Reinbot Landing Practice - Learn Anywhere

Author: Ozobot

Grades:
K—12

Subject(s):
Social Studies, Computer Science

Pre-Reader/ESL-Friendly?
No

Compatible Bot(s):
Evo

Coding Method:
Color Codes

Quick Summary:

Santa's reindeer need to be very precise to land on a rooftop. Use the launchers and Color Codes to ensure your Reinbot stops somewhere on the rooftop!

Duration: 45 min

Objectives & Outcomes

1. Student will program Ozobot to to land within the target.
2. Student will compare Speed Codes to land within the target in 30 seconds.
3. Student will identify trajectory lines to land within the target.

Preparation

Teacher Materials & Digital Resources

- Cover-Reinbot Landing Practice-1.jpg
- solution-ozobot-reinbot-landing-practice.pdf

Video

- All Grades: Reinbot Landing Practice
- Reinbot Landing Practice [Full]

Student Materials

- 1 Evo per student
- 1 Color Code Markers per student
- 1 Color Code Chart per student
- 1 Scissors per student
- 1 Clear Tape per student
- 1 Reinbot Landing Practice Activity Sheet (2 pages) (Cutouts, Landing Target) per student
- 1 Butcher Paper (optional) per student

Background Knowledge

Completed lesson

- Introduction to Ozobot: Get to Know Evo https://classroom.ozobot.com/lessons/lnHsHKD0kXTgueqAiT7Pg7jQT3
- Introduction to Color Codes 01: Line Following https://classroom.ozobot.com/lessons/lnObQXQQbKQqqa71Lql1cBsAW7
- Introduction to Color Codes 02: Color Codes https://classroom.ozobot.com/lessons/ln2bWwPIVNTBezi5aRFLyllwtc
- Introduction to Color Codes 03: Directionality https://classroom.ozobot.com/lessons/lnppxyNtNNShyp1HBQ9ZV6dAI5

Teacher Tips

For supporting any color-blind and/or visually impaired students, allow them to utilize Color Code Chart and inform the student(s) that the colors are labeled under each color segment. Be sure to label any Color Codes in these lesson materials so that they correspond to the Color Code chart. Use masking tape to label Color Code markers your student will use. Find the Color Code Chart here: ++https://files.ozobot.com/stem-education/Ozobot-Color-Codes-Chart.pdf++

Place the trees on the side to eliminate obstacles on the landing strip.

Group students together to have a competition to see which group can get the most points.

If not working on a light-colored surface or using white butcher paper, tape down sheets of white copy paper for the landing strip.

Direct Instruction

1. *Use the instructional video to guide your students through the activity. Alternatively, continue with the direct instructions below.* In this activity, students will use Speed Codes and a Timer Code to help their reinbot get to the landing target to gather points.
2. Instruct students to get out the Rooftop Target and clear tape. They will be placing the Rooftop Target 4 - 5 feet from the launch zone. Hint for students without a measuring tape: spread their arms wide apart. The distance from the fingertips of one hand to the fingertips of the other hand is about 4-5 feet. Ask students to tape down the target making sure it lies flat. Have them measure 4-5 feet from the Rooftop Target and place a 12 inch piece of clear tape to designate a launch zone. As an alternative students may want to use butcher paper or 4-5 sheets of copy paper as a landing zone. Just ask them to be sure their landing zone is flat, so their Ozobot doesn't get stuck on a seam or bumpy paper.
3. Next, have students get out scissors and the Cutouts Page. They will find a costume, some trees and some launchers. Be sure to cut out all the launchers; they will need more than one. Remind students to cut on the dotted lines.
4. This step is a great place for differentiation. Some students may do better with no trees, and others may need a challenge with more trees. Model for students placing the trees on the landing strip with the black line toward the launch zone. If their Reinbot runs into a tree, it will follow the black line and stop.

