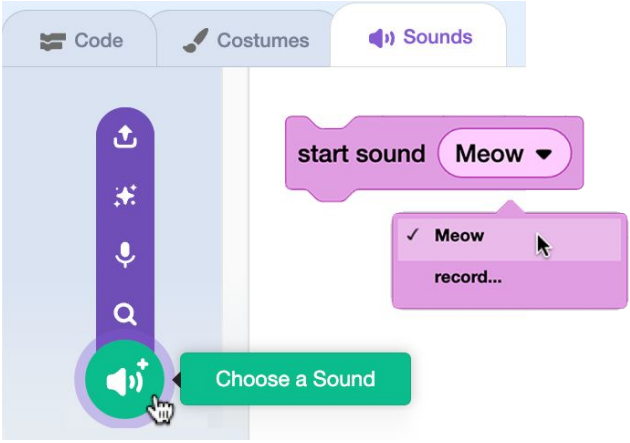
Sound and Music Cards

Make some noise while exploring the sound and music extension blocks in Scratch.

Cards in This Pack

- Sound Blocks
- Pitch and Volume
- Text to Speech
- Loudness
- Create a Face Sensing Sound Board
- Music Extension Blocks
- Alternative Pianos
- Makey Makey Foil Piano
- Make or Re-Create a Song
- My Block: Music
- Musical List
- Generate a Melody: Repeat through a List
- Fom the original Scratch Coding Cards:
  - Animate a Drum
  - Surprise Song
  - Play the Drums (video sensing)
  - Squeak (using the micro:bit)

Sound Blocks



- Click on a sprite or the backdrop and select the “Sounds” tab. Hover over the Sounds menu at the bottom of the tab, and select “Choose a Sound,” “Record,” or “Upload Sound.”

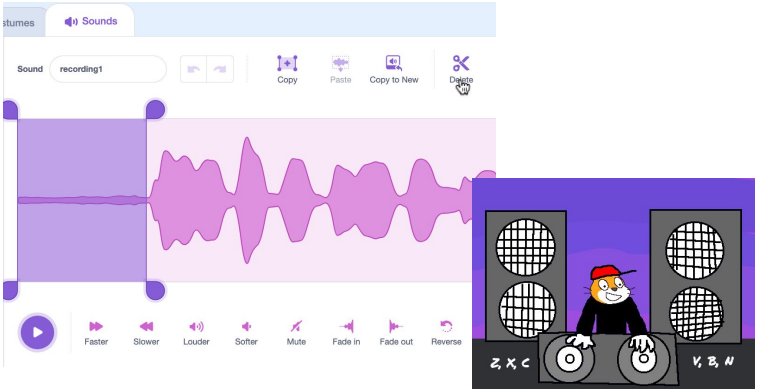
- Rules for uploaded sounds:
  - You can choose a MP3 or WAV file.
  - Please keep each of your files under 10MB.
  - Do not upload materials under copyright.
  - Uploads must follow the Community Guidelines.

Sound Blocks

scratch.mit.edu

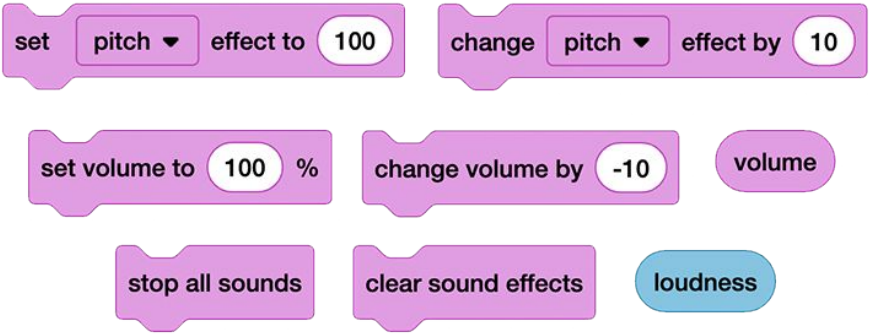
1. Explore the difference between “start sound” and “play sound until done.” Try each in a “forever” loop or add another block, like a “say” block, after the sound block to see the difference. Note when the script moves to the next block after the sound block.

2. Try using the sound editor tools to make edits, like shortening the length or adjusting the volume or adding an effect like fade in and out or reversing it.



