

## Sphero Driver's License Class A

Draft



Use the Sphero app to drive Sphero around the track while staying inside of the lines.

## Sphero Driver's License Class B

Draft



Use the Tickle app to code Sphero to drive from one point (mark) on the track to the next.

## Sphero Driver's License Class C

Draft



Use the Tickle app to code Sphero to drive from one point (mark) on the track to the next including a ramp in your course.

## Sphero Angle Coding Challenge

Draft



On a large piece of paper, whiteboard or using blue tape draw out three angles (one acute, one right, and one obtuse) and code sphero to drive on them using the tickle app. Be sure to record your angles and the code you wrote!

## MaKey MaKey Circuit Challenge 1

Draft



Simple Circuit: Figure out where to plug in the LED on the MaKey MaKey and complete a circuit by touching playdoh. (Remember that LEDs have a short leg to indicate the negative side. You need to create a loop for the current to flow!)

[See MaKey MaKey Simple Circuits Challenges](#)

\*Note: You will need LED lights for this challenge.

## MaKey MaKey Circuit Challenge 2

Draft



Ask some friends to help you and use people to complete the circuit. Add people and see if the LED still will light up. How many people can be in your chain and still complete the circuit?

[See MaKey MaKey Simple Circuits Challenges](#)

\*Note: You will need LED lights for this challenge.

## MaKey MaKey Circuit Challenge 3

Draft



Create a MaKey MaKey keyboard with tin foil and popsicle sticks. Use the scratch piano at

[scratch.mit.edu/projects/2543877](http://scratch.mit.edu/projects/2543877)

[See MaKey MaKey Simple Circuits Challenges](#) \*Note: You will need tin foil and popsicle sticks for this challenge.

## MaKey MaKey Circuit Challenge 4

Draft



Ask some friends to help you create human piano keys. Play the piano by playing your friends! Use the scratch piano at

[scratch.mit.edu/projects/2543877](http://scratch.mit.edu/projects/2543877)

[See MaKey MaKey Simple Circuits Challenges](#)

## MaKey MaKey Circuit Challenge 5

Draft



Make a switch with Playdoh that will still light up your LED on the MaKey MaKey without using yourself or another person as a ground. (Hint: You will need two alligator clips to Earth.)

[See MaKey MaKey Simple Circuits Challenges](#) \*Note: You will need LED lights & PlayDoh for this challenge.

## MaKey MaKey Circuit Challenge 6

Draft



Create a parallel circuit that will successfully light up a second LED. (Hint: Where is your LED getting output from?) Forgot what a parallel circuit is? Google it! =)

[See MaKey MaKey Simple Circuits Challenges](#)

\*Note: You will need LED lights for this challenge.

## MaKey MaKey Circuit Challenge 7

Draft



Power multiple LEDs at the same time. How many can you power? What ports on MaKey MaKey will allow you to power LEDs? (Hint: Earth is your ground. Attach your LED negative led to earth!)

[See MaKey MaKey Simple Circuits Challenges](#)

\*Note: You will need LED lights for this challenge.

## MaKey MaKey Circuit Challenge 8

Draft



Use at least 3 different materials from around the lab to build your own switch? What materials work? What won't work? Why?

[See MaKey MaKey Simple Circuits Challenges](#)

\*Note: You will need LED lights for this challenge.

# Scratch Coding Color Change Challenge

Draft



See DK Coding Kit

<http://www.dk.com/us/explore/education/celebrate-global-scratch-day-with-this-downloadable-computer-coding-kit/>

 A screenshot of the Scratch programming environment showing a project titled "COLOR CHANGE". The instructions are: "Press a key and change the color of a sprite." The code blocks include:
 

- "Choose your sprite:" section with "New sprite:" and "Choose a sprite from the library".
- "Enter the code:" section with a "when space key pressed" block followed by a "change color effect by 25" block.
- "GO!" section with a text box: "Press space bar to change colors".
- "Tip:" section: "You can choose a different effect OR Type a different number. Then press the space bar again".

 The Scratch cat and a green alien are shown as sprites. At the bottom, there is a DK logo and the text "A WORLD OF IDEAS. SEE ALL THERE IS TO KNOW" along with a URL: "Learn more at www.dk.com and http://scratch.mit.edu/".

# Scratch Coding Challenge Move to a Beat

Draft



See DK Coding Kit

<http://www.dk.com/us/explore/education/celebrate-global-scratch-day-with-this-downloadable-computer-coding-kit/>

 A screenshot of the Scratch programming environment showing a project titled "MOVE TO A BEAT". The instructions are: "Have your sprite dance to a drum beat." The code blocks include:
 

- "Choose your sprite:" section with "New sprite:" and "Choose a sprite from the library".
- "Enter the code:" section with a "when clicked" block followed by a "forever" loop containing:
  - "move 30 steps"
  - "play drum 1\* for 0.25 beats"
  - "move 30 steps"
  - "play drum 2\* for 0.25 beats"
- "GO!" section with a text box: "Click the green flag to run (start) a program".

 The Scratch cat is shown as a sprite. At the bottom, there is a DK logo and the text "A WORLD OF IDEAS. SEE ALL THERE IS TO KNOW" along with a URL: "Learn more at www.dk.com and http://scratch.mit.edu/".

