WELCOME TO THE OZOBOT COLOR CODES BOT CAMP FOR EDUCATORS

This 100% unplugged experience makes coding approachable to learners at all levels. With just the stroke of a marker you start practicing concepts like sequential thinking, syntax and debugging while planting the foundation for more advanced coding and robotics skills. After completing the Bot Camp, you'll be ready to lead and inspire your students with Ozobot's Infinite Learning Possibilities.

SETUP
YOU'LL NEED:

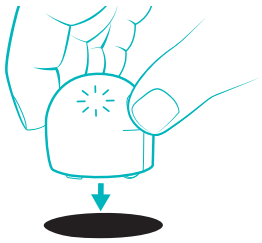
- ✓ **A fully charged Bit or Evo!**
  (For Evo be sure to update using the Evo App or Edu Updater Utility and set to classroom mode.)
- ✓ **A set of Ozobot Markers**
- ✓ **Extra plain white paper (optional)**
- ✓ **About 15 minutes of free time to complete the bot camp**

ABOUT CALIBRATION

The robot needs to know the amount of light coming off the paper to know what contrast and color to look for. If you change paper or your light conditions change, you may need to calibrate again.

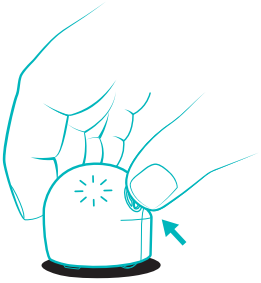
DO! **Calibrate your bot to the black spot following steps below.**

1

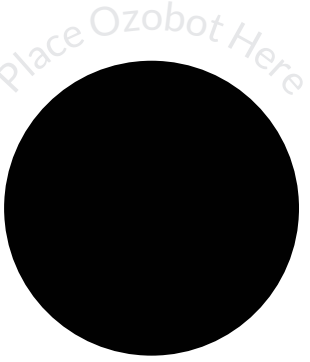


Make sure your bot is powered off, then place your bot on black circle.

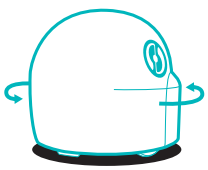
2



Press and hold your bot's power button for 2 sec. until the top LED light blinks white. Then, release power button.

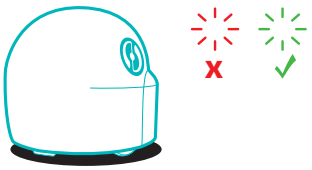


3



Your bot will move on the circle.

4



You bot blinks green when calibrated. If your bot blinks red, start over from Step 1.

If calibration is successful, Good Job! You're ready to start coding Ozobot to follow lines.

DRAWING LINES

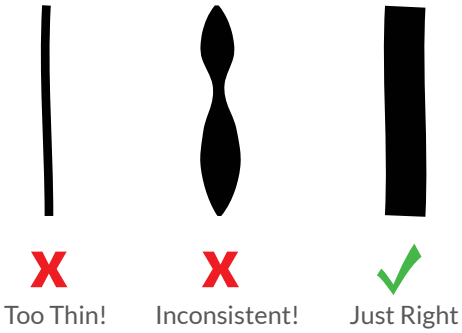
Evo and Bit are programmed to follow lines they see through their sensors.

Student Prompt Question
Why do Bit and Evo need lines this thickness?
Take a look at the sensor widths under your bot.

Student Prompt Question
What would happen if the line was too thick? Or too thin?
Test out different lines to test the limits of the bit and deconstruct what the bot sees.