3. Check out our starter project “DJ Scratch Cat” (scratch.mit.edu/projects/11640429). Explore and remix this project to think about how to pair sounds or layer sounds to create something new.

Pitch and Volume



- One way is to customize sounds is to use the sound editor tools to make edits. Another way to customize and manipulate sound in Scratch is via code blocks.
- Explore blocks in the Sounds category that can set or change the pitch or the volume. There are also blocks to stop all sounds currently playing or clear sound effects, like pitch. How might you use such blocks in a project?

Pitch and Volume

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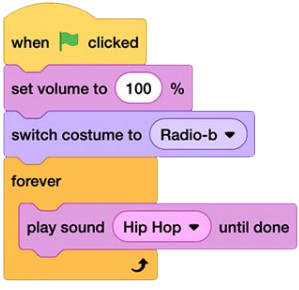
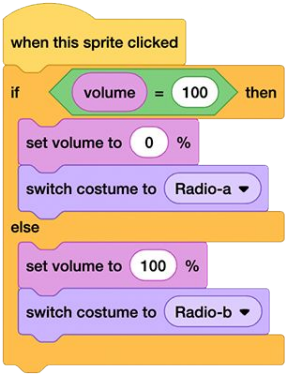
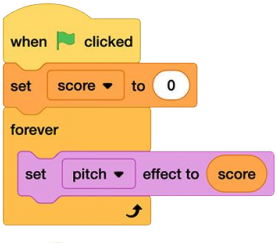
1. You could give users control over hearing or muting continuous background sound in a project. There are a number of ways to approach this. Here is one to try:

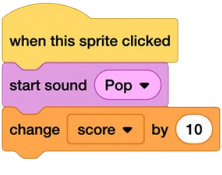


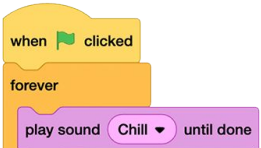


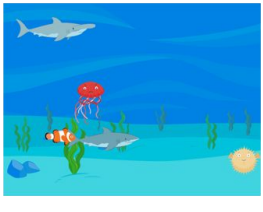
2. Or add emotion and excitement to a game by playing with the pitch of a sound. Check out our starter project "Catch the Fish, Increase the Pitch" (scratch.mit.edu/projects/1106268602). Explore and remix this project.

Notice as you click on all 30 fish that the music gets higher in pitch creating a feeling of urgency. How can sound add an emotional component to a project?