# Scratch Coding Challenge Say Something

Draft

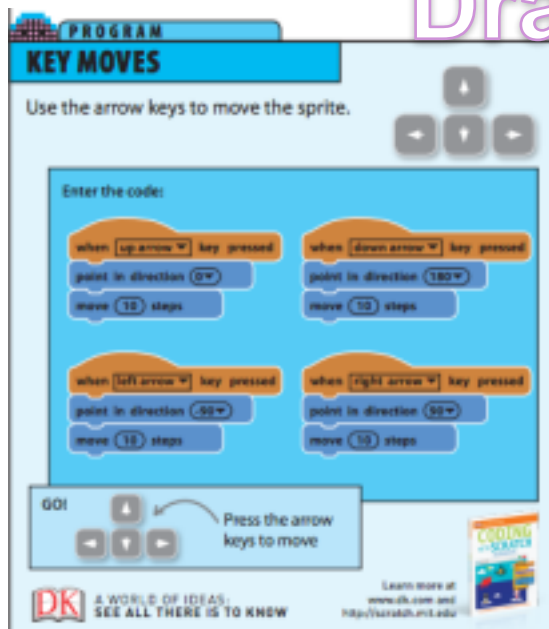


See DK Coding Kit

<http://www.dk.com/us/explore/education/celebrate-global-scratch-day-with-this-downloadable-computer-coding-kit/>

# Scratch Coding Challenge Key Moves

Draft



See DK Coding Kit

<http://www.dk.com/us/explore/education/celebrate-global-scratch-day-with-this-downloadable-computer-coding-kit/>



# Scratch Challenge: Coding & Drawing 2D Shapes

# Draft



Using this tutorial [bit.ly/2d\\_shapes\\_with\\_scratch](http://bit.ly/2d_shapes_with_scratch) code your Scratch sprite to draw 2D shapes! *Hint: you may want to work with a partner and have two computers open, one coding on scratch and the other viewing the tutorial.* To get to Scratch go to [scratch.mit.edu](http://scratch.mit.edu) & click on Try It Out!

# littlebits Challenge 1: Flashlight

# Draft



**PROJECT 1: Illuminate your way with household materials.**  
**FLASHLIGHT**

**1** Start with this circuit

power button wire bright LED

try it out! bright and shiny

**2** Put circuit in tube

when that LED light goes out

locking insulator

fill the cup with plastic cups to the top for all-around light

wrap with rubber bands

**3** Turn it on and go EXPLORE WHEN YOUR FLASHLIGHT!

add a bit of tape to diffuse the LED. what can you try?

**TIME:** 30 min  
**DIFFICULTY:** ●●○○○

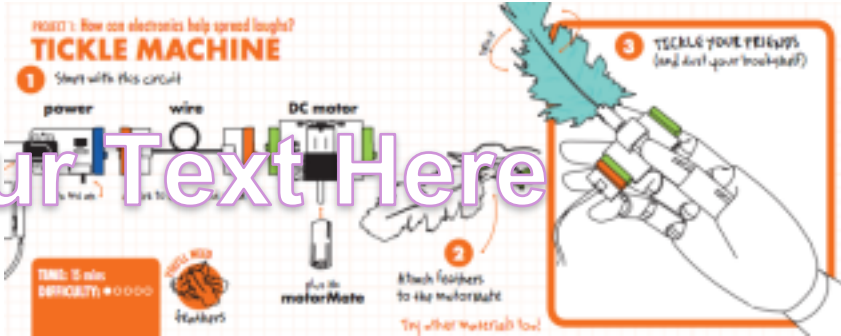
**TOOLS, NEED**

- rubber bands
- tube
- plastic cup

See [Basic Kit Booklet](#) for complete directions

# littleBits Challenge 2: Tickle Machine

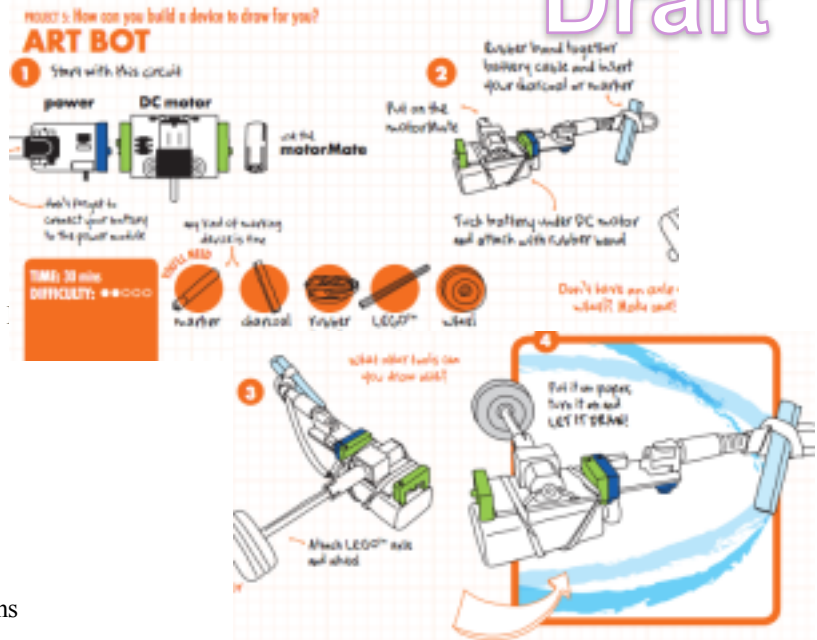
# Draft



See [Basic Kit Booklet](#) for complete directions

# littleBits Challenge 3: Art Bot

# Draft



See [Basic Kit Booklet](#) for complete directions

# littleBits Challenge 4: Breezy Buddy

Draft



## BREEZY BUDDY

CHALLENGE: Make your own weather station using littleBits and a fan. Find out whether your classroom has a better climate of the year or you're getting the memo all year on your weather with the simple fan all-weather unit.

