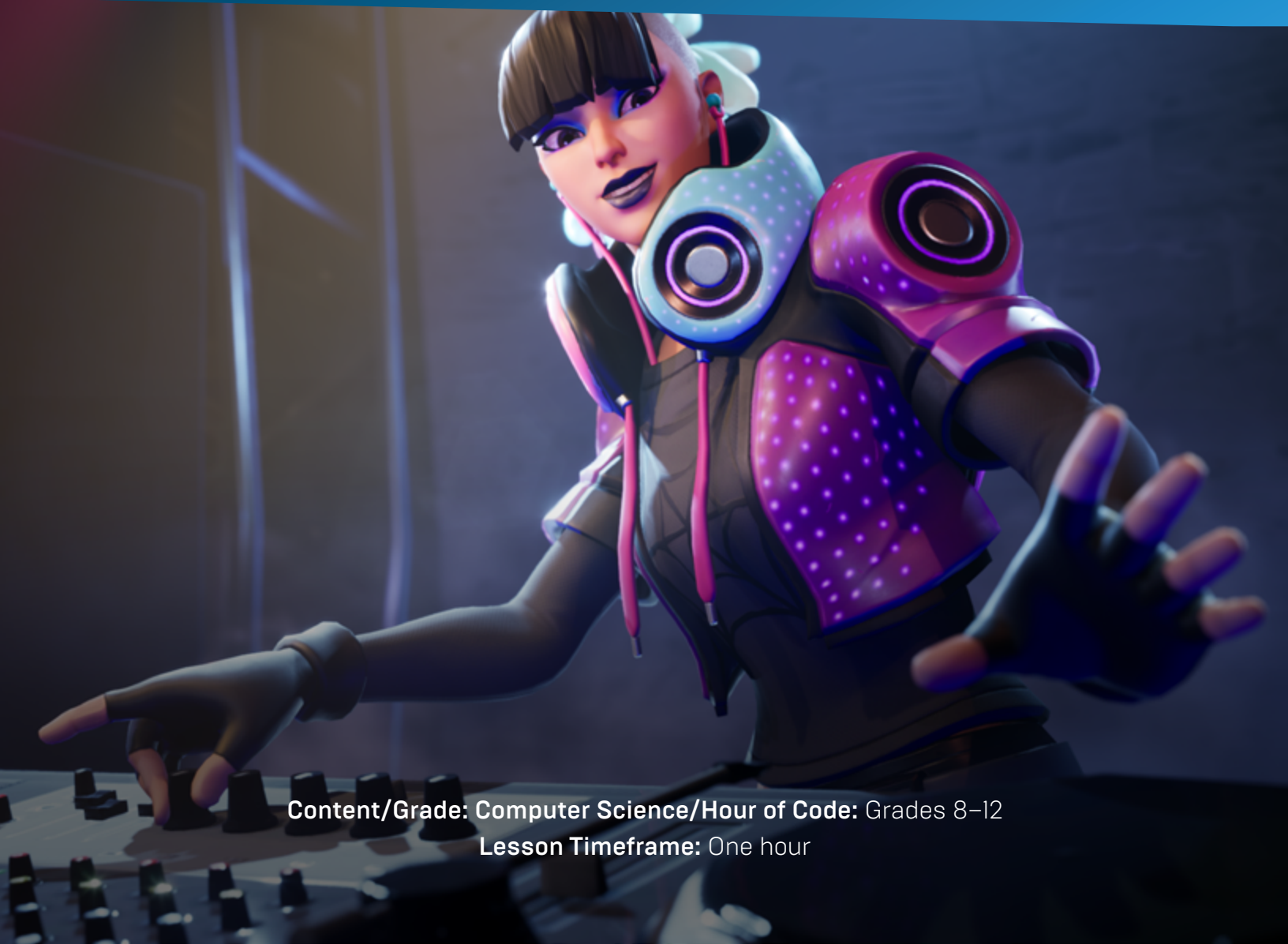


FORTNITE

MAKING MUSIC IN FORTNITE CREATIVE: CREATING LOOPS WITH THE MUSIC SEQUENCER



Content/Grade: Computer Science/Hour of Code: Grades 8–12
Lesson Timeframe: One hour

Introduction to Loops

In computer science, a loop is a programming structure that repeats a sequence of instructions until a specific condition is met. Programmers use loops to cycle through values, add sums of numbers, repeat functions, and many other things.

– [from techterms.com](https://techterms.com)

For example, if you are on a track that is a quarter mile in length, and want to run a mile, you would run around the track four times. This is an example of a loop. Once you have run around the track four times, you can stop.

Pseudocode is a way of writing coding concepts in a simple format that is easy for people to communicate and understand. The actual code in different programming languages will have different rules (or syntax), but pseudocode allows us to think about the code based on what we are trying to accomplish.

Here is an example of a loop written in pseudocode.

```
Repeat 4 Times {Run around the track}
```

Here are simple videos that explain how loops work in computer science.

[CS Discoveries: Loops](#)

[Mark Zuckerberg Explains Loops](#)

Loops can be used in any coding language, and in environments like Fortnite Creative where you can set up a scenario that creates a loop to repeat a command either infinitely or for a specified number of times

Overview

Although music allows for a wide variety of creative expression, it has several common structures that help make it appealing to listeners. Getting a basic understanding of these structures will help you be more successful with your own musical creations in Fortnite Creative.

Tempo - Also referred to as BPM (Beats Per Minute), the tempo is the speed at which the musical notes are played. A higher tempo means the music will play faster. When listening to your music, pay attention to the speed and adjust it up or down to make it sound best.

Measure/Bar - Musical notes are grouped into equal-sized measures. A common measure contains 4 beats. You may have heard musicians count 1-2-3-4. They are counting the beats in each measure at the desired tempo for that song. You will use grids in Fortnite Creative to make sure your music fits this pattern.

Notes - In sheet music, notes are written along horizontal lines, called staff lines or staves. The location of the notes on a staff indicates the pitch, and the shape of the note indicates how long the note lasts.

It is not necessary, but a basic understanding of musical notation will make it easier to recreate songs in Fortnite Creative, and easier to create your own music.

Developing musical skills could open a world of enjoyment in addition to developing your creative and analytical mind. The patience, practice, and creativity of musicians can also be helpful when learning new technology.