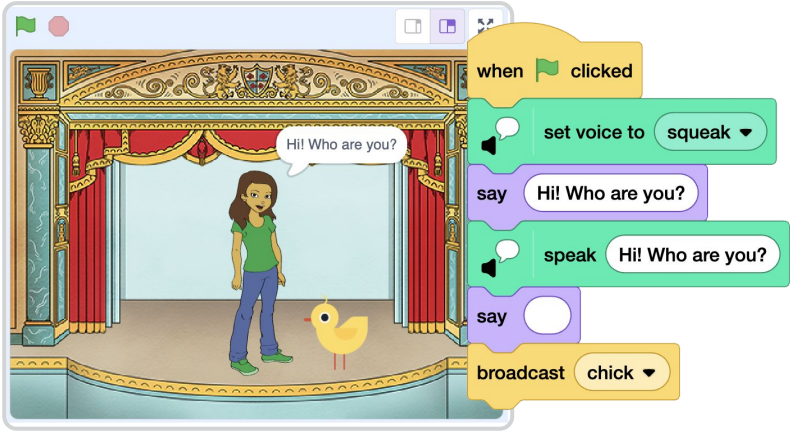








Text to Speech

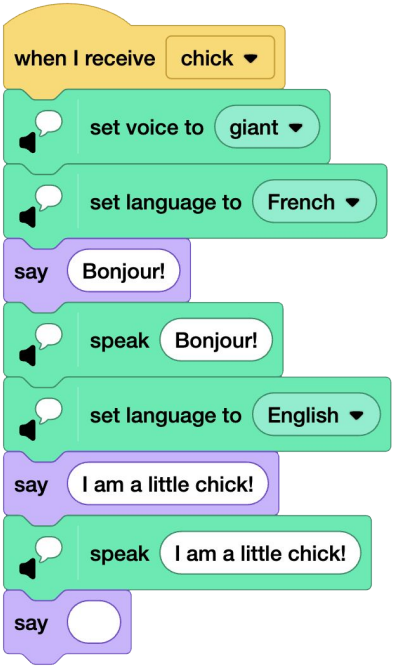


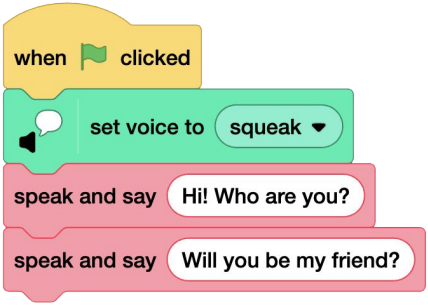
- Add the Text to Speech extension by clicking on the extension menu in the lower-left corner of the project editor. Note: You must be connected to the internet to use it.
- Set a voice. Type words into the block to hear them read aloud. Adjust the language to match the text for better pronunciation.
- Pair with blocks like “say” or the Translation extension blocks to make your projects more accessible.

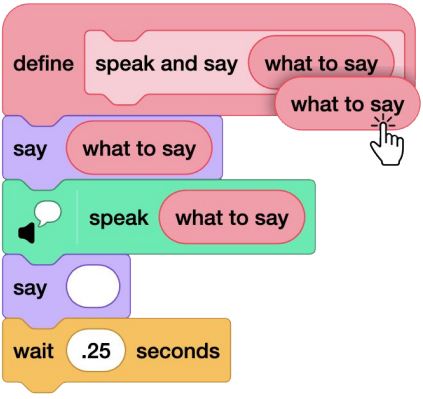
Text to Speech

scratch.mit.edu

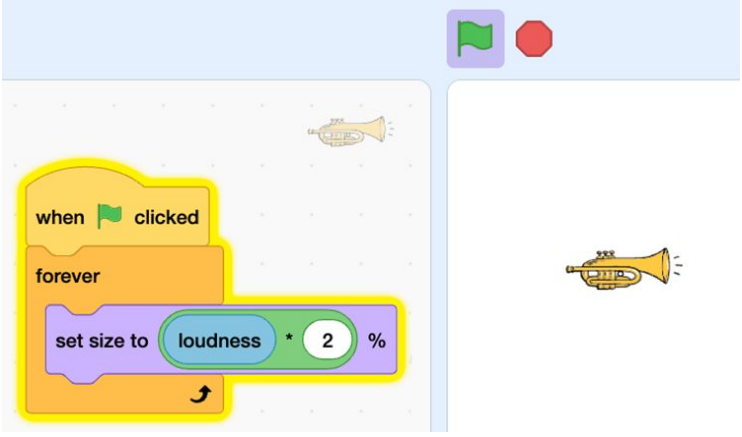
1. Check out our starter project “Text to Speech” (scratch.mit.edu/projects/1106234816). Explore and remix this project. Think about how to combine text to speech with “say” blocks to make text heard and seen.
2. See what happens when you adjust the language, or use with translate blocks.
3. Optional: Create a custom My Block to speed up the process of creating dialogue that can be heard and seen. (See our My Blocks resources for more.)







Loudness



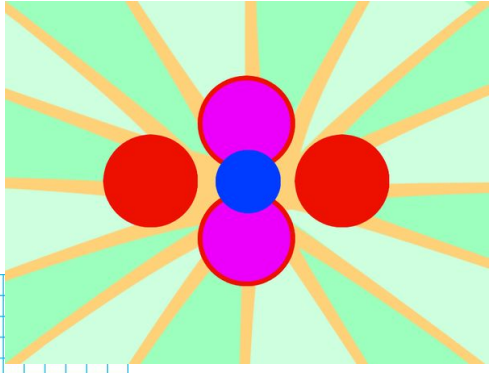
- Did you know there is also a “loudness” reporter block under the Sensing category that records the “loudness” of the noise that a microphone receives, on a scale of 0 to 100, to control things in Scratch?
- You must enable your microphone in the browser (nothing will be recorded or stored).
- How could you use this in a project? Try using it in the “set size” block inside a “forever” loop. Then, make some noise!