- 1. MAKE YOUR CIRCUIT:** Connect the littleBits components as shown in the diagram.
- 2. MAKE YOUR BREEZY BUDDY:** Attach the fan to the circuit board and connect the wires.
- 3. TEST IT:** Turn the device on and observe the fan's operation.

**ADDITIONAL TIPS:** You can use a fan to create a breeze in your classroom or use it to cool down your computer.

[See the Gadgets and Gizmos Activity Guide for full directions.](#)

# littleBits Challenge 5: Spinmate

Draft



## SPINMATE

CHALLENGE: Make your own weather station using littleBits and a fan. Find out whether your classroom has a better climate of the year or you're getting the memo all year on your weather with the simple fan all-weather unit.

- 1. MAKE YOUR CIRCUIT:** Connect the littleBits components as shown in the diagram.
- 2. MAKE YOUR SPINMATE:** Attach the fan to the circuit board and connect the wires.
- 3. TEST IT:** Turn the device on and observe the fan's operation.
- 4. ADDITIONAL TIPS:** You can use a fan to create a breeze in your classroom or use it to cool down your computer.

**ADDITIONAL TIPS:** You can use a fan to create a breeze in your classroom or use it to cool down your computer.

[See the Gadgets and Gizmos Activity Guide for full directions.](#)

# littleBits Challenge 6: Mega Blaster

Draft



A series of six numbered steps with diagrams showing the assembly of the Mega Blaster. Step 1: 'BUILD YOUR FRONT end using one track &amp; loop wire.' Step 2: 'Secure the loop wire to the front of the shell by your magnet wire coil. Then, attach your battery.' Step 3: 'TAKE THE SHIELD OFF by sliding the battery to the inside of the shell &amp; with the wire.' Step 4: 'Cut a 3.17" (3/4") piece of foam &amp; tape strip.' Step 5: 'Wrap the front end with the battery on the inside and tape it in place. BE CAREFUL TO KEEP THE COIL AND YOUR FRONT END FROM COMING OFF THE COIL ON SHOWN.' Step 6: 'TAKE THE SHIELD OFF by sliding the battery to the inside and tape it in place. BE CAREFUL TO KEEP THE COIL AND YOUR FRONT END FROM COMING OFF THE COIL ON SHOWN.' Step 7: 'TAKE THE SHIELD OFF by sliding the battery to the inside and tape it in place. BE CAREFUL TO KEEP THE COIL AND YOUR FRONT END FROM COMING OFF THE COIL ON SHOWN.'

[See the Gadgets and Gizmos Activity Guide for complete directions.](#)

# littleBits Challenge 7: Wireless Doorbell

Draft



A series of four numbered steps with diagrams showing the assembly of the Wireless Doorbell. Step 1: 'Wire your littleBits together to build your wireless doorbell. The littleBits you need are: a battery, a push button, a speaker, a light, and a magnet wire coil. The littleBits you need are: a battery, a push button, a speaker, a light, and a magnet wire coil.' Step 2: 'Build the wireless doorbell. The littleBits you need are: a battery, a push button, a speaker, a light, and a magnet wire coil.' Step 3: 'Connect the back of the doorbell to the door. The littleBits you need are: a battery, a push button, a speaker, a light, and a magnet wire coil.' Step 4: 'Mount the doorbell to the door. The littleBits you need are: a battery, a push button, a speaker, a light, and a magnet wire coil.'

[See the Gadgets and Gizmos Activity Guide for full directions.](#)

# littleBits Challenge 8: Mischief Machine

Draft



**MISCHIEF MACHINE**

Build an automation to make your robot mischievous. Use a combination of littleBits to make your robot do something unexpected. You'll use a littleBits sensor to detect when you touch the robot and a littleBits actuator to make it do something unexpected.

- 1** You're going to make your robot do something unexpected. You'll use a littleBits sensor to detect when you touch the robot and a littleBits actuator to make it do something unexpected.
- 2** Build the second circuit. The littleBits sensor will detect when you touch the robot and the littleBits actuator will make it do something unexpected.
- 3** Add the motor to the robot. The motor will make the robot do something unexpected.
- 4** Add the paper to the robot. The paper will make the robot do something unexpected.
- 5** Add the littleBits sensor to the robot. The littleBits sensor will detect when you touch the robot and the littleBits actuator will make it do something unexpected.

