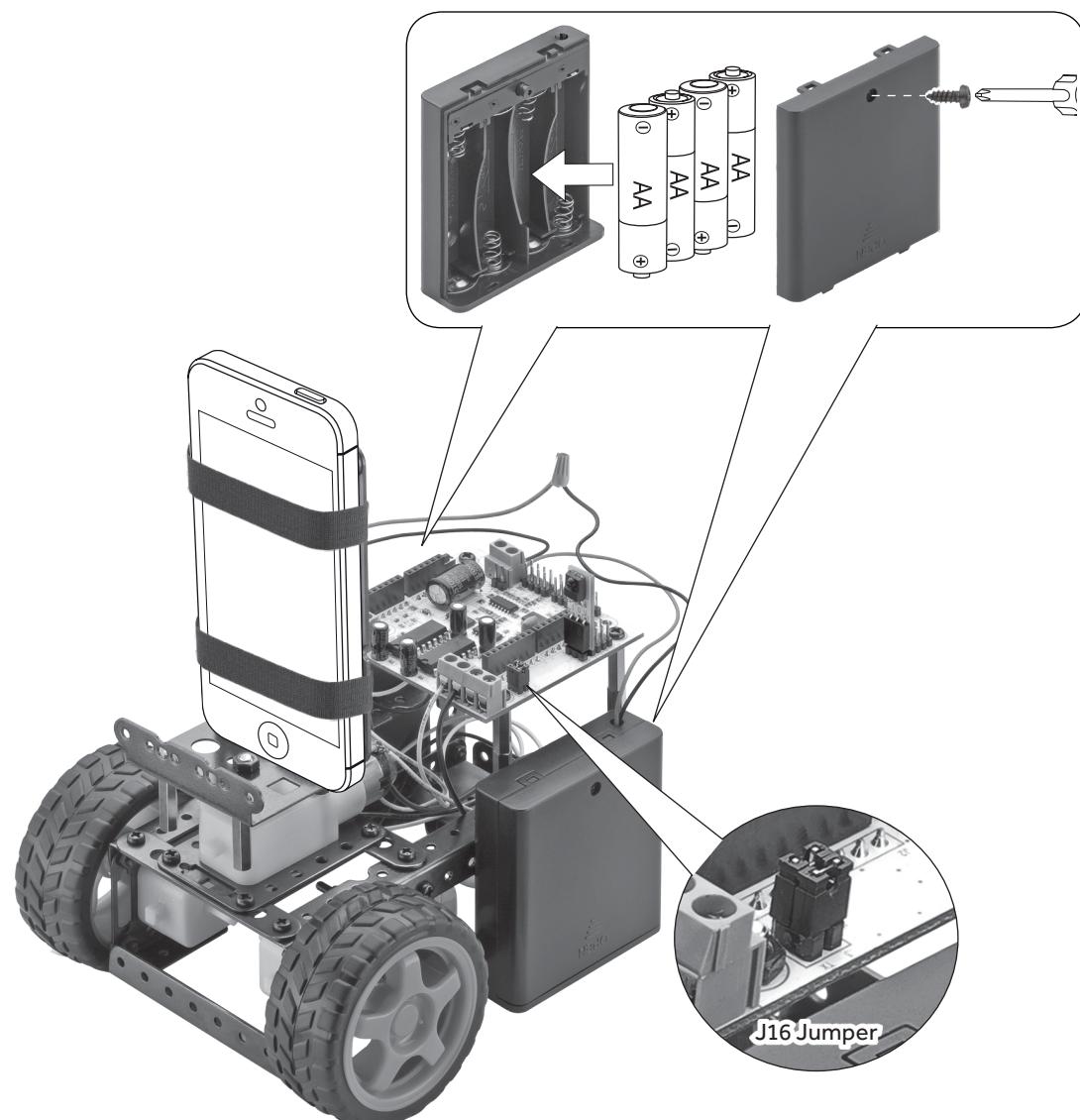
1. For the Arduino program and libraries, go to <http://shack.net/MakeItRobotics>.
2. At the end of the blog post, click **Make: it Robotics Add-On Project Kit 1 Support Files** and save the folder to your computer.
3. If you have not created a directory in your Arduino folder for the Make: it Robotics programs, open READ_ME.txt and follow the directions.
4. Connect your Arduino Uno R3 to your computer with a USB cable.
5. Remove the jumpers from J16 on the PCB to allow your Arduino's USB port to communicate with your computer.
6. Open one of the .ino files in the Arduino programming environment.
 - **Surveillance_demo.ino** automatically cycles through each motor function.
 - **Surveillance_home_remote.ino** cycles through each motor function when you press any key on any IR remote control you have in your home.
 - **Surveillance_IR_remote.ino** allows you to control your robot using the Make: it Robotics Kit Remote Control.
7. Verify and upload the program to your Arduino Uno R3.
8. Remove the USB cable from your Arduino Uno R3.
9. Put the jumpers back onto J16. When the PCB is connected to your Arduino and the jumpers on J16 are in place, your Arduino's serial port will be unavailable.



Button	Function
SW1	Forward
SW2	Turn left
SW3	Backward
SW4	Turn right
SW5	Turn camera stand clockwise
SW6	Turn camera stand counter-clockwise

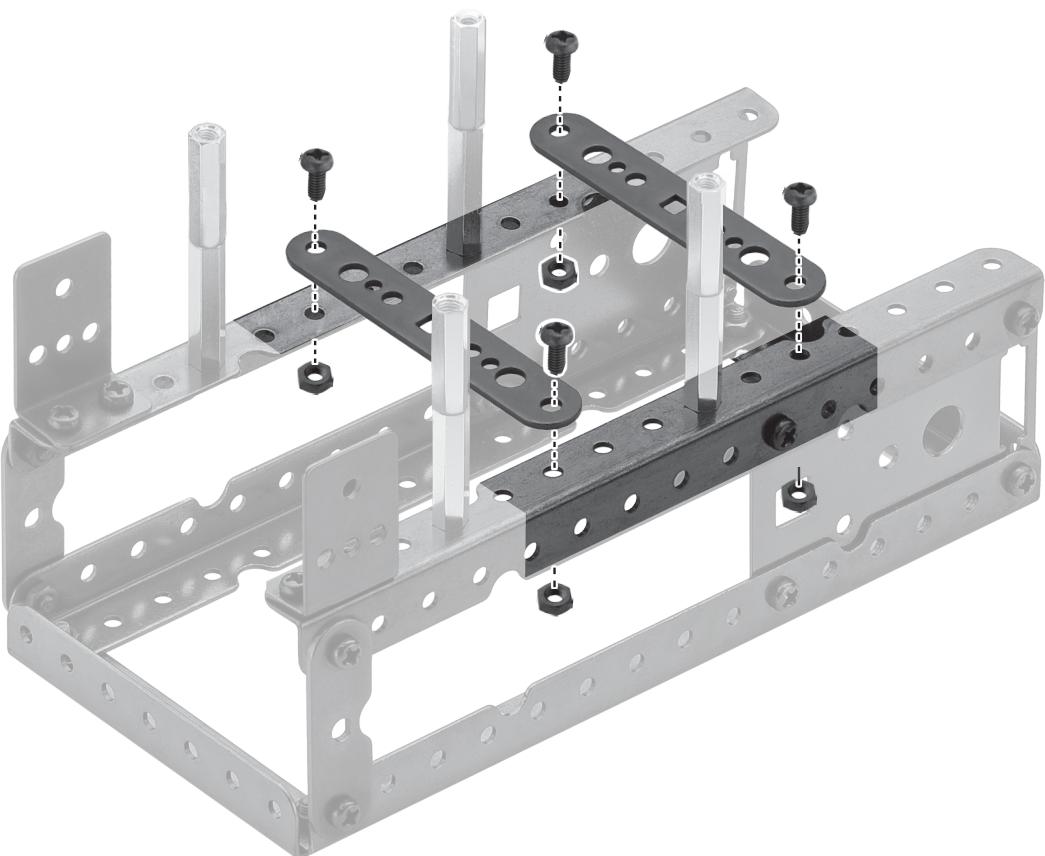
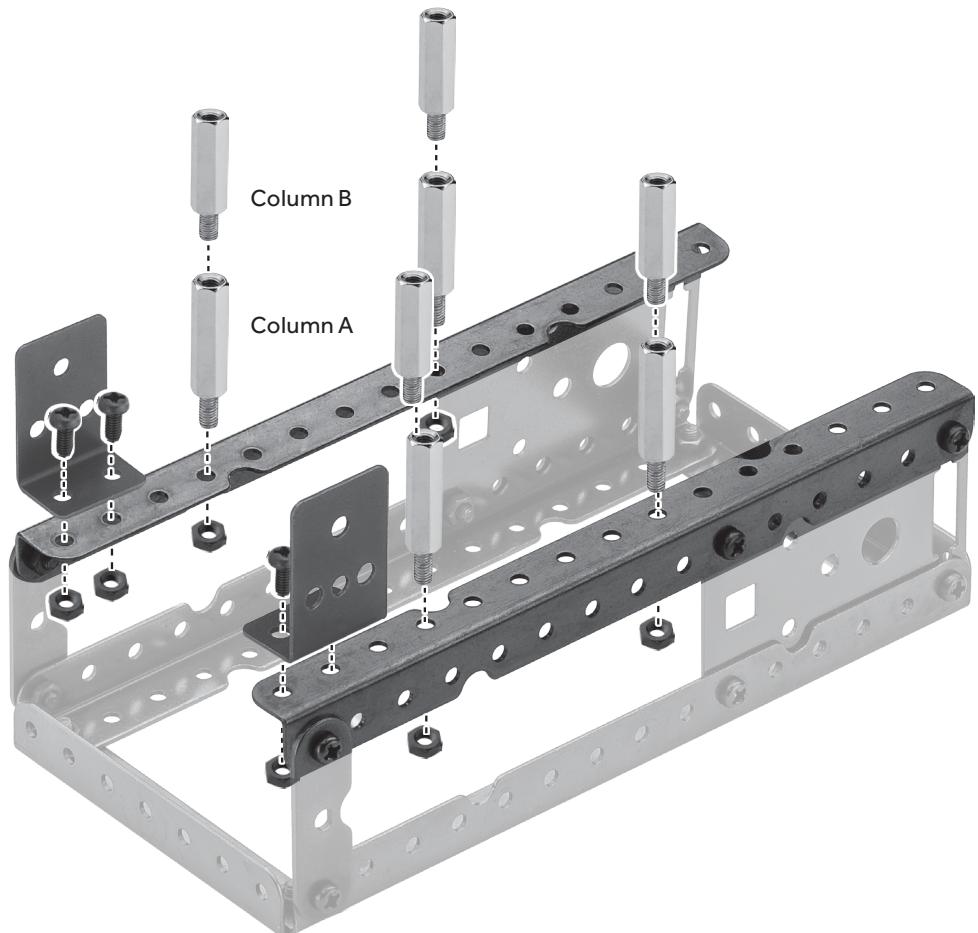
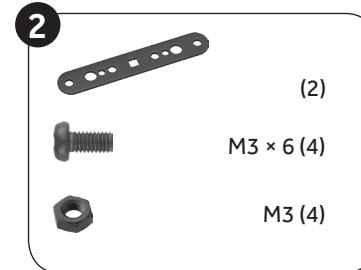
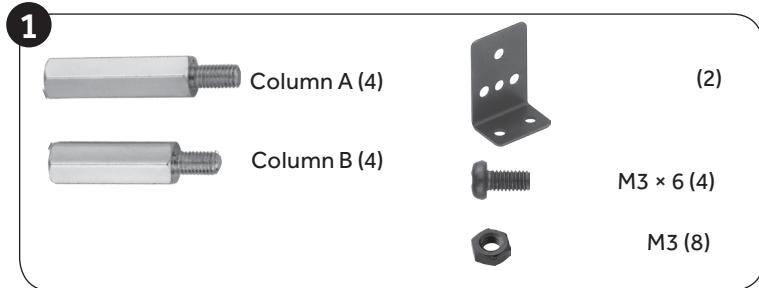
Play