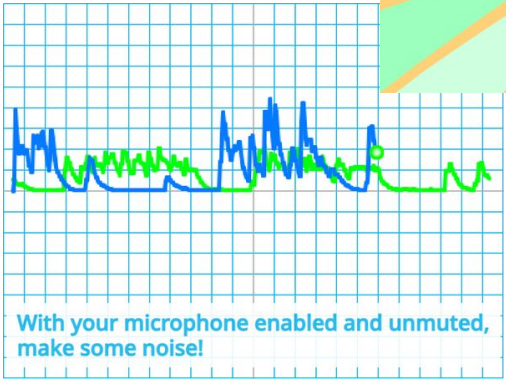
Loudness

scratch.mit.edu

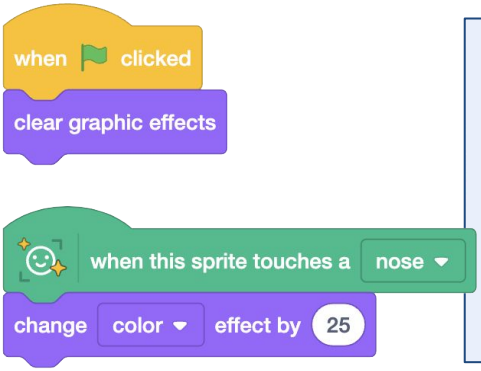
1. Check out our starter projects “Sound Graph” (scratch.mit.edu/projects/1105532968) and “SoundFlower” (scratch.mit.edu/projects/1111537402).
2. Explore! See how singing, playing music, or just making fun noises at different volumes creates an effect.
3. Remix and change the sprites, or adjust the numbers to see the effects.

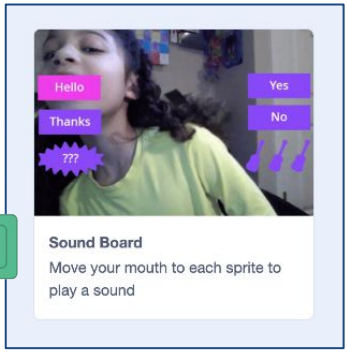
How might you create an interactive art piece to accompany a musical performance?





Create a Face Sensing Sound Board





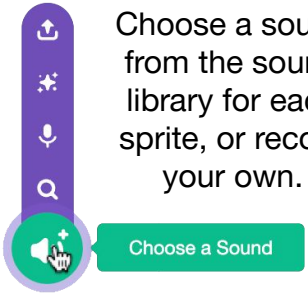
- Go to **lab.scratch.mit.edu/face**.
- Choose a variety of fun sounds or record your own and **code a sound board.** Or code effects controlled by your face.
- *Optional*: On the Face Sensing homepage, click on the **"Sound Board" starter project** to experiment with the sprites and sample code.

Sound Board

lab.scratch.mit.edu/face

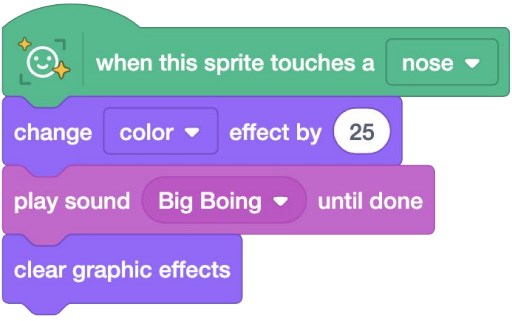
GET READY

Choose a few sprites, or draw your own.

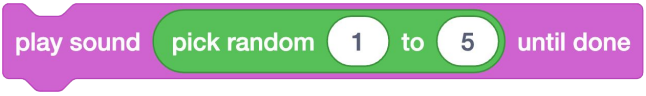


Choose a sound from the sound library for each sprite, or record your own.