[See the Gadgets and Gizmos Activity Guide for complete directions.](#)

# littleBits Challenge 9: Bubblebot

Draft

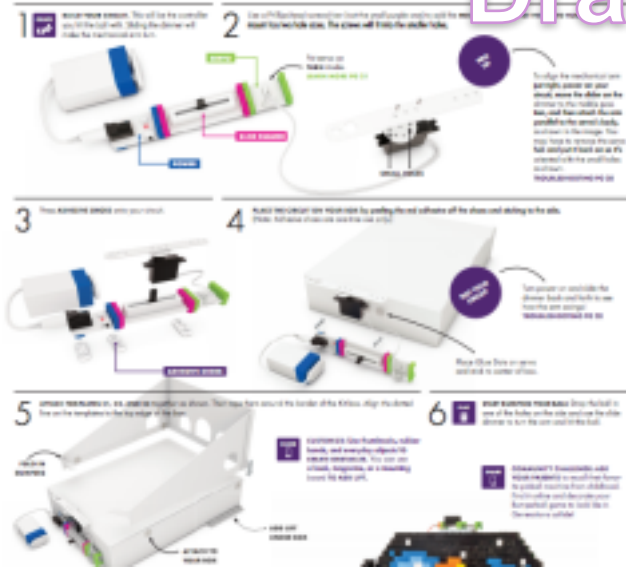


- 1** Build the first circuit. The littleBits sensor will detect when you touch the robot and the littleBits actuator will make it do something unexpected.
- 2** Build the second circuit. The littleBits sensor will detect when you touch the robot and the littleBits actuator will make it do something unexpected.
- 3** Add the motor to the robot. The motor will make the robot do something unexpected.
- 4** Add the paper to the robot. The paper will make the robot do something unexpected.
- 5** Add the littleBits sensor to the robot. The littleBits sensor will detect when you touch the robot and the littleBits actuator will make it do something unexpected.
- 6** Add the littleBits sensor to the robot. The littleBits sensor will detect when you touch the robot and the littleBits actuator will make it do something unexpected.

[See the Gadgets and Gizmos Activity Guide for Complete directions.](#)

# littleBits Challenge 10: Bumperball

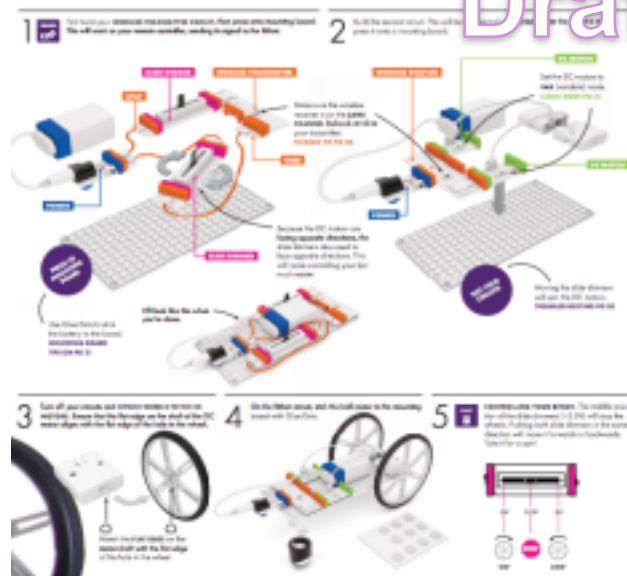
Draft



[See the Gadgets and Gizmos Activity Guide for complete directions.](#)

# littleBits Challenge 11: Bitbot

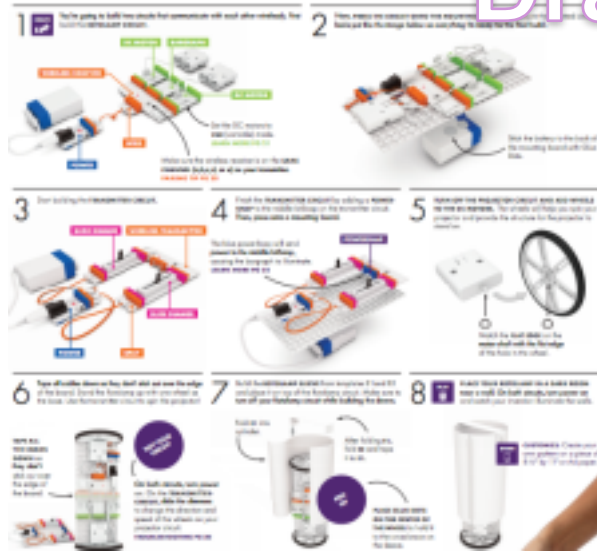
Draft



[See the Gadgets and Gizmos Activity Guide for full directions.](#)