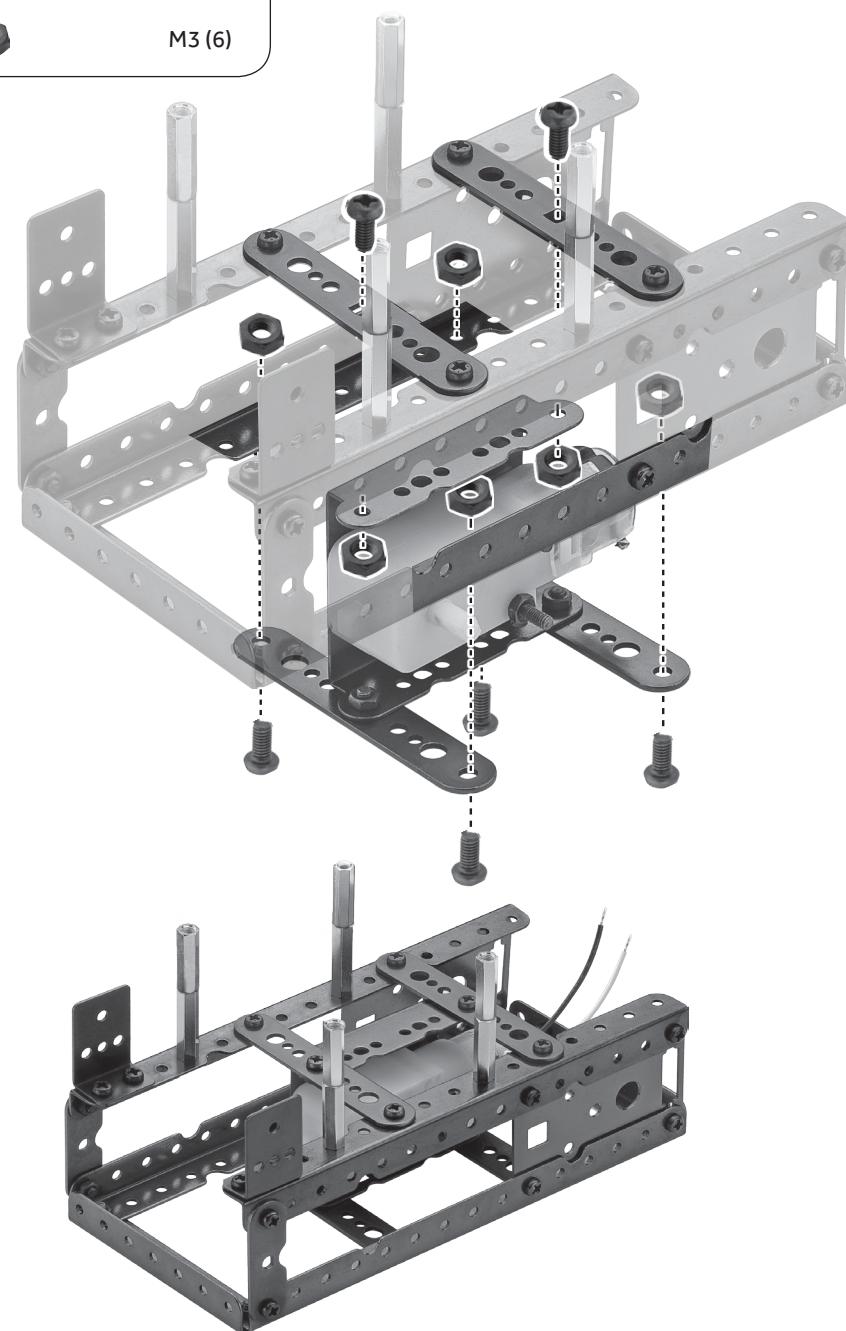
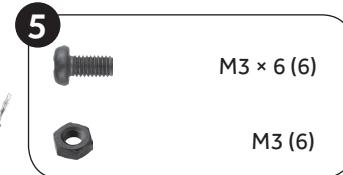
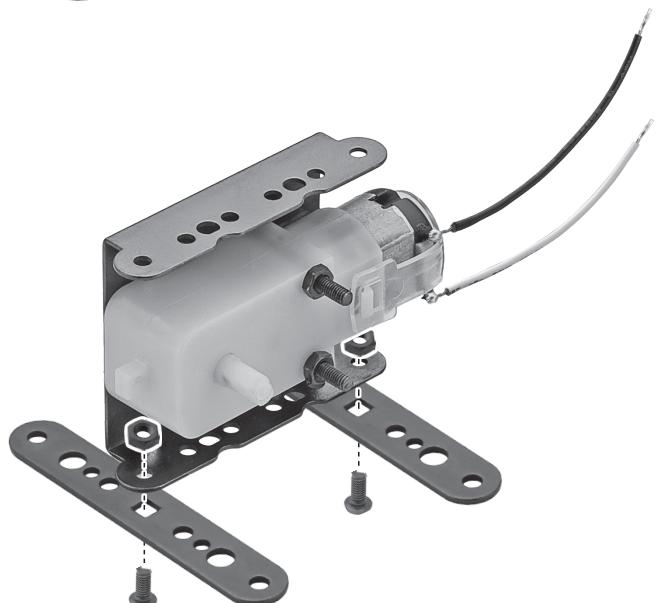
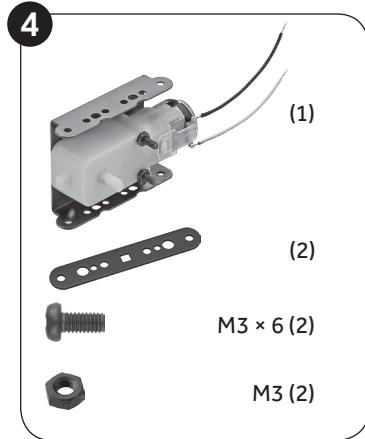
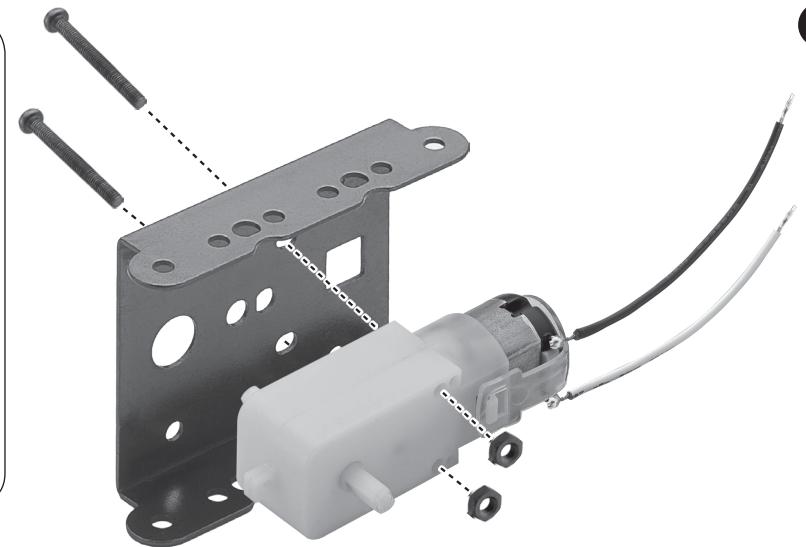
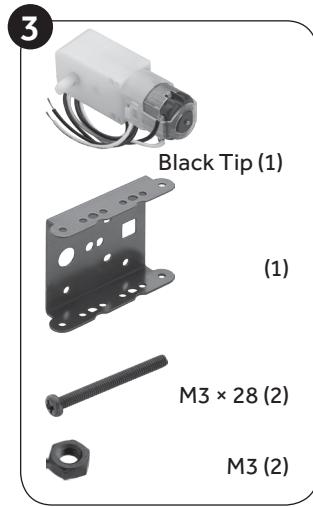
1. Install batteries into the battery compartments on the robot matching the polarities marked inside. Replace the cover and screw.
2. Turn on your smartphone's video camera.
3. Slide the power switch to ON on both battery compartments.
4. Experiment! Dive into the Arduino program to customize your surveillance robot.

