Start Here!  

littleBits Basics

Start building creations with step-by-step instructions for 16 inventions. You’ll get ideas for how to put your own spin on each invention, and before you know it, you’ll be creating your own from scratch.

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Challenges get you to flex your creative muscles. They start with an open-ended problem. Your mission is to explore how you could use your Bits™ to create an invention that solves that problem.

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Animatronics is a type of special effect that uses electronics to create lifelike animals, creatures, humans, aliens – you name it. In this challenge, you’ll create your own unique animatronic creature.

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Quick Start

1. Download the littleBits Invent app.

Is your smart device compatible? Find out at littleBits.com/app

2. Add this kit to your profile.

3. Use your device to control your inventions!
BUILD & PLAY WITH THIS CIRCUIT FIRST.

1. TURN POWER ON
2. SLIDE THE DIMMER BACK AND FORTH
3. EXTEND YOUR CIRCUIT WITH A WIRE
4. MAKE SOME NOISE WITH A BUZZER
5. WATCH THE BARGRAPH LIGHT UP

CAUTION: Parental supervision and assistance may be required for safe use of components.
1. **ANATOMY OF A BIT™**
   Learn how you can tell top from bottom.

2. **COLOR-CODED BY FUNCTION**
   Bits™ are grouped into four different categories, which are color-coded.
   - **POWER (BLUE)**
     Power Bits, plus a power supply, run power through your circuit.
   - **WIRE (ORANGE)**
     Wire Bits connect to other systems and let you build circuits in new directions.
   - **INPUT (PINK)**
     Input Bits accept input from you or the environment and send signals that affect the Bits that follow.
   - **OUTPUT (GREEN)**
     Output Bits do something – light up, buzz, move...

3. **MAGNET MAGIC!**
   Bits snap together with magnets. The magnets are always right – you can’t snap them together the wrong way.

4. **ORDER IS IMPORTANT**
   - **POWER BITS** always come first and **INPUT BITS** only affect the **OUTPUT BITS** that come after them.

5. **SOME BITS ARE ADJUSTABLE**
   Switches, buttons, and dials on the Bit allow you to change how the Bit functions.
Occasionally Bits™ and accessories get updated, so the features or appearance of your Bits may differ from those used in this guide.
Every circuit starts with power. It provides the electricity that makes your Bits spin, buzz, blink, and shine.

The power Bit converts the 9 volts of electricity in the battery to the 5 volts that littleBits circuits run on.

The power Bit also sends a signal through your circuit. Controlling this signal with inputs is how you control your circuit.
**MEET THE BIT**

Slide this dimmer back and forth to control your circuit. As you slide it up, more signal goes to the Bits that follow, brightening lights, speeding up motors, and raising the volume on your buzzer.

**MINI-CHALLENGE**

Can you invent something with the slide dimmer that waves a flag back and forth? How could you change the speed it waves?

**SAMPLE CIRCUIT**

**HOW IT WORKS**

When the slider is all the way to the left, it’s sending an off or 0 volt signal. When the slider is all the way to the right, it’s sending a 5 volt signal. The slider can be positioned to send any signal between 0 and 5 volts.

**REAL WORLD ANALOGIES**

- Household Dimmer Switch
- Stereo Volume Control
- Car Pedal
MEET THE BIT

Use this Bit to control your circuits with light! The amount of light shining on the sensor will change how your circuit behaves. It's a great way to activate your circuit without hands and is perfect for alarms!

MINI-CHALLENGE

Can you invent something that moves when the lights go out?

REAL WORLD ANALOGIES

- NIGHT LIGHT SENSOR
- PHOTOGRAPHER’S LIGHT METER
- FINGER PULSE METER

The light sensor measures how much light is shining on it. It has two modes. In LIGHT mode, as the light shining on the sensor gets brighter, more signal passes through it (making lights brighter or motors turn faster). In DARK mode, the signal increases as it gets darker.

Use the purple screwdriver to turn the dial and adjust how much light it takes to change the signal. Clockwise increases sensitivity, counterclockwise decreases it.

MODE: light or dark
SENSITIVITY: “-” decrease, “+” increase

This is the component that measures light.
**MEET THE BIT**

The wire Bit has a flexible wire running between its two bitSnaps®. This allows you to place your Bits farther apart, turn corners, and make connections that can twist, turn, and spin.

**MINI-CHALLENGE**

Can you invent a circuit that uses the wire to shine the bargraph on the light sensor?

**HOW IT WORKS**

The wire doesn’t change the signal in any way – it just carries it over from one Bit to another.

