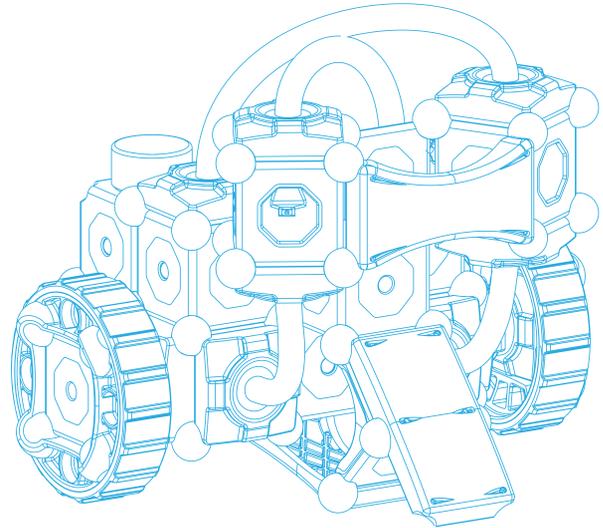


# MOSS

**Exofabulatronixx 5200**

Guide to Getting Started



Modular  
Robotics

# Modular Robotics

MOSS is designed and assembled by Modular Robotics in Boulder, CO USA from components made all over the world.

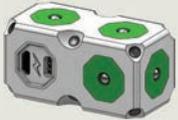
Modular Robotics  
3085 Bluff Street  
Boulder, CO 80301

(303) 656-9407

For questions and more robots, visit:

**[www.modrobotics.com](http://www.modrobotics.com)**

# 1. Getting Started



Extended  
Battery  
x1



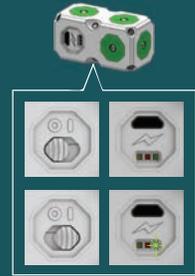
Proximity  
Sensor  
x1



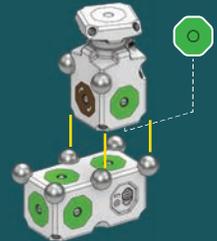
Motor  
x1

- A** Every MOSS robot needs a Battery Block. The Exofabulatronixx 5200 kit includes one Extended Battery Block. Flip the power switch on and the green LED will tell you that your Extended Battery Block is charged. It'll turn red when it's getting low, but you can recharge it using the included Micro USB cable. Just plug it into your computer until the yellow charging light turns off!
- B** Attach a Motor Block so that one of its green power faces is connected to a green power face on the Extended Battery Block. Now the Motor Block is powered, but it still needs an input to tell it how to spin.
- C** Attach a Proximity Sensor with one of its green faces connected to a green power face on the Extended Battery Block. Make sure that the red data-output face of the Proximity Sensor is connected to one of the Motor's brown data-input faces.
- D** Woo! You just created a simple MOSS robot. The Motor now responds to the Proximity Sensor. Move your hand in front of it to find the sweet spot where the Motor stops and changes direction.

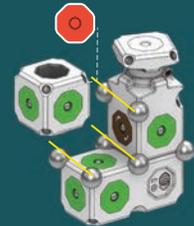
A



B



C



D



# 2. Face Colors

Understanding the colors of MOSS faces is essential to building robots. Power and Data must flow through your construction without mixing. If they do, you won't hurt MOSS, but your robot may misbehave.



### Power

Green faces route power throughout a MOSS robot. Once a block is powered by connecting a green face to a Battery Block, its other green faces will power more blocks.



### Data In

Brown faces listen for data to tell that block what to do. Connect a red face on a sensor to the brown face on a Motor Block and it'll drive according to the sensor's output.



### Data Out

Red faces broadcast data. For instance, the red face on a Proximity Sensor sends out data according to how close it is to an object.



### Pass-through

Blue faces can conduct either Power or Data, but not both at once. You can use the blue faces on a Flexy Block to connect two faces that can't be arranged to touch.

# 3a. The Brain Block

## Introduction:

You can remotely control your robot with Bluetooth using a Brain Block! The Exofabulatronixx 5200 includes a Double Brain Block. The Double Brain has eight red data faces, numbered one through eight.

You can use the Double Brain to pair your constructions with any of our free iOS or Android MOSS mobile apps. Pair your Double Brain to a Mac or PC to reprogram your Brain Block using MOSS Scratch or MOSS Flash. By pairing with different applications you can remotely control your constructions, read data from sensors, and reprogram your construction to exhibit entirely new behaviors. Learn more at [www.modrobotics.com/moss](http://www.modrobotics.com/moss)

Two constructions in this guide require the use of the Brain Block. You'll need to pair via Bluetooth with a mobile app to control and maneuver those robots.



As you build, note the numbered faces on the Double Brain Block. They correspond to the numbered controls in apps such as MOSS Control.



Look for this symbol to know when a construction requires a Bluetooth-connected mobile device to operate.



Made for Apple iPhone®, iPad®, and iPod®

iPhone 5s iPad (4th generation)  
iPhone 5c iPad mini  
iPhone 5 iPad (3rd generation)  
iPhone 4s iPad 2  
iPhone4 iPod touch (5th generation)  
iPhone 3GS iPod touch (4th generation)

"Made for iPod," "Made for iPhone," and "Made for iPad" mean that an electronic accessory has been designed to connect specifically to iPod, iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that use of the accessory with iPod, iPhone or iPad may affect wireless performance.

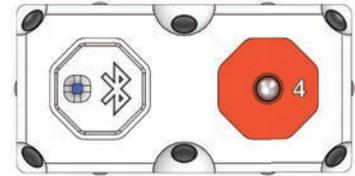
# 3b. Pairing the Brain Block

**A** When using your Double Brain Block you'll need to pair it with an Android or iOS mobile device. Before you begin, make sure your device has Bluetooth capability and it is turned ON.

**B** Connect your Double Brain Block to the Extended Battery and turn the battery on. If you do not see a series of flashing colors on your Double Brain Block or need help with this step, please refer to Section "1. Getting Started."

**C** Once you power on your construction, you'll need to use your mobile device to complete the pairing. Open your Bluetooth settings and look for the MOSS Brain Block you wish to pair with. For additional help please refer to your specific device's support guide.

**D** When you pair with a MOSS Brain Block, its LED indicator light will turn solid blue indicating a successful connection. You are now ready to use one of our free mobile apps to play!



The flashing lights on a Brain Block are the identifying code. Each color corresponds to a letter at the end of a MOSS block name. For example a red light corresponds with the letter "R." Use the three color codes to tell MOSS brains apart.



Control



Log



Dashboard



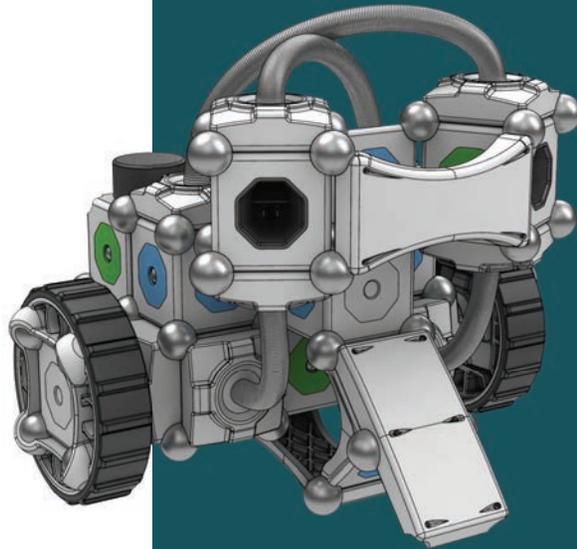
Sketch

To learn more about our mobile apps visit [www.modrobotics.com/moss/apps](http://www.modrobotics.com/moss/apps)



## Robot 1806: Braitenbird

The splendid Braitenbird is a flightless MOSS robot that uses two proximity-sensing “eyes” to detect and avoid obstacles. A robotic marvel of magical movement inspired by the writings of Valentino Braitenberg. Build this adventurous avian wanderer and watch it navigate through a forest of standing books with incredibly lifelike behavior.





