

<b>Unit of Inquiry Name:</b> Robots to the Rescue	<b>Lesson # 8</b>
<b>Learning Event 1:</b> Students experience phenomena, make observations, and collect data through investigations.	
<b>Lesson Concept:</b> Create Ozobot tracks using color code commands.	
<b>Computer Science Standards</b> K-2.AP.12 Create programs with sequences of commands and simple loops, to express ideas or address a problem. K-2.AP.14 Develop plans that describe a program's sequence of events, goals, and expected outcomes. K-2.AP.16 Debug errors in an algorithm or program that includes sequences and simple loops.	
<b>Anchor Phenomenon:</b> Robots can be programmed to deliver food to people. ( <a href="#">Starship Robot Video</a> ) <b>Lesson Investigative Phenomenon:</b> Ozobots understand color codes. <b>Question to Investigate:</b> How do color codes work?	
<b>Key Vocabulary:</b> color code command	
<b>Habit of Mind #7:</b> Questioning and Problem Posing: How do you know? Having a questioning attitude; knowing what data are needed and developing questioning strategies to produce those data. Finding problems to solve. (I can ask thoughtful questions and find problems!)	

Materials Needed	Prepare
<ul style="list-style-type: none"> <li>• <a href="#">Unit 3 Resource Slides</a></li> <li>• 1 set of Ozobot markers per group</li> <li>• 1 Ozobot per group</li> <li>• 1 piece of blank paper per group (Launch)</li> <li>• 1 piece of blank paper per student (Explore)</li> <li>• Chart correction tape or blank paper and regular tape (for mistakes)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure Ozobots are charged</li> <li>• Chart labeled "Tips for Drawing Color Codes"</li> <li>• Create small groups of four students. Each student in the group will be assigned a letter (A, B, C, D).</li> <li>• Charge and calibrate Ozobots prior to lesson.</li> <li>• Print <a href="#">certificates</a> for each student</li> </ul>

Stage	Teacher Does Learning Experience... Strategies/activities	Student Does		
Lesson 8 Launch/ Engage  15 min.	<p><b>Coders, we are going to continue with the same question to investigate today, “how do color codes work?”</b></p> <p>Display Lesson 8 <a href="#">Resource Slides</a> with the image of different tracks.</p> <p><b>Look at the images on the screen. What do you see? What do you notice?</b> Allow for student responses.</p> <p><b><i>These are great noticings, computer scientists! Your job now is to draw one of these lines exactly as it appears on the screen and then we are going to test each line of code to see what happens.</i></b></p> <p>Pass out one piece of blank paper and a pack of Ozobot markers to each Ozobot group. Assign each group a different line to recreate (depending on how many groups you have some groups may end up recreating the same line). Choose a student in each group to recreate their assigned line while other members assist and observe. Walk around helping students recreate their assigned line as needed. Embrace any mistakes as a learning experience, the lines do not all have to be accurate.</p> <p><b><i>Great job drawing these lines just as they appear on the screen programmers. Now that you have recreated them, it’s time to see what happens when our Ozobot moves along your lines of code. Pay attention to what Ozobot does. Think about what happened and what was supposed to happen.</i></b> Distribute one Ozobot to each group.</p> <p><b><i>Everyone in your group observed what happened when Ozobot moved along your line. Now it’s time to share the information with the rest of the class.</i></b> Move to the next slide in the resource slides.</p> <p><b><i>Which group(s) tested this line? What happened? What was supposed to happen? Why do you think that happened?</i></b> Document ideas on the slide or on chart paper. Continue through the slides until all groups share their findings with the class.</p>	<p>Students share their noticings about the different lines of Ozobot code. (3 minutes)</p> <table><tr><th>Expected Student Responses (ESR)</th></tr><tr><td><ul style="list-style-type: none"><li>• There are four lines.</li><li>• Each line looks different.</li><li>• Each line has a color code on it.</li><li>• Each line has the same color code.</li><li>• Each line has the color code for pause.</li></ul></td></tr></table> <p>In groups, students recreate lines on slide. (3 minutes)</p> <p>Students observe what happens when the Ozobot moves along their line. (3 minutes)</p> <p>Students share their findings with the rest of the class. They hypothesize about why the Ozobot did or did not understand the color code correctly. (5 minutes)</p>	Expected Student Responses (ESR)	<ul style="list-style-type: none"><li>• There are four lines.</li><li>• Each line looks different.</li><li>• Each line has a color code on it.</li><li>• Each line has the same color code.</li><li>• Each line has the color code for pause.</li></ul>
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<p>Lesson 8 Explore/ Explain</p> <p>30 Min.</p>	<p><b>Great observations computer scientists! Let's create a chart to help us remember all of these tips. That way when we make our own tracks with color codes, Ozobot will be able to move along on the track and understand our color codes.</b></p> <p>Co-create Tips for Drawing Color Codes chart with student input and add to Unit 3 phenomena wall. Sample Tips:</p> <p>Color code commands only work on black lines.</p> <p>Color code command boxes need to be the same size.</p> <p>Don't draw color codes on a curve</p> <p>Do draw color codes on the straight part of the line.</p> <p><b>Now that we know how to draw color codes so our Ozobot understands them, it is time for you to give it a try. For our final hour of code activity you are going to turn one of your favorite shapes into a track for Ozobot to move on. Let's think of some shapes we can turn into Ozobot tracks. What shapes would make a good Ozobot track?</b></p> <p>Allow for student responses. Teacher tip: Circles &amp; ovals may be hard since color codes don't always work well on curved lines. Squares and rectangles will work best.</p> <p><b>These are all great ideas, I chose a diamond for my shape. Right now I want you to watch how I can make an Ozobot track using a diamond.</b></p> <p>Model drawing track under document camera.</p> <p><b>First, I am going to draw my shape in pencil. I am not using the Ozobot marker yet because I might make a mistake. I am going to make my diamond very large so it takes up most of the space on the paper. Now it's your turn to draw your shape on your paper. Remember to make your shape big so the Ozobot has a nice sized track to move on. You will have 5 minutes to draw your shape.</b></p> <p>Pass out a blank sheet of paper to each student. Walk around to ensure students are drawing their shape in pencil largely and clearly. Note: Today the 15 min of Hour of Code is chunked into three 5-min sections.</p> <p><b>Next we are going to plan what color code we want to use and where it should go on our shape track. I want my Ozobot to move at turbo speed along my diamond track, so I am going to carefully color in the color code command for turbo speed (blue, green, blue).</b> Model how to draw color command code, making sure to make three equal boxes of color.</p>	<p>Students co-create and Ozobot Tips chart. (5 minutes)</p> <p>Students share possible shapes for their Ozobot tracks. (3 minutes)</p> <p>Students draw a shape in pencil. (5 minutes)</p>
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**Now it's your turn to decide what color code you want to use and where you want to put it on your shape track. You will have 5 minutes to add your codes.**