**REAL WORLD ANALOGIES**

- EXTENSION CORD
- POWER LINES
- STRING OF LIGHTS
**MEET THE BIT**

The split lets you connect a single Bit to two others. If you place an input before the split, it will control the two outputs at once, like a single light sensor controlling two motors. The flexible wires on the split also allow you to place your Bits farther apart and position them how you like.

**MINI-CHALLENGE**

Can you invent a circuit with two parts that move at the same time?

**REAL WORLD ANALOGIES**

POWER STRIP

HEADPHONES

**HOW IT WORKS**

The split divides the incoming signal and sends it to the two output bitSnaps.
**MEET THE BIT**

The littleBits Bluetooth Low Energy Bit (marked “BLE” on your Bit) is the easiest way to control your inventions wirelessly, from any smart device (like a phone or tablet). All you need is the littleBits Invent app and this Bit to move motors on wireless vehicles, or trigger buzzers for pranks. You can also use your circuit to control functions on your device, like triggering the camera to take a picture.

**MINI-CHALLENGE**

Can you invent a prank using the Bluetooth Low Energy Bit in your circuit?

**REAL WORLD ANALOGIES**

- Wireless Mouse & Keyboard
- Fitness Trackers

**HOW IT WORKS**

The Bluetooth Low Energy Bit can send and receive a signal from your smart device using Bluetooth Low Energy wireless technology, up to a distance of about 80ft (25m) indoors. To use the Bluetooth Low Energy Bit, you first need to connect it to your smart device (smartphone, tablet) through the littleBits Invent app.

Check your device’s compatibility at littleBits.com/app.
Using the Bluetooth Low Energy Bit with your device:

Once connected, you can use the app’s controls to send signal information from your device to your circuit and vice versa. You can also create custom control dashboards for your inventions. Controls range from simple buttons and dimmers to accelerometers. You can communicate with up to two Bluetooth Low Energy Bits at the same time.

Using the Bluetooth Low Energy Bit to control your device:

**Display Screen:** You can take remote readings of the signals going into your Bluetooth Low Energy Bit with on-screen readouts.

**Photos & Video:** Signals from the Bluetooth Low Energy Bit can control the camera on your phone, letting you take photos and video remotely.

**Wireless:** The antenna sends and receives signals between your device and the Bluetooth Low Energy Bit.

**Using your device to control your Bluetooth Low Energy Bit:**

**Touch Screen:** Send signals to your Bluetooth Low Energy Bit with on-screen buttons, sliders, and other controls.

**Movement:** The accelerometer and gyroscope in your device sense movement. The signals from these sensors can be sent to your Bluetooth Low Energy Bit to control your circuits.

*App may differ from screenshots shown.*
The buzzer makes a sound no one can ignore. It's great at sounding the alarm or annoying those nearby.

**How it works**
The buzzer converts the electrical signal it receives into a vibration, which creates a buzzing sound. The higher the signal it receives, the more intense the vibration, and the louder the sound is.

**Mini-Challenge**
Can you invent a way to communicate with your friends using the buzzer?

**Real World Analogies**
- Doorbell
- Car Alarm
- Washing Machine
The bargraph shows you how much signal the Bit is receiving with a display of five light-emitting diodes (LEDs) in different colors. Try it with a dimmer to make your own adjustable lamp.

Can you invent a way to measure your mood?

The bargraph uses five LEDs to turn electricity into light. Each LED on the board needs a certain amount of signal in order to light up. As you increase the signal sent to the bargraph, more LEDs will shine.
**SERVO**

**MEET THE BIT**

The servo is a motor that can swing back and forth or be turned to a specific position.

There are a few accessories you can use with the servo (like the mechanical arm). You can find out how to use those on pages 18 and 19.

**MINI-CHALLENGE**

Can you invent something that uses the servo to clean up your desk?

**HOW IT WORKS**

The servo has two modes. In **TURN** mode, the input from other Bits determines the position of the hub – try using a slide dimmer to set the angle you want. In **SWING** mode, the servo will move back and forth on its own like a pair of windshield wipers – the input signal controls the speed of the swing.

The servo’s range of motion is about 110 degrees.

**REAL WORLD ANALOGIES**

- **TRUCK CRANE**
- **WINDSHIELD WIPERS**
- **ROBOT**
MEET THE BIT
Use the fan to create a gentle breeze, perfect for cooling things off. You can also try taping small things (like stickers or pieces of paper) to the center of the fan for some spinning visuals.

MINI-CHALLENGE
Can you invent something that uses the fan to move an object across the table?

REAL WORLD ANALOGIES
- LEAF BLOWER
- PERSONAL FAN
- AIRPLANE PROPELLER

HOW IT WORKS
Inside the fan is a tiny motor. When it receives a signal, it spins. The more signal it receives, the faster it spins.

Feet for attaching to mounting boards and shoes
MEET THE BIT

Use the motor to spin, turn, twist, and roll.