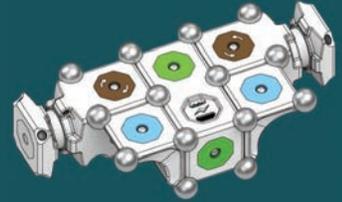
Extended Battery  
x1



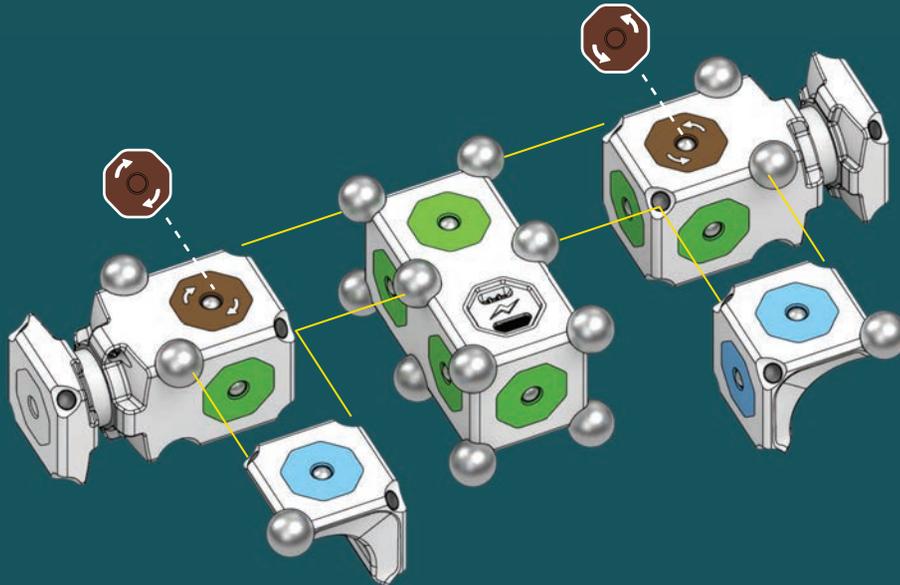
Corner  
x2



Motor  
x2



1





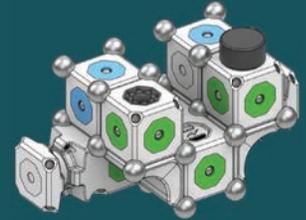
Microphone  
Sensor  
x1



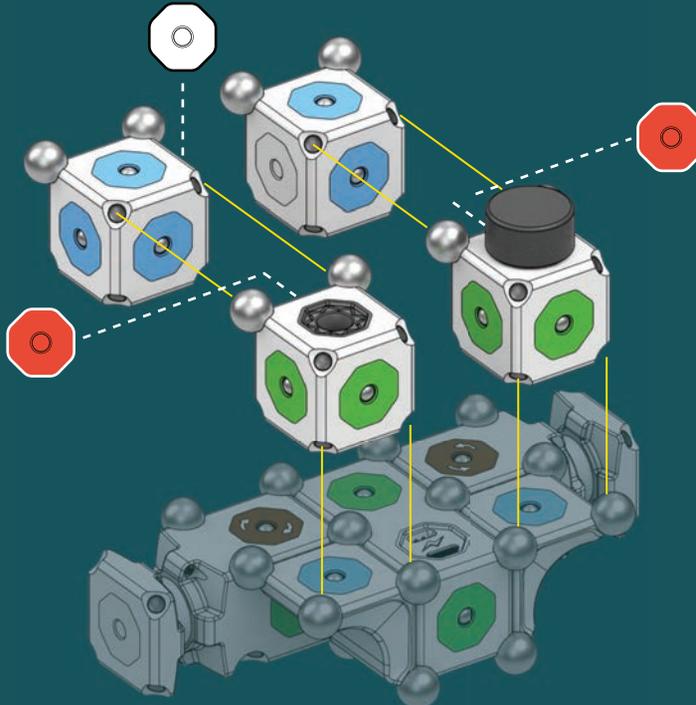
Knob  
Sensor  
x1



Hub  
x2



2





Proximity  
Sensor  
x2



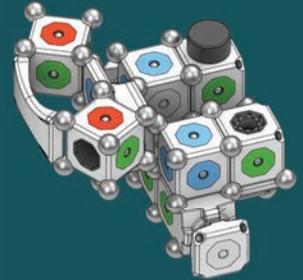
Hub  
x1



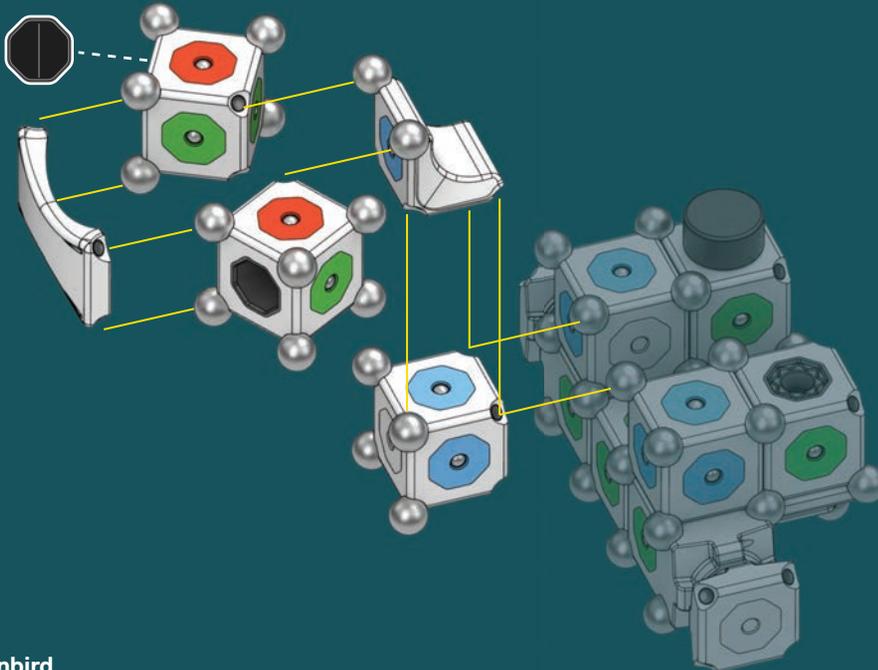
Corner  
x1



Arch Brace  
x1



3





Short Flexy  
x2



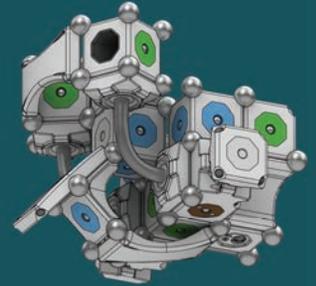
Corner  
x1



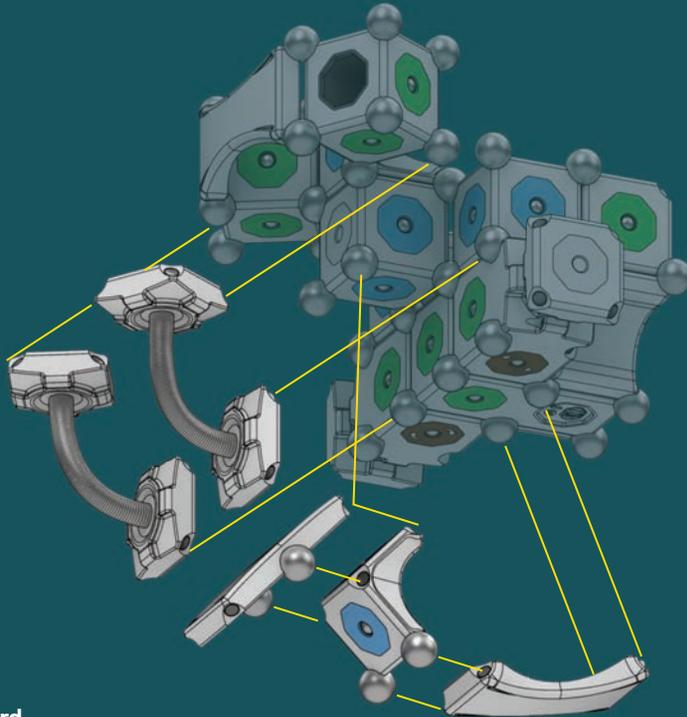
Arch Brace  
x1



Short Brace  
x1



4

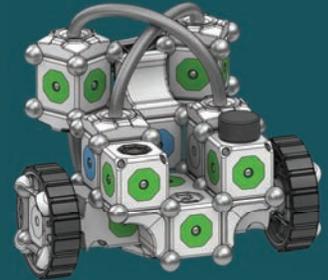




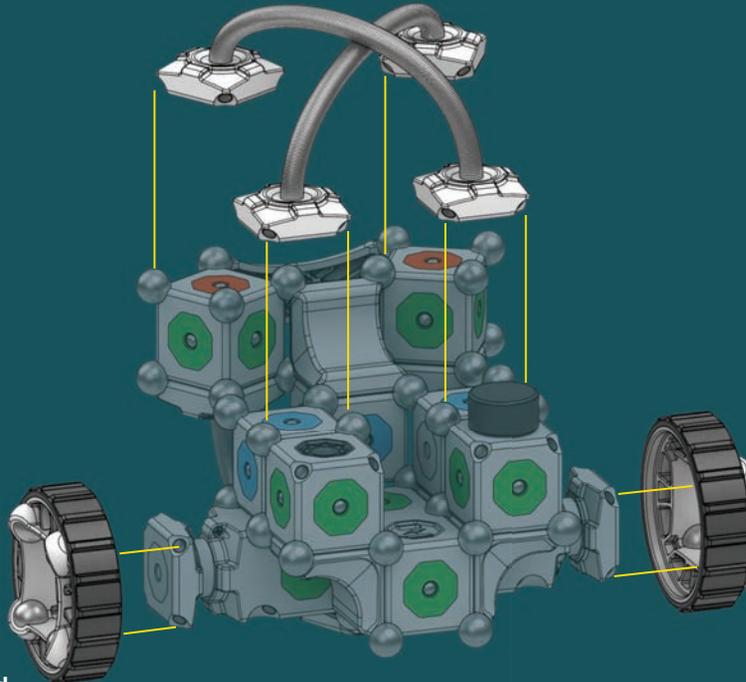
Wheel  
x2

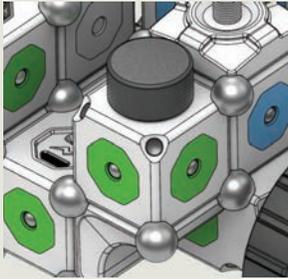


Long Flexy  
x2

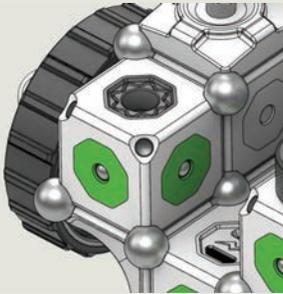


5





Adjust the Knob Sensor to tune Braitenbird's forward movement to the left or right.



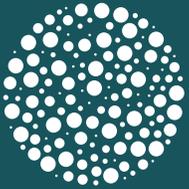
If Braitenbird gets stuck, free it by clapping your hands to trigger the Microphone Sensor.

## Play Guide: Braitenbird

Braitenbird uses two Proximity Sensors to sense and avoid obstacles.