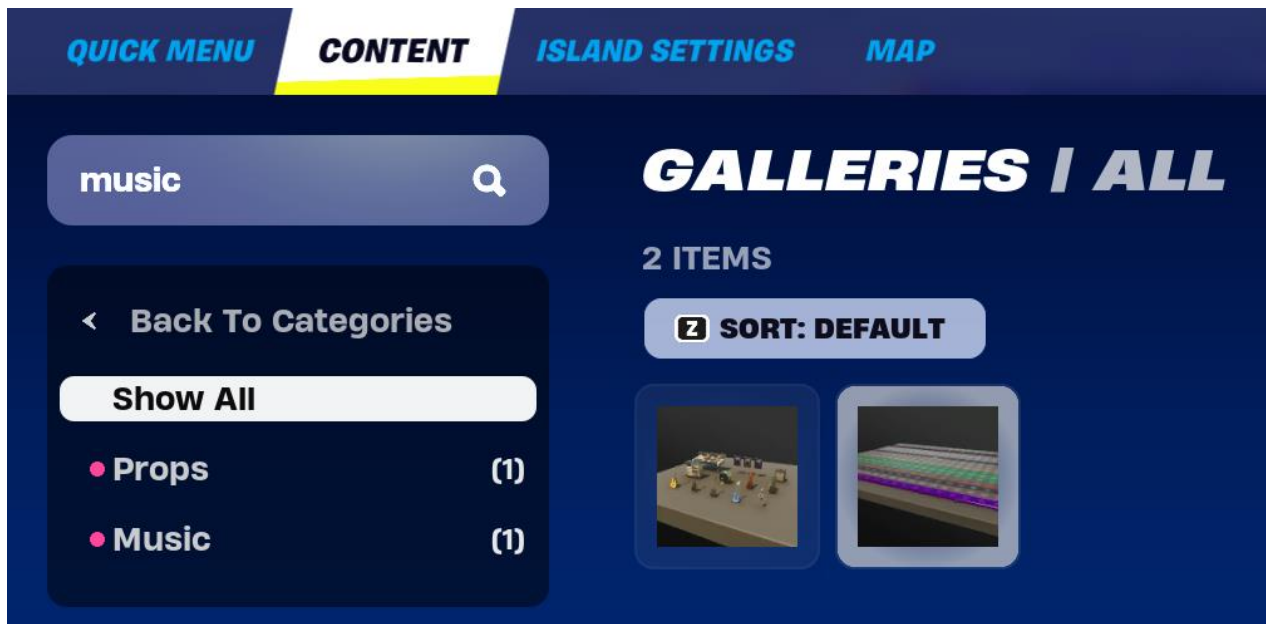
Step 1: Gather Your Supplies

What you need

		
<p>Music Blocks Gallery (Gallery)</p>	<p>Pulse Trigger</p>	<p>Player Spawn (Device)</p>

To gather the necessary items, you will need to enter your creative inventory. The key mapping for **Inventory** will be shown on-screen. The default is the **I** key.

Get your **Music Blocks**.



From your Creative inventory, select the **Galleries** tab. Notice the search box and categories on the left-hand side for narrowing your results. In this case, we searched for the **Music** keyword to view all music-related galleries. Select the **Music Block Gallery**, then click the **Equip** button.

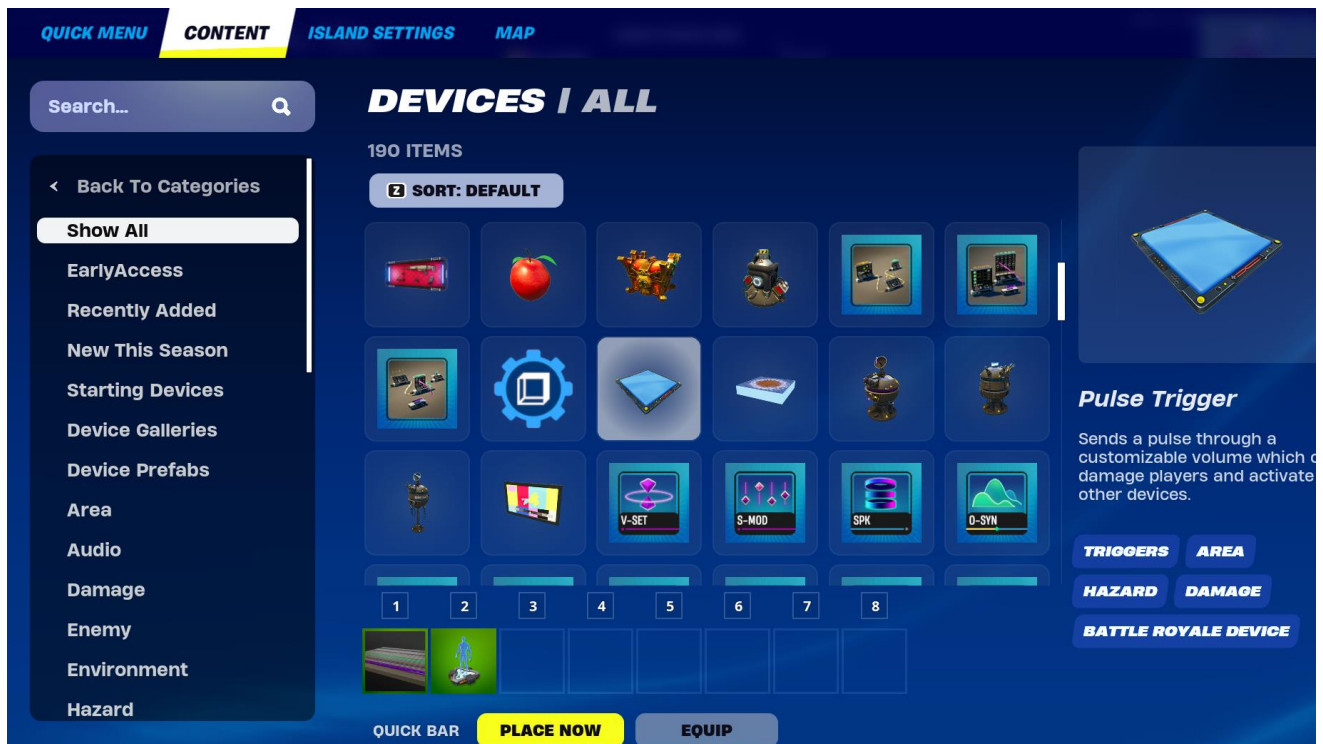


After you select **Equip**, the Music Block Gallery will appear in your Quick Bar. In this case, the Music Block Gallery is in slot 1. The items in the Quick Bar will be accessible when using the **Phone** device on your island.

Get your devices. Select the **Devices** tab in your **Creative** inventory.