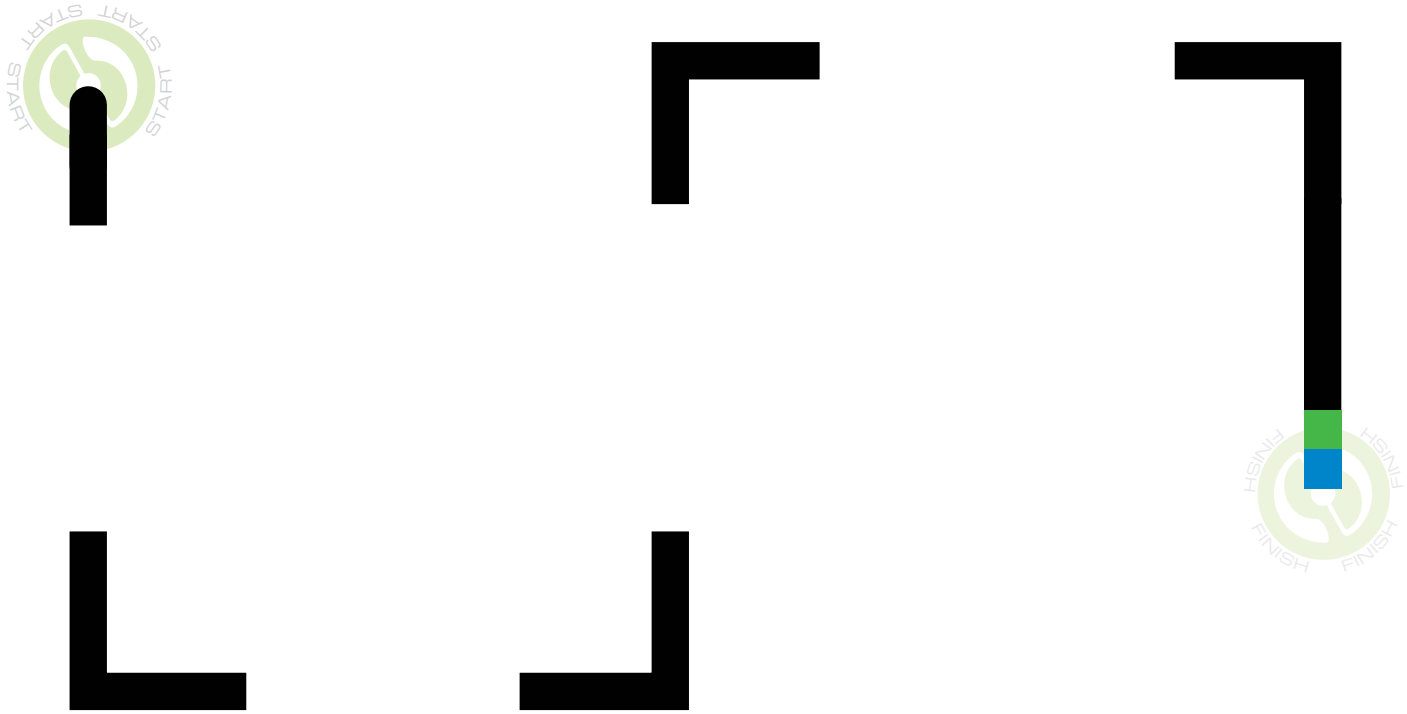
Real-world Connection
In text-based coding, your directions should be precise or it won't be read. Giving instructions to your bot is the same way, so keep your drawing precise.

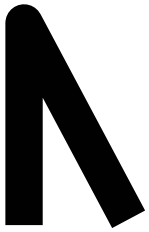
Ozobot Tip
How to hold the marker: the chisel-tip can set down flat to make the right thickness for your lines. Practice holding the marker at the right angle.



DO!

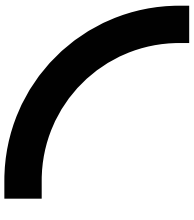
Finish the Line
Use black marker to connect the lines. Place bots on the START and the bot will race to the FINISH.



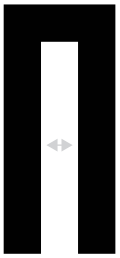


Too Sharp!

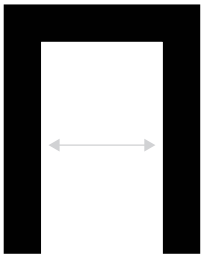
Just Right



Just Right



Too Close!



Just Right

Ozobot Tip
Be sure to keep your line thickness consistent in corners.

DO!

Drawing corners

Complete the corners in this map to get Ozobot from START to FINISH.

EXPLORING COLOR

Evo and Bit can see different colors through their optical sensors.

Ozobot Tip
When Bit and Evo are on a black line, they reflect blue in the LED. They also reflect blue in the LED when on a blue line.