# littleBits Challenge 12: Rotolamp

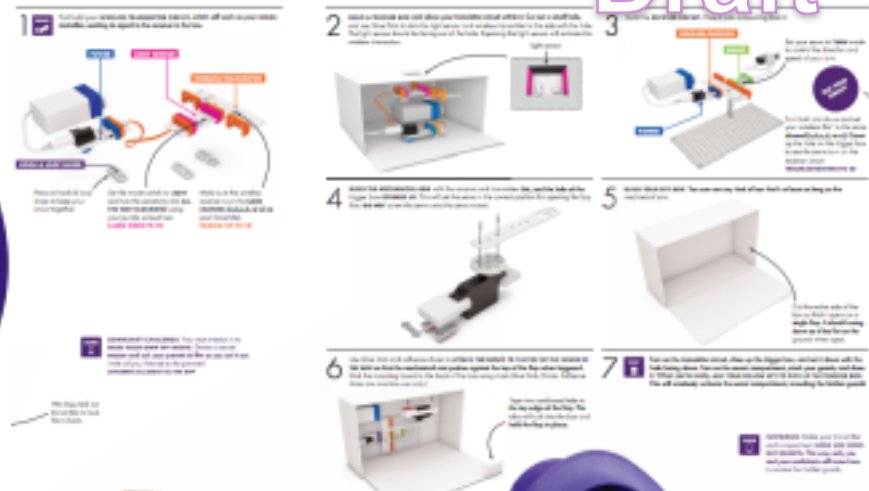
Draft



[See the Gadgets and Gizmos Activity Guide for full directions.](#)

# littleBits Challenge 13: Spy Box

Draft



[See the Gadgets and Gizmos Activity Guide for full directions.](#)

### Dash Challenge 1: Turn Dash into a Car

Draft



**TURN DASH INTO...  
A CAR!** 

Help Dash get ready to hit the open road! Add **sounds, lights, and movement** to make your car a reality.

Backward

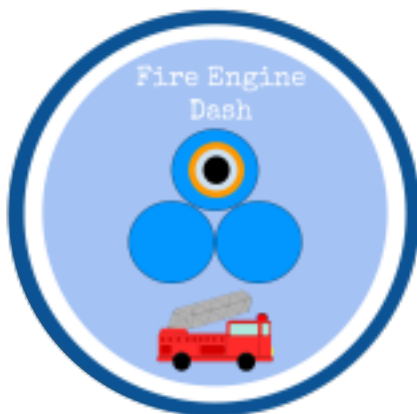
Tail  Transport

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[Dash Challenge Cards](#) created by The Digital Scoop

### Dash Challenge 2: Turn Dash into a Fire Engine

Draft



**TURN DASH INTO...  
A FIRE ENGINE!** 

Help Dash get ready to put out fires and rescue people! Add **sounds, lights, and movement** to make your fire engine come to life.

All Colors  Transport

Forward

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[Dash Challenge Cards](#) created by The Digital Scoop



### Dash Challenge 3: Turn Dash into a Train

Draft



**TURN DASH INTO...  
A TRAIN!**



Toot! Toot! All aboard the Dash express! Add **sounds, lights, and movement** to turn Dash into a train. Bonus: Can you have Dash the train pull Dot or a LEGO creation?

Transport

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### Dash Challenge 4: Turn Dash into an Animal

Draft



**TURN DASH INTO...  
AN ANIMAL!**



Roar! Bark! Squeak! Add **sounds, lights, and movement** to turn Dash into an animal.

Forward

Animal

Mood

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[Dash Challenge Cards](#) created by The Digital Scoop

## Dash Challenge 5: Turn Dash into an Alien

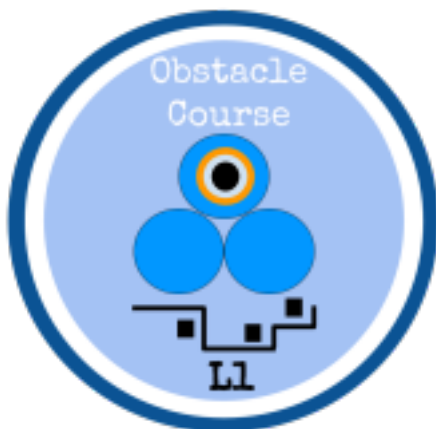
Draft



[Dash Challenge Cards](#) created by The Digital Scoop

## Dash Challenge 6: Obstacle Course Level 1

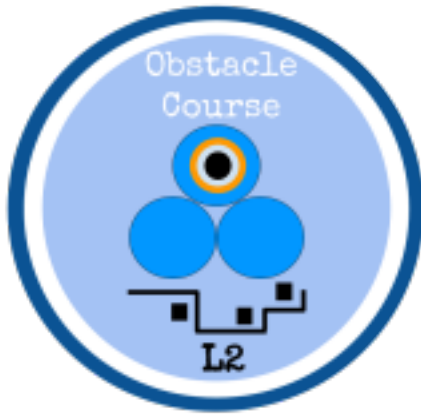
Draft



Program Dash to navigate around at least **three** obstacles on a track using the Path App.