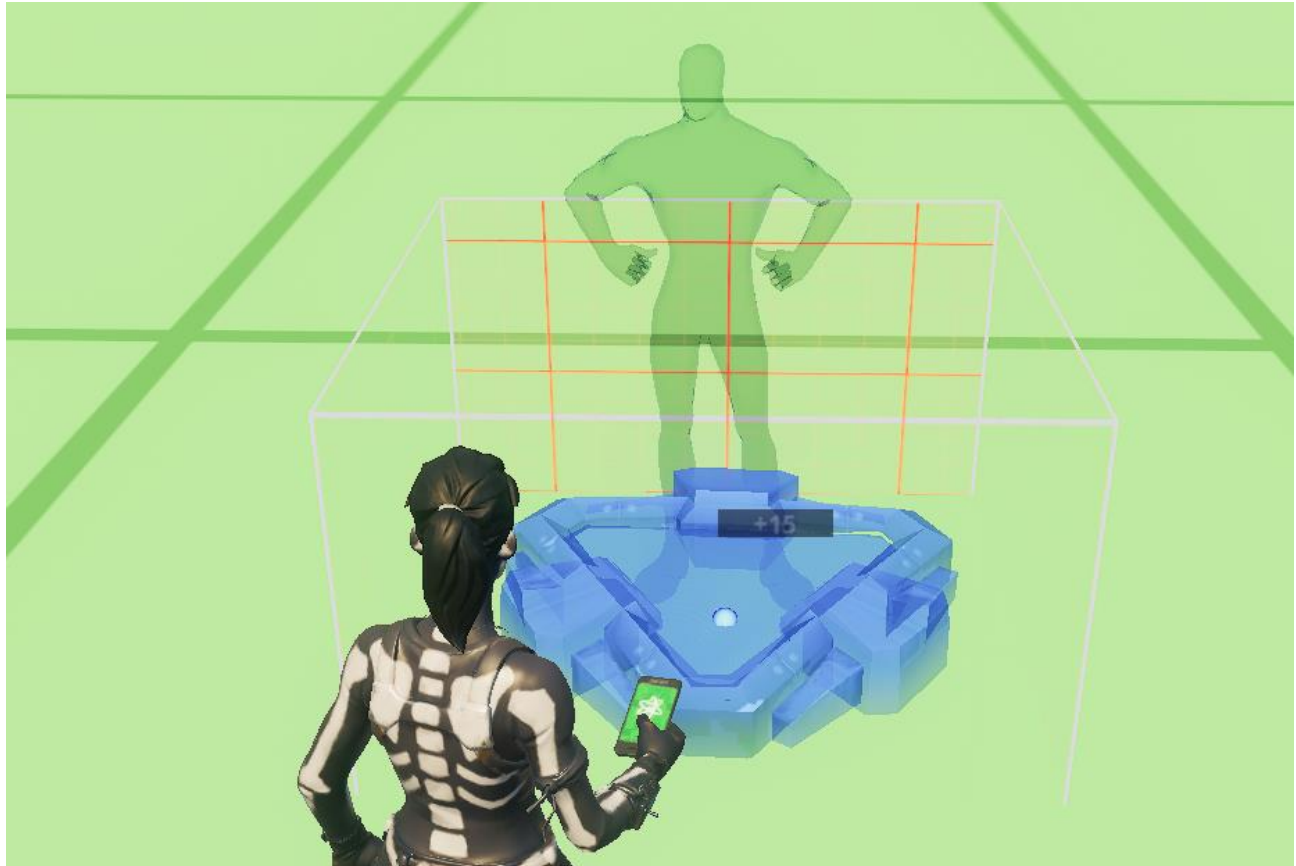
Find the device labeled **Player Spawner** and click the **Equip** button after highlighting that device.



Next, find the Pulse Trigger. Highlight the **Pulse Trigger** and click the **Equip** button.

Step 2: Placing Inventory Items on Your Island

Player Spawn

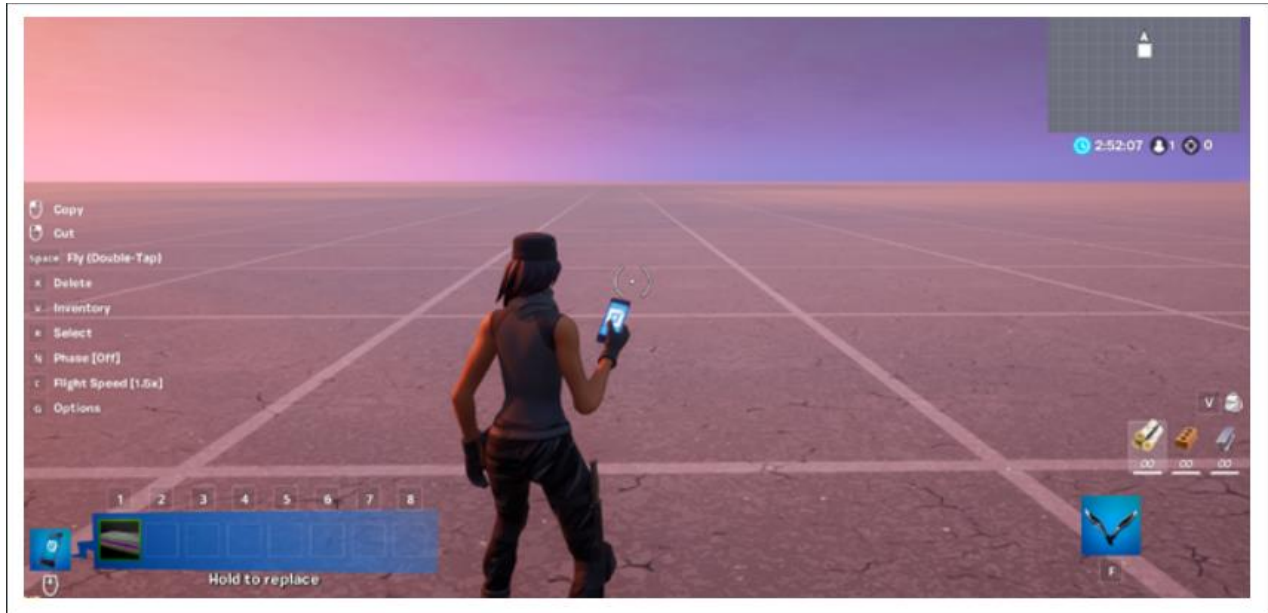


First, place a **Player Spawn** device in the center of the map on the white square.

Although configuration options are available for the **Player Spawn** device, no changes are necessary.

With the **Player Spawn** device placed on the island, you will appear at this location when entering your island instead of skydiving down. This will save you time and always start you in the same location.

