

Getting Started with Codey Rocky™

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About Codey Rocky

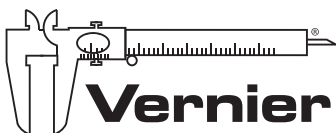
Codey Rocky is an easy-to-use STEM robot kit designed to help bring computer science education into the real world. Codey Rocky is made by Makeblock, a leading DIY robotics construction and STEM education platform for makers, hobbyists, STEM learners, and educators.

Codey Rocky's two-in-one construction allows students to program in ways not possible with a traditional robot. Codey is the brain of the robot; when you upload programs, you will connect and upload the program to Codey. Rocky, the wheeled cradle, gives Codey the mobility to go anywhere (Rocky cannot be programed directly; it must be paired with Codey).

Codey has multiple sensors and input/output devices, all of which can be incorporated into your programs:

- IR transmitter and receiver
- 3-axis accelerometer and gyroscope
- Light and sound level sensor
- 3 programmable buttons and a gear knob
- Speaker
- 8 × 16 LED matrix
- RGB LED

When Codey is docked with Rocky, you can also write programs that take advantage of Rocky's proximity and color sensors (when the sensor bar is rotated forward and downward, respectively).



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Codey Rocky Default Program

Codey Rocky comes with a Default Program preinstalled. Codey Rocky will respond to A, B, or C button presses with the following actions:

- Laughing and doing a little shimmy
- Scowling, retreating, then darting forward while making an angry cat noise
- Making sad eyes and retreating a short distance while making a sad cat noise

RETURN CODEY ROCKY TO THE DEFAULT PROGRAM

If students have been running their own code on Codey Rocky, and you wish to return the robot to the Default Program, you can do so using mBlock 5 software (cannot be done using mBlock app):

1. Connect Codey Rocky to a computer via USB cable. Launch the mBlock 5 software and connect to the robot by clicking on the "Connect" button and selecting the USB port to which Codey Rocky is connected.
2. After connecting, click the gear icon, , in the Device/Sprite section of the mBlock 5 window, and select Reset Default Program.
3. Choose "Updates" in the dialog. mBlock 5 will reinstall the Default Program on Codey Rocky.

mBlock Software and App

Use the free mBlock 5 software or mBlock app to write code for Codey Rocky and upload the code to the robot. Visit www.mblock.cc/mblock-software and download the appropriate version of mBlock for your device:

Windows® and macOS® Computers

Download and install mBlock 5 software for Windows or macOS. Then follow the procedure in the "Programming with mBlock 5 Software (Computers and Chromebooks)" section to start coding.

Chromebooks

To run mBlock on a Chromebook, download the Chrome extension, mLink. After installing mLink on your Chromebook, launch mLink; mBlock 5 will automatically open in a tab in the Chrome browser. Follow the procedure in the "Programming with mBlock 5 Software (Computers and Chromebooks)" section to start coding.

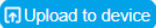
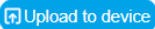
mBlock App (iOS and Android™ Devices)

Download the mBlock app from the Apple App Store or the Google Play Store. After installing mBlock, follow the procedure in the "Programming with mBlock App (iOS and Android)" section to start coding. **Note:** There are a number of apps in the app stores that have similar names including the Makeblock app and the mBlock Blockly app; this guide covers just the mBlock app.

Programming Codey Rocky with mBlock

mBlock 5 and mBlock app are based on MIT Lifelong Learning Lab's Scratch 3.0. If using a combination of devices, you will find that mBlock 5 and the mBlock app function quite similarly once you get programming.

Programming with mBlock 5 Software (Computers and Chromebooks)

1. After downloading, launch mBlock 5 and click the “+” icon to start a new project.
2. Press the power button on Codey to turn on the robot. Then, connect Codey to the computer or Chromebook via a USB cable. Note that Codey does not need to be connected to Rocky when writing code for the robot.
3. Connect to Codey by clicking Connect,  Connect, in the Device/Sprite section of the mBlock 5 window. Then, select the USB port to which Codey is connected. Once Codey is connected, the Connect button is replaced by  Upload to device and  Disconnect buttons. You will also notice that when you select a Device like Codey Rocky, the palettes will update to include only the blocks that can be used to program the robot.
4. To create code for Codey Rocky, drag blocks from the various palettes in the Script section into the Code section. By connecting blocks together, you can create programs. **Important:** Each program must begin with a “hat block” to tell Codey when to run that program. For instance, blocks connected to the “when Codey starts up” hat block will run when Codey turned on.
5. Upload your code to Codey Rocky by clicking the  Upload to device button.
6. After the uploading process is complete, Codey Rocky will run your code. Code that begins with a “when Codey starts up” hat block will be run after it is uploaded to Codey Rocky and when Codey is turned on. If a program begins with a different hat block, such as the “when button A is pressed”, the program will run when the event occurs.