5. Next, model for students how to wrap the costume around the bot and secure it with a piece of tape.
6. Students will fill in three Color Codes on each launcher. First is the Timer Code which allows Ozobot to run for 30 seconds and then it turns off. The Timer Code goes in the first code blank from start on a launcher. Remind students to pay attention to the direction the bot will be traveling. The Timer Code is red, black, blue, green.
7. The code in the middle is the Speed Code. Tell students they want the bot to travel fast enough to get to the target in 30 seconds, but not so fast that it goes past the target. In choosing the Speed Code, they need to do a bit of testing, adjusting, and testing again. Have students decide on a Speed Code to start testing. Instruct students to fill in the Speed Code in the middle of the launcher.
8. Last is the Line Switch Straight Code. A Line Switch Code tells the bot to leave the line it is following, cross over empty space, and join the next line it finds. In this case, students want the bot to go straight to arrive at the target, so they'll use the Line Switch Straight Code which is green blue green. Model for students filling in the Line Switch Straight Code in the last code blank on the launcher.
9. Students will now test their launcher! Remind students to observe if their Reinbot stops at a tree, goes past the target, stops before the target, or lands right on the bullseye! After the first trial, students may need to adjust the direction of their launcher or use a different Speed Code. If they need to use a different Speed Code, have them get a blank launcher and fill in the Timer Code, the Line Switch Straight Code, and a different Speed Code. Then ask them to test again.
10. After a few practice runs and adjustments, instruct students to get out the Reinbot Score Sheet. For each round, record the Speed Code used. If the Reinbot stopped on the Rooftop Target, record how many points they got for each run. After three runs, have them add the points for that round and write the total on the Score Sheet. Students will then compare each round's total points, the speed code used and any other strategies used. Suggested questions to ask students: Did your point total increase each round? Did the point total decrease? Was there a pattern?
11. For early finishers or students who need a challenge: Measure the distance your bot travels with each Speed Code in inches, feet, and yards, or millimeters, centimeters, and meters. Add more obstacles like lines with different Line Switch Codes.

Supplements

Lesson Closure

Use the Completion Checklist to evaluate your student's work. Suggested ways to use the checklist: Have students use the Completion Checklist to analyze their own work. Pair students and have them analyze each other's work using the Completion Checklist. Have students present their work to the class and allow the class to give feedback using the Completion Checklist.

Completion Checklist

Did you program your Reinbot by filing in the Color Codes on the Launcher?
Did you observe and make adjustments to the Speed Code?
Did you observe and make adjustments to the direction or placement of the Launcher?
Did your Reinbot stop on the Landing Target?

Additional Attachments

Academic Standards

- ISTE.1.c

  Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.

- ISTE.4.c

  Students develop, test and refine prototypes as part of a cyclical design process.

- ISTE.5.b

  Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.

- CSTA.1A-AP-14

  Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

- CSTA.1B-AP-15

  Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

- CCSS.MATH.CONTENT.2.OA.B.2

  Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.

- NGSS.K-PS2-1

  Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

- NGSS.K-PS2-2

  Motion and Stability: Forces and InteractionsAnalyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

- NGSS.3-PS2-1

  Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

- NGSS.MS-PS2-2

  Plan an investigation to provide evidence that the change in an object?s motion depends on the sum of the forces on the object and the mass of the object.