Check in with students as they design their tracks and add color codes.

Facilitator Questions

- What color code are you planning to use?
- Where on your shape are you going to put your color code?
- What colors do you need for your color code?

**Now, we are going to carefully trace over the rest of my shape with the black Ozobot marker and test our Ozobot tracks.** Model tracing over the pencil lines with a black marker and testing your Ozobot track.

**Yay! I have completed my shape track for Ozobot. Before I test Ozobot on the track, take a minute to think about my code and what is supposed to happen. Now let's see what actually happens.** Place Ozobot on track under the document camera for students to observe.

**What happened?** Allow for student responses.

**Awesome, Ozobot moved around the track at turbo speed just like I wanted it too. Now it's your turn to finish up and test your Ozobot shape tracks. Remember that it's okay to make mistakes and if you start to feel frustrated you can use our persistence chant to calm down and try again. Once you are calm think about what happened, what was supposed to happen, and how you can fix it. Don't give up and try again!**

As students finish up their tracks, pass out one Ozobot per group of four. Partner B can start with the Ozobot today.

If time allows, select a few tracks to put under the document camera to share with the whole class to celebrate students' work.

**Ok! Let's get ready to clean up! Make sure that all of our markers are capped tightly and the Ozobot is turned off. Both the marker and the Ozobot should be placed on the desk. Now let's practice our Pause, Breath, Finish Up chant.**

Students add color code commands to their shape. (5 minutes)

Students trace over the pencil lines with a black marker and then test their Ozobot tracks. (5 minutes)

Students recite the pause, breathe, finish up chant. (1 minute)

<p>Lesson 8 Reflect/ Evaluate</p> <p>15 min.</p>	<p><b><i>Congratulations coders, you did a great job creating Ozobot tracks with color codes and you have now completed an Hour of Code! As a celebration, we are going to learn a new color code command for our Ozobot. This code is called the tornado command.</i></b> Under the document camera create an Ozobot track with the tornado color code (red, green, red, green). Have one student from each group recreate the track with the tornado color code. Students put the Ozobot along the line to discover what the Ozobot does after it reads the tornado color code.</p> <p>Celebrate and pass out <a href="#">certificates</a> of completion to students.</p> <p><b><i>Roboticists, in this lesson we continued to investigate the question: How do color codes work? What did we figure out?</i></b> Invite students to share their thinking. Record their thinking on the Phenomena Wall with their names in parentheses after their thoughts.</p> <p><b><i>Wow we have learned so much about coding our Ozobots in this Unit! We are going to add the Tips from our chart to our eBook so that we can share these tips with the rest of the school. Who can read the first tip for me?</i></b> Type tips into eBook or take a photo of chart and insert photo into eBook.</p>	<p>Students celebrate completing Hour of Code by testing the new tornado color code command. (5 minutes)</p> <p>Students share their thinking.(3 minutes)</p> <p>Add tips from chart to new eBook page (5 minutes)</p>
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Please join the Unit 3 Curriculum Discussion at <https://forms.gle/pPYEBvxdTFbSKPNo9> to provide feedback on this lesson.