There are a few accessories you can use with the DC motor (like wheels). You can find out how to use those on pages 17, 19 and 20.

MINI-CHALLENGE

Can you invent something using the DC motor that travels across the table?

SAMPLE CIRCUIT

DC MOTOR

MODE: CW (clockwise), VAR (variable mode), and CCW (counterclockwise)

Can be mounted to other materials with included #6 screws.

Feet for attaching to mounting boards or shoes.

HOW IT WORKS

The DC (or “direct current”) motor rotates a shaft when it receives a signal. The more signal it receives, the faster the motor will spin.

A switch on the board lets you choose which direction the motor spins. CW spins clockwise and CCW spins counterclockwise. When the switch is in VAR (variable) mode, the amount of signal the motor receives from previous Bits allows you to control the speed and direction (clockwise or counterclockwise) of its motion. In this mode, using an input like a slide dimmer makes steering easy!
**ADHESIVE SHOES**

**MEET THE ACCESSORY**
Shoes slip onto your Bit feet and hold your circuit together. On the bottom of your shoes you’ll find adhesive, which is great for securing your circuits to different surfaces.

**HOW IT WORKS**
First, snap together your littleBits circuit. Then press the feet of your Bits into the holes of the shoes and place it on your chosen surface.

Adhesive shoes can be secured onto any surface — paper, cardboard, plastic — you name it! Just peel the adhesive backing off, and stick it on.

**NOTE:** The shoe adhesive is for one-time use only.

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**MOTORMATE**

**MEET THE ACCESSORY**
The motorMate makes it easy to attach paper, cardboard, LEGO® axles, and lots of other materials to the DC motor.

**HOW IT WORKS**
To mount, slide the motorMate onto the shaft of the DC motor by aligning the flat edges. The motorMate has two different sized slots: one fits most standard craft sticks and the other fits thicker papers like cardstock. LEGO axles fit right into the center.
**SERVO HUB**

**MEET THE ACCESSORY**
The servo hub lets you easily attach materials to your servo motor and add more complex movements to your littleBits inventions.

**HOW IT WORKS**
The servo hub can be attached and removed by gently pushing or pulling it on or off the servo motor. This is helpful if you need to reorient how the holes are positioned for a project. The servo hub can be permanently attached by using a small screw in the center hole.

Use the included #6 screws with any of these eight outer holes.

**BALL CASTER**

**MEET THE ACCESSORY**
The ball caster works as a wheel, adding rolling support to your inventions. The ball can also be removed from the socket, so you can use it in games and contraptions. You can even use the socket as a ball stand!

**HOW IT WORKS**
Attach the ball caster to a surface using small screws (not included) or Glue Dots.

![Single screw hole]
**MECHANICAL ARM**

- Fits a Sharpie™-sized marker
- Connect to DC motor shaft
- Fits a pen

**MEET THE ACCESSORY**
The mechanical arm attaches to both the servo hub and the DC motor shaft, and offers lots of leverage for pushing, pulling, and throwing.

**HOW IT WORKS**

To attach the mechanical arm to the servo hub, use two of the #6 screws (included) and a Phillips-head screwdriver. Be sure to screw through the holes on the servo hub.

To attach the mechanical arm to the DC motor, line up the flat edge of the DC motor shaft with the flat edge of either of the flat-edged holes on the mechanical arm.

The two large holes on the end are perfect for holding pens and markers in place.

**SERVO MOUNT**

- Connect to servo hub with included #6 screws
- Connect to servo hub with included #6 screws

**MEET THE ACCESSORY**
The servo mount lets you attach your servo to a mounting board or a pair of littleBits shoes. It’s a great way to keep the servo steady so the arm can go wild.

**HOW IT WORKS**

Push the servo in from the side until it clicks into place. To keep the servo from sliding up and down, use the included screws and a Phillips-head screwdriver.

**FEET**

Feet for mounting boards and shoes
**a25 WHEEL**

**MEET THE ACCESSORY**
When used with a DC motor, this wheel is perfect for making bots, cars, and all sorts of spinning inventions.

**HOW IT WORKS**
The metal shaft of the DC motor and the hole in the wheel are both flat edged. To attach the wheel to the DC motor shaft, align the flat edge of the hole in the wheel with the flat edge of the motor shaft. Press firmly to slide it on.

The wheel also connects to the servo hub using the included #6 screws.

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**a26 MOUNTING BOARD**

**MEET THE ACCESSORY**
The mounting board is like the backbone of some of your inventions. It allows you to keep your circuit intact and move it around with ease! It also provides structure, which is helpful for building out inventions like a vehicle.

**HOW IT WORKS**
Snap together your littleBits circuit and press the feet of your Bits into the holes of the mounting board.