Reinbot Score Sheet

Name: _____

1

SAMPLE SOLUTION

Round 1 Color Code 

1st Run: 3 2nd Run: 4 3rd Run: 0

Total score for round 1: 7

Round 2 Color Code 

1st Run: 5 2nd Run: 0 3rd Run: 3

Total score for round 2: 8

Round 3 Color Code 

1st Run: 0 2nd Run: 0 3rd Run: 0

Total score for round 3: 0

Round 4 Color Code 

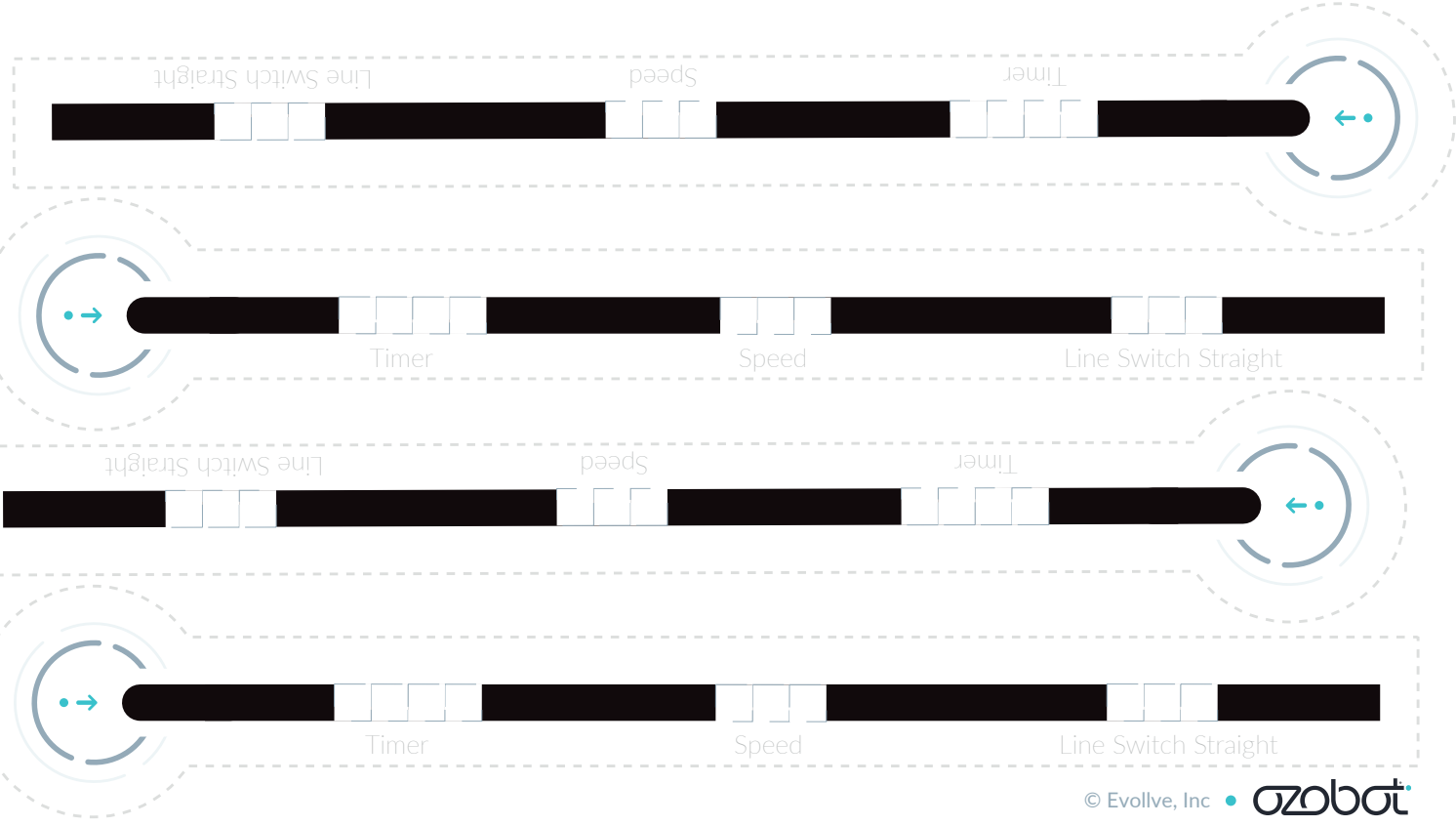
1st Run: 4 2nd Run: 3 3rd Run: 5

Total score for round 4: 12

Round 5 Color Code 

1st Run: 4 2nd Run: 4 3rd Run: 3

Total score for round 5: 11



 • ozobot

Rooftop Target

Name: _____

2

Reinbot Landing Practice
Cutouts

Name: _____

3

Reinbot Landing Practice - Learn Anywhere

What We'll Cover:

1. We'll program Ozobot to to land within the target.
2. We'll compare Speed Codes to land within the target in 30 seconds.
3. We'll identify trajectory lines to land within the target.

Materials:

- 1 Evo per student
- 1 Color Code Markers per student
- 1 Color Code Chart per student
- 1 Scissors per student
- 1 Clear Tape per student
- 1 Reinbot Landing Practice Activity Sheet (2 pages) (Cutouts, Landing Target) per student
- 1 Butcher Paper (optional) per student

Activity Instructions:

1. Santa's reindeer need to be very precise to land on a rooftop. Use the launchers and Color Codes to ensure the Reinbot stops somewhere on the Rooftop Target! In today's lesson, you will use Speed Codes and a Timer Code to help the Reinbot get to the landing target to gather points.

   Introduction: watch.cloudflarestream.com/2372d561f918b723199d1fe25d21779a

   ozobot-reinbot-landing-practice.pdf: https://stg-files.ozobot.com/lessons/57a65fb9-ae17-4157-8a40-eb26d416223d/ozobot-reinbot-landing-practice.cMIOnpPXRKx5EzeZ5CpkBwe8.pdf

2. Get out your Rooftop Target and clear tape. It is best to work on a light colored surface if possible. You'll place your Rooftop Target 4 - 5 feet from your launch zone. To measure 4-5 feet, spread your arms wide apart. From the fingertips of one hand to the fingertips of the other hand is about 4-5 feet. Tape your Rooftop Target to your work surface making sure the edges lie flat. Measure about 4-5 feet from your Rooftop Target and place a 12 inch piece of clear tape to designate a launch zone.