Now place your **Music Block Gallery** on the island.



First, equip your **phone**.

Next, press the key matching the slot with your **Music Block Gallery**. In this case, it would be the **1** key.



The blue highlight will show the area needed to place the **Music Block Gallery**. Move and look around to change the location. Select an area near the center so it will be close to your spawn location. When the blue highlight is in the correct location, left-click the mouse to place the gallery in that location.



Now, with the **Music Block Gallery** placed, it's time for some fun!

ACTIVITY:

Running on the **Music Blocks** will activate their sounds. Spend a few minutes running on the blocks to hear them.

- Notice how each color is a different type of instrument. Which ones are your favorites?
- Notice how running along the same color block will play a different pitch. Test the far ends of your favorite instruments to hear the highest and lowest pitches available.
- Notice how the musical notes are labeled on the blocks. Do you play an instrument or know musical notation?

Step 3: Introducing the Pulse Trigger

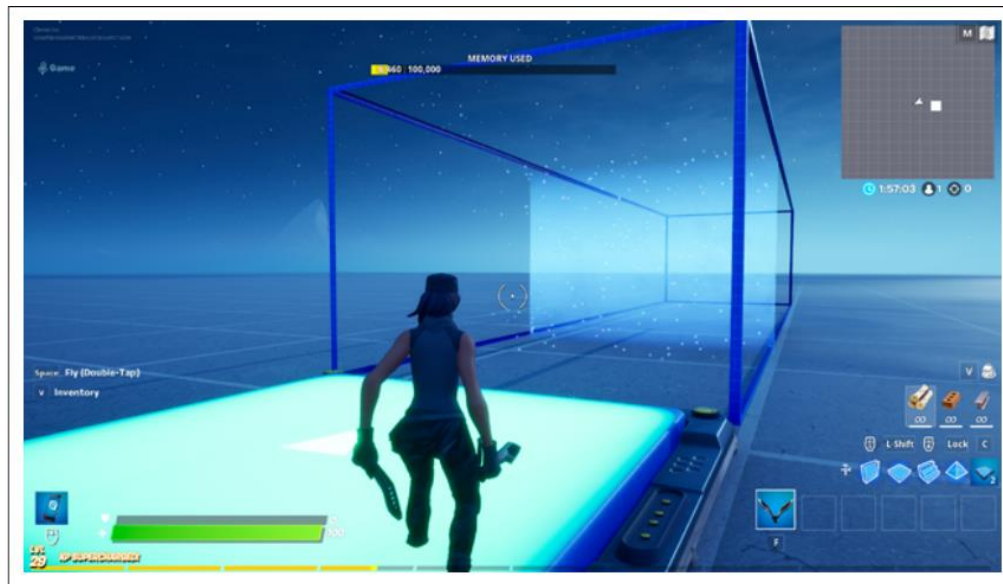
You will be using the Pulse Trigger device to play **Music Blocks** that you have selected and placed to make a song. Place the **Pulse Trigger** where you want it to go. Find a spot near the center **Player Spawn**, but where it won't interfere with the **Music Blocks**.



When placing the **Pulse Trigger**, the activation volume area will extend to your right. In this example, we face the **Music Blocks** behind us when the **Pulse Trigger** is placed. (NOTE: You can change the **Zone Direction** in the **Pulse Trigger** customization options if it needs to be changed.)



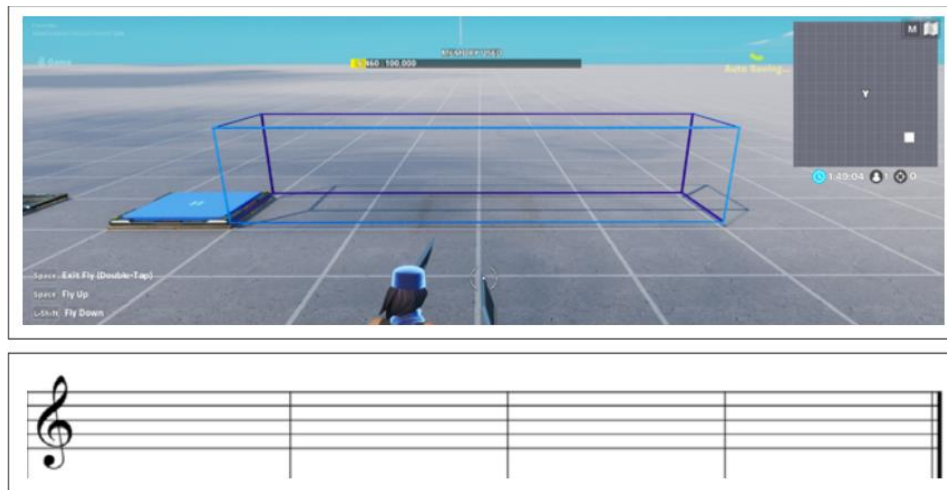
Notice the configuration with the long wireframe box extending from the **Pulse Trigger**. This wireframe box is the activation volume. Any **Music Blocks** placed in here will play when activated by the **Pulse Trigger**.



Stepping on the blue pad of the **Pulse Trigger** will send a pulse through the entire volume, extending out from the **Pulse Trigger**.

Step 4: Optimizing Your Settings for Musical Composition

Music has structures and patterns that we use to make it pleasing to our ears. We can configure our settings and use our environment to implement these structures inside Fortnite Creative.

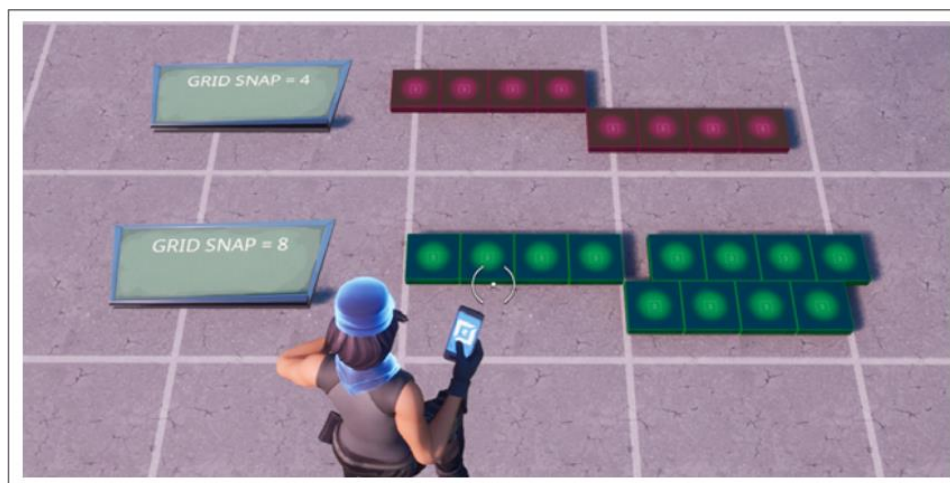


Notice how the image of the **Pulse Trigger** looks similar to the image of the musical staff with measures. For your project, each tile in the **Pulse Trigger** will represent one bar, or measure.