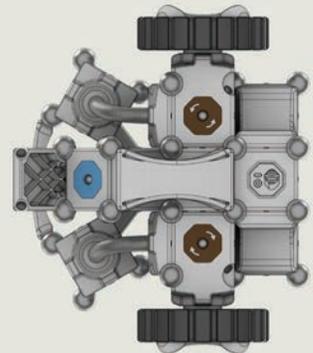
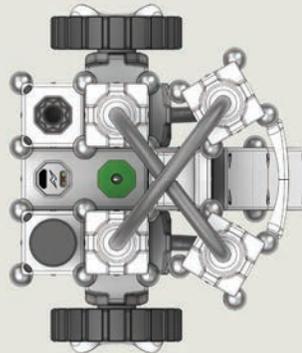
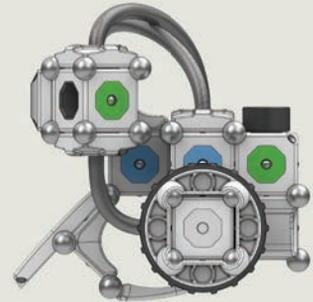
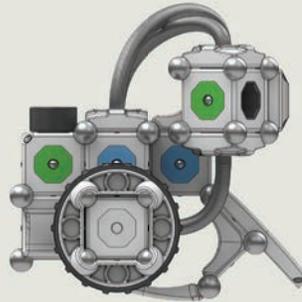
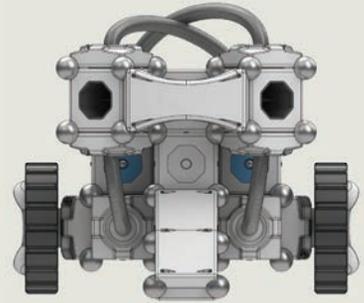
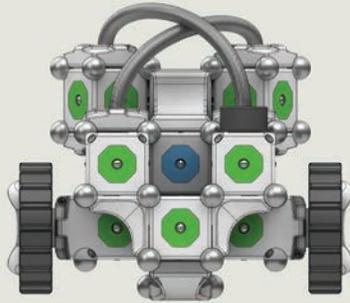
The Proximity Sensor uses infrared light to detect objects. Sensors may need to get close to dark objects to detect them.

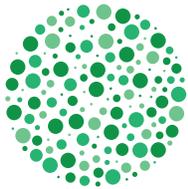
Try building a maze out of books for your Braitenbird to wander through!



**MOSS**

Robot 1806:  
**Braitenbird**

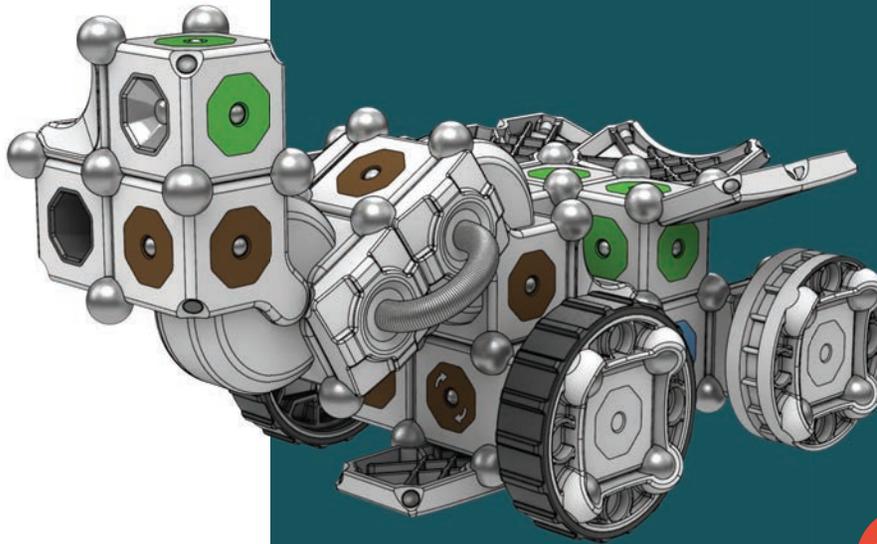




# MOSS

## Robot 704: Inquisitronic

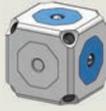
Harness the spirit of cosmic exploration with the MOSS planetary rover, Inquisitronic. This remote-controlled, two-wheel-drive vehicle is adept at exploring the mysterious terrain under your bed. Is that your long-lost sock or an alien life form? Shed some light on the matter with the proximity-sensing flashlight arm. Take readings of ambient brightness and noise with the rear-mounted sensors. This is your opportunity to explore new worlds with only your curiosity to guide you!