## Dash Challenge 7: Draw a Heart Level 1

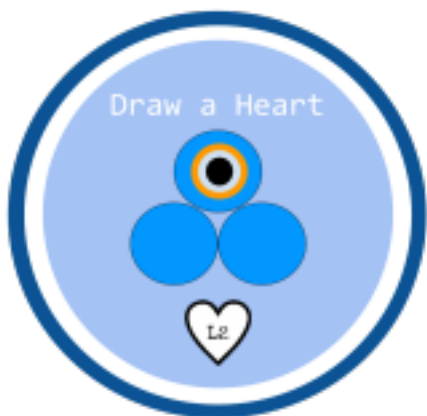
Draft



Make a Dash Robot that draws a heart using the Path App. *Hint, you may need the lego adapters, tape and a marker.*

## Dash Challenge 8: Draw a Heart Level 2

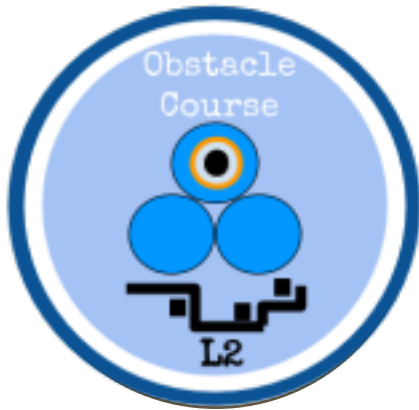
Draft



Make a Dash Robot that draws a heart using the Blockly App. *Hint, you may need the lego adapters, tape and a marker.*

## Dash Challenge 9: Obstacle Course Level 2

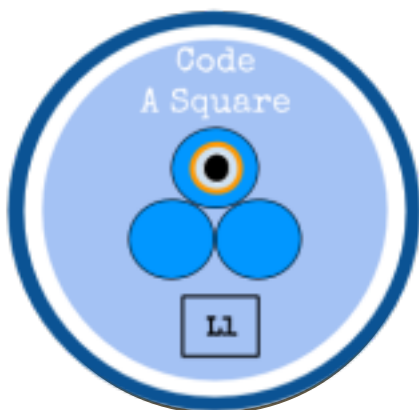
Draft



Program Dash to navigate around at least **three** obstacles on a track using the Blockly App.

## Dash Challenge 10: Coding Challenge Square L1

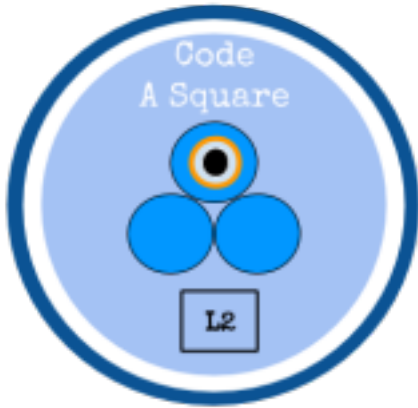
Draft



Program Dash to drive around a square (draw one or use blue tape) by coding with the Blockly App.

## Dash Challenge 11: Coding Challenge Square L1

Draft



Program Dash to drive around a square (draw one or use blue tape) by coding with the Blockly App. Use the repeat block to program a loop.

## Lego Wall Challenge 1: 5x Facts Array

Draft



Create a 5s multiplication facts array (must have all facts  $5 \times 1$  through  $5 \times 9$ ) on the lego wall.

## Lego Wall Challenge 2: 6x Facts Array

Draft



Create a 6s multiplication facts array (must have all facts  $6 \times 1$  through  $6 \times 9$ ) on the lego wall.

## Lego Wall Challenge 3: 7x Facts Array

Draft



Create a 7s multiplication facts array (must have all facts  $7 \times 1$  through  $7 \times 9$ ) on the lego wall.

## Lego Wall Challenge 4: 8x Facts Array

Draft



Create a 8s multiplication facts array (must have all facts  $8 \times 1$  through  $8 \times 9$ ) on the lego wall.

## Lego Wall Challenge 5: 9x Facts Array

Draft



Create a 9s multiplication facts array (must have all facts  $9 \times 1$  through  $9 \times 9$ ) on the lego wall.

Lego Wall Challenge 6: Marble Run Level 1

Draft



Create a marble run with at least one turn/drop.

Lego Wall Challenge 7: Marble Run Level 2

Draft

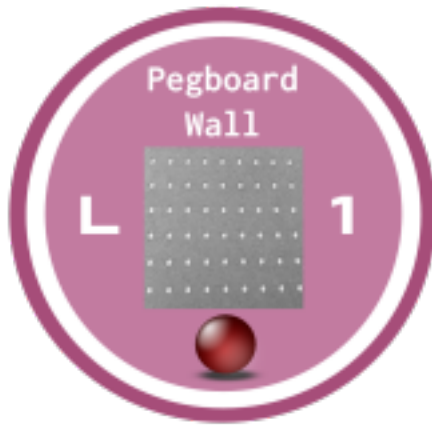


Create a marble run with at least three turns/drops.



## Pegboard Wall Challenge Level 1

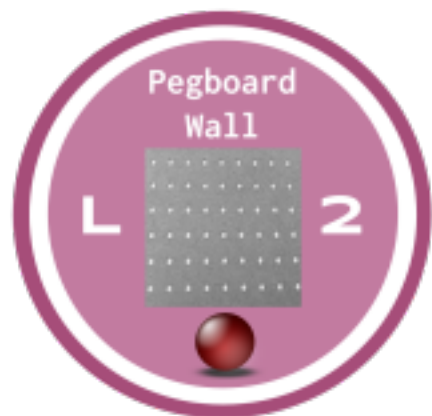
Draft



Create a marble run with at least one PVC pipe, two 90° elbows and two colorful pieces.

## Pegboard Wall Challenge Level 2

Draft



Create a marble run with at least two PVC pipes, three 90° elbows and three colorful pieces.