**NOTE:** Your circuit must be complete before you press it onto the board. You won’t be able to add Bits one at a time.

Use the included #6 screws in any of the holes to permanently attach to any surface.
HELPFUL TOOLS & MATERIALS

THE WORLD AROUND YOU IS FULL OF MATERIALS FOR PROTOTYPING AND CREATING INVENTIONS. At littleBits, we dig through our recycling bins all the time to collect stuff for our inventions. In fact, the very first prototype of a Bit was made with cardboard, copper tape, and a few electronic components like LEDs. Here's some of our favorite stuff to work with:
THE LITTLEBITS™ INVENTION CYCLE

The littleBits Invention Cycle is a roadmap for your invention journey. Each phase is full of activities and questions that help you explore your ideas and develop your invention.

DO I HAVE TO GO THROUGH THE LITTLEBITS INVENTION CYCLE EXACTLY IN ORDER?

Nope! If you want, you can remix while you play or share while you create. Each phase of the invention cycle represents a different way of thinking and making. They work well in order, but a good design process is always a bit messy.
TEST YOUR CIRCUIT
Before you play with your new invention, you’ll turn the power on and make sure all your Bits are doing their jobs.

POWER ON/OFF: The p1 power Bit has an on/off switch. This icon will let you know when it’s time to turn it on or off.

PRO TIPS
Keep your eyes open for these bits of littleBits wisdom. These tips will help build your inventing skills and level up your inventions.

USE RUBBER BAND OR MASKING TAPE
This icon will tell you when to use rubber bands or some masking tape to keep something in place.

TURN DIAL CLOCKWISE (CW):
Use the purple screwdriver to turn the dial on the Bit all the way clockwise.

TURN DIAL COUNTERCLOCKWISE (CCW):
Use the purple screwdriver to turn the dial on the Bit all the way counterclockwise.

PHILLIPS-HEAD
The metal screws included with your set require a Phillips-head screwdriver (not included). Do not use the plastic purple screwdriver on these screws.

DOWNLOAD THE LITTLEBITS INVENT APP
Discover inventions, connect with the littleBits community, and easily upload and share your own creations.

WIRELESS CONTROL
Control your Bluetooth® Low Energy Bit using the littleBits Invent app.

CHANGE MODE
Some Bits have a switch that changes how the Bit works. This icon will tell you which mode your switch should be in.

USE GLUE DOTS®
This icon will let you know when to use Glue Dots. Glue Dots help stick things together when tape doesn’t cut it.

EXTRA IMPORTANT INFO!
This icon will let you know when there is a small, but very important step we don’t want you to miss. If you ignore these your invention won’t work.

CREATE
PUT SOMETHING TOGETHER. You can build it from the instructions or make something from your imagination. Don’t worry if it doesn’t work or if it isn’t perfect. The important thing is to create your first model so you have something to experiment with.

REMIX
IMPROVE YOUR INVENTION. Keep experimenting! Add new Bits, swap parts with other inventions, or take all the pieces apart and put them together in a different way.

PLAY!
USE IT! Playing with what you’ve created is fun, but also an important part of inventing. Playing is like a test run. It’s a chance to see how well your invention works and look for ways you can make it better.

SHARE
INSPIRE OTHERS. Show the world what you’ve created on the littleBits Invent app or at littleBits.com. Get inspired by exploring what others have shared. Create, play with, and remix other inventions. This is how awesome new inventions are born.
SPINMATE

INVENT A SPINNING SIGN FOR YOUR FORT, OR A CREATURE THAT DANCES DIZZILY ON YOUR DESK.
Create this versatile invention and let your imagination run wild.

TIME
15 MINUTES (MINIMUM)

LEVEL

BITS™ + MATERIALS

a1 battery & cable
p1 power
a25 DC motor
i5 slide dimmer

a25 wheel
a26 mounting board
Glue Dots®
*masking tape
*decorating materials
(not included)
BUILD YOUR CIRCUIT.

15 SLIDE DIMMER

p1 POWER

o25 DC MOTOR
2 ATTACH A WHEEL TO THE DC MOTOR.

LINE UP THE FLAT EDGE OF THE DC MOTOR SHAFT WITH THE FLAT EDGE OF THE CENTER HOLE IN THE WHEEL

3 PRESS YOUR CIRCUIT ONTO THE MOUNTING BOARD.
4 PRESS YOUR DC MOTOR ONTO THE MOUNTING BOARD.

5 ATTACH THE BATTERY TO THE MOUNTING BOARD.

USE TWIST TIES OR RUBBER BANDS ON DC MOTOR FOR EXTRA SECURITY

USE GLUE DOTS
SET THE DC MOTOR TO VAR (VARIABLE) MODE.

