Lesson

EVO TEACHES NOTES ON A KEYBOARD

CREATED BY

Richard Born
Associate Professor Emeritus
Northern Illinois University
rborn2@niu.edu

TOPICS

Music, Physics, Programming

GRADES

3-12

METHOD

OzoBlockly

DURATION

20-30 minutes

Evo Teaches Notes on a Keyboard

By Richard Born
Associate Professor Emeritus
Northern Illinois University
rborn2@niu.edu

Introduction

Octaves, notes, clefs, scales, sharps, flats, C4, white keys, black keys—all of these terms and many more are associated with music. Ozobot Evo can be the teacher's assistant in helping young students learn music fundamentals in a way that is both engaging and fun! In this lesson, the teacher and student are presented with an OzoBlockly program and Ozomap for which Evo tours an octave of the standard keyboard, while stopping momentarily at each key to play the sound associated with the key.

Evo's voice is definitely high-pitched, which is evident by the chirping as soon as Evo is turned on. The OzoBlockly "play note" blocks start with Treble C (C5) and end with B8, including all naturals and sharps/flats in that range. This means that Evo's voice starts at Treble C and actually extends almost an octave higher than the standard 88-key piano, as shown in Figure 1. The octave that is studied with Evo in the OzoBlockly program provided in this lesson is the octave from C5 to C6. This octave has a rather low volume with Evo, but the volume does increase as Evo moves up the scale.

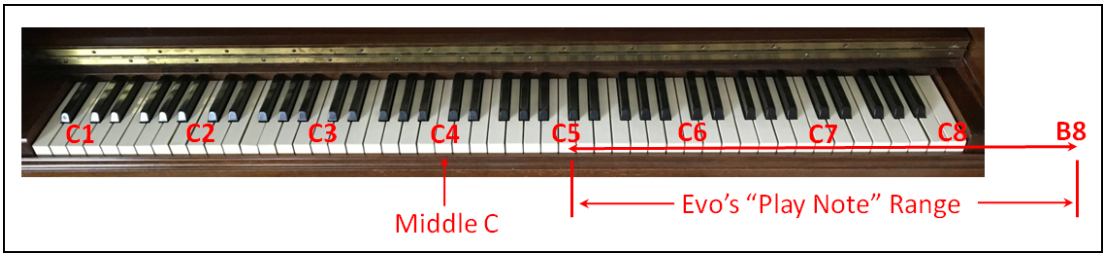

Figure 1

Advanced Activities

For students and teachers of physics, this lesson could also be used in conjunction with appropriate lab equipment to determine the frequencies of Evo's notes. For example, Vernier Software and Technology's LabQuest 2 and Microphone are an excellent equipment choice. At a very minimum, students should discover that the frequency of the tone doubles from approximately 523 Hz (cycles/sec) to 1046 Hz when going from C5 to C6.

For computer science students, a good exercise would be for them to carefully study the provided OzoBlockly program and then modify it so that Evo plays the scale in a different octave—say from C6 to C7.

The OzoMap and Running the OzoBlockly Program

Figure 2 shows a small version of the Ozomap as an aid to our discussion here. A full-size version of the Ozomap, suitable for duplication, can be found on the last page of this document. The center of the map contains the black and white keys from C5 through C6, with the keys named by their letter designation and flats and sharps, as appropriate. A Treble Clef is also shown with the locations of the notes on the clef.

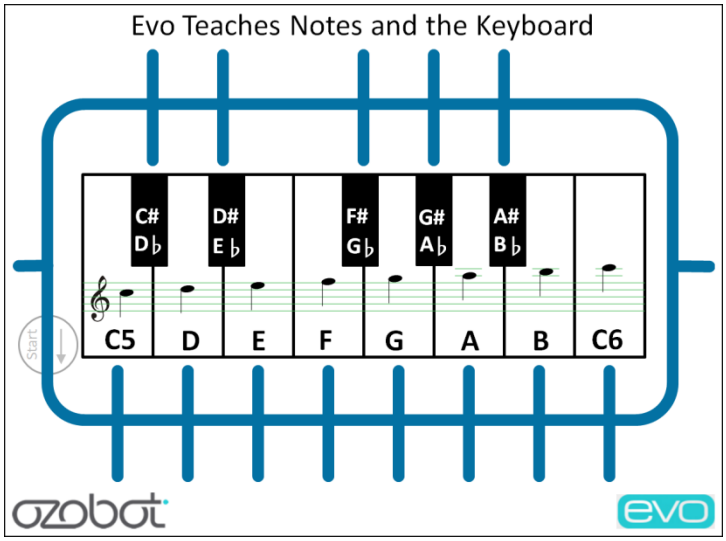

Figure 2

The OzoBlockly program file accompanying this document, *EvoKeyboard.ozocode*, is first loaded into Evo via instructions at the OzoBlockly web site. Evo is then started from the off position by pressing its button once. Evo will chirp and flash its front lights blue. While the lights are blue, double-press Evo's button to start running the program. The top LED will turn red and give you three seconds to set Evo on the start location facing the direction shown by the gray arrow. After three seconds, Evo will start moving, stop at each intersection where there is a white key, and play the corresponding note for one second. It will then turn around at the intersection on the far right center of the map, and play the notes in reverse while moving down the scale. Evo will then repeat this process for the notes associated with the black keys. This will all be done over and over again until Evo runs out of battery power or is turned off by quickly pressing its button once.

Evo Teaches Notes and the Keyboard