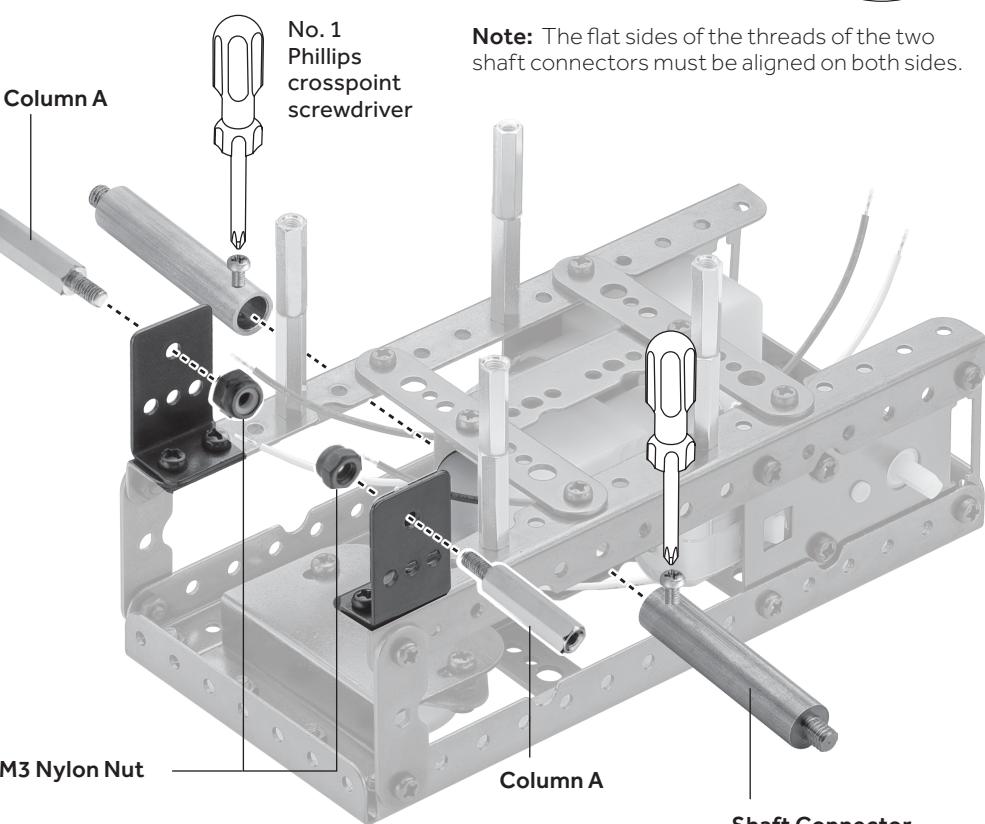
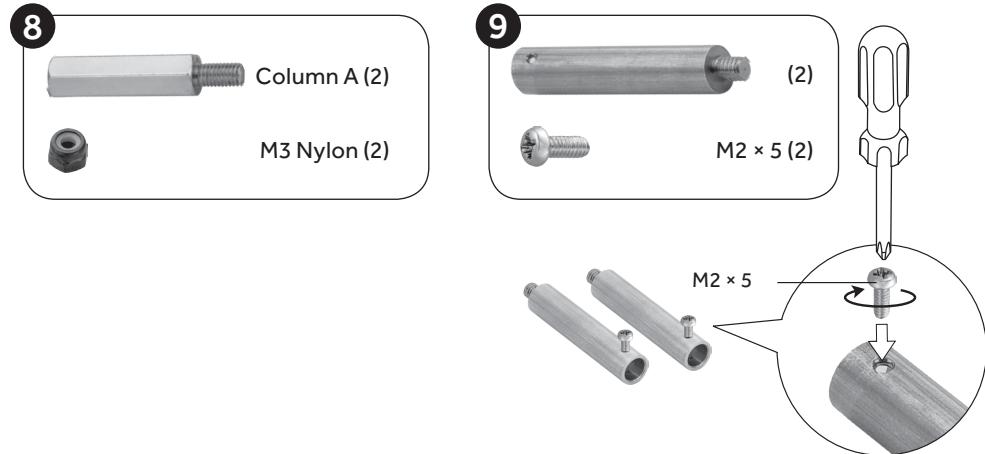
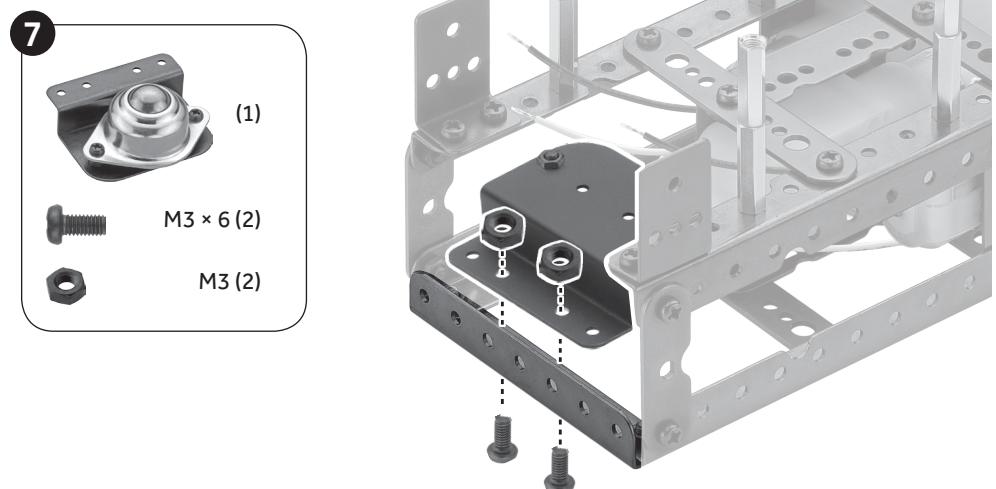
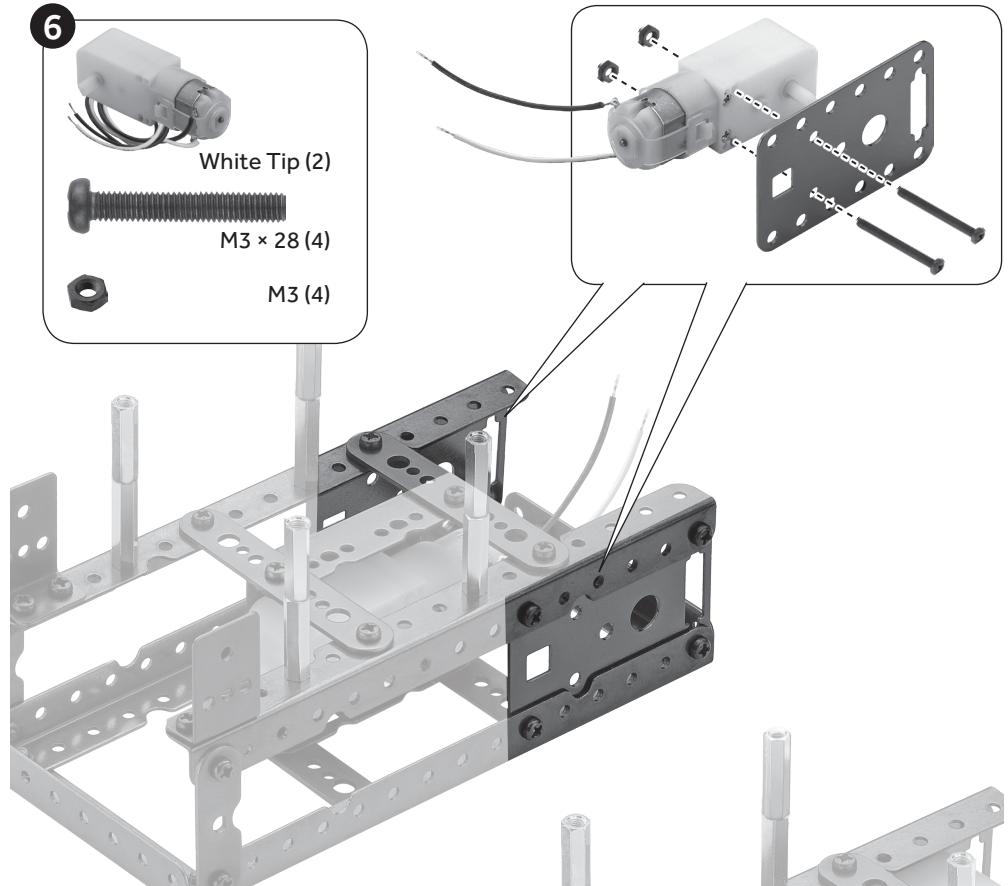


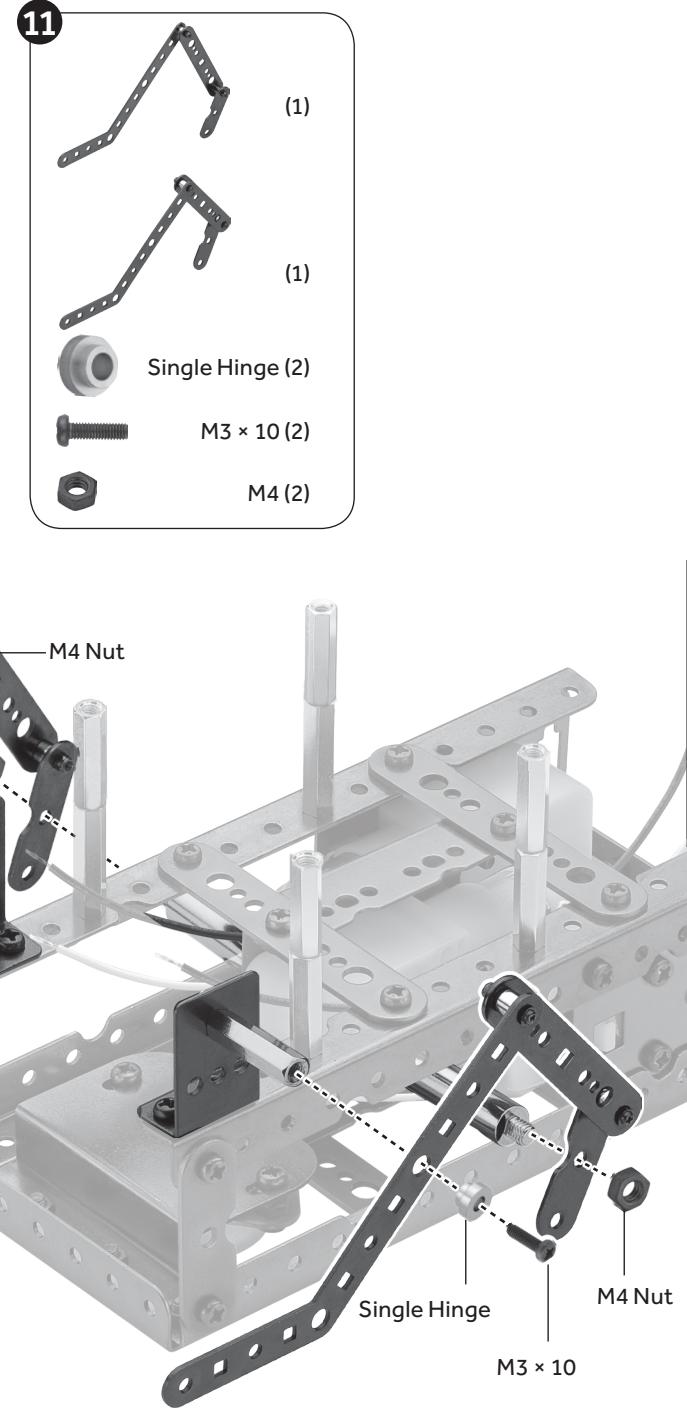
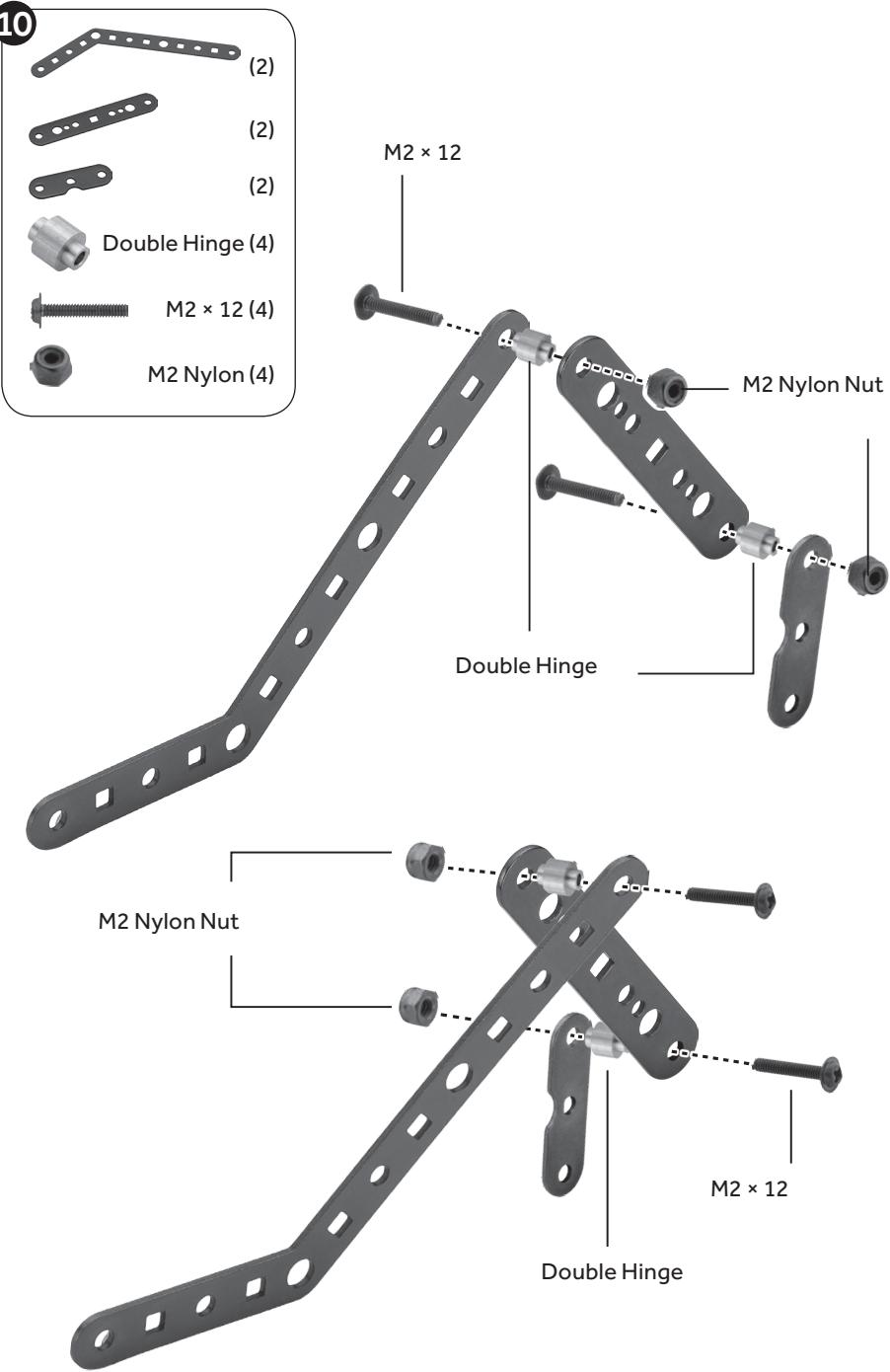
Bulldozer Robot