SPIN IT! Set the wheel on a flat surface, turn power on and move the slide dimmer to set the turn direction and speed.
CUSTOMIZE! The back side of the mounting board is your canvas. Make it useful, playful or just plain weird using the provided stickers or any materials you’d like.

SPIN YOUR HEART OUT! Set the wheel of your Spinmate on any flat surface and let it go! Where’s your favorite place to use it?
**HOW IT WORKS**

p1 POWER sends a signal through the circuit.

The i5 SLIDE DIMMER controls how much power goes to the DC motor.

The speed and direction of the o25 DC MOTOR depends on how much signal it receives from the slide dimmer. Since the o25 DC motor is in variable (VAR) mode, its speed and direction is dependent upon how much signal it receives from the slide dimmer. If the slide dimmer is in the middle the wheel should be stopped. A full signal from the slide dimmer will make the wheel spin counterclockwise (CCW), while no signal will make the wheel spin clockwise (CW).
WE INVENT THE WORLD WE WANT TO LIVE IN.
TRY SOME OF THESE IDEAS TO CUSTOMIZE YOUR INVENTION. THEN COME UP WITH YOUR OWN!

A. GIVE YOUR SPINMATE SOME DEPTH. What twirling, 3D creature-contraption can you create? Use different materials to bring it to life!

B. SPIN A NEW STORY. Use the two sides of the mounting board to animate an image, tell a story, or wave a flag.

C. TURN IT UP. Add the bargraph and other Bits to make your Spinmate even more attention-grabbing.

TAKE VIDEOS OF EACH MOVING COLLAGE YOU MAKE TO CREATE AN ONLINE GALLERY! Post on the littleBits Invent app or at littleBits.com and share it with friends and family.
BUBBLEBOT

INVENT A BOT THAT CREATES BIG, BEAUTIFUL BUBBLES using only a few Bits and some items from around the house. Slowly move the slide dimmer to control how quickly the bubble grows. Can you make the ultimate bubble?

30 MINUTES

LEVEL

- battery & cable
- power
- fan
- bargraph
- slide dimmer
- mounting board
- Bubblebot template
- Glue Dots®
- tape
- plate
- bubble solution
- decorating materials

(not included)
BUILD YOUR CIRCUIT.

p1 POWER

09 BARGRAF

013 FAN

05 SLIDE DIMMER
2 PRESS YOUR CIRCUIT ONTO THE MOUNTING BOARD.

3 ATTACH THE BATTERY TO THE MOUNTING BOARD NEXT TO THE POWER BIT.

USE GLUE DOTS
4 PRESS THE FAN ONTO THE MOUNTING BOARD.

5 TURN POWER ON AND TEST YOUR CIRCUIT. When you slide the dimmer, the bargraph should light up and the fan should spin.
ASSEMBLE BUBBLEBOT TEMPLATE.

WANT TO CUSTOMIZE YOUR BUBBLEBOT? NOW’S THE TIME!

DETAIL VIEW
7 Slide the template onto the fan.

8 Tape the template onto the fan.
9 POUR BUBBLE SOLUTION INTO A SMALL PLATE OR BOWL.

With the fan completely off, dip the tip of the Bubblebot template into the bubble solution. When you lift the tip of the bubble tube, you should see a thin film of bubble solution covering the opening.

THE FAN MUST BE OFF WHEN DIPPED IN SOLUTION, OR THE BUBBLE WILL INSTANTLY POP!
WITH POWER ON, slowly use the slide dimmer to turn the fan on and start blowing bubbles.

BECOME A MASTER BUBBLE-CRAFTER! Can you release the bubble from the tube so it floats through the air?
HOW IT WORKS

**p1 POWER** sends a signal through the circuit.

The **SLIDE DIMMER** controls how much signal moves through to the bargraph and fan.

More LEDs on the **BARGRAPH** light up as more signal passes through.

The **FAN** receives signal from the bargraph. The more signal it receives, the faster it spins, pushing more air into the bubble.
TRY SOME OF THESE IDEAS TO CUSTOMIZE YOUR INVENTION. Then come up with your own!

A TRY DIFFERENT CONTAINERS FOR BLOWING BUBBLES. Replace the paper bubble tube with plastic bottles you find around the house. Explore whether a yogurt cup works better than a milk carton!

B MODIFY THE BUBBLE TUBE! Cut fringe into the edge of the bubble tube. This helps it hold more bubble solution.

C SWITCH IT UP. Which other Bits can you use to control the Bubblebot?