Connected Device  
Required



Double Brain  
x1



Hub  
x2



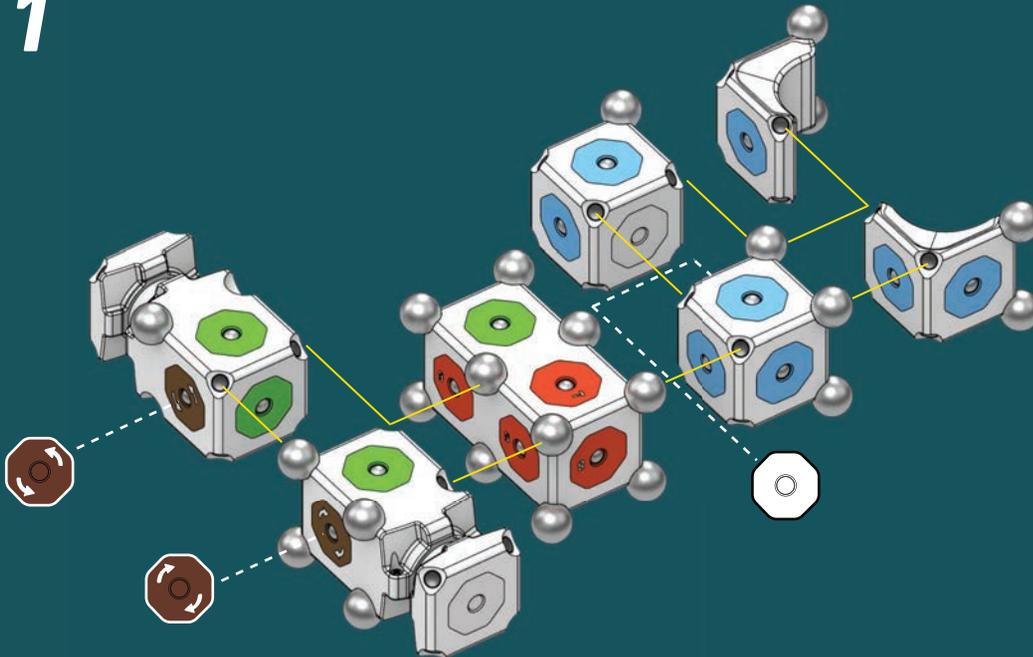
Corner  
x2



Motor  
x2

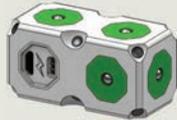


1





Pivot  
x1



Extended Battery  
x1



Microphone  
Sensor  
x1



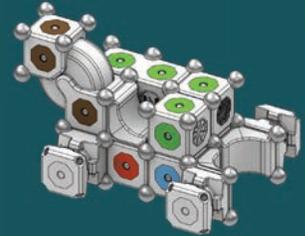
Brightness  
Sensor  
x1



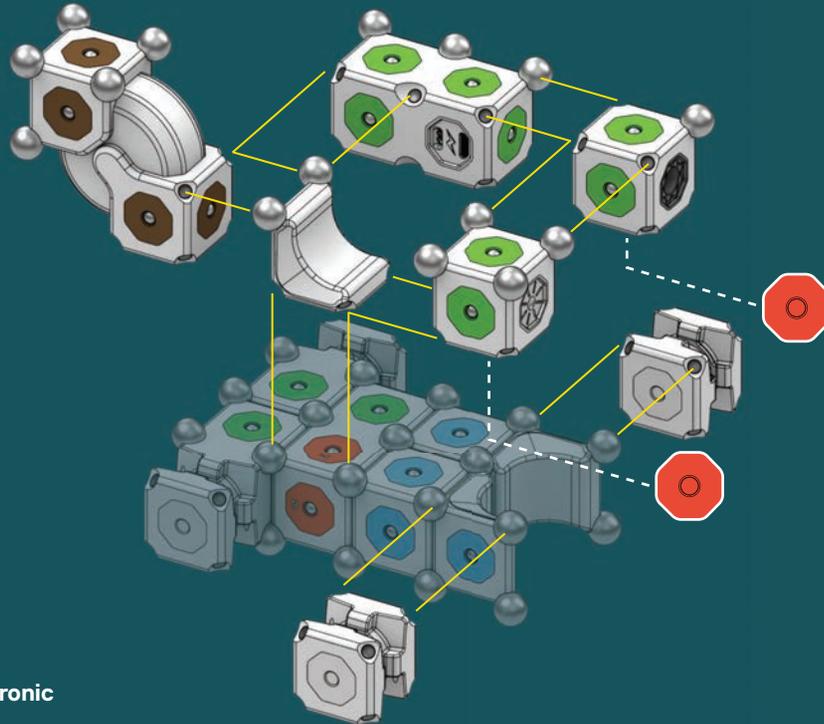
Axle  
x1

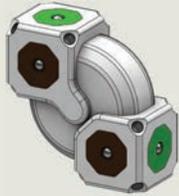


Corner  
x1



2

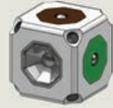




Pivot  
x1



Wheel  
x2



Flashlight  
x1



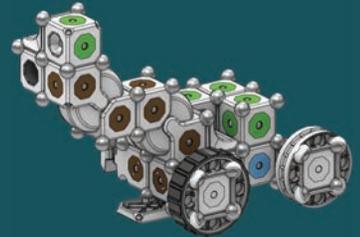
Corner  
x1



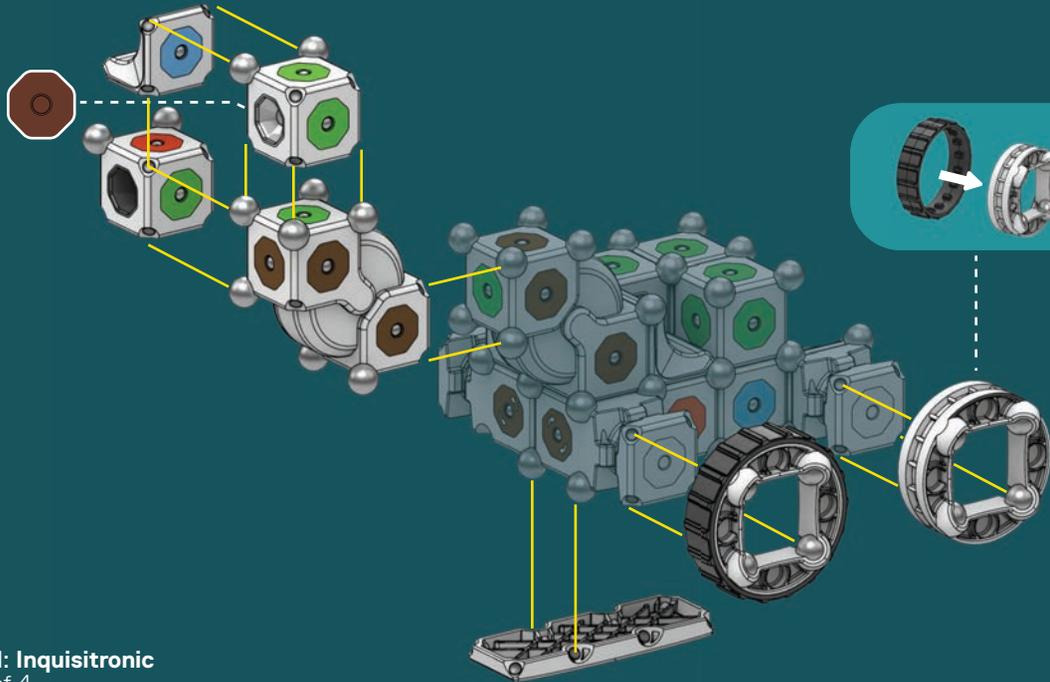
Proximity  
Sensor  
x1

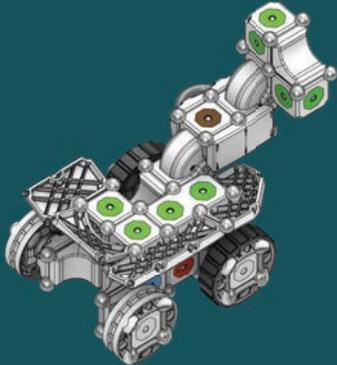
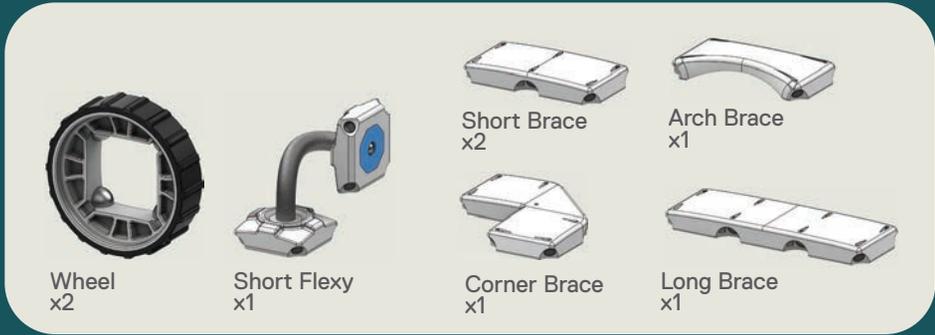