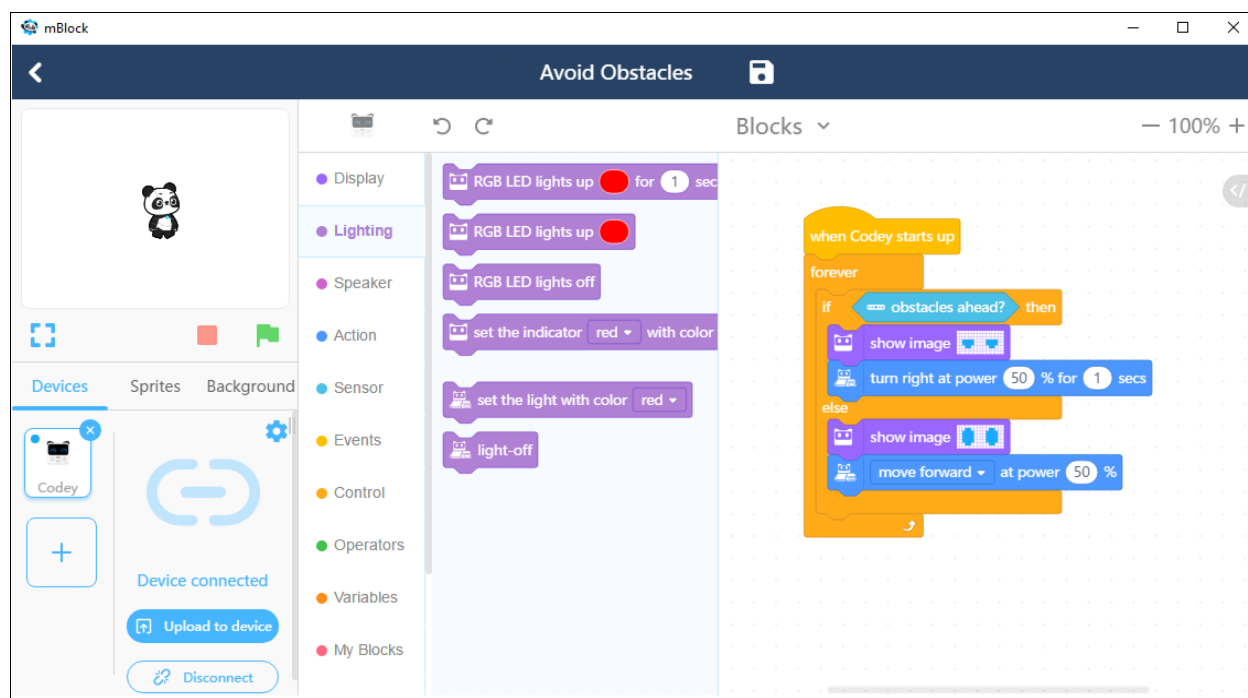


FIGURE 1 mBlock 5 window includes four main sections or panes: Stage, Devices/Sprites, Scripts, Code

Programming with mBlock App (iOS and Android)

After launching the mBlock app, you can choose either to do the Codey Rocky programming tutorials or dive into programming.

Tutorials

1. Tap Codey basic (see Figure 2).
2. Tap Start now.

Note If you have used mBlock 5 software to load your own programs onto Codey Rocky, mBlock app will not connect to the robot. Restore the Default Program to Codey Rocky, using the steps outlined in the "Return Codey Rocky to the Default Program" section.

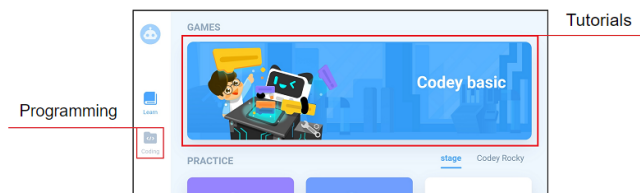


FIGURE 2 mBlock app main screen

Programming

1. To begin programming, tap Coding in mBlock app (see Figure 2).
2. Tap the "+" icon to start a new project. Then, select Codey from the list of devices.
3. After loading the coding environment (see Figure 3), the app will attempt to connect to Codey Rocky via Bluetooth® wireless technology. Press the power button on Codey, and hold your phone or tablet close to the robot. After connecting, the app will automatically return to the coding environment.
4. To create code for Codey Rocky, drag blocks from the various palettes into the Code area. By connecting blocks together, you create programs for Codey Rocky. **Important:** Programs must begin with a "hat block," which tells Codey when to run the code. For instance, a program that begins with a "when green flag clicked" hat block will run when you tap the  icon in the lower-right corner (see Figure 3).
5. When you're done programming, tap the  icon and Codey Rocky will run your code. Programs that with a "when green flag clicked" hat block will start immediately. Programs that begin with a different hat block, such as "when button A is pressed", will run when the event occurs.