   Landing Strip: watch.cloudflarestream.com/6ef976962aa4c12d258f0dc49a632a66

3. Next, get out your scissors and your Cutouts Page. You'll notice a costume, some trees and some launchers. Use the dotted lines as cutting guides. Be sure to cut out all the launchers; you'll need more than one.

   Cutouts: watch.cloudflarestream.com/b0cb2872f1b3e91adcfeebf52cbe2ad0

4. For this step you need the trees you just cut out and some tape. Take a look at the landing strip. It looks like clear sailing with no obstacles! You're going to add some trees to make this landing a little more challenging. Tape the trees to your landing strip with the black line toward the Launch Zone. If your Reinbot runs into a tree, it will follow the black line and stop.

   Trees: watch.cloudflarestream.com/33be12172efae5242a8de6e2b41b8b79

5. Time to dress up your Ozobot! You'll need the costume and tape for this step. Wrap the costume around your bot and secure it with a piece of tape.

   Costume: watch.cloudflarestream.com/d116ea5b8250231074e4950725e318b0

6. Finally, the launchers are where the programming begins! You'll need to fill in three Color Codes on each launcher. First is the Timer Code. Your Reinbot has 30 seconds to arrive on the target. The Timer Code goes in the first code blanks your bot comes to when it leaves start on a launcher. Pay attention to the direction your bot will be traveling. The Timer Code is red, black, blue, green. Fill in the Timer Code.

   Launchers - Timer Code: watch.cloudflarestream.com/e1959fca350869b87e47fd33792aa344

7. The code in the middle will be the Speed Code. You want your bot to travel fast enough to get to the target in 30 seconds, but not so fast that it goes past the target. In choosing the Speed Code, you will need to do a bit of testing, adjusting, and testing again. Decide on a Speed Code to start with. Fill in the Speed Code in the middle of the launcher.

   Launchers - Speed Code: watch.cloudflarestream.com/5162d7e47bdac3cd1d38c816cb51fac8

8. The last code you need is the Line Switch Straight Code. A Line Switch Code tells your bot to leave the line it is following, cross over empty space, and join the next line it finds. In this case, you want your bot to go straight to arrive at the target so you'll use the Line Switch Straight Code which is green blue green. Fill in the Line Switch Straight Code in the last code blanks on the launcher.

   Launchers - Line Switch Code: watch.cloudflarestream.com/c1bace79decf4e05fd0cc51b9a9214bf

9. Now for the fun part, testing the launcher! Observe if your Reinbot stops at a tree, goes past the target, stops before the target, or lands right on the bullseye! After your first trial, you may need to adjust the direction of your launcher or use a different Speed Code. If you need to use a different Speed Code, get a blank launcher and fill in the Timer Code, the Line Switch Straight Code and a different Speed Code. Then test again.

   Test your Launcher: watch.cloudflarestream.com/abd0316661f1c51d355d93e103d2eee4

10. After a few practice runs and adjustments, get out the Reinbot Score Sheet. For each round, record the Speed Code used. If your Reinbot stopped on the Rooftop Target, record how many points you got for each run. After three runs, add your points and write the total on the Score Sheet. Compare each round's total points, the speed code used and any other strategies used. Did your points increase each round? Did they decrease? Was there a pattern?

    Reinbot Score Sheet: watch.cloudflarestream.com/f2a8e2e029ed9ecc91deee92d3d603ea

11. To wrap up this activity: Did you program your Reinbot by filing in the Color Codes on the launcher? Did you observe and make adjustments to the Speed Code? Did you observe and make adjustments to the placement of the launcher? Did your Reinbot stop on the Landing Target? If you'd like to continue this activity: Measure the distance your bot travels with each Speed Code in inches, feet, and yards, or millimeters, centimeters, and meters. Add more obstacles to the landing strip.