Long Brace  
x1

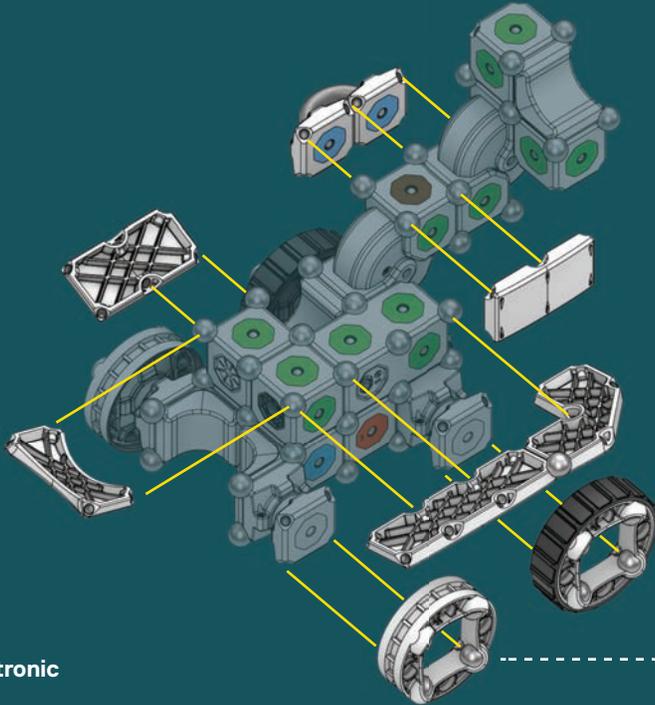


3





4

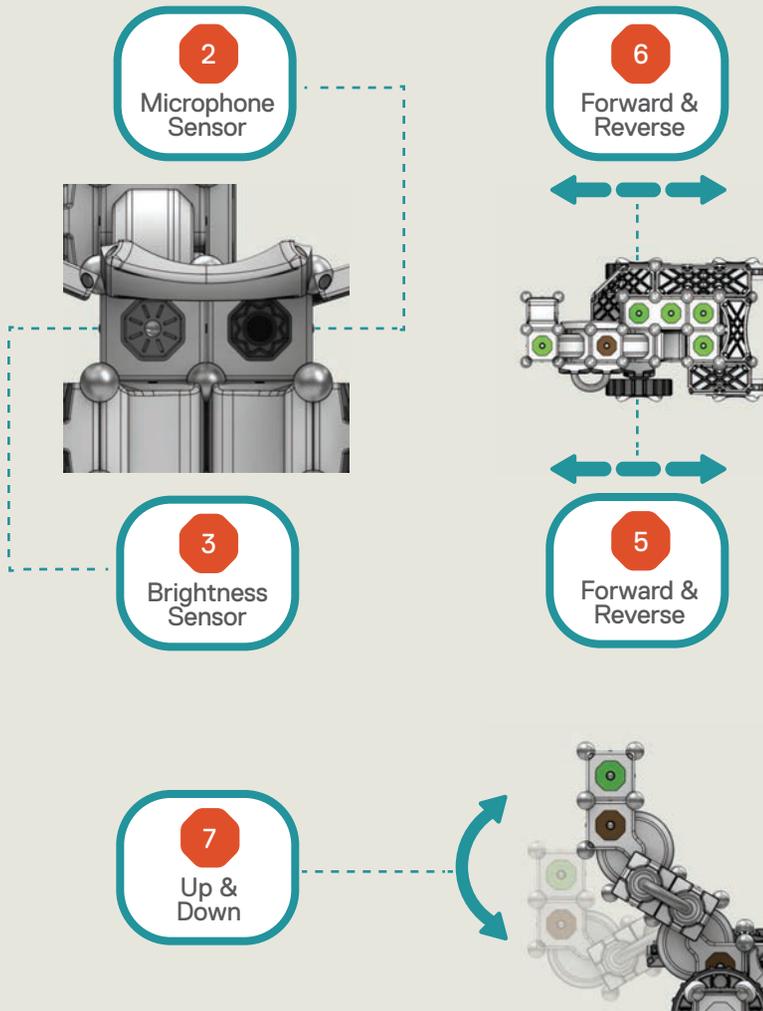


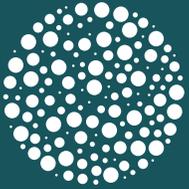
## Play Guide: Inquisitronic

The Brightness and Microphone Sensors send data to your mobile device. If you aren't seeing data, make sure you've switched the in-app controls to data inputs, not action outputs.

Inquisitronic is a differential drive robot. To turn, spin your Motors in opposite directions.

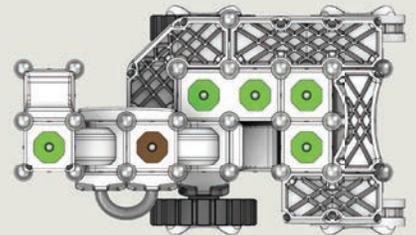
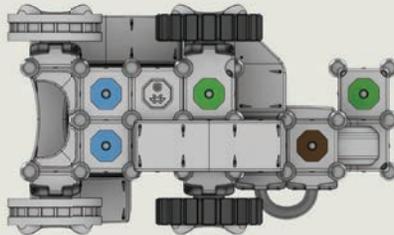
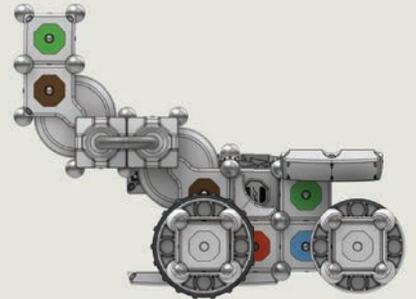
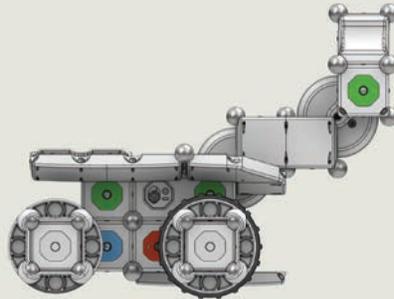
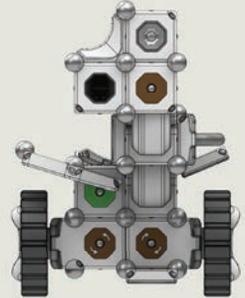
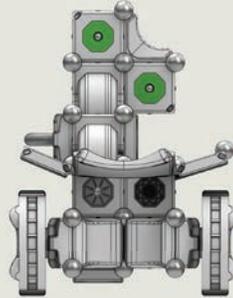
The Flashlight at the end of Inquisitronic's arm is activated by the Proximity Sensor. The closer it is to an object, the brighter it glows!