WHAT WAS YOUR BEST BUBBLE-BLOWING TECHNIQUE? Share videos and photos of your favorite bubble strategy on the littleBits Invent app or littleBits.com!
BUMPERBALL

INVENT A GAME THAT PUTS A NEW SPIN ON AN OLD ARCADE FAVORITE: the pinball machine. Use the slide dimmer to catapult the ball and watch it bounce and bump all over the box like it’s out of control!

30 MINUTES (MINIMUM)

TIME

LEVEL

Gizmos & Gadgets, 2nd Edition Box

Bumperball templates (A, B, C)

Glue Dots®

BITS® + MATERIALS

a1 battery & cable
pl power
a1 servo
L5 slide dimmer

mechanical arm
a26 mounting board
a22 ball caster
screws (2)

• Phillips-head screwdriver
• tape
• decorating materials

(not included)
BUILD YOUR CIRCUIT.

- 15 SLIDE DIMMER
- p1 POWER
- o11 SERVO
2 PRESS THE SERVO HUB ONTO THE SERVO.

YOU CAN SECURE THE HUB ON THE SERVO WITH THE INCLUDED SMALL SCREW THROUGH THE CENTER HOLE

3 PRESS YOUR CIRCUIT ONTO THE MOUNTING BOARD.
4 SET SERVO TO TURN MODE.

5 WITH THE POWER ON, MOVE THE SLIDE DIMMER TO THE MIDDLE POSITION AND ATTACH THE ARM TO THE SERVO HUB PARALLEL TO THE SERVO’S BODY AS SHOWN.

USE PHILLIPS-HEAD SCREWDRIVER

SLIDE DIMMER MUST BE AT HALF-WAY FOR THE BUMPERBALL TO WORK

MODE: TURN

i12 temp.sensor:Fahrenheit mode
i13 lightsensor:light mode
o11 servo:swing mode
Makey Makey:click mode

i12 temp.sensor:celsius mode
i13 lightsensor:dark mode
o11 servo:turn mode
Makey Makey: space mode
6 ATTACH THE SERVO TO YOUR GIZMOS & GADGETS, 2nd EDITION BOX.  
Make sure it is centered.

7 TAKE SOME PRACTICE SWINGS! Moving the slide dimmer should make the mechanical arm rotate side to side.
FOLD THE EDGES OF TEMPLATE B. THIS WILL BE THE BACK OF YOUR BUMPERBALL.

ATTACH BUMPERBALL TEMPLATES A AND C TO BUMPERBALL TEMPLATE B BY SLIDING THE TABS INTO THE MATCHING SLOTS.

WANT TO CUSTOMIZE YOUR BUMPERBALL? NOW’S THE TIME!

USE TAPE
10 **Fold the semi-circular tabs on the templates inwards.** These will rest on the top of the box.

11 **Fold the bumpers on your template.** These will bounce the ball towards the mechanical arm when you play.

12 **Take the ball out of the ball caster.**
ATTACH YOUR TEMPLATE TO THE TOP OF YOUR BOX.

USE GLUE DOTS

USE TAPE

PLAY!

BUMP IT UP! What’s your high score? Challenge your friends to see who can get the most points in a minute!

+100

+75

+25
HOW IT WORKS

**p1 POWER** sends a signal through the circuit.

The **i5 SLIDE DIMMER** controls how much power moves through to the servo.

Since the **o9 SERVO** is in **TURN** mode, the position of the mechanical arm depends on how much signal it receives from the slide dimmer.
TRY SOME OF THESE IDEAS TO CUSTOMIZE YOUR INVENTION. Then come up with your own!

A  ADD SPECIAL EFFECTS. Can you add lights and sounds to enhance your design? Try building a scoreboard!

B  CREATE OBSTACLES. Use thumbtacks, rubber bands, and everyday objects to enhance your game.

C  MAKE AN AUTOMATIC SCOREBOARD! Connect the Bluetooth® Low Energy Bit and light sensor to your circuit to make a scoreboard on your smart device.

DID YOU INVENT THE ULTIMATE BUMPERBALL? Host a tournament, then share the game and results on the littleBits Invent app or at littleBits.com!
BITBOT

INVENT A ROVER THAT ROAMS YOUR WORLD WIRELESSLY.
This bot was designed to do your bidding from your smart device! Use this versatile vehicle to prank your pets, set up a snack delivery system for Mom, or turn your room into a race track!

30 MINUTES (MINIMUM)  LEVEL

DOWNLOAD THE LITTLEBITS INVENT APP TO CREATE AND CONTROL YOUR BITBOT.

REMIX

TURN YOUR BITBOT INTO A DRAWBOT!
ANIMATRONICS CHALLENGE

IT’S ALIVE! Animatronics is the use of electronics to create lifelike animals, creatures, humans, aliens – you name it. Some of your favorite movies probably use animatronics! Your challenge is to invent an electronic creature or character using Bits, then film it in action. Make us believe that it’s real! Gather your friends and family to witness your extraordinary, awe-inspiring, battery-powered menagerie of animatronic creatures.