Student Prompt Question
Put the bot on colorful items like clothes, tools, or packaging. What happens?

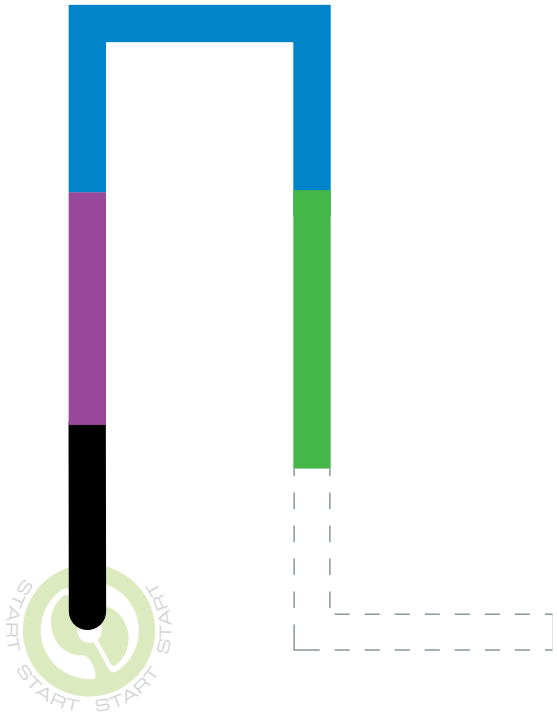
Student Prompt Question
You know how your bot can see black and white with its sensors. Can you use what you know to explain how it can see, and reflect, just about any color?

Student Prompt Question
How does the bot react when you use the different Ozobot marker colors? What happens if you try other color markers like pink, purple, orange or yellow?

Real-world Connection
Computers understand colors in amounts of red, green and blue (RGB). Engineers use number values for each color to tell a computer what color to show.

DO!

Light Show
Try different colored markers to continue this path and create an LED light show.



COLOR CODES

Bit and Evo can read and react to sequences of color, called Color Codes.

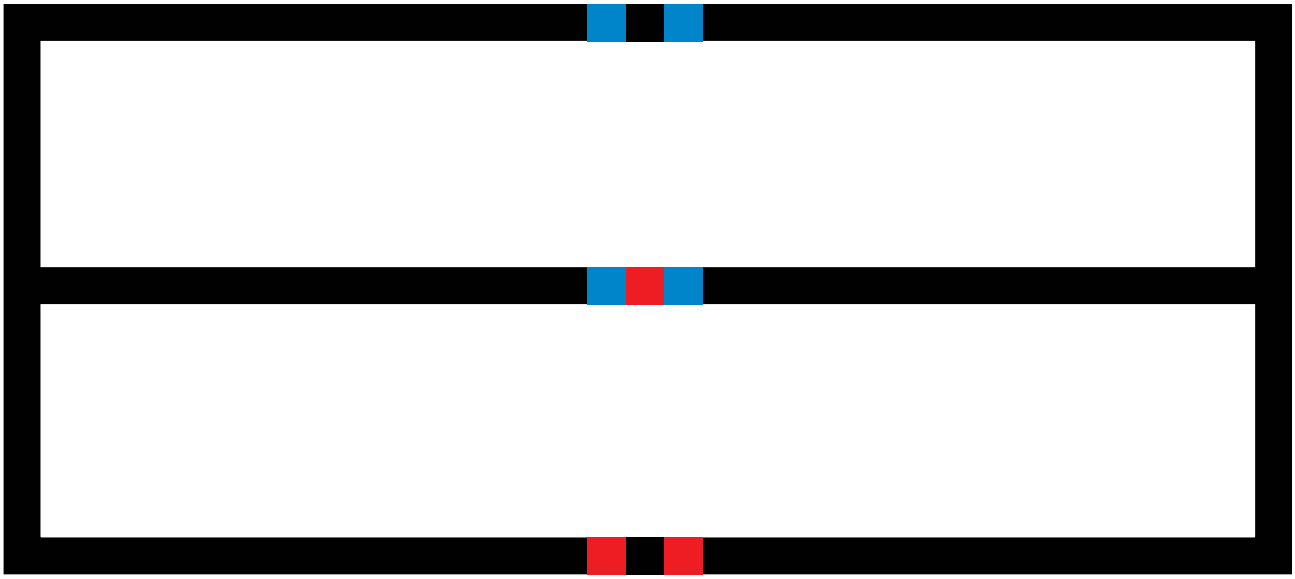
Real-world Connection
Color codes are like 'functions' in programming - a premade chunk of code that does a specific task.