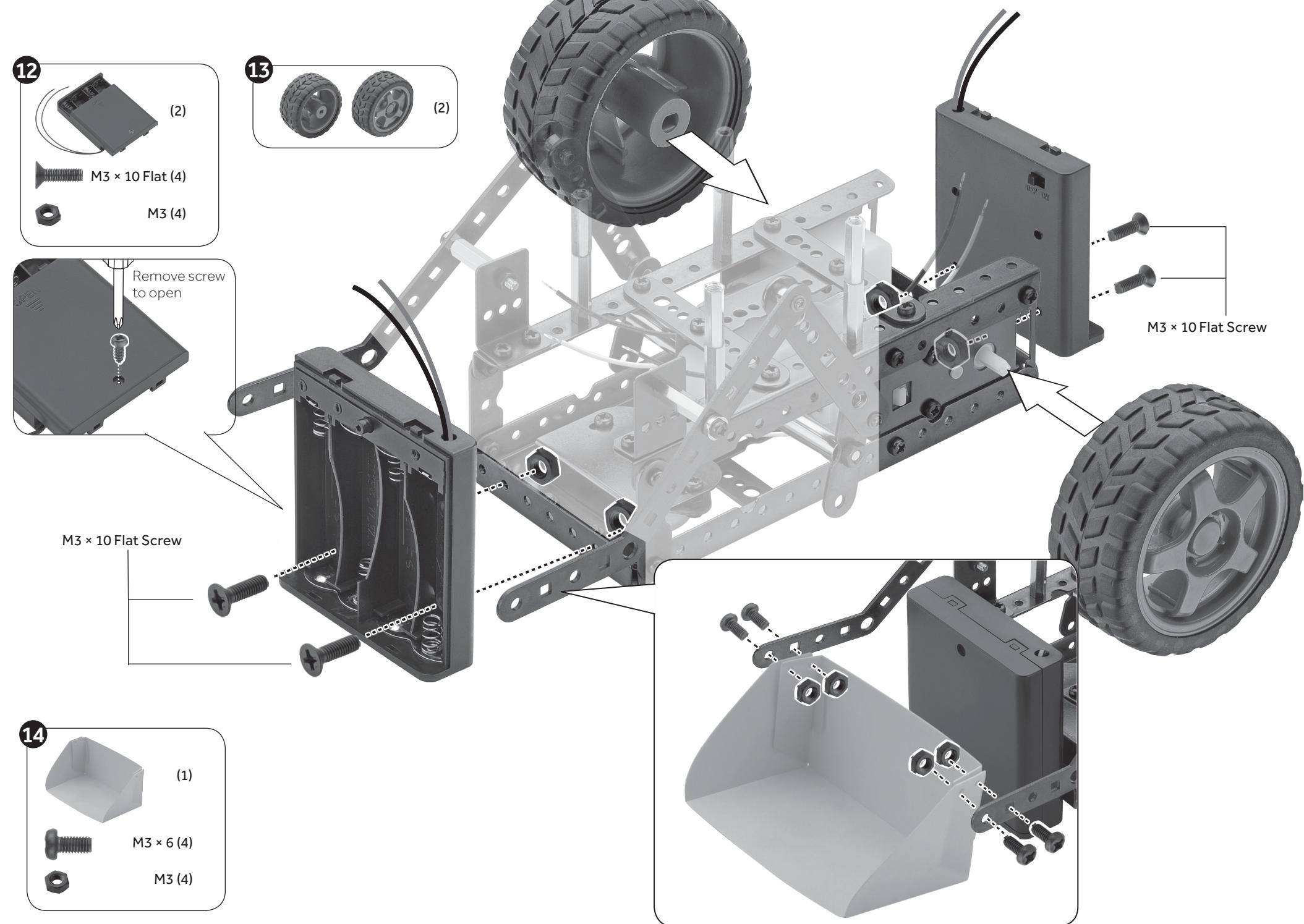
To build the Bulldozer Robot, begin by building the robot base (see "Project Kit 1 Robot Body" on page 6). Then build according to the following steps.

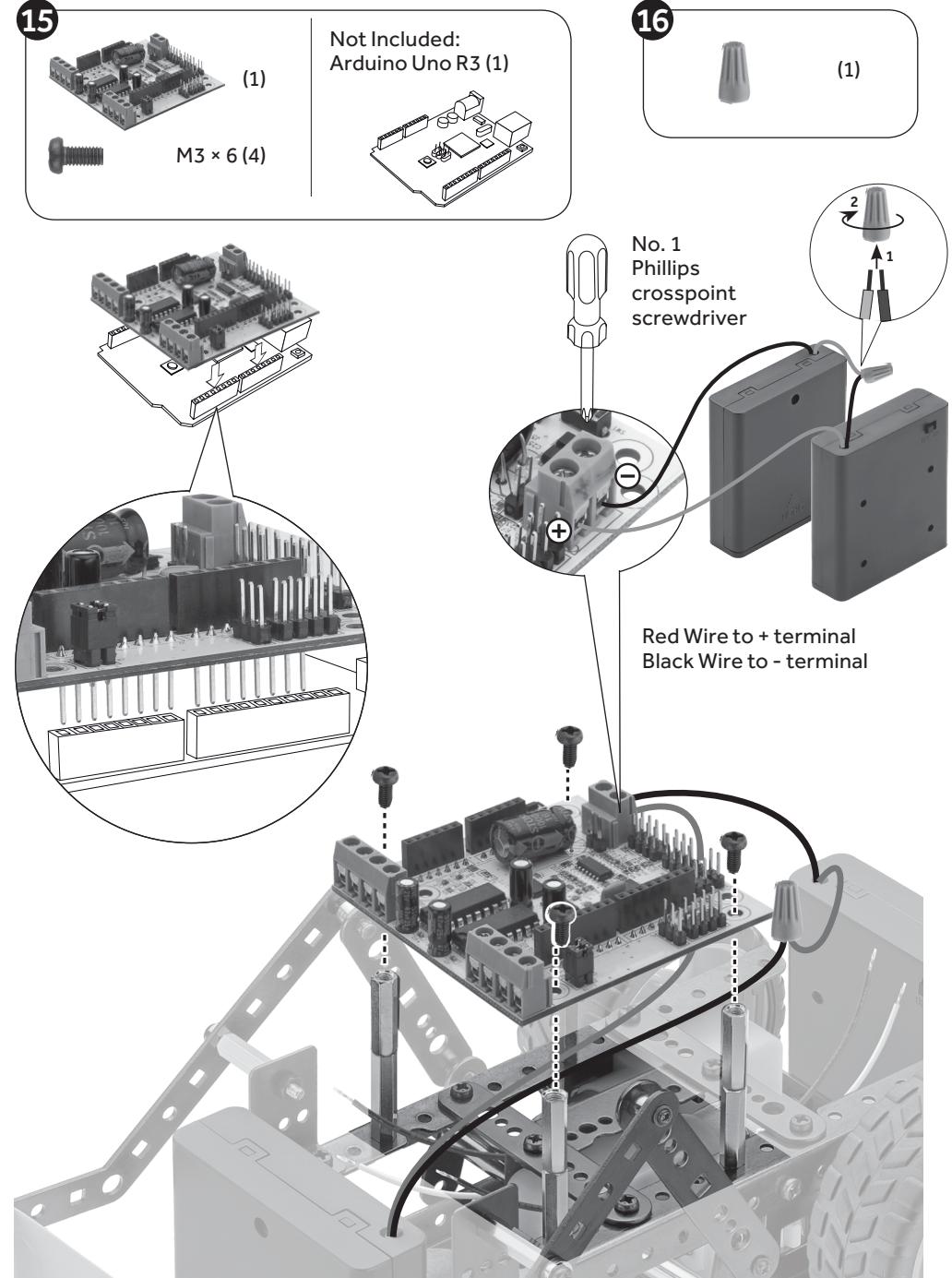






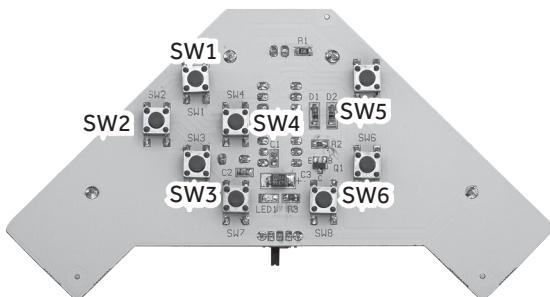






Download the Support Files

1. For the Arduino program and libraries, go to <http://shack.net/MakelRobotics>.
2. At the end of the blog post, click **Make: it Robotics Add-On Project Kit 1 Support Files** and save the folder to your computer.
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4. Connect your Arduino Uno R3 to your computer with a USB cable.
5. Remove the jumpers from J16 on the PCB to allow your Arduino's USB port to communicate with your computer.
6. Open one of the .ino files in the Arduino programming environment.
 - **Bulldozer_demo.ino** automatically cycles through each motor function.
 - **Bulldozer_home_remote.ino** cycles through each motor function when you press any key on any IR remote control you have in your home.
 - **Bulldozer_IR_remote.ino** allows you to control your robot using the Make: it Robotics Kit Remote Control.
7. Verify and upload the program to your Arduino Uno R3.
8. Remove the USB cable from your Arduino Uno R3.
9. Put the jumpers back onto J16. When the PCB is connected to your Arduino and the jumpers on J16 are in place, your Arduino's serial port will be unavailable.

