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| **Topic &**  **Duration** | Genre, beat string, and makeBeat / 1-2 Class Periods / 60 minutes |
| **Priority Standards** | **Georgia Music Technology Standards:**   1. [**MSMTC6.CR.1**](https://case.georgiastandards.org/f3b94c72-9c0d-11e8-b85c-3b1a3079ae6e/0b28edda-fc39-11ea-a8d1-0242ac150004/1932) Generate musical ideas for various purposes and contexts.   **Foundations of Computer Programming Standards**   1. [**MS-CS-FCP-** 4.1](https://case.georgiastandards.org/00fcf0e2-b9c3-11e7-a4ad-47f36833e889/ac4b16a7-8293-41d0-b699-3bcc99695fd0/569) Develop a working vocabulary of programming including[…], data. 2. [**MS-CS-FCP-** 4.3](https://case.georgiastandards.org/00fcf0e2-b9c3-11e7-a4ad-47f36833e889/9a8b042d-2d57-4df4-9540-1eb36b200672/571) Cite evidence on how computers represent data and media (sounds, images, video, etc.). |
| **Supporting Standards** | **Foundations of Computer Programming Standards**   1. [**MS-CS-FCP-3**](https://case.georgiastandards.org/00fcf0e2-b9c3-11e7-a4ad-47f36833e889/35695273-4888-4f59-89a5-45ef323b432f/563)Utilize computational thinking to solve problems. |
| **Student Facing Goals** | Students will be able to...   * understand string data types. * apply string data to the makeBeat() function. |
| **Essential Question & Enduring Understanding** | **Why is the string data type useful in computing?**  *The “string” data type can be used to represent sequences of characters or sounds.* |
| **Evidence of Learning** | **Formative:** Students will convert step sequencer grid information into beat strings that can be used within a makeBeat() function in EarSketch.  **Summative:** Unit project |
| **Materials** | Computer or Laptop  EarSketch |
| **Vocabulary** | **String:** A sequence of characters (letters, numbers, punctuation, etc.) with single or double quotation marks around them. |

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| **Resources** | |
| * Unit 2 Lesson 2B PPT * Sequencer grids: * U2L2B -WS- Evaluate Step Sequencer Grid file * EarSketch debug practice: <https://earsketch.gatech.edu/earsketch2/?sharing=PzOb2T1bAjsDjHs0wNKD_g> * EarSketch beat string & makeBeat scripts are in U2L2B -WS- Evaluate Python Code file | EarSketch Curriculum Panel (Links)   * 3.2 Beat strings * 3.3 The makeBeat() function * 3.4 Create a beat based on your musical genre |

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| **Teacher Preparation** |
| 1. Have the Genre Remix script used to model variables ready to open. 2. Review the evaluate grid and script files to ease facilitation of discussion on which script matches which sequencer grid. (1 matches C, 2 matches A, 3 matches B) |

Lesson Implementation

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| **Engage / Explore: Debug challenge Time: *10 Minutes Slides: 4,5*** | |
| **Section Goal:** Students will demonstrate their understanding of EarSketch syntax by debugging a script. | |
| **Student Activities**   * Click on the link provided and debug the errors in the script in5 minutes (Slide 4*).* * After 5minutes**,** when called on, explain a bug that they fixed *(*Slide 5*).* | **Teacher Activities:**   * Explain that you will provide a link for a script with errors and students will have5 minutes to debug the script (Link in resources). * After 5 minutes**,** facilitate discussion with students regarding how to debug errors. Allow students to share how they approached the errors with their classmates. Solutions can be found in the notes section of Slide 5**.** |
| **Coding Connections: N/A** | |

