



OZOBOT DANCE-OFF FOR THE HOUR OF CODE™

Essential Question

What is computer programming?

How can we make Ozobot dance using programming?

Hour of Code™

What is the Hour of Code? The Hour of Code is a nationwide initiative by Computer Science Education Week (www.csedweek.org) and Code.org (www.code.org) to introduce millions of students to one hour of computer science and computer programming. The idea is to introduce the concept of coding to students and letting them know that anyone can write computer code!

The following is a planner created by Ozobot that suggests a lesson that can be used for the Hour of Code. In this lesson you will introduce the concept of coding and allow students to practice coding by creating a dance routine for Ozobot.

No prior programming experience is required for this lesson. It is self-contained and introduces students to programming through OzoBlockly, which is a visual programming language and editor based on Google's Blockly. Please find more information about the Hour of Code™ here <https://hourofcode.com>.

Prerequisites

No programming experience or knowledge of Ozobot is required.

Standards

- ISTE 4.b – Plan and manage activities to develop a solution or complete a project
- 6.a – Understand and use technology systems
- CC Math 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.

Grouping

Groups of two or three students

Materials

- Tablet or computer with the OzoBlockly editor <http://ozoblockly.com/>
- Ozobot Bit or Ozobot Evo, 1 per group of 2-3 students
- Blank paper for sketching

Age/Grade Level

Grades 1-12

OzoBlockly Programming Topics

Free Movement, Light Effects

OzoBlockly Mode

Use any OzoBlockly mode 1-5

Lesson Duration

1 hour

Vocabulary

- *Ozobot Bit/Evo* - Little robot that can follow drawn lines or can be programmed using visual codes or through the OzoBlockly programming language
- *OzoBlockly* - A visual editor which allows to create programs by plugging blocks together. The blocks can be used to control Ozobot's behavior like movement, LED lights, etc.
- *Rotate Right or Left* - Approximate 90° turn
- *Rotate Slightly Right or Left* - Approximate 45° turn
- *Steps* - a unit of movement forward or backward
- *Free Movement* - Ozobot's capability of moving around freely without visual guidance such as following lines, which is Ozobot's default behavior

Overview

1. Students are introduced to Ozobot and OzoBlockly by examining some of the sample programs that are included in the editor. They also learn how to load a program onto Ozobot and how to run it.
2. Students will write and debug their own program that makes Ozobot dance. As a culminating activity, you may want to have a dance-off for all groups of the class.

Tips

For more info on how to plan your event for the Hour of Code, please take a look at the Hour of Code website <https://hourofcode.com/how-to/events>.

You can also sign up your event there. Other great pages to help you plan are:

<https://hourofcode.com/how-to>

<https://hourofcode.com/promote/resources>

Beyond this Lesson

After completing this lesson, students should be comfortable writing their own OzoBlockly program. As the next step, you may want to do another lesson using OzoBlockly. You can see all of these lessons in the OzoBlockly section of the Ozobot Lesson Library here <http://portal.ozobot.com/lessons/list/ozoblockly>.

Contact

Please contact us at ozoedu@ozobot.com with any question about Ozobot or this lesson plan.

LESSON

1. A Simple Square Dance - Guided Activity

Introduction to Coding

"How many of you have heard of computer code? Today we are going to learn what coding is, and actually write our own computer code!"

1. As a class, brainstorm the steps for walking in a square
 - a. Start by allowing the kids to come up with ideas without input from you.
 - b. Write the steps on white board, cards or paper strips so they can be moved around and edited instructions inserted.
 - c. As the steps develop, question the students so they see where the steps need to be more specific. Add details to the instructions.
2. Show video: <https://www.youtube.com/watch?v=THOEQ5soVpY> about "What is coding?", or any of the inspirational videos from the Hour of Code website <https://hourofcode.com/us/promote/resources#videos>.

Introduction to OzoBlockly

"Now we are going to see how a computer program looks like"

Divide students into groups. For this activity, we recommend groups of at most three students.

There are many examples of different programs in the OzoBlockly editor. Have your students navigate to the editor at <http://ozoblockly.com/editor>. When the editor first starts up, it is set to mode 2 (Beginner). At the time of this writing, there are 4 modes available and they gradually become more comprehensive with more options to control Ozobot and more advanced programming concepts. They mode can be switched on the top left, but for the purpose of this introduction we are going to stay in mode 2.

Guide your students to load and examine some of the examples. They are located on the right pane of the editor:

1. In the right pane, click on the examples tab  which is the third tab from the top. This shows all the examples for the mode you are in.

2. Make sure students are in mode 2. They should see the "Square Walk", "Victory Lap" and "Dizzy" examples.
3. Have students choose an example by clicking "Load Example". This will show the code in the editor.