One of the most common time signatures for music is called 4/4 time (four-four). This means that you count 4 beats per measure. Conforming the music to this pattern will help make it flow better.

You can accomplish this structure by using the **Grid Snap** feature in Fortnite Creative. Basically, when placing objects, the **Grid Snap** number will define the number of increments available in each tile. Since we already determined that a tile will represent one measure, the **Grid Snap** will determine your time signature.

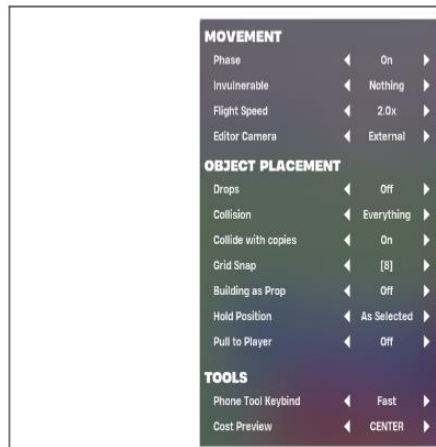
For your example, you can use a **Grid Snap** value of 4, 8, 16, or 32.



You will use **Grid Snap = 8** for this project. With this setting, four **Music Blocks** fit inside the tile. It also allows more advanced placement of the blocks in 1/8 increments (eight notes).



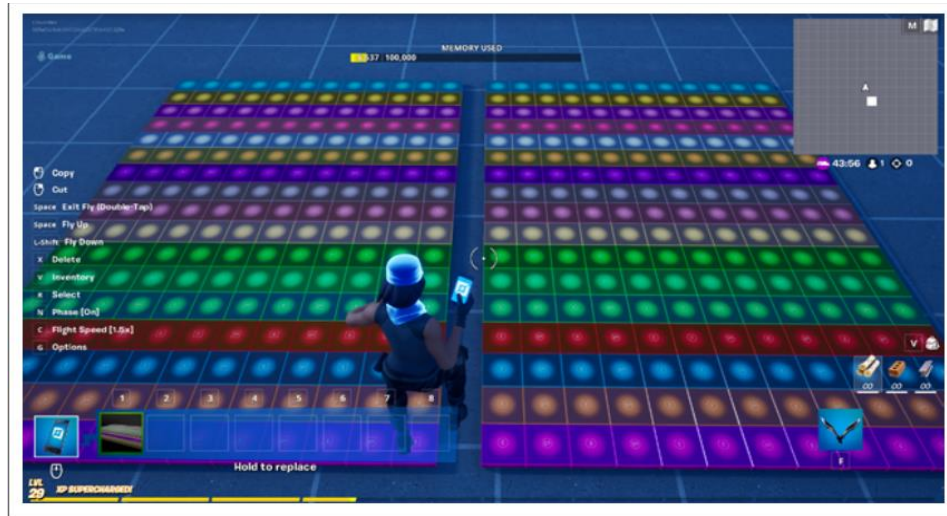
With the Phone equipped, select the **Options** command. In this case, the **G** key is mapped to **Options**.



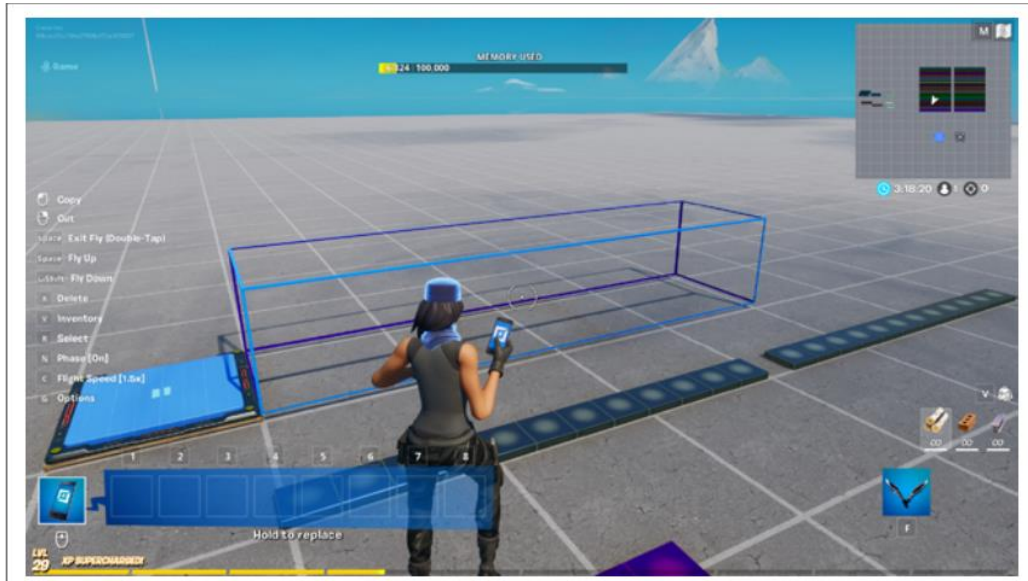
Inside the Options Quick Menu, change the Grid Snap to **[8]** then click **Close**.

Step 5: Putting the Music Together

The **Music Block Gallery** is arranged according to the chromatic scale. This is 12 notes that are equally spaced in pitch (like playing black and white piano keys in sequence). Each set of 12 notes is an octave. In the image below, we have divided the **Music Block Gallery** to show that each instrument is supplied with two octaves. When grabbing **Music Blocks**, make sure to grab the notes from the correct octave.



When you have selected the instrument of choice, you can select all the notes from that instrument and copy them near your **Pulse Trigger**.



With the music note blocks copied and ready, let's create a simple song.