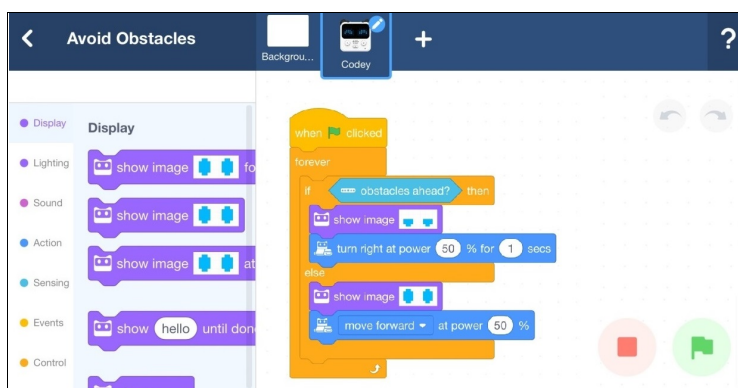


FIGURE 3 The mBlock app coding environment includes palettes (left) and the programming area (right).

First Codey Rocky Program: Simple Obstacle Avoidance

After downloading mBlock and connecting to your robot, you can create your first program for Codey Rocky. The sample program in Figure 4 is for a simple obstacle-avoidance program. If Codey Rocky's proximity sensor detects an obstacle ahead, the robot turns to the right. If no obstacle is detected, Codey Rocky drives forward. The "show image" blocks give some feedback about whether Codey Rocky "sees" an obstacle or not.



FIGURE 4 Simple obstacle avoidance program in mBlock 5 software; in mBlock app, the "when green flag clicked" hat block replaces "when Codey starts up."

Create this program in mBlock 5 or the mBlock app and run the code on Codey Rocky. Does Codey Rocky move as expected? Experiment with the code:

- Increase or decrease the driving or turning speed.
- Make the avoidance motion more complex by adding additional turn or move blocks when an obstacle is detected.
- Add blocks from the Speaker/Sound palette to alert the user when an obstacle is detected.
- Add commands so that Codey Rocky sometimes turns left to avoid an obstacle and other times turns right.

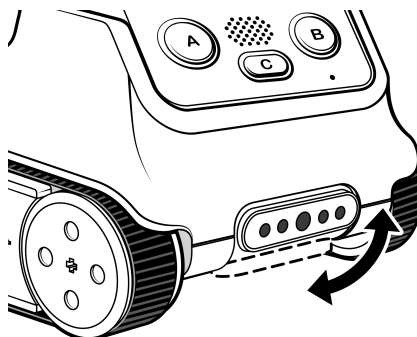
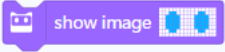
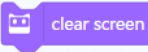
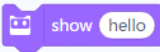
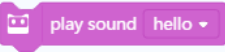
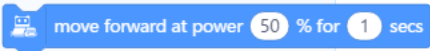
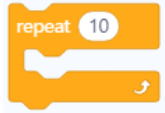
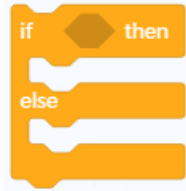


FIGURE 5 The Codey Rocky sensor bar can be rotated; point forward to detect obstacles ahead or downward to detect the color of the surface.

mBlock Palettes and Blocks

mBlock 5 software and the mBlock app include a matching set of palettes and blocks, with one exception in the Events palette: in mBlock 5 software, you will find the “when Codey starts up” hat block; in mBlock app, you will find the “when green flag clicked” hat block. In most cases, you will start a program with a “when Codey starts up” hat block in mBlock 5 or a “when green flag is clicked” hat block in the mBlock app.

Palette	Description	Example Blocks
Display	Control Codey’s 8x16 LED display	  
Lighting	Control Codey’s RGB LED	 
Speaker (mBlock 5) Sound (mBlock app)	Control Codey’s speaker	  
Action	Move Codey Rocky	 
Sensor (mBlock 5) Sensing (mBlock app)	Reading onboard sensors	 
Events	Start your code running	 (mBlock 5)  (mBlock app) 

Palette	Description	Example Blocks
Control	Guide the flow of your code	 
Operators	Math and logic commands	 
Variables	Create and control variables	 
My Blocks	Define your own blocks	 

Saving Your mBlock Programs

In both the mBlock 5 software and app, you can save your programs by clicking/tapping the file icon. Program files are saved within mBlock, so you are able to open saved programs when you reopen the software or app. **Note:** To change the name of your programs, click or tap the “Untitled” title at the top of the window.

In the mBlock 5 software, if you want to share a program file with a classmate or save your program files locally, you can download the .mblock program file to your desktop or another folder by doing the following:

- Exit the programming area by clicking the “<” icon in the upper-left corner of the window.
- Click on the “...” icon for the program.
- Choose “Save to your computer” from the menu and then select a location where you want to save the program file.

Note: You can create a cloud account with Makeblock by clicking the account icon in the upper-right corner of the Project screen. After creating an account, programs you create are automatically synced with Makeblock’s online storage. You can access your program files on a different computer/device by simply by logging into your account.

Additional Resources

On the Vernier Codey Rocky web page (www.vernier.com/mb-cr), you'll find

- *Coding with Codey Rocky: Mission to Mars* activity module
- Codey Rocky Troubleshooting and FAQs