Students can now examine the code for any of the examples. The easiest example to start with is the "Square Walk". Have students read the different blocks and compare it to the program that they came up with in the introduction.

Introduction to Ozobot

"How do we go from the code on the screen to making the Ozobot move?"

Now it is time to load the program onto Ozobot and run the program. To explain all the steps involved, show students the tutorial video on <http://ozoblockly.com/>. You can also find the loading steps on the OzoBlockly Tips Sheet <http://files.ozobot.com/stem-education/ozoblockly-getting-started.pdf>, which may be handy for students to have close when they are loading the program. Make sure that students go through all the steps: calibration, loading and running the program.

Once they mastered these steps, let them try out different examples. This makes them more confident in their ability to program Ozobot and shows them different programs and how Ozobot appears when executing the program.

2. The Dance-Off - Independent Activity

"How can we write our own program that makes Ozobot dance?"

Exploration

Your students' task is to write a program that makes Ozobot dance! Rather than starting a program from scratch, your students may feel more comfortable modifying an existing program:

1. Have students go to mode 2 and open the "Square Walk" example again.
2. Let them modify the code a bit. Maybe they can insert some light effects and try out some of the movement commands.
3. Have students load the program onto Ozobot and see how they changed the program when Ozobot executes it.

Programming

Now discuss with students how they want to go forward. You may want to touch on the following points:

- What kind of movements or light effects do you want Ozobot to do? Do you want to start a program from scratch or keep on modifying what you have?
- It may be helpful to sketch out the movement and light effects on a piece of paper before continuing to program. Students should indicate movement as well as LED animations or light changes.
- Ozobots love to dance to music. Do you want to play music in the background to make this more fun? It's probably a good idea to have all groups use the same music.

There are a couple of points that your students may need help to overcome. In particular, be aware of the following:

- Make sure that students do not put the Ozobot on the lines that they drew in the sketch. Those lines are merely an abstraction and meant to be used to plan the program. Instruct the students not to use line following in their program (i.e. only use blocks from the "Movement" and not from "Line Navigation" category).
- If the drawings are too detailed or have shapes that cannot be completed with the current tools and knowledge, demonstrate how to edit the sketch to achieve success with the code. For example, if the lines for Ozobot's movements are too curvy, they may be difficult to program. Suggest that students use a series of small linear movements and rotations instead.

Note: In OzoBlockly modes 1-4, it is not possible to have LED light animations while Ozobot is moving. For example, using a "Police car lights" block, followed by a "Move forward" block will do the police car animation first while Ozobot is stationary. Then, after the animation is done, Ozobot will start moving. If you want to express changing LED colors while Ozobot is moving, you will have to use alternating short movements with the "Move" block and changing the LED color with the "Set light color" block.

Tip: You probably want to instruct your students to use a "repeat forever" loop around the entire program. This makes Ozobot repeat all commands inside the loop indefinitely and is very useful for a dance.

Note: when loading the program to an Ozobot, you may notice that certain blocks can extend the load time substantially. Specifically, this is the case for the composed LED animations (police car lights, rainbow, etc.), but not for the elementary "Set light color"

block. Certain composed moves (skate or zigzag) also prolong the loading time.

Differentiation: This activity can be adjusted according to your students' abilities. Naturally, more advanced students will make use of more elaborate movement and LED light sequences. But you may want to encourage students to make their own light animations or special moves. They also may want to use movement or light animation blocks from mode 4 (Advanced), which gives them more access to elementary movement and light animation commands.

Debugging

Students will have to try running their program with Ozobot, observe what is happening, and adjust their program accordingly. They will likely have to repeat this sequence multiple times until they reach the desired result and therefore the correct program for their planned dance. This process is called debugging and it is an integral part of the process of programming.

Dance-Off

As a culminating activity, you may want to have all groups compete in a dance-off. Set up the music if you are using any and have all groups let their Ozobot dance at the same time. You can designate a referee or have groups vote for the winner (they are allowed to vote for a group other than their own).

Reward your students! After completing the dance-off or after spending one hour trying, please direct your students to the final page from the Hour of Code www.code.org/api/hour/finish. There your students can see leaderboards, share their achievements on social media and print out certificates.

Share

We would love to see your students' creations! Please share your documents, photos and videos with us for a chance to win cool prizes and be featured on our website. Contact us at ozoedu@ozobot.com.

3. Example Program

The following is a screen shot of an example program. This shows how the “Square Walk” program can be modified to create a dance. There are many different ways of programming a dance of course and there is no right or wrong answer. This makes this activity a perfect first introduction to programming – your students will learn so much without putting too much pressure on them.