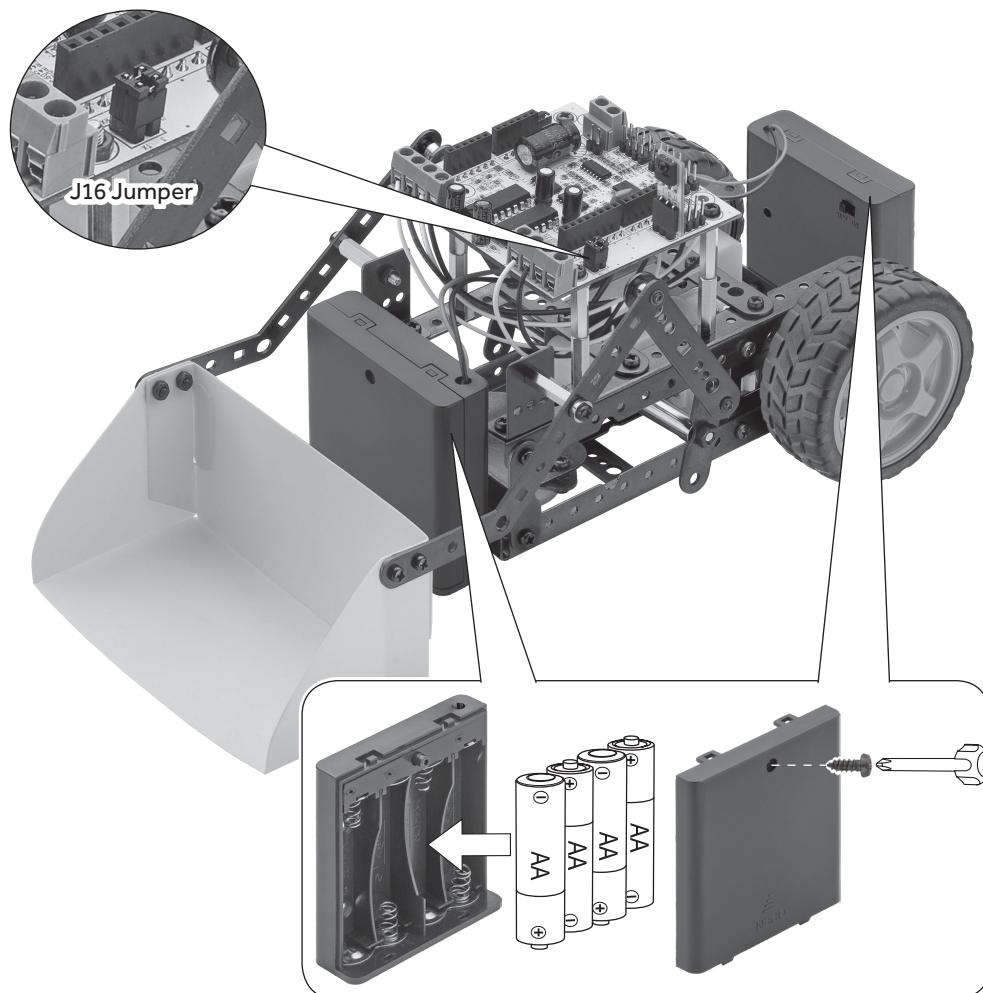


Make: it Robotics Remote Control (not included)

Button	Function
SW1	Forward
SW2	Turn left
SW3	Backward
SW4	Turn right
SW5	Blade up
SW6	Blade down

Play

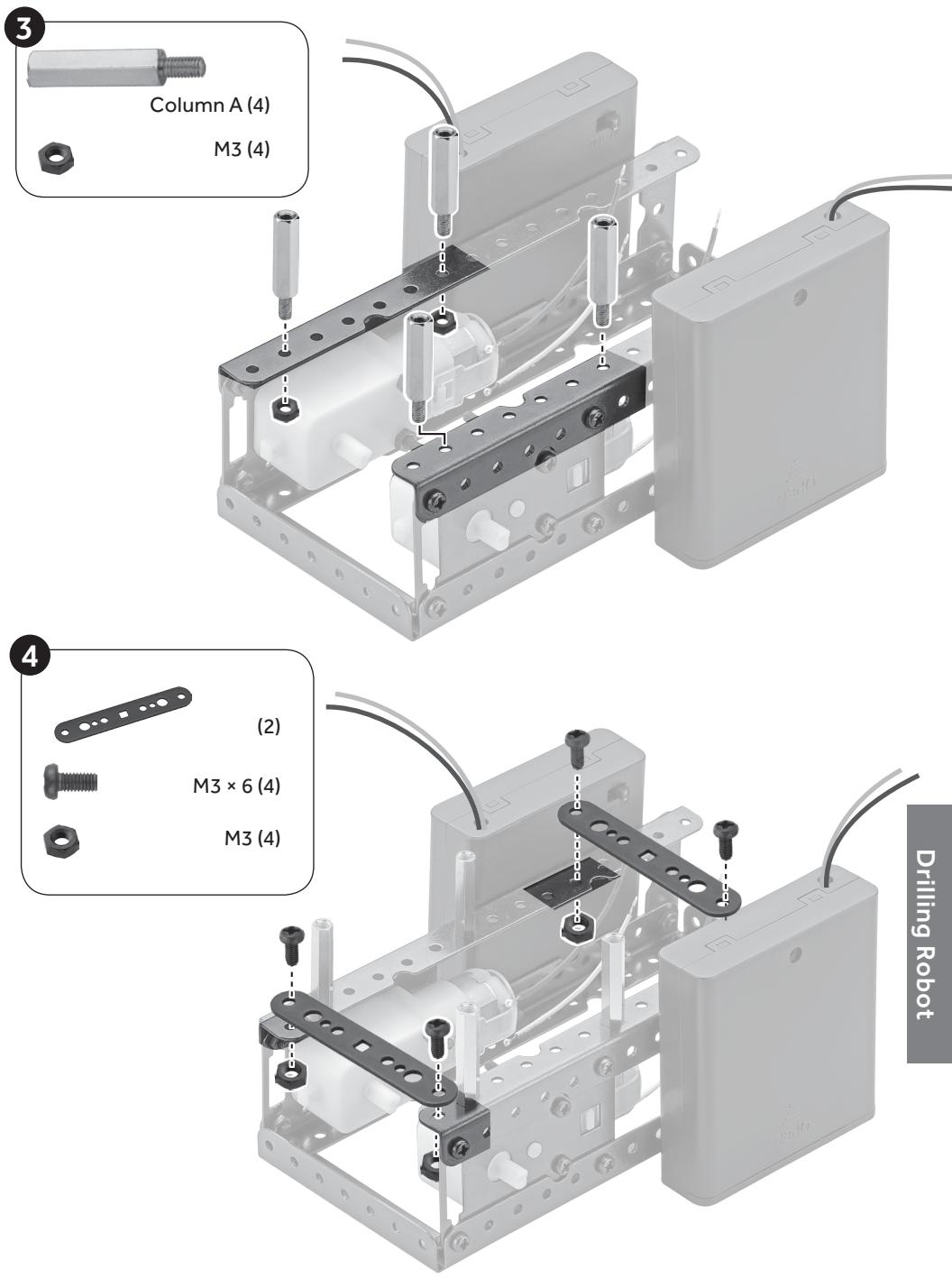
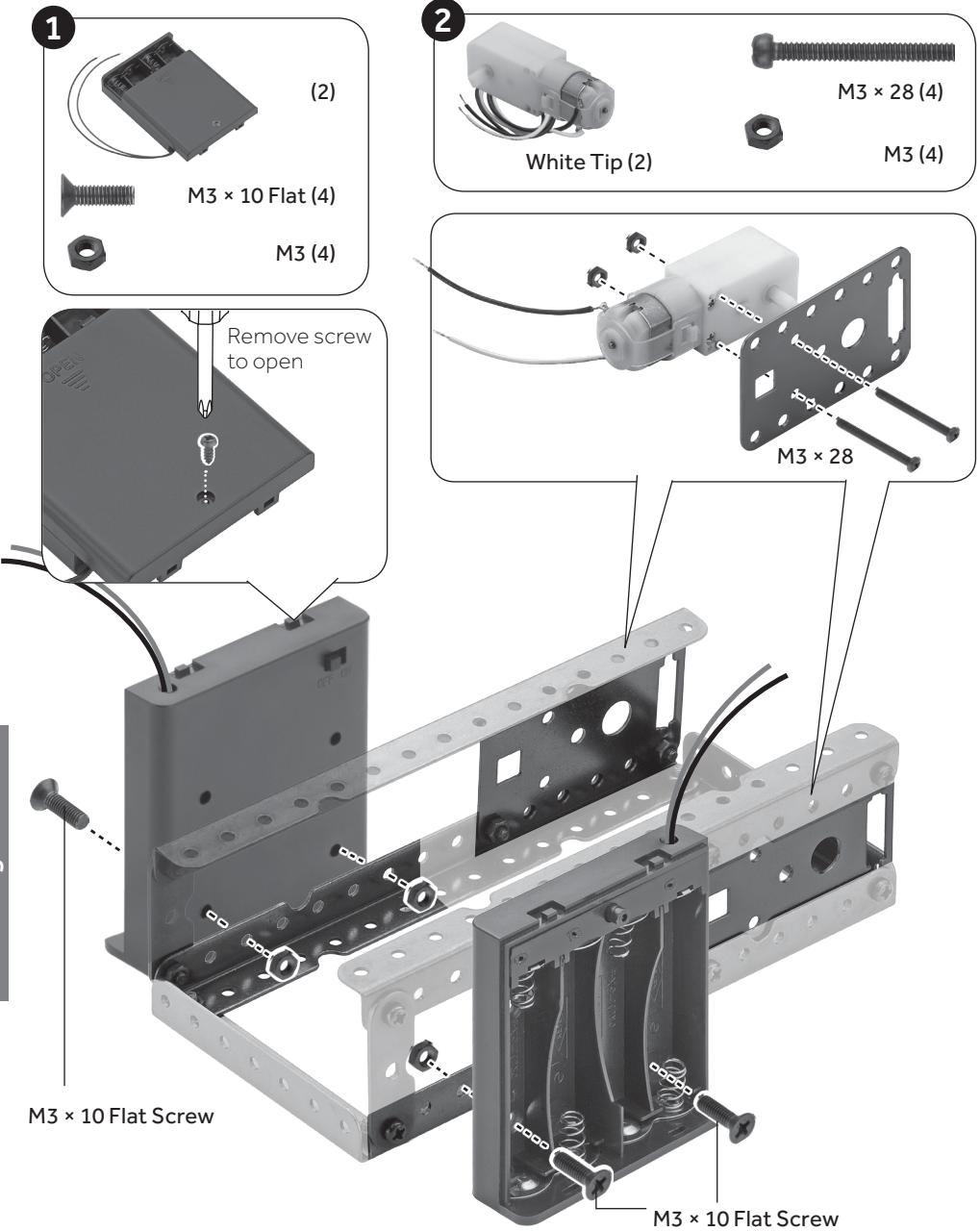
1. Install batteries into both battery compartments, matching the polarities marked inside. Replace the cover and screw.
2. Slide the power switches to ON on both battery compartments.
3. Experiment! Try programming the Arduino so that the bulldozer lifts its payload and moves a specific distance before deploying it.