## Pegboard Wall Challenge Level 3

Draft



Create a marble run with at least four PVC pipes, four 90° elbows and five colorful pieces.

## Pegboard Wall Challenge Level 4

Draft



Create a marble run that goes from the top of the wall to the bottom. Must have at least three PVC pipes, three 90° elbows and four colorful pieces.

## Pegboard Wall Challenge Level 5

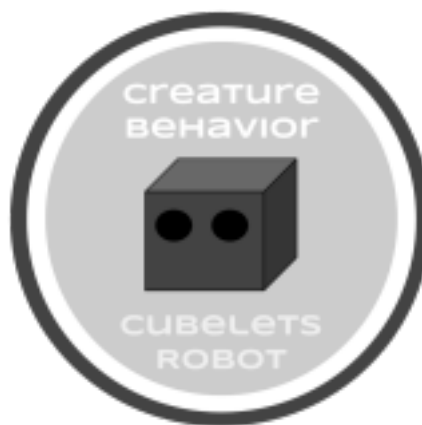
Draft



Using littlebits (and other materials) create a sign that has at least one light and one moving part.

## Cubelets Challenge 1: Creature Behaviors

Draft



Make driving robots that represent different creature behaviors. Some of these might even make you think of different emotions.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 2: Motion Activated Alarm

Draft

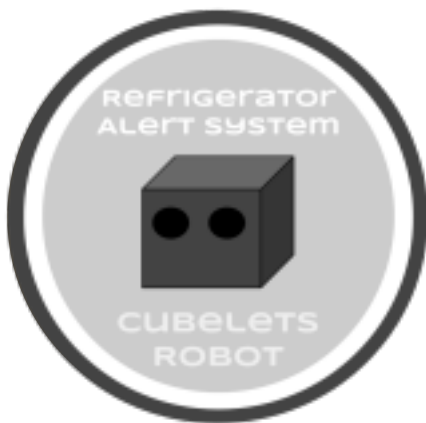


Make a robot that acts as a motion-activated alarm light.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 3: Refrigerator Alert System

Draft



Imagine that your power has gone out, but your Cubelets have plenty of batteries. How could you build a robot that alerted you when the refrigerator was starting to get warm inside?

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 4: Conveyor Belt

Draft

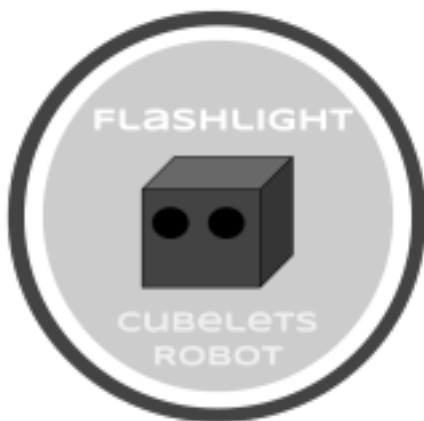


Make a conveyor belt robot that can move something across it.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 5: Flashlight

Draft

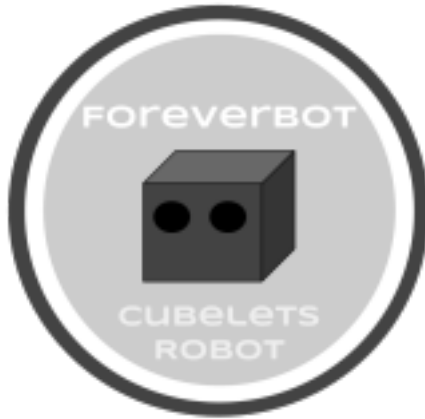


Make a flashlight that “knows” to come on in the dark.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 6: Forever Bot

Draft

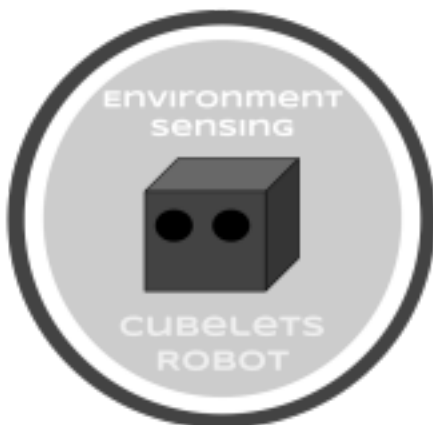


Make a robot that will “go forever” by using at least two senses and two actions.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 7: Environment Sensing Bot

Draft



Construct an “environment” or arrange other objects around a robot so that it will “go forever” or “never quit”

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 8: Lighthouse

Draft

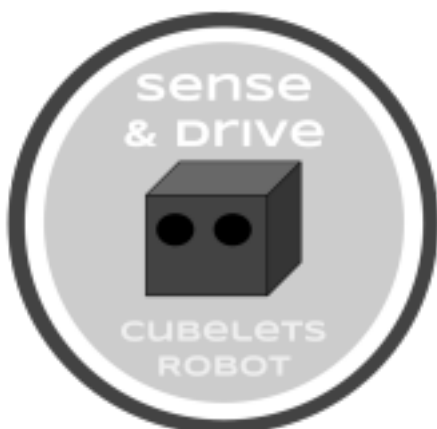


Can you make a robot lighthouse that knows to come on in the dark?