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| **Explain: Defining a beat string from a step sequencer grid Time: 15 minutes** | |
| **Section Goal:** Students will learn how to define a beat string based on a step sequencer grid for different genres of music. | |
| **Student Activities**   * Turn the 0 and – on the Single Ladies step sequencer grid into a set of beat strings. * Follow along with the modeling of adding the beat strings into EarSketch in the Dembow beat example. | **Teacher Activities**   * Show the Dembow step sequencer grid (Slide 6) as a reminder, then explain that it can be represented as 0 and – where a 0 plays the beat and – is a rest (Slide 7). Discuss how to convert the grid into beat strings. * Explain the House example. As a class, convert the grid into beat strings. * Direct students to the Single Ladies grid and allow them time to independently convert the grid into beat strings. * Model adding the Dembow beat strings into EarSketch (Slide 12).   + Define variables for each instrument present in the sequence.   + Define and create beat strings for each instrument. |
| **Coding Connections: N/A** | |

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| **Elaborate: Apply your Skills Time: 10 minutes** | |
| **Section Goal:** Students willlearn how to define beat strings. | |
| **Student Activities**   * Define the beat strings from their previous step sequencer grid (created from the previous lesson). * Enter their defined beat strings into their previously created Genre Remix script. | **Teacher Activities**   * After modeling the creation of beat strings in EarSketch, instruct students to open the step sequencer grid they made in the previous lesson and turn the grid into beat strings. If extra practice is necessary, use a traditional DAW to create a simple sequence for students to define as a beat string and add to EarSketch as a class. * Once students finish converting their sequences to beat strings, instruct them to add the beat strings to their Genre Remix script. |
| **Coding Connections: N/A** | |

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| **Explain: Defining makeBeat() function calls from a step sequencer grid** **Time: 10 minutes** | |
| **Section Goal:** Students will learn how to utilize makeBeat() function calls. | |
| **Student Activities**   * Follow along with the modeling of adding makeBeat() function calls into EarSketch utilizing the Dembow beat example. | **Teacher Activities**   * Explain that to play beat strings in EarSketch, it’s necessary to use the makeBeat() function (similarly how it’s necessary to use the fitMedia() function to play stems). * Explain that the difference between the two functions is that the 4th input of the makeBeat() function is a beat string. * Show the makeBeat() function call examples for the Dembow and Queen beats (Slides 18-19). * Model adding the Dembow makeBeat() function calls into EarSketch. |
| **Coding Connections: N/A** | |

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| **Elaborate: Apply your Skills Time: 10 minutes** | |
| **Section Goal:** Students will learn how to export makeBeat() rhythms from EarSketch and import them into Soundtrap. | |
| **Student Activities**   * Define the makeBeat() function calls from their previous sequences (created from the previous lesson). * Enter their makeBeat() function calls into their previously created Genre Remix scripts. * Export their rhythm from EarSketch and import it into Soundtrap. * Make a second rhythm in EarSketch and export it for import into Soundtrap. | **Teacher Activities**   * Instruct students to convert their step sequencer grids (made in the previous lesson) into beat strings. Students will then utilize makeBeat() function calls to play their rhythms in their Genre Remix scripts. * Explain how to export from EarSketch and import into Soundtrap (Slides 21-28).   + Select the Scripts tab in the Content Manager.   + Select the three lines icon next to the script to be exported (in this case, Genre Remix).   + Select the download icon next to WAV   + Locate the downloaded file and import into a DAW of your choosing. * Have students create and export a second rhythm from EarSketch into Soundtrap. |
| **Coding Connections: N/A** | |

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| **Evaluate:** Assessment / Wrapping Up  **Time: 5 minutes** | |
| **Section Goal:** Students will demonstrate their understanding of step sequencers, beat strings, and makeBeat() by matching step sequencer grids to their corresponding beat strings. | |
| **Student Activities**   * Pair up with their partner. * Receive either the grid handout or the script handout. * Work with their partner to decide which grid goes with which script. | **Teacher Activities**   * Put students in pairs. * Hand out the step sequencer grid (U2L3B2W - Evaluate Sequencer Grids + G2) and script (U2L3B2W - Evaluate Python Code + GT) to each pair. * Inform students that both worksheets contain the same beats/rhythms. Instruct them to work with their partners to match the step sequencer grids to the scripts. |
| **Coding Connections: N/A** | |