Step 6: Matching Music Blocks with Musical Notes

Ode to Joy - Beethoven

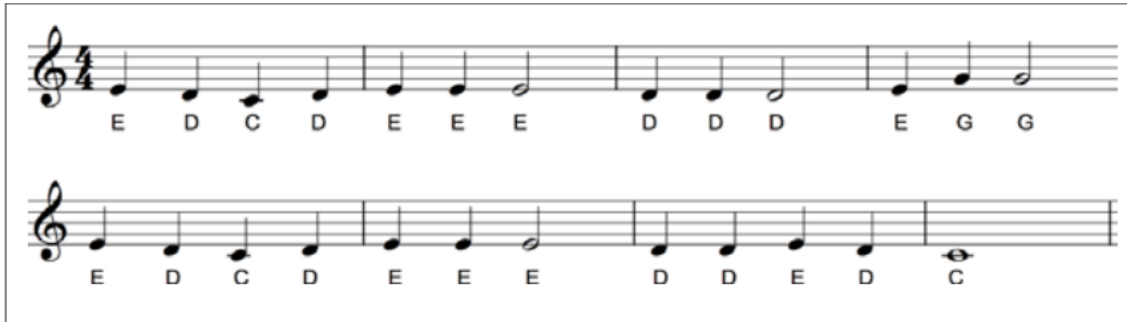
B B C D D C B A G G A B B A A

Twinkle Twinkle Little Star

D D A A B B A G G F# F# E E D A A G G F# F# E

A A G G F# F# E D D A A B B A G G F# F# E E D

Mary Had a Little Lamb



When selecting **Music Blocks**, find the musical note in the middle of the staff lines and select the matching **Music Block** from the center of the **Music Blocks**. In this case, the **C** note is placed with other notes higher and lower, so you will need to grab the **C Music Block** from the center.

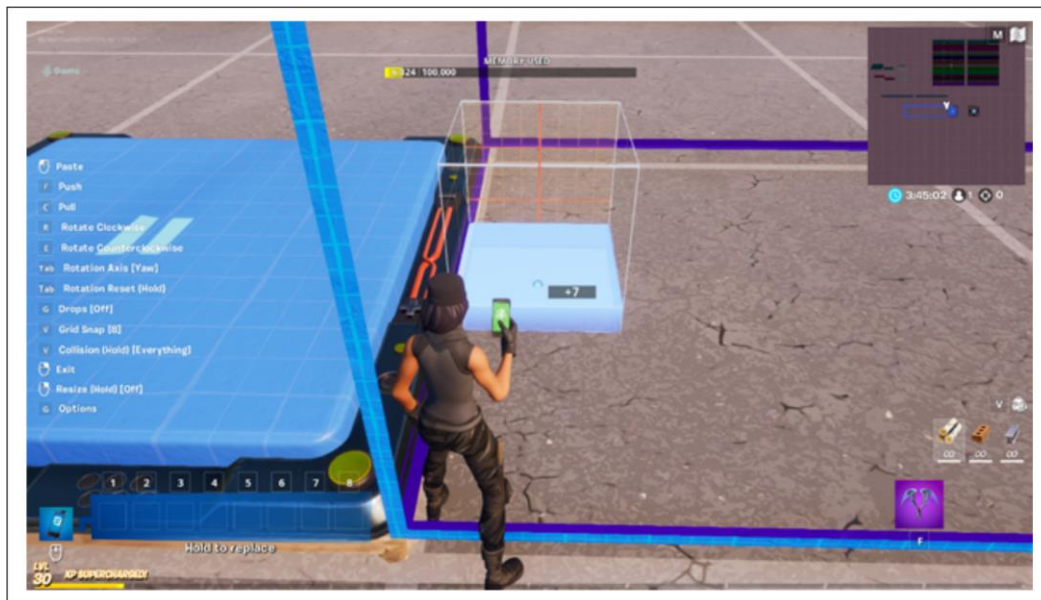


Step 7: Placing Your Music Blocks

Notice the first note in the example is labeled **B**. This note is also in the middle of the staff, so take the **B** note from the middle of your selected instrument.



Pick up the **B Music Block** and place it at the beginning of the first bar, closest to the **Pulse Trigger** pad.



Place the first **Music Block**. You should be able to place 4 **Music Blocks** per tile. This matches the 4 beats per bar/measure in your music.



After placing the first **Music Block**, step on the **Pulse Trigger** pad to make sure your music note is played. If it doesn't play, make sure the **Music Block** is within the **Pulse Trigger** volume outlined in blue.

Once it is working, you will use this block to align all subsequent blocks.



With the first two **B** notes placed, you can place the next note, **C**. There are two of each note for every instrument. Make sure to pick the correct notes. In this case, we placed the **B** note from the center of our **Music Blocks**. There is a **C** note on the far left and one in the middle. Use the **C Music Block** from the center.

Let's complete the first measure.



This is the **Music Blocks** in Fortnite Creative. (**B, B, C, D**)



Here are the musical notes from the first bar. (**B, B, C, D**)

Make sure yours match, then complete all of the bars in this sample song.





Troubleshooting

Does your song play too fast or too slow?

Adjust the Tempo of your song by getting close to the Pulse Trigger pad and selecting the Customize option. Adjust the Tempo (BPM) and try again until it sounds right.

Do all your Music Blocks connect in a row without overlapping and without extra space between them?

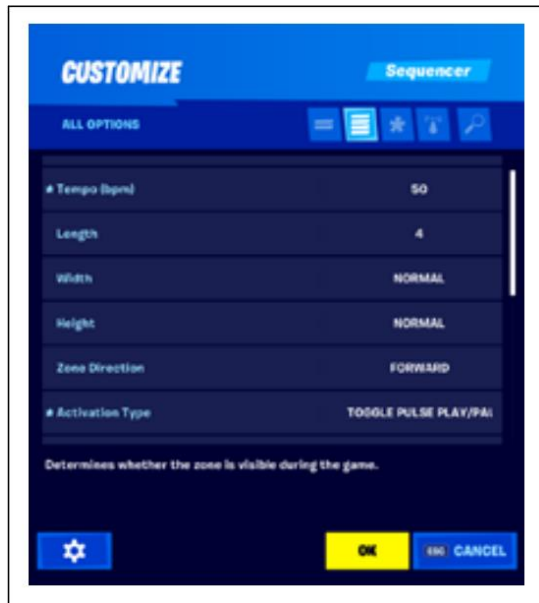
To fix a Music Block that is out of place, you can use the Phone tool to cut and paste the block into the correct position.

Do your musical notes seem correct, or are there some notes that are out of place?

Remember that there are two of each note for every instrument. Each of the two notes are different by one octave. Selecting the wrong octave could make an uncomfortable sound in your song. Double-check anything that sounds bad, and replace the Music Block(s) with the proper selection. (Hint: When notes are higher on the music staff, they are a higher pitch. Lower notes are a lower pitch. In our sample song, the G note is lower than the A, so grab the G block that is a lower/deeper pitch.)