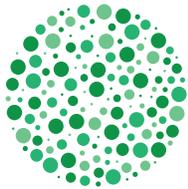




# MOSS

Robot 704:  
Inquisitronic

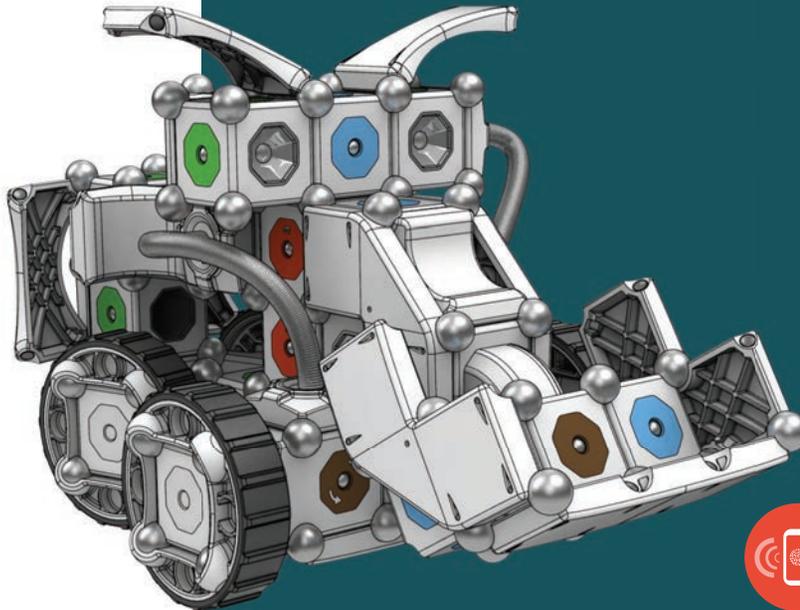




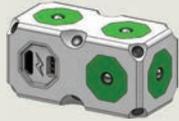
MOSS

## Robot 53: Jawbotdamut

Jawbotdamut is a remote-controlled, front-end loading MOSS robot. Got an avalanche of plastic bricks blocking your dollhouse driveway? No problem, this wacky robo-wonder can power through and clear a path for Bo Peep to rescue her sheep. Saving toys is all in a day's work for this run-of-the-mill hero whose eyes will set your heart aglow.



