Robots, STEAM &
Music, Oh My!

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Come Follow Me, Let’s Walk Along, We’ll Sing and Dance and Play. We’ll Wiggle Our Bones and Clap Our Hands and Then We’ll Strike a Pose. BOOM!

I am so glad you have joined this workshop. We are going to have fun making music and hopefully you will be able to bring some new ideas to your classroom.

Please download the Wonder Workshop Dash Xylo app. The avatar looks like this. You will need a robot later to connect with. Please do not try to connect now.

Please download the Ozobot Evo app that looks like this. You will need a robot later to connect with. Please do not try to connect now.

After you are able to download these apps go to to https://labz.makeymakey.com/d/
Please don’t forget the ‘s’ in https: ;) If you have trouble downloading, please ask three people before me. 3B4Me
Primary Standards - Which of these could we apply to this session?
MU:Cr1.1.III.a. Compose and/or improvise melodic, rhythmic, and harmonic ideas for compositions of increasing complexity and accompaniment patterns in a variety of styles.
MU:Cr2.1.8.a. Select, organize, and document musical ideas for arrangements, song, and compositions within expanded forms that utilize various compositional techniques and convey expressive intent.
MU:CR3.1.2.b. Present a final version of personal musical ideas to peers or informal audience.
MU:Pr4.1.2.b. Demonstrate knowledge of musical concepts (for example, tonality, meter) in a variety of music for performance.
MU:Pr5.1.II.a. Develop and apply criteria to critique individual and small-group performances of a varied repertoire of music, create rehearsal strategies to address performance challenges, and refine the performances.
MU:Pr6.1.2.a. Perform music for a specific purpose with expression and technical accuracy.
MU:Re7.1.K.b. With guidance, demonstrate how a specific music concept (for example, beat, melodic direction) is used in music.
MU:Re8.1.6.a. Describe a personal interpretation of how performers' application of the elements of music and expressive qualities, within genres and cultural and historical context, convey expressive intent.
MU:Re9.1.3.a. Evaluate musical works and performances, applying established criteria, and describe appropriateness to the context.
MU:Cn10.4.a. Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music as developmentally appropriate.
MU:Cn11.4.a. Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life as developmentally appropriate.

Session Goal
The goal for this session is to let you experience various coding techniques that can be used in music classrooms. We will explore these and relate them to the Orff, Kodaly and Education Through Music philosophies of music education. At the end we will create a composition incorporating the Makey Makey invention kit along with the Dash and Evo Ozobot robots.

Evo Ozobots
These robots have sensors that read black, red, blue and green lines. Combinations of these colors can have the robot do certain commands such as spin, pause and turn right. Uses in music can be melodic contour, lyric and phrase recognition and even storytelling. Most Ozobots come with their own markers which are expensive, so I found that you can use Crayola-type washable markers and use the side of the marker and not the tip. Dry erase markers do not work with the robots.

Now let’s practice using the markers. Use the flat side of any color marker and practice lines on the blank paper. The color you select will change the color of Evo. Try using different colors. Turn on Evo and place him at the beginning to see if he follows your track! Using the coding sheet, practice drawing the spin code. Use an inch of black then the spin code and another inch of black. Try coding some other color commands..
Track for Reading
Rivers take a different shape as they traverse the ground to their destination. In this section we are going to use the text and create a visual representation of the lyrics. Helen Richards’ Education Through Music and Kodaly philosophy both track phrases so students can experience and internalize the music.

Key of F
I’ve Got Peace Like a River
I’ve Got Peace Like a River
I’ve Got Peace Like a River
In My Soul.

Process:
1. Track phrases in air.
2. Create own river in air. (The robots have trouble reading loops)
3. Practice on next page with ‘laser finger’.
4. Place an X on paper. Together sing and draw river on paper with pencil. Sing and track together. Did you get to the end early? Did you still have some river left? What can you do to get to the end of the river at end of the phrase?
5. Trade paper with a partner so they can follow your river. Have discussion with partner about what was fun and what was challenging about partner’s river track.
8. Check coding with Evo Ozobot.