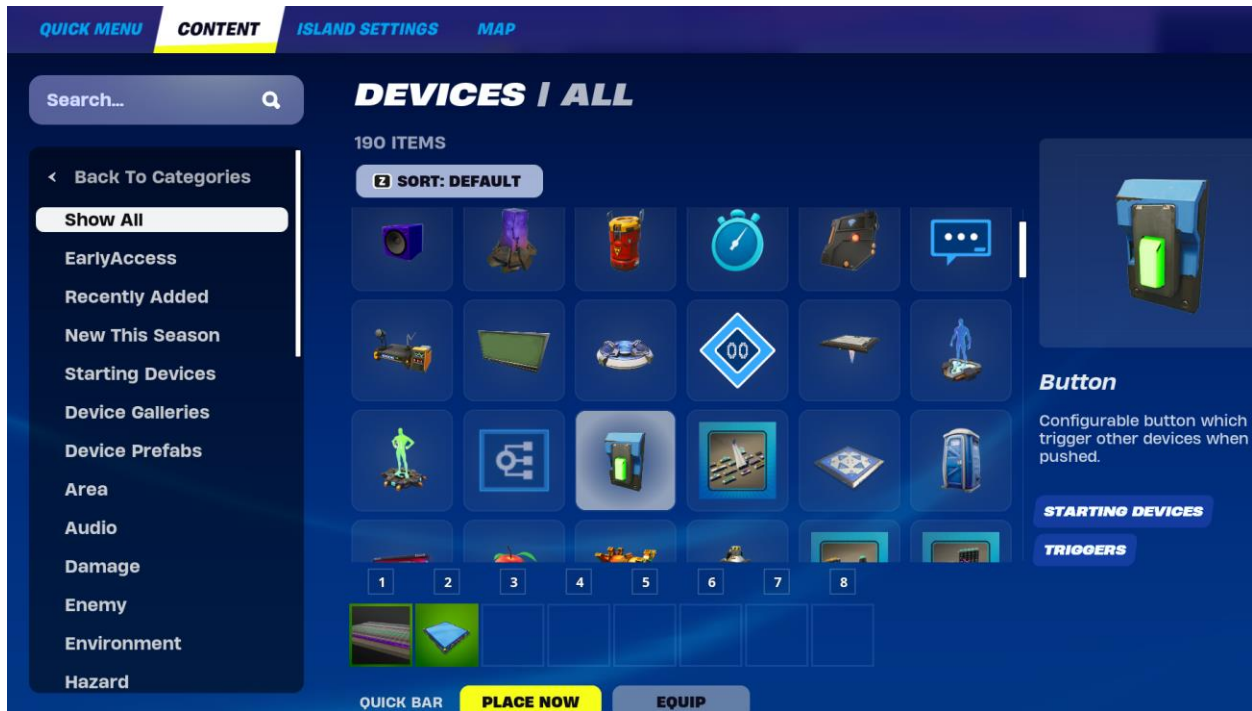
Is the activation volume of your Sequencer facing the correct direction, and is it sized correctly to play this song?

If the activation volume (Zone) is facing the wrong direction, you can change it by Customizing the Pulse Trigger and changing the Zone Direction field. To adjust the size of the Zone, you can change the Length, Width, and Height values. If you don't see these options, click the All Options icon to reveal all options (see below).

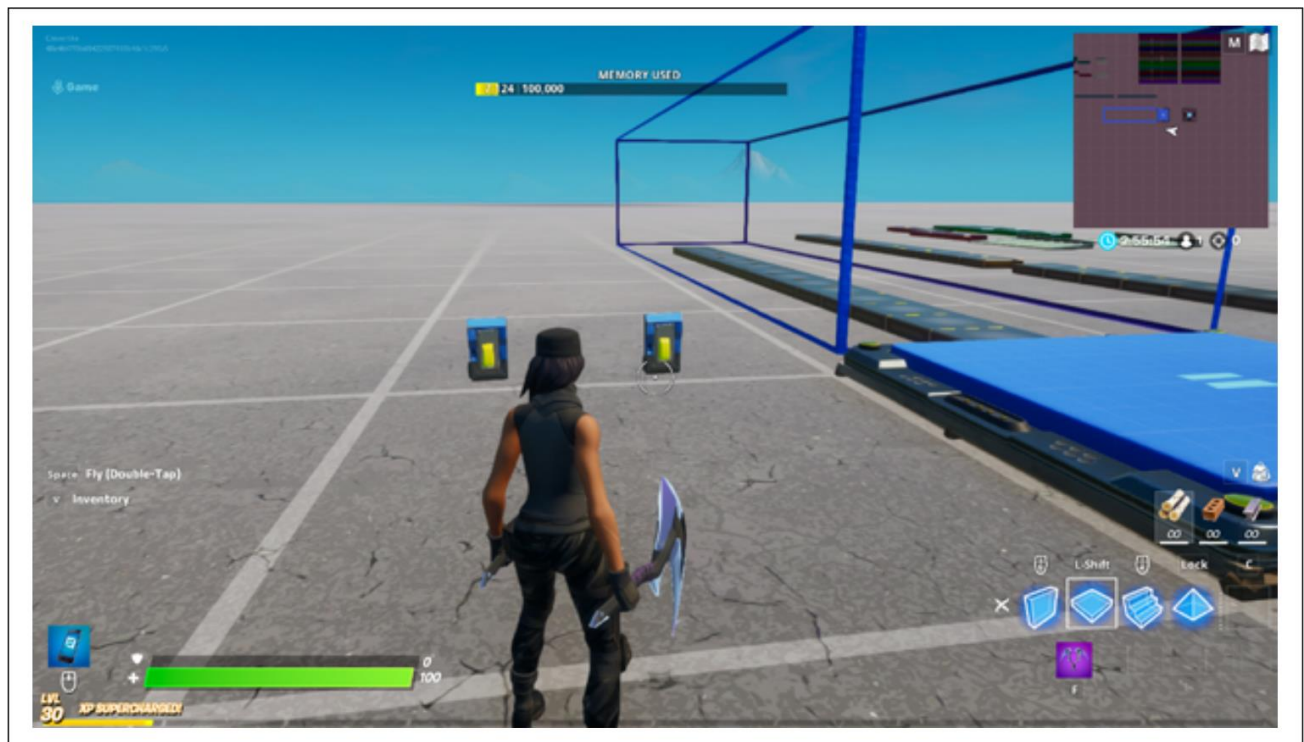


Step 8: Controlling Your Song in a Fortnite Creative Game

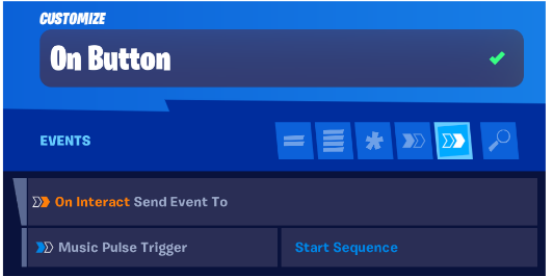
This exercise is unique, and it can be created and tested without starting the game. In addition to the great creative fun of making music, **Pulse Triggers** are also capable of triggering other devices that can be useful when inventing your own games. As a final step in this guided activity, you will create an **On/Off** switch to toggle the music.