Connected Device  
Required



Extended Battery  
x1



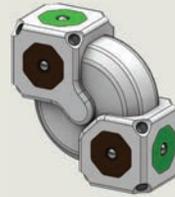
Brightness Sensor  
x1



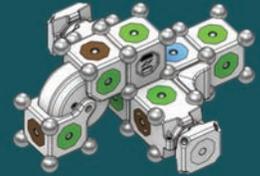
Corner  
x2



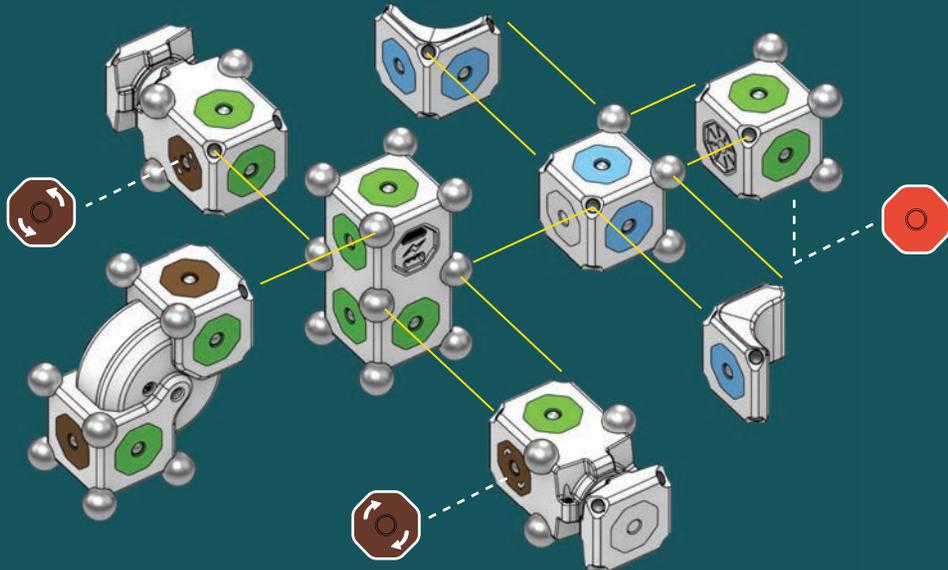
Motor  
x2



Pivot  
x1

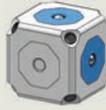


1





Double Brain  
x1



Hub  
x1



Corner  
x1



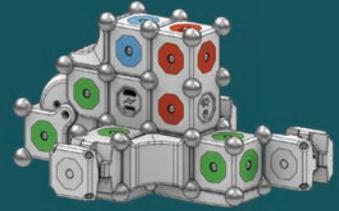
Axle  
x1



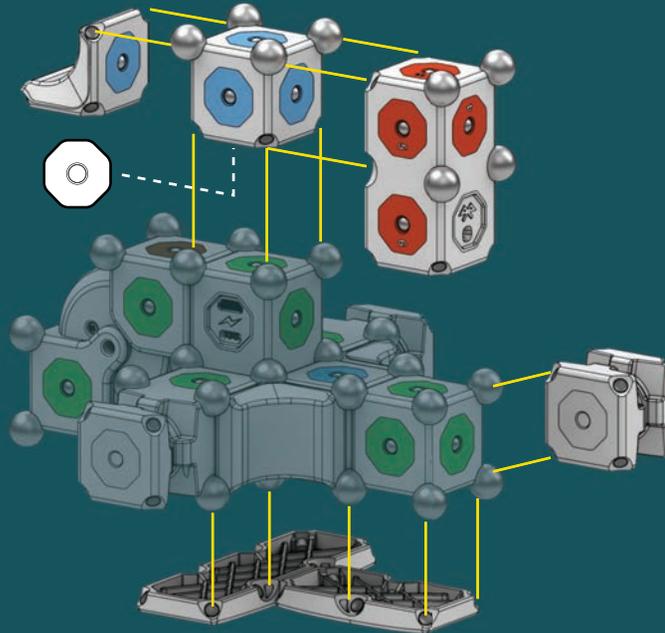
Short Brace  
x1

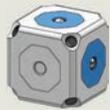


Long Brace  
x1



# 2





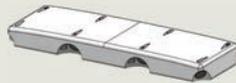
Hub  
x2



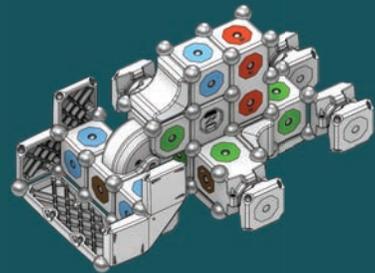
Axle  
x1



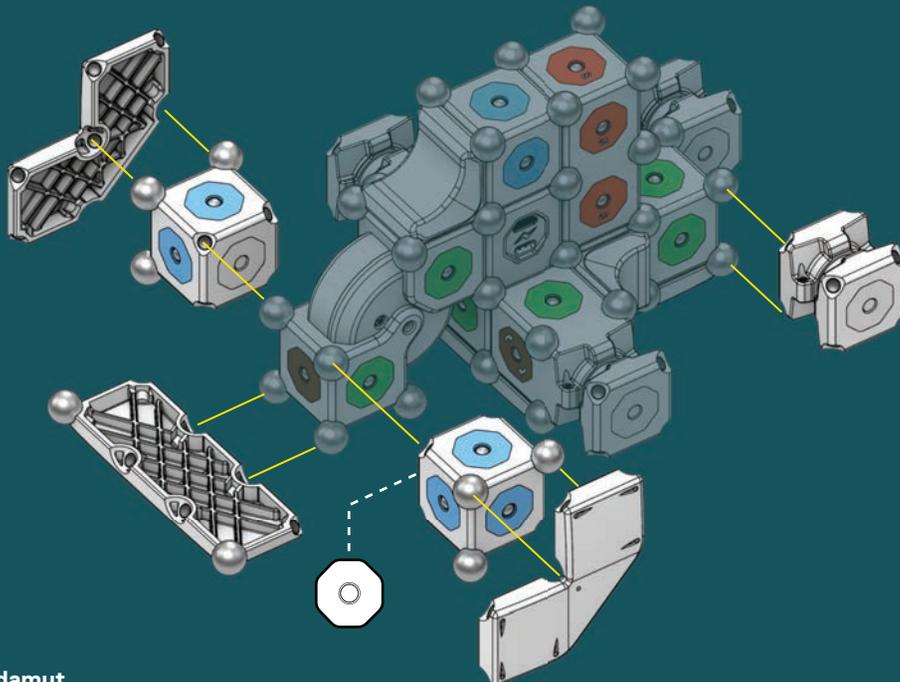
Corner Brace  
x2

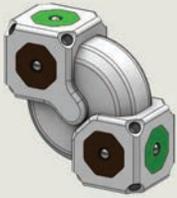


Long Brace  
x1

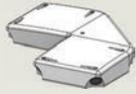


# 3





Pivot  
x1



Corner Brace  
x2



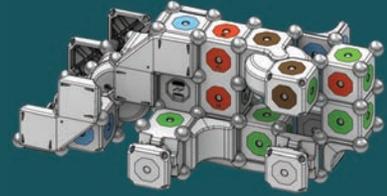
Corner  
x2



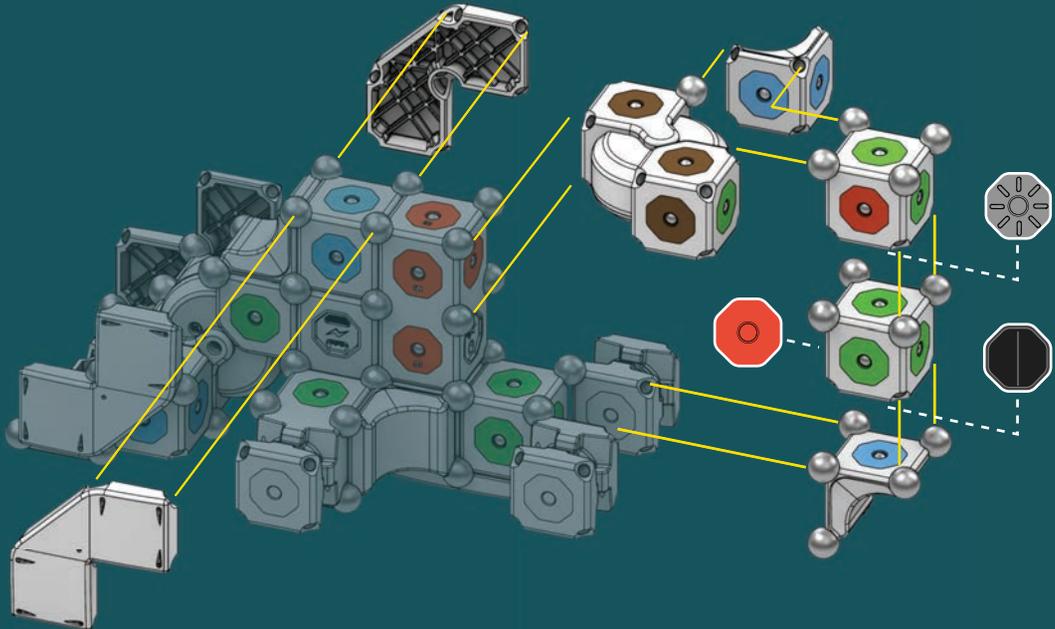
Proximity  
Sensor  
x1



Brightness  
Sensor  
x1



4





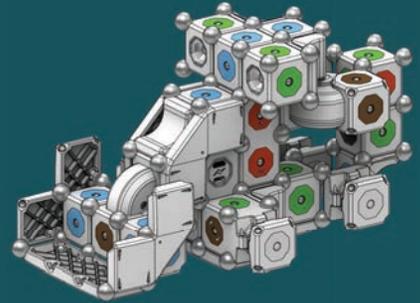
Hub  
x2



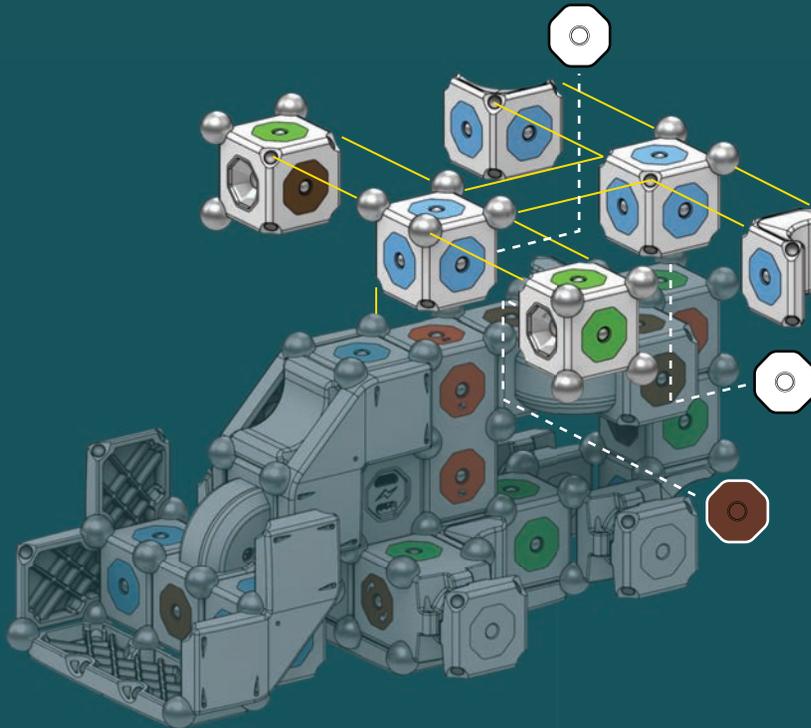
Flashlight  
x2



Corner  
x2



5





Wheel  
x2



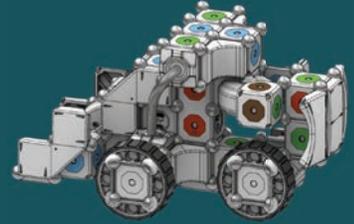
Long Flexy  
x1



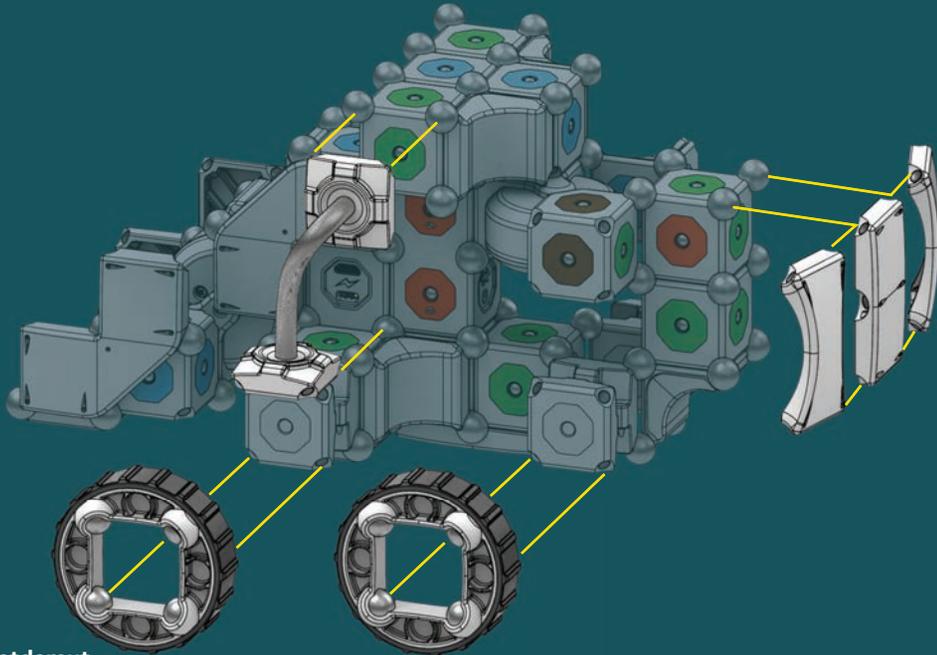
Arch Brace  
x2



Short Brace  
x1



6





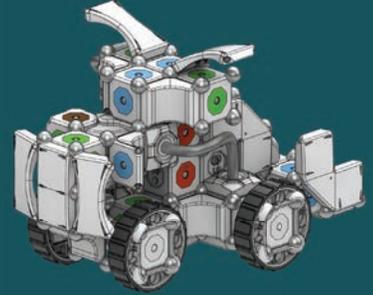
Wheel  
x2



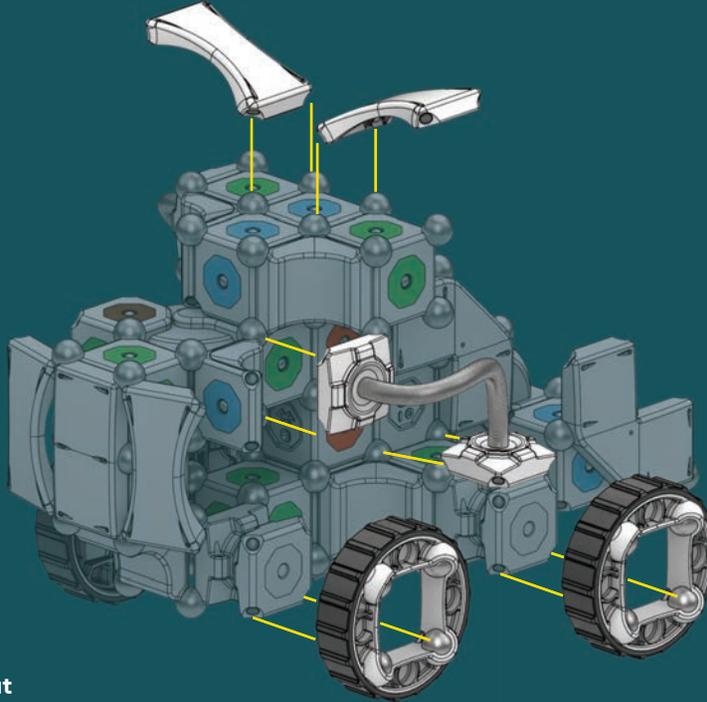
Long Flexy  
x1



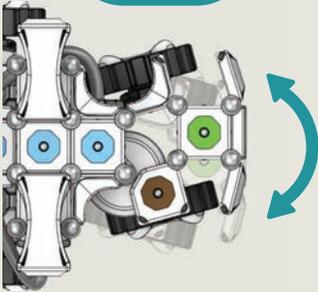
Arch Brace  
x2



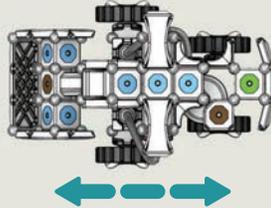
7



4  
Left &  
Right



1  
Forward &  
Reverse



7  
Lifting



8  
Lights



## Play Guide: Jawbotdamut

Push, carry and plow your way through dominos or ping-pong balls. Looking for a challenge? See if you can scoop two ping-pong balls into the bucket at once.

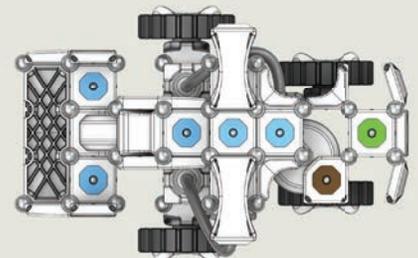
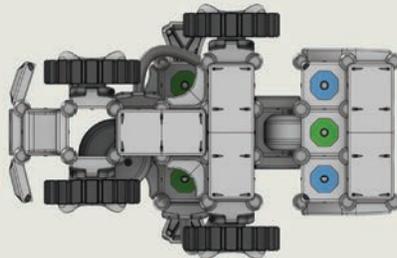
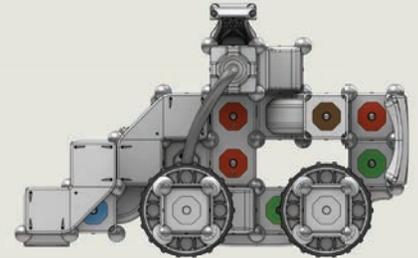
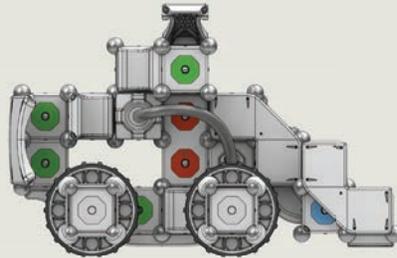
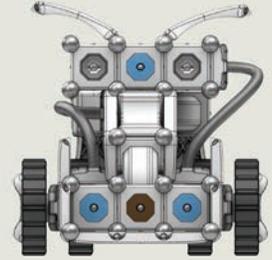
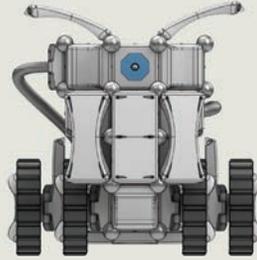
Modify the Jawbotdamut's bucket to discover new ways to scoop, carry and plow!

Is your Jawbotdamut spinning in circles? Double-check the arrows on your Motor's brown data-in faces.



# MOSS

Robot 53:  
Jawbotdamut



# 4. Available Blocks

The MOSS robot construction system is comprised of blocks that you can combine to build a multitudinous variety of robots. Use the following index of blocks to see what is available or visit [www.modrobotics.com/moss](http://www.modrobotics.com/moss) to discover new MOSS robots.



## Extended Battery

The Extended Battery is a rechargeable LiPo battery that powers your robots.



## Double Brain

The Double Brain Block uses Bluetooth wireless communication to link your robot to a mobile device or computer.



## Brightness Sensor

The MOSS Brightness Sensor is tuned to respond to bright sources of light, like a flashlight or the sun.



## Proximity Sensor

The Proximity Sensor helps your robot measure distance to the closest object using infrared light.



## Knob Sensor

The Knob Sensor uses a potentiometer to precisely control a data value.



## Mic Sensor

The Mic Sensor measures the level of noise around it.



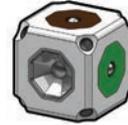
### **Pivot**

The Pivot provides a powered articulation to robot construction. Use it to create steering mechanisms or powered hinges.