Ozobot Tip
You can give your students codes without the titles to let them investigate and record what each does.

Ozobot Tip
Ozobots can only read color codes when they are within black lines before and after the code.

Real-world Connection
Computers rely on grammar rules to read code. This helps the computer know where code instructions start and stop. For Ozobot, black lines represent start/stop code grammar.

DO! See if you can "crack the code" for Ozobot's color code language by testing the track below. Can you tell which color code means, Slow, Fast and U-Turn?



Tips: Code Reference Sheet

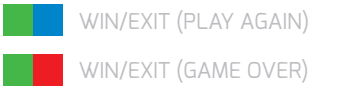
SPEED

DIRECTION

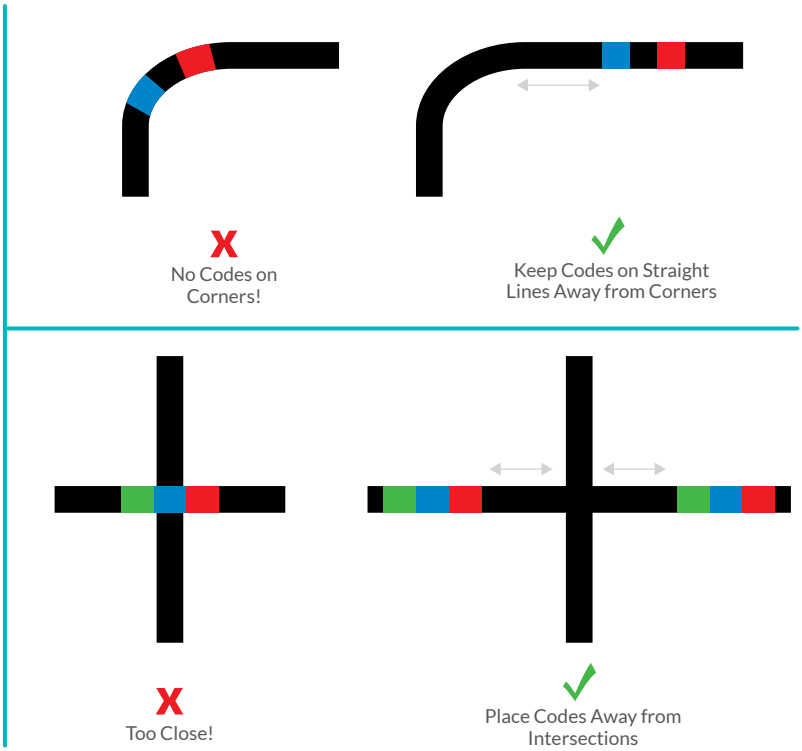
SPECIAL MOVES

TIMERS

WIN/EXITS



Tips: Drawing Codes



COLOR CODES

Real-world Connection
Coding is precise—any extra letters or lost punctuation can break a program. Color Codes and line drawing must also be exact for the robot to understand the instructions correctly.

Real-world Connection
Working with robot sensors is getting more important every day. Today, factories use robots with color and light sensors, Infrared proximity sensors, cameras, accelerometers and more. Learning how to use and care for sensors is a modern skill!

Student Prompt Question + Real-world Connection
Engineers and scientists need to know the limits of what their materials can and can't do, so they test them in extreme conditions. For example, a new engine will be tested at high speeds and extreme temperatures until it breaks. You can test out the limits of the robots code sensing by drawing different code sizes.

DO!

Code Creator
Use markers to practice creating the cool color codes below.

TORNADO

Copy the code above to practice!

BACKWALK

Copy the code above to practice!

COLOR CODES

Ozobot Tip
Some codes mean the same thing no matter which way Ozobot reads them. Other codes have two meanings depending on which direction they are read.