Q: HOW HAS LITTLEBITS IMPACTED YOU CREATIVELY?
MYA: littleBits has enabled me to make things that not only look cool, but DO cool things.

Q: WHAT DO YOU PLAN ON INVENTING NEXT?
MYA: We have rabbit and squirrel problems in our backyard, so I plan on making a garden protector to keep them out.

Read more of Mya’s interview at: LITTLEBITS.COM/COMMUNITY-INVENTORS/MYA-BERKEY

PREVIOUS CHALLENGE WINNER:
MYA BERKEY, 13

COMMUNITY SPOTLIGHT:
BRAINSTORM YOUR ELECTRONIC CREATURE.  
Is it an animal? A person? Does it move or speak or breathe? How do you want it to look?  

Bring your character to life. Build your circuit, then bring on the quirkiness. Remember: weirdness is wonderful.

SHOW YOUR CREATURE TO YOUR FRIENDS.  
How do you want them to react?  

SHOW YOUR CREATURE TO YOUR FRIENDS.  
How do you want them to react?

CAN YOU CHANGE THE COLOR, ADD FUR, OR USE LIGHT TO CHANGE THE APPEARANCE?  
Can you use sound to help your character talk or make noises?  
Can you use motion to help your character dance, fly, or hug someone?  
Can you use the Bluetooth® Low Energy Bit to control your character differently?

ENTER THIS CHALLENGE! Make a video and share your masterpiece. Show your invention in action and create a short film featuring your animatronic creature. Post it to the Animatronics Challenge online or in the littleBits Invent app!
FIND 12 MORE INVENTIONS ON THE LITTLEBITS INVENT APP.

MEGABLASTERS
It’s a bird! It’s a plane! It’s super kid! If you could have one superpower, what would it be? With a few Bits and a little imagination, you can blast that power onto anything!

PRANK PACKAGE
Invent a box that bursts open on command to surprise unsuspecting bystanders. Get ready to score your sister and prank your parents with just one tap on your phone or tablet.

SPIN ROLLER
Invent a topsy turvy rolling hover board that does flips while it rolls! Put a tiny figurine on the board and try to keep it standing as you steer the bot from your phone.

SWING-O-MATIC
Invent a machine that mimics your moves and helps you improve your baseball, golf, or tennis swing. Picture the ball coming at you and take your best shot – the mechanical arm moves when you do.

AIM GAME
Invent a game to train your aim! Grab some buds and lots of paper balls – this invention tallies how many times you hit the target and keeps score on your device.

ROTOLAMP
Create your own light patterns that dance in the dark with this rotating light projector. Personalize your creation and control its speed and direction from your phone.

CONTROL THESE INVENTIONS USING THE LITTLEBITS INVENT APP

GET IT ON Google Play Download on the App Store
INCHWORM
Invent a creature that crawls across the carpet like a hungry inchworm racing for an apple. See how quickly it can creep around as you control it wirelessly from your device.

ART SPINNER
Create a spin art platform! Draw the next great artistic masterpiece or dizzying geometric patterns to hypnotize your friends!

CAMERA CLICKER
Invent a controller that snaps photos wirelessly from the camera on your phone or tablet. Set the device up and use your Bits to capture a short film, snap some sweet moves, or take a sequence of silly pics with your friends.

FAN OF FORTUNE
A spinning fan can do more than blow air. Could yours predict the future? Just shake your phone to activate the spinner and let fate decide your future. Ask the fan of fortune any question – we just hope you’re a fan of the answer!

BREEZY BUDDY
Whether your classroom feels like the surface of the sun or you want to bring the breeze with you on your next nature walk, this simple fan will keep you cool.

MISCHIEF MACHINE
Create an invention to make your parents shriek, EEK! With the press of a button on your phone, you can pull this prank on unsuspecting friends and family. Control the robotic arm to rustle whatever you put it into!