### **Motor**

The Motor has a rotating end that can be used to power a rolling wheel. Experiment with the orientation of your motor block and create new types of movement.



### **Flashlight**

The Flashlight glows brightly when activated. Use it to light your path or trigger a Brightness Sensor.



### **Wheel**

The MOSS Wheel is a support piece that can translate the rotating face of an Axle or Motor into smooth motion.



### **Axle**

The MOSS Axle is a support piece with the unique ability to spin along one axis.



### **Corner**

The Corner is a connective block that can link and support nearby faces.



### Hub

The Hub is a connective block that can link nearby faces. The humble Hub is one of the most versatile pieces of MOSS thanks to its unique ability to split, connect, or average signals to multiple blocks.



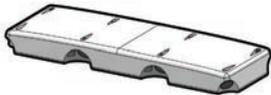
### Long Flexy

The Long Flexy is a connective block that allows you to connect power or data across four standard block lengths.



### Short Flexy

The Short Flexy is a connective block that allows you to connect power or data across two standard block lengths.



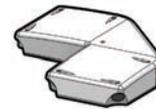
### Long Brace

The Long Brace spans three standard block lengths. This block is the best choice to strengthen areas of your robot.



### Short Brace

The Short Brace spans two standard block lengths, providing connective support for up to six steel spheres.



### Corner Brace

The Corner Brace spans three standard block lengths with a 90 degree bend in the middle.

## Important Information About MOSS:

General: Not for use by children under the age of 8. Do not get MOSS wet! Do not submerge, burn, puncture, crush, microwave, or expose MOSS to extreme heat or fire. Keep MOSS out of the dirt - magnetic particles will stick to the connectors and may cause damage. Do not connect the MOSS Battery Block to more than one power source. MOSS charges at 5V DC (  ). Your MOSS packaging should be retained because it contains important information about the manufacturer.

Cleaning: Before cleaning, disconnect the Battery block from the USB charging cable. Use a lightly moistened (with water), soft, lint-free cloth to clean MOSS. DO NOT USE alcohol, household cleaners, ammonia, window cleaner, aerosol sprays, solvents or abrasives. Do not spray water directly on the product. Do not let moisture enter any openings.



## WARNING

WARNING: Not suitable for children under 8 years old. This product contains small parts with magnets. Swallowing these parts can cause the magnets to stick together across the intestines causing serious injuries or death. Seek immediate medical attention if the small parts are swallowed.

You've just begun your journey to the summit of *Mount Im'awesome'Atbuilding'robots*. To reach its exhilarating peak you need only let your imagination run wild. The robots you've built in this guide are a tiny portion of the creations available to you. Let your intuition and imagination guide you to create the robots you've always wanted to build.

We hope you enjoy MOSS and can't wait to see what you build! Please share your creations with us on Facebook or Twitter using the hashtag:

***#myMOSS***

Want more robot construction ideas? Visit:

***[www.modrobotics.com](http://www.modrobotics.com)***