Student Prompt Question
Why is it important to know if a code's direction matters?

Student Prompt Question
Is there a logic behind which codes are the same in both directions (palindromes)?

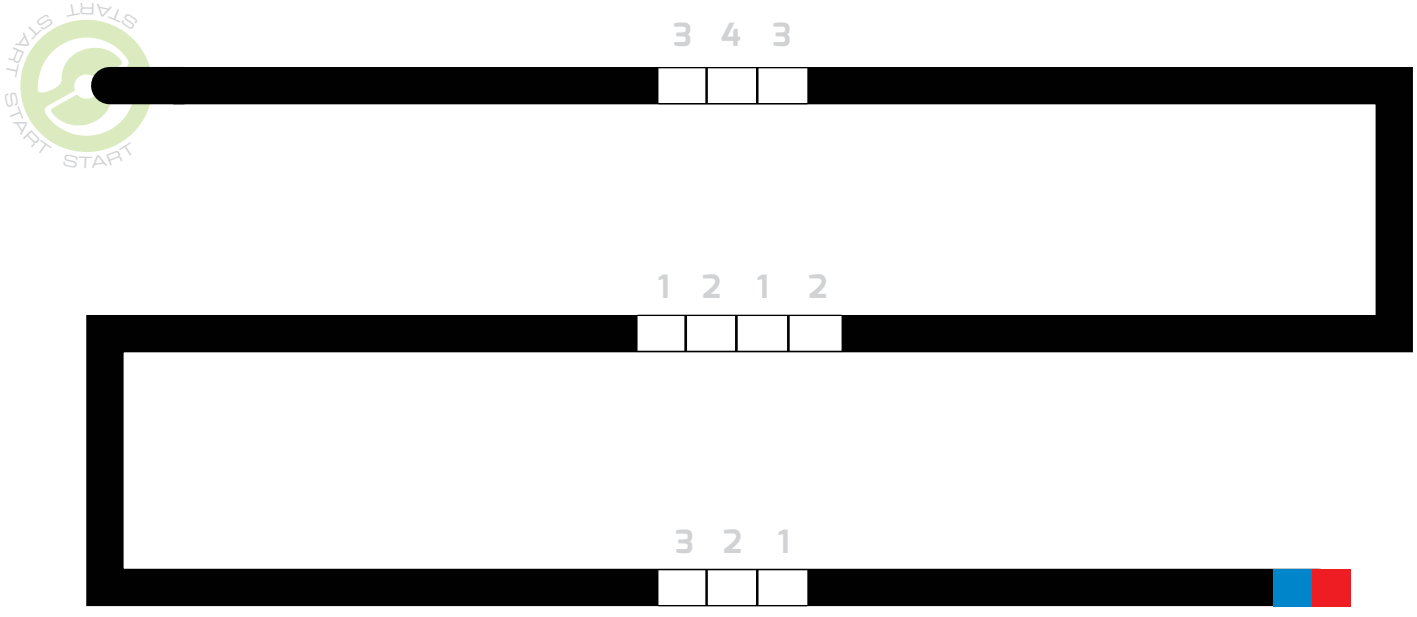
DO!

Code by Numbers

Use the color key to color the codes, then see what Ozobot does in both directions.

Color Key

1 2 3 4



DIRECTION CODES

When Evo or Bit meet an intersection, they bot will randomly choose which direction to go, unless you tell it which way to go with a "direction code ".

Student Prompt Question

Which way does Ozobot go? Test it out on the map below and keep track of where it went.