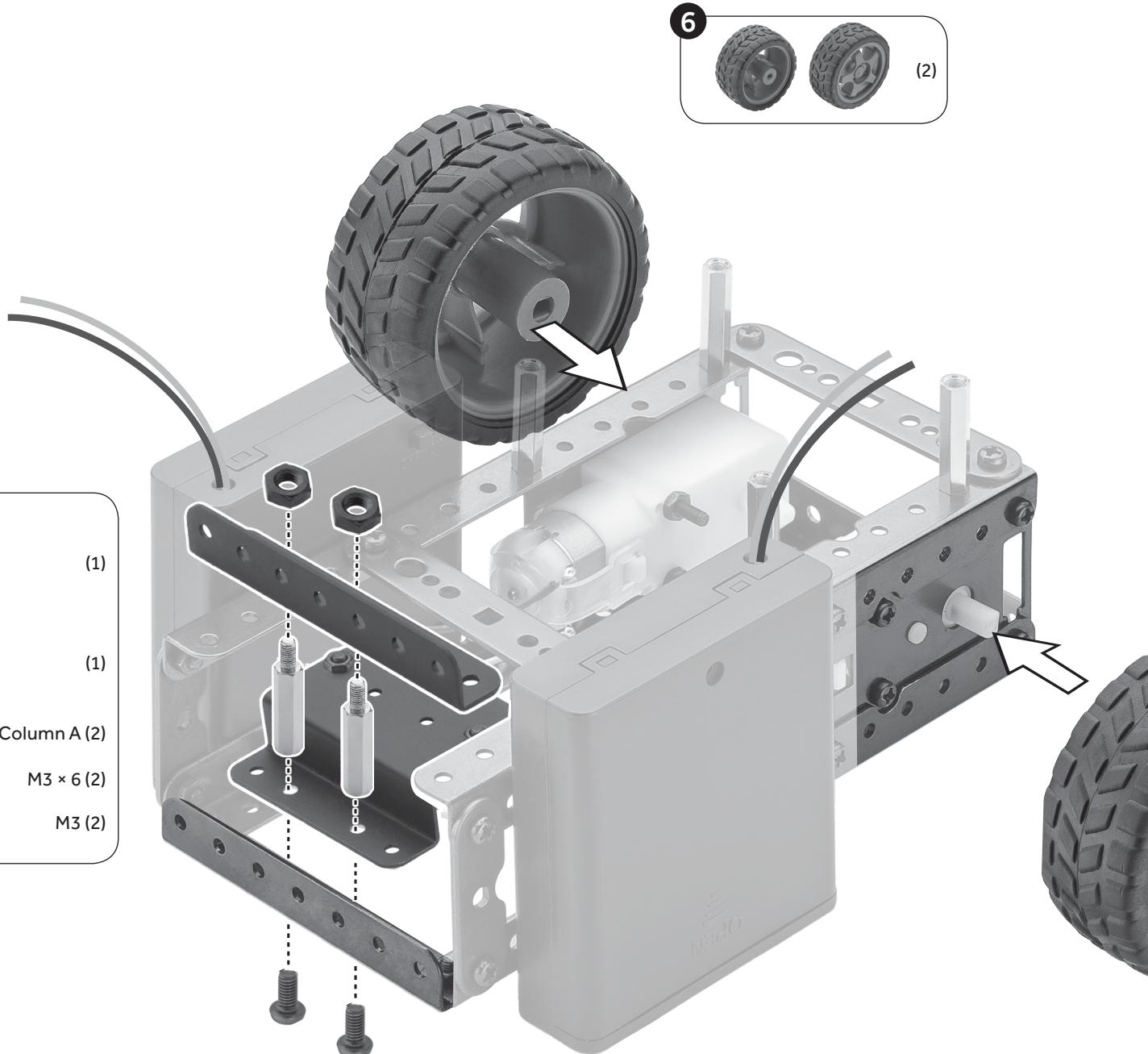
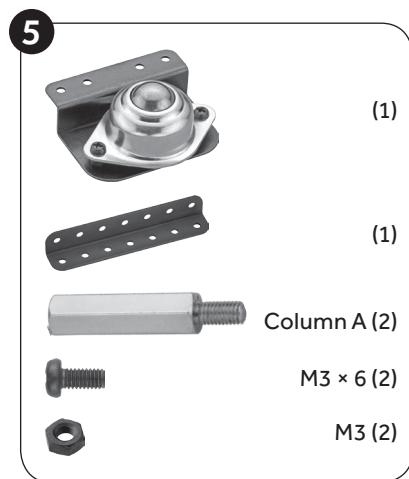


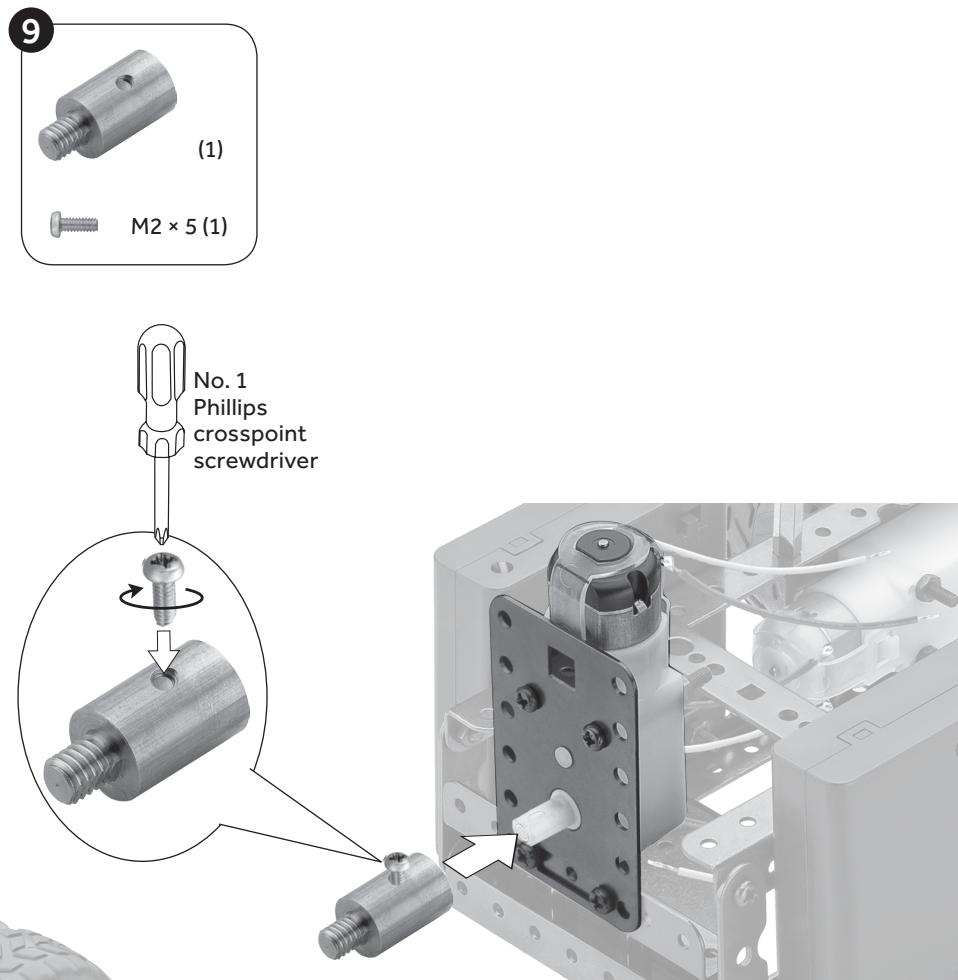
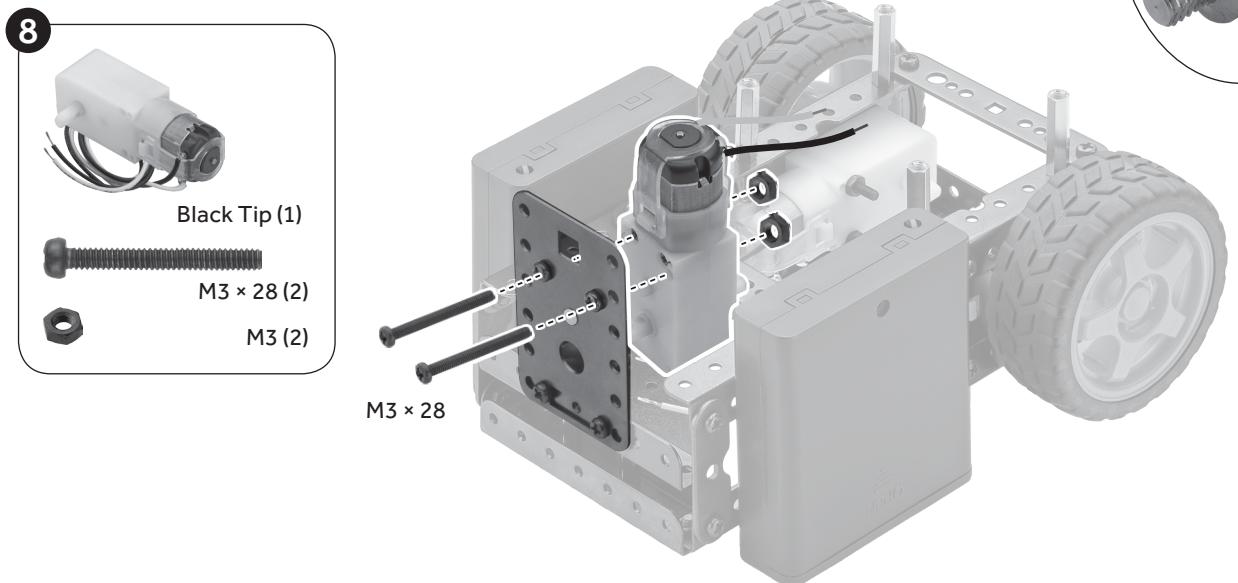
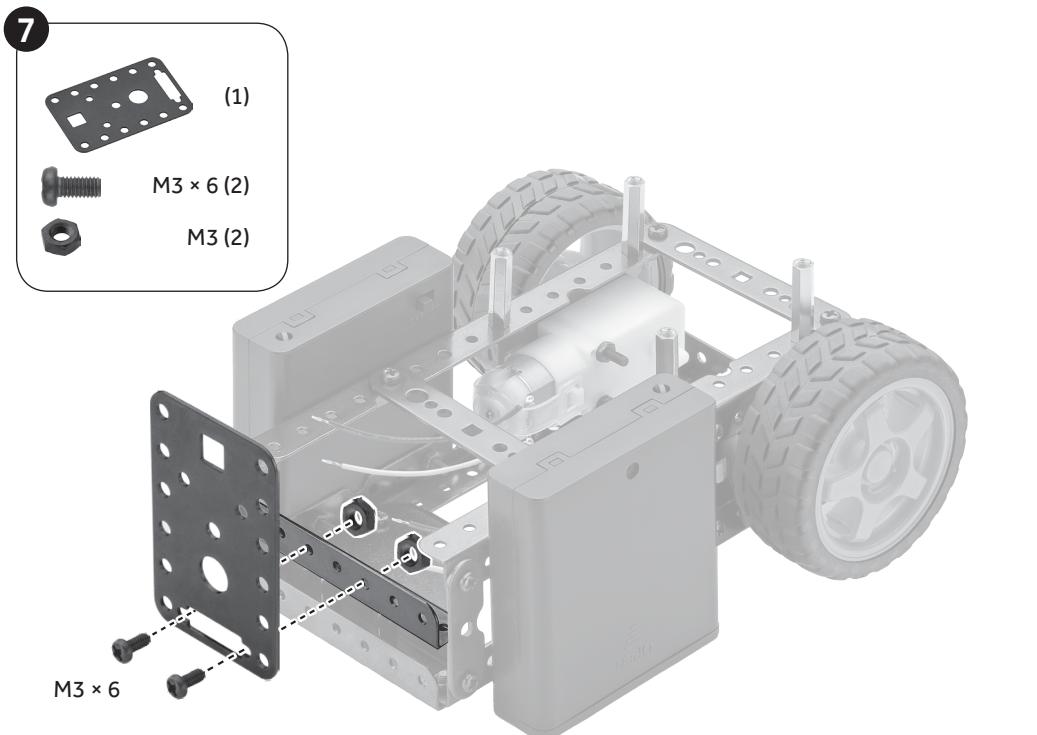
Drilling Robot