View from Mount Holyoke, Northampton, Massachusetts, after a Thunderstorm by Thomas Cole
**Makey Makey**

**Warning!** Extended use may result in creative confidence! Makey Makey is an invention kit for the 21st century. The creators say Makey Makey takes everyday objects and transforms them into touchpads empowering students to interact with computers as creative tools. The computer becomes an extension of their creativity, fostering imaginative play and discovery. They also say the mundane and boring keyboard is replaced by any object that conducts electricity - pie pans, Play-Doh, bananas, and even potted plants. At this time there are two models of Makey Makey. The original with five alligator clip cables and the Go model with one alligator cable.

Some ideas you could create:

- Banana Piano
- Play-Doh and Penny Piano
- Makey Makey Musical Water
- Lego Piano
- High Five Human Partners
- Drummer Dash Robot with Makey
- Makey

**Makey Makey Rotating Game**

While singing Peace Like a River, students will play on C and F ostinato in Piano app to rhythm ‘Won’t You Be My Friend’. (½ ⅓ ¼ ¼ rest). Stop at end of each verse to rotate.

Using Makey Makey Go using Bongo app, other group will rotate playing lo hi hi lo hi lo 4 times
(tadi tadi tadi ta)

**Dash Robots w/ Xylophone**

The Dash Robot with the separate Xylophone accessory allows students to play pre-recorded songs, modify those and compose their own. The Xylo App stacks the notes from C to C. We will use C (red), D (orange), F (lt green), G (green) & A (bl/gr).

**Makey Makey Activity along with Dash Robot Activity**

Process:

1. Use F Pentatonic scale so, la, do re mi (C,D,F,G,A).
   a. Have Students sing so, la, do (I’ve Got Peace) and Teacher finishes phrases.
   b. Teacher models each phrase and Students echo sing each phrase with Curwen hand signs.
   c. Switch parts and Teacher sings so, la, do and Students complete phrases.
   d. Sing whole first verse.
2. Go to [https://labz.makeymakey.com/d/](https://labz.makeymakey.com/d/) to see all of the apps for Makey Makey. (Don’t forget to use s in https:)
3. Use the Piano app and explore the F Pentatonic scale.
4. Using F Pentatonic, work with a partner to transfer solfege to piano.
5. With partner take turns creating 16 count improvisation on piano where count 8 ends on so₁ (C) and count 16 ends on do (F).

Dash Robots w/ Xylophone

Process:
6. Use F Pentatonic scale so₁ la₁ do re mi (C,D,F,G,A).
   a. Have Students sing so₁ la₁ do (I've Got Peace) and Teacher finishes phrases.
   b. Teacher models each phrase and Students echo sing each phrase with Curwen hand signs.
   c. Switch parts and Teacher sings so₁ la₁ do and Students complete phrases.
   d. Sing whole first verse.
7. Go to Xylo app you downloaded earlier. Connect to a Dash robot with attached xylophone. Each group will transfer solfege to robot using a different section of the song.
8. Use the Xylo app and create a new song and explore the F Pentatonic scale.
9. With partner take turns creating 16 count improvisation on piano where count 8 ends on so₁ (C) and count 16 ends on do (F).

Final project
A: Makey Makey bongo ostinato or F pentatonic ostinato from above steps
https://apps.makeymakey.com/bongos/
https://ericrosenbaum.github.io/MK-1/
B: Evo using pitched and unpitched instruments to accompany line creation on F pentatonic. Should red lights be one instrument family? Pitched/unpitched? Can use paper to create movement or use Ozobot Evo app to drive. Connect papers together?
C: Dash Robots create 16 count F pentatonic composition. Scarves create movement to accompany.
D. Sing
I've Got Peace Like a River…
I've Got Joy Like a Fountain…
I've Got Love Like an Ocean…


Note - I was able to purchase these materials by writing two donorschoose.org grants, a $500 small grant from Chicago Foundation for Education and my own personal funds. You can find these items on eBay, Amazon, Target and vendor websites.