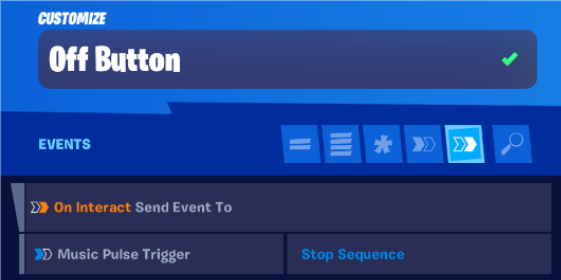


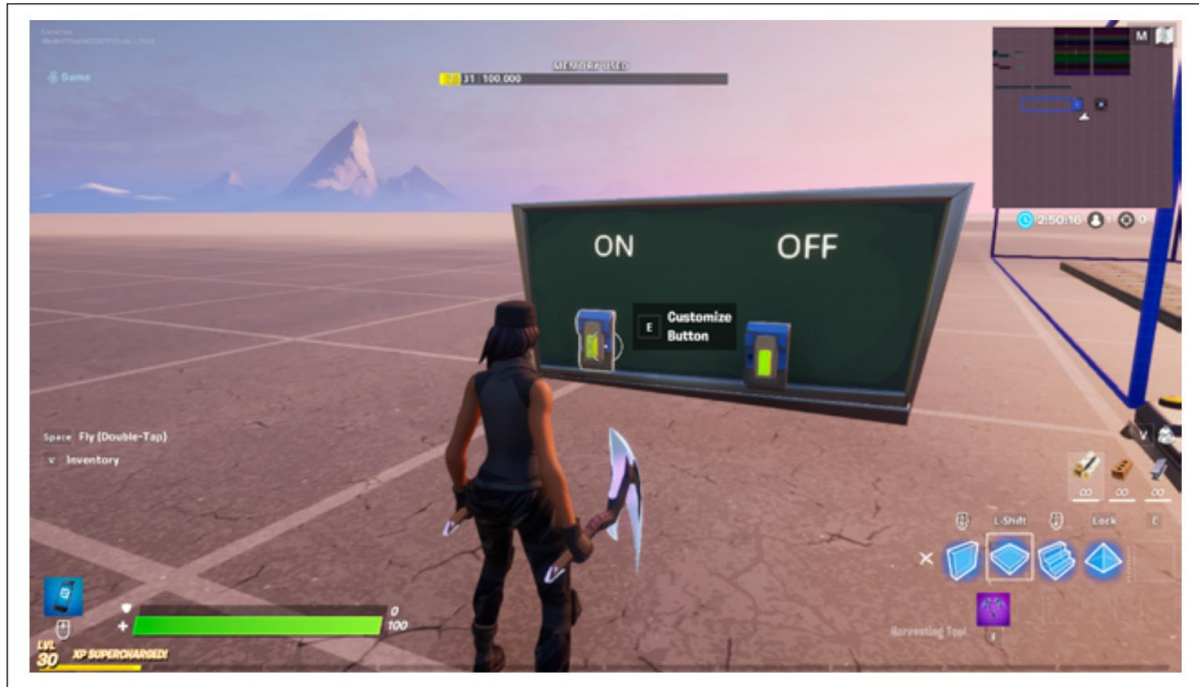
Go to the **Creative inventory** and **Equip** the **Button** from the **Devices** category.



Place two buttons near each other. (Placing them in a location where you can see the **Sequencer** in the background is a good idea.)

	<p>Set the name of one button to show that it's the "On button".</p> <p>Set it to send a start sequence event to the Pulse Trigger that your music is in.</p>
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	<p>Set the name of the other button to show that it's the "Off button".</p> <p>Set it to send a stop sequence event to the Pulse Trigger that your music is in.</p>
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To make this exercise easier, change the **Pulse Trigger Looping** value to **Infinite** so it will play continuously when you push **ON**, and will stop when you press **OFF**.

CUSTOMIZE

Music Pulse Trigger

BASIC OPTIONS      

* Loop Infinitely	ON
Tempo (Bpm)	110.0
* Length	10.0 TILES
Width	1.0 TILES
Height	1.0 TILES
Zone Visible During Game	OFF

Congratulations!

You have made a Music Machine in Fortnite Creative, and you've learned how to create and control loops in the game. Loops are an important part of programming, and now you are equipped with the experience to put loops to work for you in your own creations.

Activity

Now you understand how music, pulse triggers, and loops work in Fortnite Creative. Integrate the idea in your game world. Here are a few ideas/challenges:

- Create your own musical composition, or play a song of your choice in your game world.
- Create a more complex song—If you are inspired by the musical creation, try to challenge yourself to create a more complex song.
- Explore more controls—If you like to fidget with the controls, go explore the Devices in Fortnite Creative and try to invent a new way to control your Music Machine.
- Did you know that the Pulse Trigger can activate many different devices? Try creating a sequence that only performs a series of actions without playing a single note of music.

Sample Music Resources

When the Saints Go Marching In

Musical notation for "When the Saints Go Marching In" in G major, 4/4 time. The notation includes a treble clef, a key signature of one sharp (F#), and a 4/4 time signature. The melody is written on a single staff. Below the notes are guitar chords: G B C D, G B C D, G B C D B, G B A, AB A. A vocal line (Vo.) is also present, with chords: G G B D D D C, BC D B, G A G.

Ode to Joy - Beethoven

Musical notation for "Ode to Joy" by Beethoven in G major, 4/4 time. The notation includes a treble clef, a key signature of one sharp (F#), and a 4/4 time signature. The melody is written on a single staff. Below the notes are guitar chords: B B C D, D C B A, G G A B, B A A. The notation is divided into four systems, with measure numbers 5, 9, and 13 indicated at the start of the second, third, and fourth systems respectively. The chords for the second system are B B C D, D C B A, G G A B, A G G. The chords for the third system are A A B G, A B C B, G A B C B, A G A D. The chords for the fourth system are B B C D, D C B A, G G A B, A G G.

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