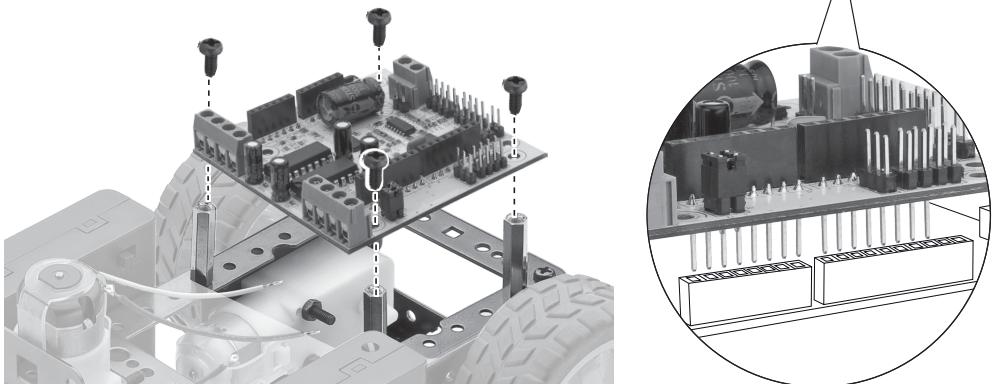
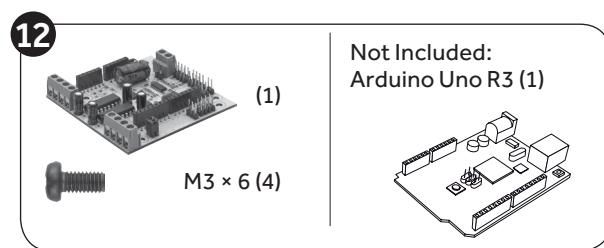
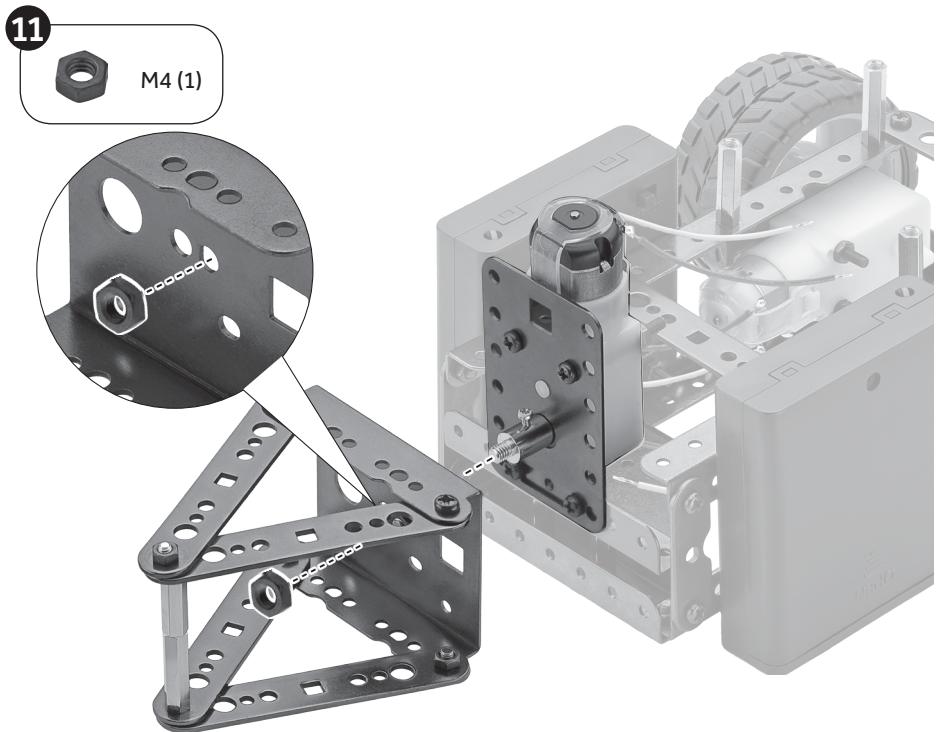
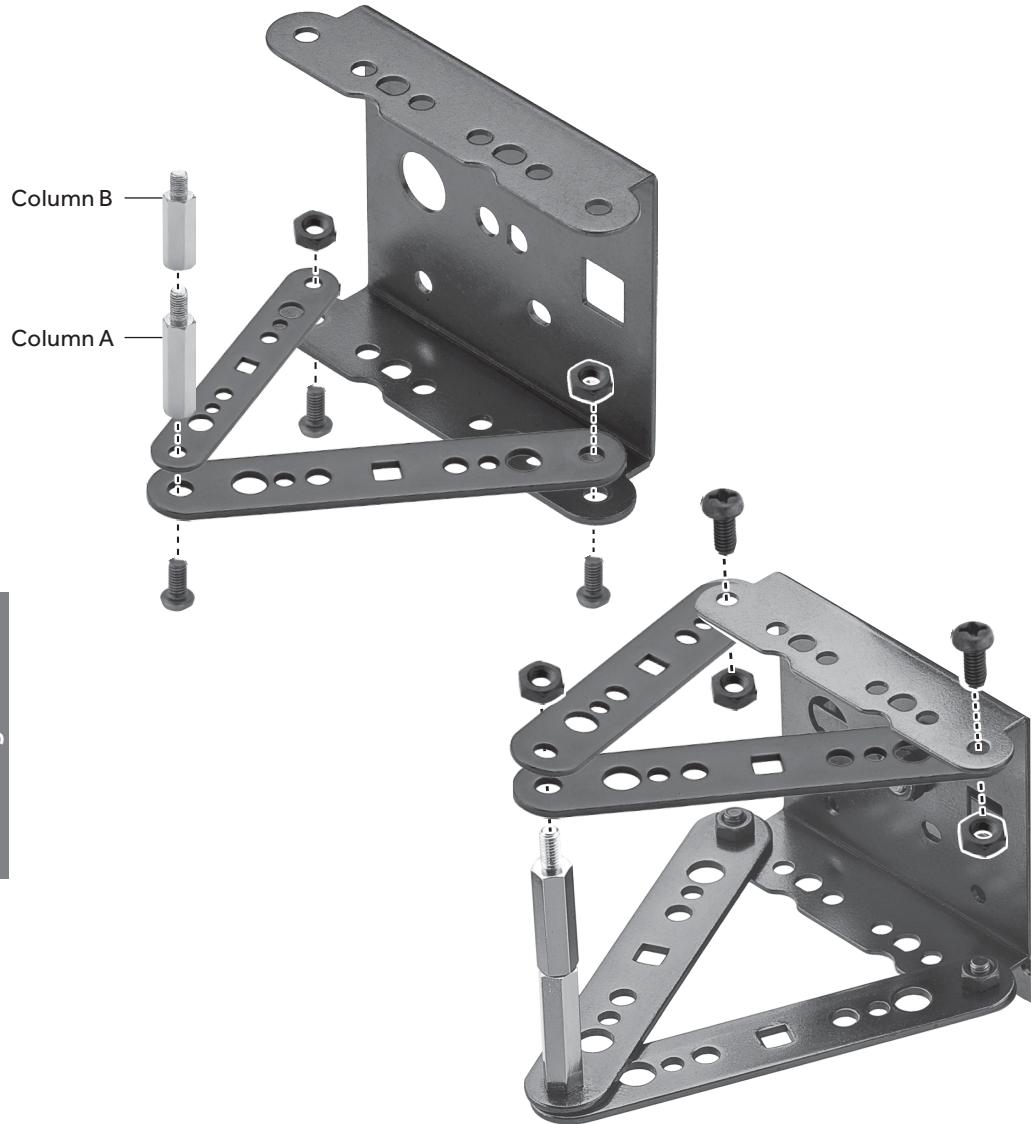
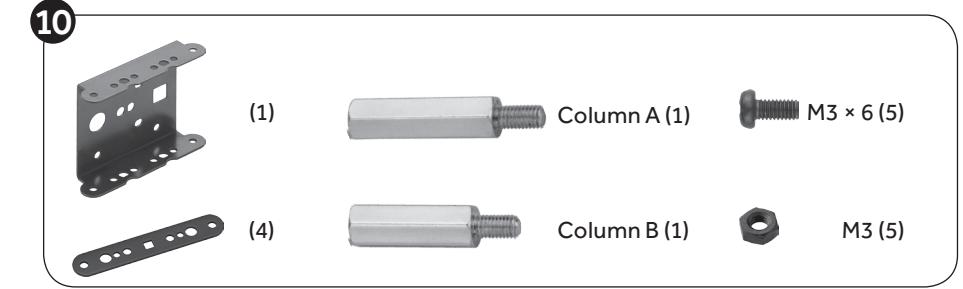
To build the Drilling Robot, begin by building the robot base (see "Project Kit 1 Robot Body" on page 6). Then build according to the following steps.