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 9: Sense and Drive Bot

Draft

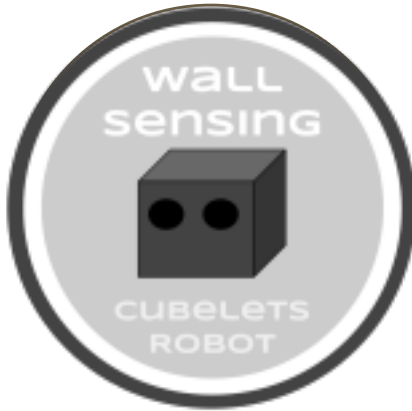


Using the Blocker Cubelet can you make a steering robot with sides that drive and sense independently?”

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 10: Wall Sensing Bot

Draft

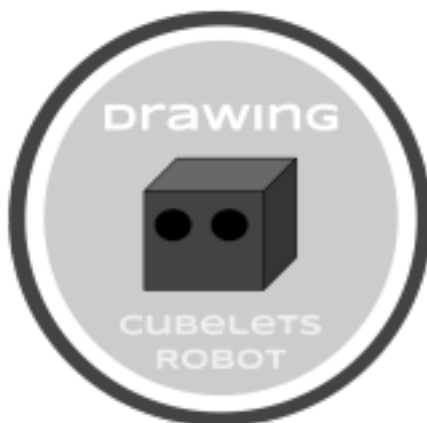


Make a robot that slows down and stops as it approaches objects or walls.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Cubelets Challenge 11: Drawing Bot

Draft



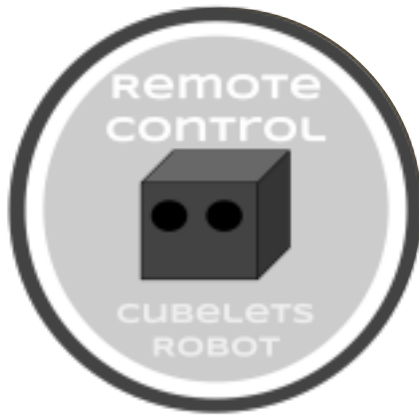
Make a robot that can draw a line. Hint you will need legos, tape and a marker.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.



## Cubelets Challenge 12: Remote Control Bot

Draft



Use the BlueTooth Cubelet to control your robot to drive around a stool and back.

See [10 Cool Things You Can Do with Cubelets!](#) for hints and detailed instructions.

## Art Challenge 1: Binary Bracelet

Draft



Directions:

1. Find the first letter of your first name in the Binary Decoder Key.
2. Use two different colored beads and a pipe cleaner to make the code for your name.
3. Wrap the bracelet around your wrist to wear it!
4. Share your bracelet with your classmates to see if they can figure out your letter.

A	■ ■ ■ ■ ■ ■ ■ ■	N	■ ■ ■ ■ ■ ■ ■ ■
B	■ ■ ■ ■ ■ ■ ■ ■	O	■ ■ ■ ■ ■ ■ ■ ■
C	■ ■ ■ ■ ■ ■ ■ ■	P	■ ■ ■ ■ ■ ■ ■ ■
D	■ ■ ■ ■ ■ ■ ■ ■	Q	■ ■ ■ ■ ■ ■ ■ ■
E	■ ■ ■ ■ ■ ■ ■ ■	R	■ ■ ■ ■ ■ ■ ■ ■
F	■ ■ ■ ■ ■ ■ ■ ■	S	■ ■ ■ ■ ■ ■ ■ ■
G	■ ■ ■ ■ ■ ■ ■ ■	T	■ ■ ■ ■ ■ ■ ■ ■
H	■ ■ ■ ■ ■ ■ ■ ■	U	■ ■ ■ ■ ■ ■ ■ ■
I	■ ■ ■ ■ ■ ■ ■ ■	V	■ ■ ■ ■ ■ ■ ■ ■
J	■ ■ ■ ■ ■ ■ ■ ■	W	■ ■ ■ ■ ■ ■ ■ ■
K	■ ■ ■ ■ ■ ■ ■ ■	X	■ ■ ■ ■ ■ ■ ■ ■
L	■ ■ ■ ■ ■ ■ ■ ■	Y	■ ■ ■ ■ ■ ■ ■ ■
M	■ ■ ■ ■ ■ ■ ■ ■	Z	■ ■ ■ ■ ■ ■ ■ ■

This activity is a [Code.org Unplugged Activity](#)

## Magna-Tiles 3D Shape Designer

Draft



Using Magna-Tiles design three different 3 dimensional shapes (cube, rectangular prism, pyramid, triangular prism etc.)

## Magna-Tiles Fraction Challenge Level 1

Draft



Using magna-tiles design three 2 dimensional shapes that represent different fractions (for example place a green and a purple square next to each other, the one color would represent  $\frac{1}{2}$ ).

## Magna-Tiles Fraction Challenge Level 2

Draft



Using magna-tiles design three 2 dimensional shapes that represent equivalent fractions. For example create a shape that represents  $\frac{1}{3}$  then another that represents  $\frac{2}{6}$  and another that represents  $\frac{3}{9}$ . (*You may not use this example!*)