Left	Right	Straight

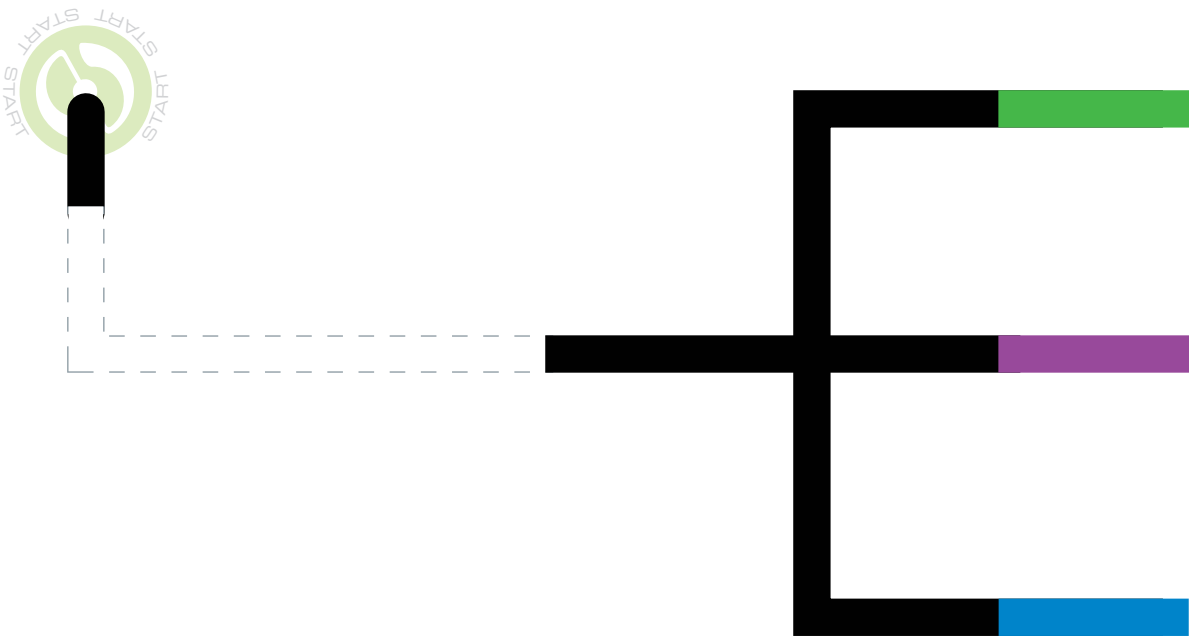
Ozobot Tip

You and your students can use this random choice generator to help make decisions, like choose which activity to do.

DO!

Which Way?

Use black marker to complete your path, then place bots on the START. bots will randomly select a color. Repeat several times.



DIRECTION CODES

Student Prompt Question
How much warning do the bots need?
Test out different distances between directional codes and intersections to find out. (The answer is about 1 inch.)

Real-world Connection
Computers can be programmed to make a random decision. Creating randomness is used in many computer applications like the security systems you use online everyday. Watch how your bot makes random decisions at intersections.

DO!

Wrong Way
You are ready to help bots find the finish line. Color the correct code in the path so bots avoids the dead ends!

Code Bank

Choose one

Go straight

Go Left

Go right

JUMP CODES

You can program Ozobot to go "off road" with jump codes. These codes direct the bots to leave the line they are following and seek a new line.

Real-world Connection
Brain teasers like mazes reinforce logical thinking, planning, creating hypotheses—all the skills scientists and engineers use daily!

Student Prompt Question
Can you use directional codes and jump codes to build a maze for Ozobot? What else could you create with Ozobot? Design a story? Build a city? Model the solar system? or an animal habitat? Then present your creation to the class!

Ozobot Tip
Ozobots come with DIY skins students can decorate to use for integrated STEAM projects, using paper and crafts supplies or recycled materials.

DO!

Jump Codes
With Jump Color Codes you can move from line to line. Choose the correct Jump code to get from START to FINISH in a flash.

Code Bank

Choose one


Jump Straight


Jump right


Jump left

Congratulations!

Completing Ozobot Educator Bot Camp for Color Codes.

You're now ready to fearlessly lead your student "troops" in unplugged coding and robotics with Ozobot.

Check out our Basic Training for Color Codes lessons for students at https://portal.ozobot.com/lessons/compilation/color-codes-basic-training

Check out our Lesson Library at www.portal.Ozobot.com for hundreds of FREE lesson ideas including OzoBlockly Basic Training.

Take your skills even further with Bot Camp for OzoBlockly and master coding Ozobot with Computers or Tablets.

Share your classroom's projects on Facebook, Twitter, YouTube or Instagram. (Or check out what other teachers are doing there for inspiration).

Contact us as ozoedu@ozobot.com anytime for a 1-1 consultation.