    Lesson Wrap Up: watch.cloudflarestream.com/e8aa0b8410d62a39016f824343b6136d

Reinbot Score Sheet

Name: _____

1

Round 1 Color Code _____ 1st Run: _____ 2nd Run: _____ 3rd Run: _____

Total score for round 1: _____

Round 2 Color Code _____ 1st Run: _____ 2nd Run: _____ 3rd Run: _____

Total score for round 2: _____

Round 3 Color Code _____ 1st Run: _____ 2nd Run: _____ 3rd Run: _____

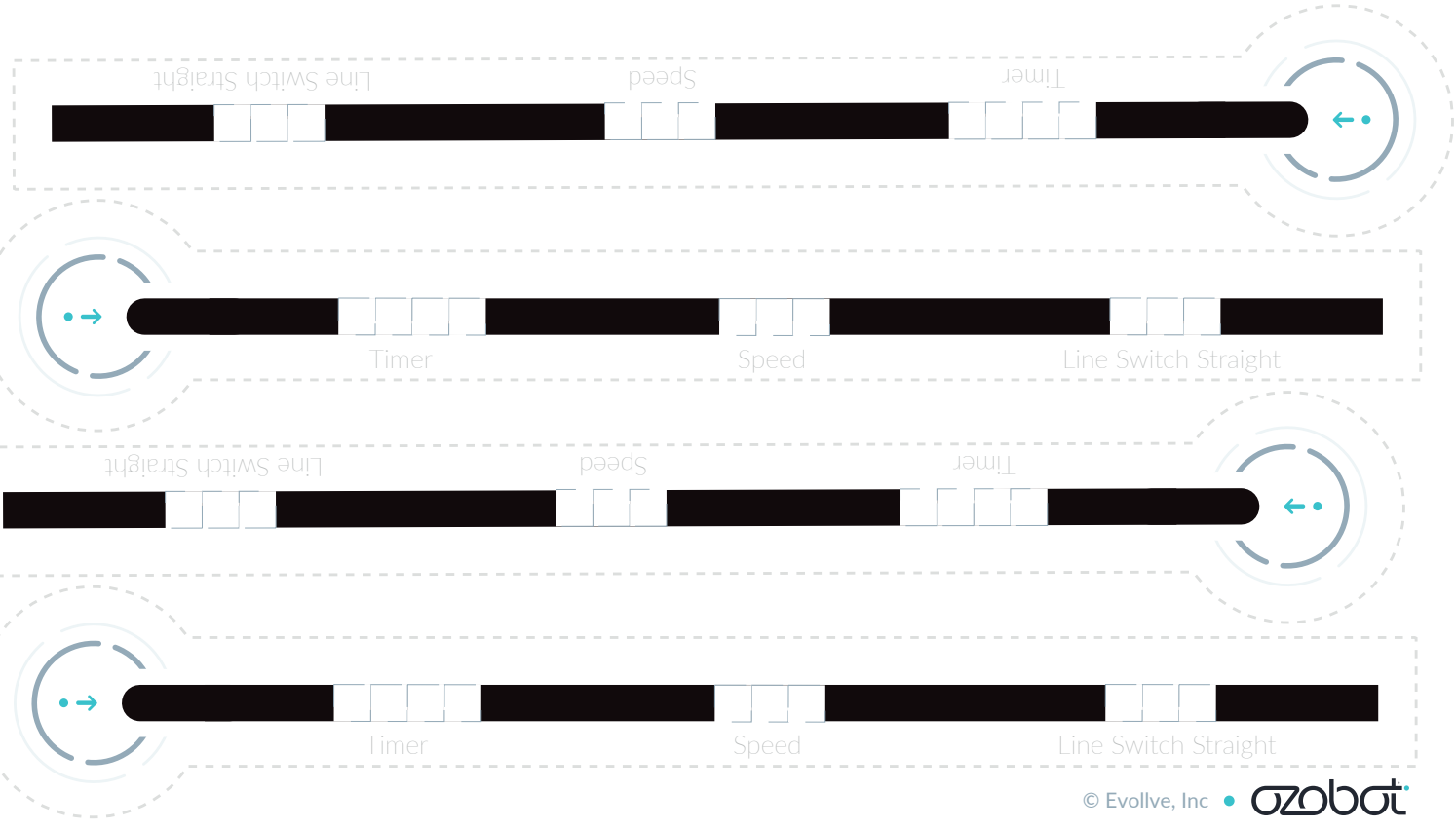
Total score for round 3: _____

Round 4 Color Code _____ 1st Run: _____ 2nd Run: _____ 3rd Run: _____

Total score for round 4: _____

Round 5 Color Code _____ 1st Run: _____ 2nd Run: _____ 3rd Run: _____

Total score for round 5: _____



Rooftop Target Map

Name: _____

2

Reinbot Landing Practice
Cutouts

Name: _____

3