INVENTED BY COMMUNITY MEMBER: Tan Tran
AKA superyummywonton
GLOSSARY

**BLUETOOTH® LOW ENERGY TECHNOLOGY** This technology sends a special kind of wireless signal that uses less power than things like wifi internet or wireless phones. It allows you to send and receive signals between your littleBits circuits and devices like mobile phones and tablets. **BRAINSTORM** Brainstorming is a creative activity that helps generate a large number of ideas. There are many variations on how to brainstorm. The important thing is to let your imagination run wild. Often, the best solutions come from unexpected places. **CIRCUIT** Circuits are paths that electric currents follow. **CLOCKWISE** Turning in the same direction as the hands of a clock. **COUNTERCLOCKWISE** Turning in the opposite direction as the hands of a clock. **CREATE** This is the first phase of the littleBits Invention Cycle where you explore new ideas and bring them to life with your first prototype. **INPUT** Input Bits™ are buttons, switches, and sensors; the eyes and ears of the system. They interpret their surroundings to make things happen. **INVENTION** Something created with your own ingenuity, experimentation, and imagination. **OUTPUT** Output Bits take orders from input Bits to convey the visual, physical, and audible. They generally do something – like light up, buzz, or move. **PLAY** This is the second phase of the littleBits Invention Cycle where you test your prototype for the first time. **POWER** The energy used to do work. **PROTOTYPE** A model designed to test an idea. **REMIX** This is the third phase of the littleBits Invention Cycle where you experiment with making changes to your prototype to see how you can improve it. **SENSOR** A sensor is a device that detects or measures something from its surrounding environment and converts it into an electrical signal. **SHARE** This is the fourth phase of the littleBits Invention Cycle where you show your invention to others to get feedback and inspire other inventors. **SIGNAL** A signal is an electrical message sent from one Bit™ to another. Input Bits change the message this signal sends. Output Bits translate this signal into an action (like light, motion, or sound). **VOLTS** The unit of measurement for electric pressure that pushes an electrical current through a circuit. Voltage is usually supplied by a battery or a generator. **WIRE** The wire allows you to put more space between your Bits. Try it whenever you need to break up your chain, like when you need to put a light at the top of a model building. **WIRELESS** While most Bits communicate with each other through a wire in the bitSnap™, there are a few that can send signals without a physical wire. They use electromagnetic waves (like radio and infrared) to communicate with other wireless Bits, the internet, and devices like smartphones and tablets.
TROUBLESHOOTING

1. MAKE SURE YOUR POWER BIT™ IS ON. You should see a red LED illuminated on the board.

2. TRY SWAPPING IN A NEW 9 VOLT BATTERY. Low batteries can cause a circuit to act erratically. Bits™ have different power demands. For example: a DC motor may appear to not be working while a light still shines brightly.

3. ENSURE THE POWER CABLE IS SECURELY FASTENED TO BOTH THE POWER BIT AND THE BATTERY.

4. MAKE SURE YOUR BITS ARE ARRANGED IN THE PROPER ORDER. Remember that you always need a power Bit & power supply at the beginning of each circuit, and an output Bit at the end. If the last Bit in your chain is an input, then it won’t do anything to affect your circuit.

5. CHECK YOUR CONNECTIONS. Are all the Bits securely snapped to each other? You can also try gently wiping down the ends of the bitSnaps with a soft cloth (like your sleeve). Sometimes dust gets in the way of a strong connection. Try unsnapping, cleaning the bitSnaps, and snapping it all back together again.

STILL HAVING TROUBLE? Visit littleBits.com/faq or contact our customer service team at support@littleBits.com.
**WARNING**

- This product contains small magnets. Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnets are swallowed or inhaled.
- Most Bits are small parts. DO NOT allow children under 3 years old to play with or near this product.
- NEVER connect any modules or circuits to any AC electrical outlet.
- Do not touch or hold any moving parts of modules while they are operating.
- Keep conductive materials (such as aluminum foil, staples, paper clips, etc.) away from the circuit and the connector terminals.
- Always turn off circuits when not in use or when left unattended.
- Never use Bits in or near any liquid.
- Never use in any extreme environments such as extreme hot or cold, high humidity, dust or sand.
- Connecting 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.

**NOTES**

- Several projects in this kit involve the use of sharp objects. These tools should be used ONLY under direct adult supervision.
- Do not connect the two battery terminals to any conducting material.

**CARE AND CLEANING**

Clean Bits ONLY by wiping with a dry cloth. If necessary, isopropyl alcohol on a cloth may be used sparingly, and then wipe with a dry cloth.

**BATTERIES**

- Non-rechargeable batteries are not to be recharged.
- Batteries are to be removed from the product before being charged.
- Batteries are only to be charged under adult supervision.

**RADIO AND TELEVISION INTERFERENCE**

This equipment complies with the limits for a Class B digital device, pursuant to 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.

**INSTRUCTIONS**

We recommend using littleBits brand 9-volt batteries, but standard alkaline or standard rechargeable batteries may also be used. Properly discard and replace exhausted batteries.

**VERY IMPORTANT NOTE**

- Batteries are subject to damage by static electricity. Handle with care.
- Some modules may become warm to the touch when used in certain circuit designs. This is normal. Rearrange modules or discontinue using if they become excessively hot.
- Discontinue use of any Bits that malfunction, become damaged or broken.

**PRODUCT DISCLAIMER**

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