Drilling Robot

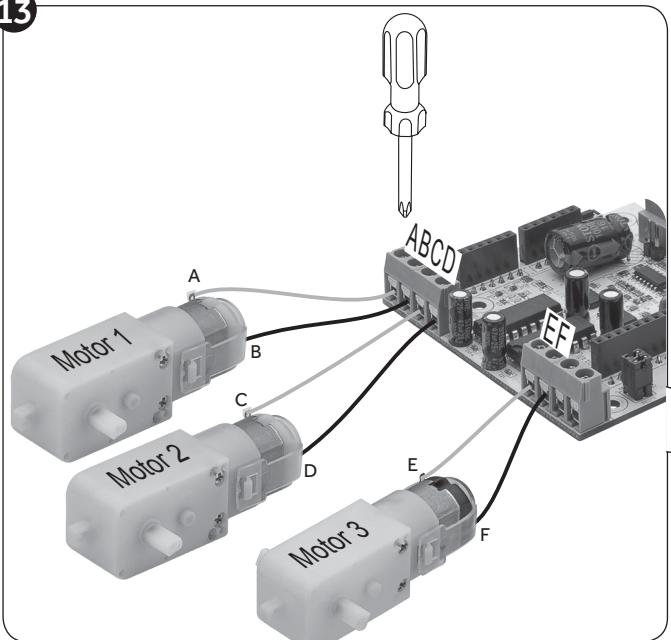








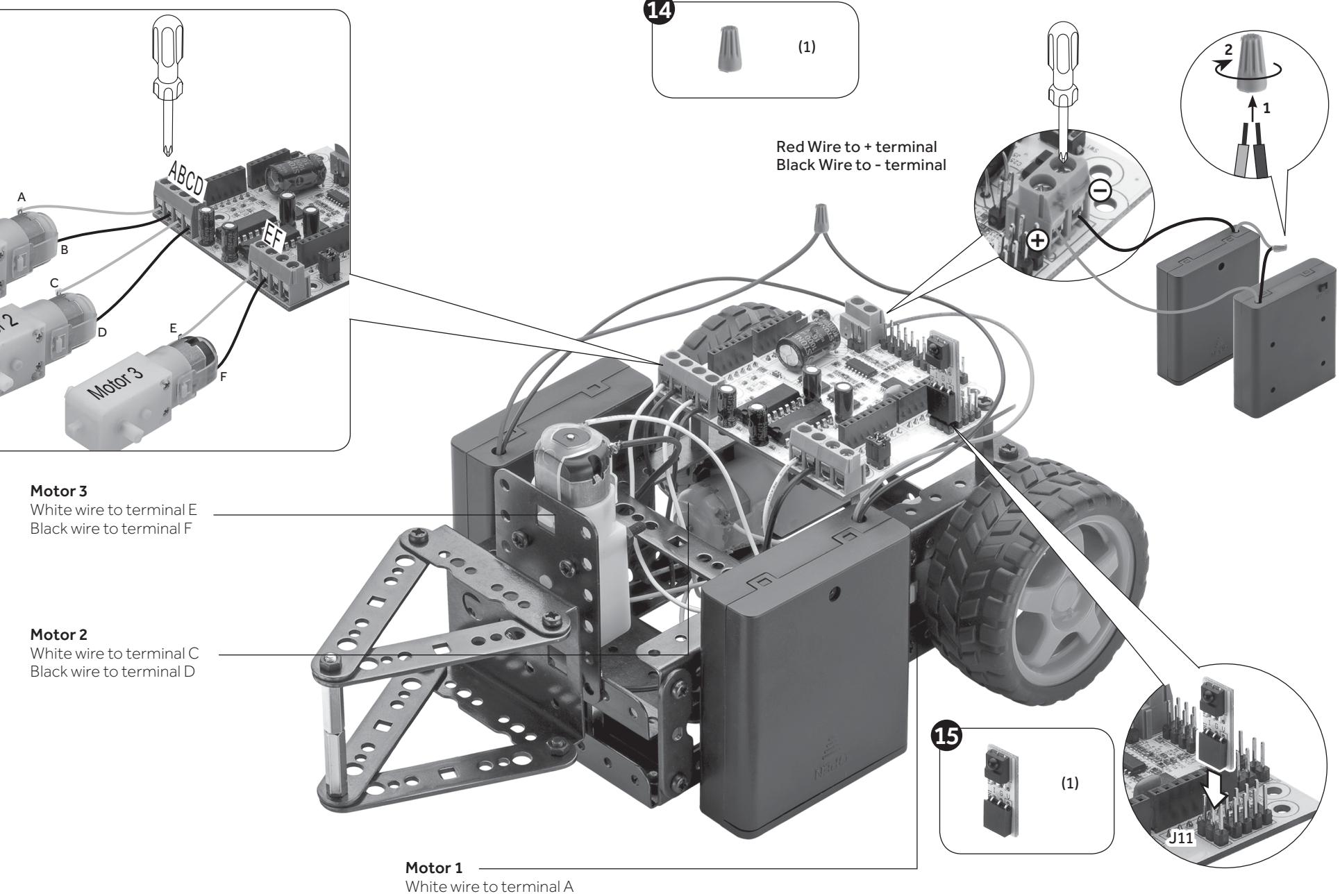
13

**Motor 3**

White wire to terminal E
Black wire to terminal F

Motor 2

White wire to terminal C
Black wire to terminal D



14

(1)

Red Wire to + terminal
Black Wire to - terminal

15

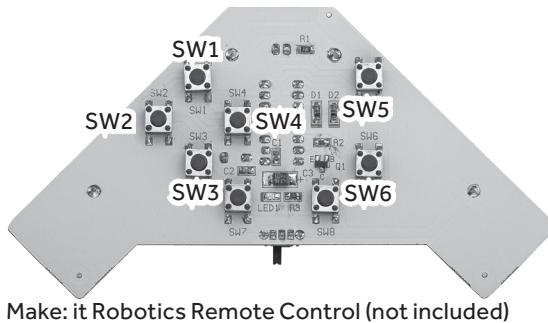
(1)

Motor 1

White wire to terminal A
Black wire to terminal B

Download the Support Files

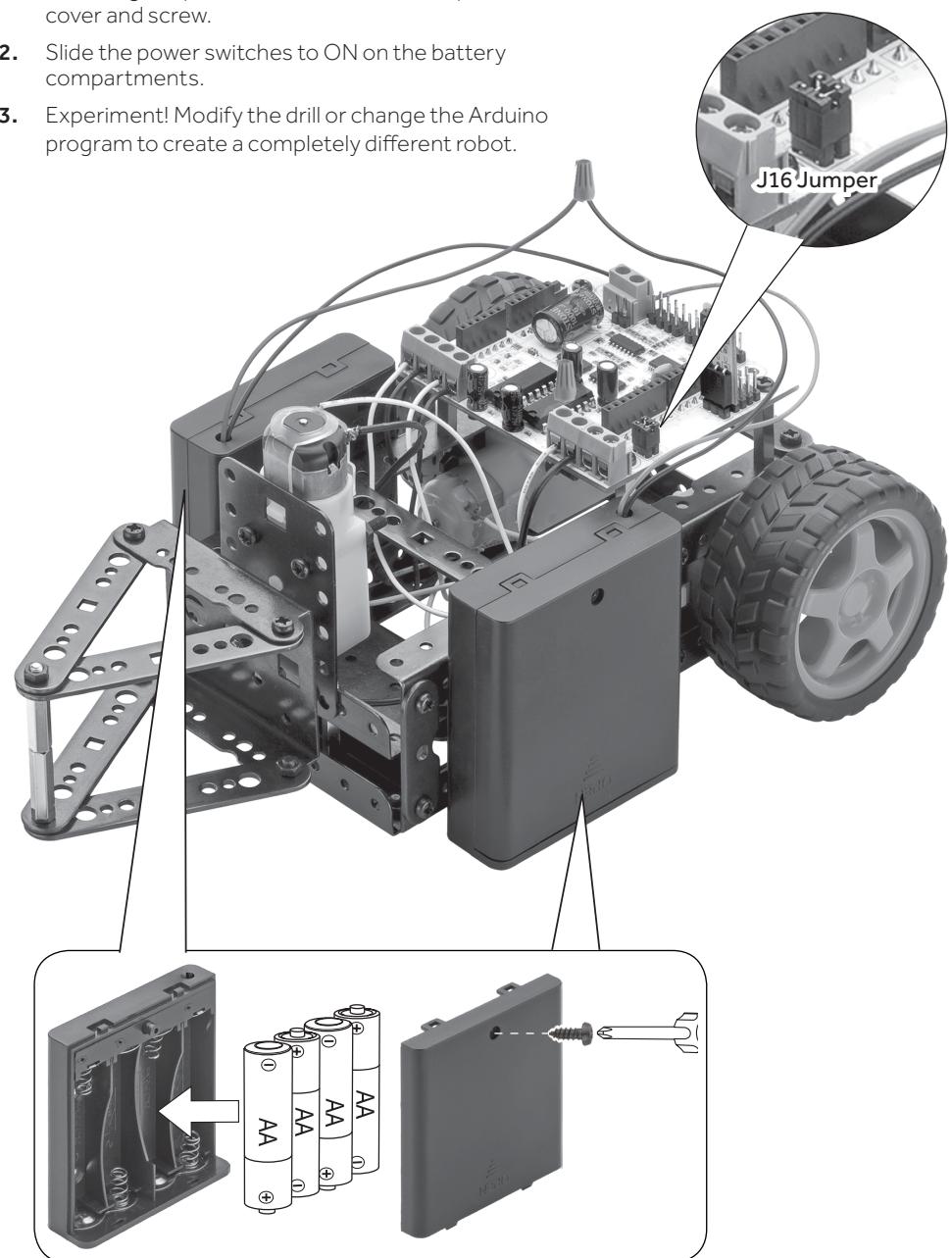
1. For the Arduino program and libraries, go to <http://shack.net/MakelRobotics>.
2. At the end of the blog post, click **Make: it Robotics Add-On Project Kit 1 Support Files** and save the folder to your computer.
3. If you have not created a directory in your Arduino folder for the Make: it Robotics programs, open READ_ME.txt and follow the directions.
4. Connect your Arduino Uno R3 to your computer with a USB cable.
5. Remove the jumpers from J16 on the PCB to allow your Arduino's USB port to communicate with your computer.
6. Open one of the .ino files in the Arduino programming environment.
 - **Drill_demo.ino** automatically cycles through each motor function.
 - **Drill_home_remote.ino** cycles through each motor function when you press any key on any IR remote control you have in your home.
 - **Drill_IR_remote.ino** allows you to control your robot using the Make: it Robotics Kit Remote Control.
7. Verify and upload the program to your Arduino Uno R3.
8. Remove the USB cable from your Arduino Uno R3.
9. Put the jumpers back onto J16. When the PCB is connected to your Arduino and the jumpers on J16 are in place, your Arduino's serial port will be unavailable.



Button	Function
SW1	Forward
SW2	Turn left
SW3	Backward
SW4	Turn right
SW5	Rotate drill clockwise
SW6	Rotate drill counter-clockwise

Play

1. Install batteries into the battery compartments, matching the polarities marked inside. Replace the cover and screw.
2. Slide the power switches to ON on the battery compartments.
3. Experiment! Modify the drill or change the Arduino program to create a completely different robot.



FCC Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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