ADD CODE

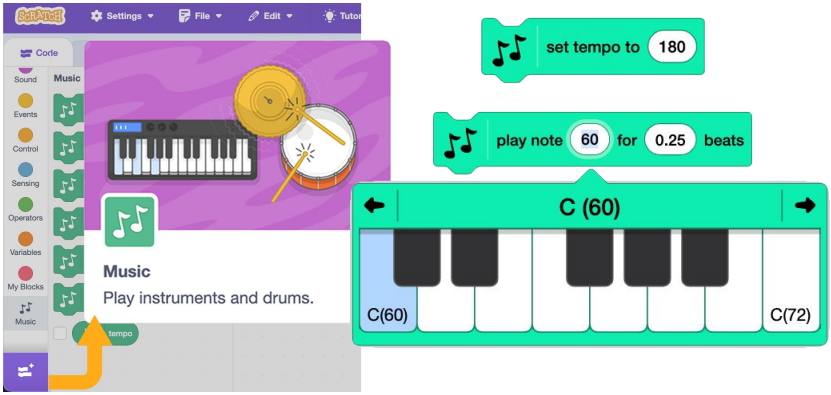


1. Add code to each sprite to play a sound, change an effect, or perform another animation when parts of your face touch them.



2. Try adding multiple sounds to a sprite. Use the “pick random” operator so each time is a surprise.

Music Extension Blocks



- Add the Music extension by clicking on the extension menu in the lower-left corner of the project editor and choosing “Music.”
- The beat or BPM (beats per minute) is a basic rhythmic unit of a measure. You can make the beat faster or slower by changing the number in that input bubble.
- A standard tempo is 60 BPM, which means one beat will be played each second. What happens if you create a sequence of “play note” blocks and use the same beat but change the tempo?

Music Extension Blocks

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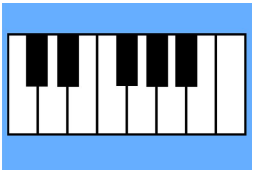
1. Check out our starter project “Piano” (scratch.mit.edu/projects/1106245381). We’ve set up a basic piano using the “play note _ for _ beats” block.

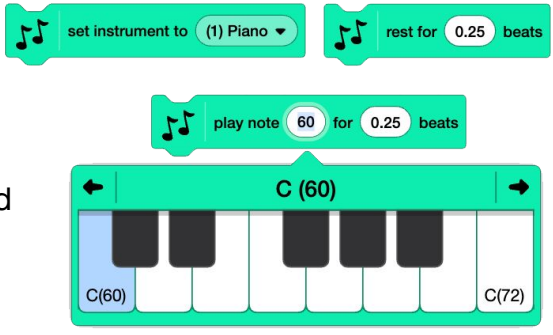


2. Click in the note input bubble to see the piano keys that appear so that you can choose a note attached to a number.

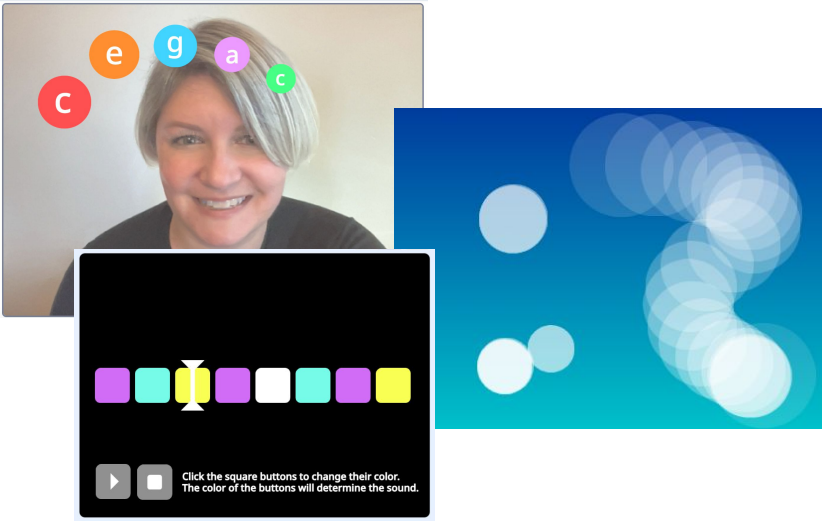
3. Adjust the beat using different numbers and test the difference.

4. Try changing the instrument, either via the slider we have provided or by changing the script. Note that changing the instrument on one sprite does not change it for all sprites in a project, so you could have a separate instrument for each key. How does using a variable make it easier to adjust the instrument for all keys at once?

5. In your remix, you could change what the piano looks like, add computer keyboard shortcuts, change the tempo, or add higher and lower notes.



Alternative Pianos



- What about creating an alternate piano keyboard? For instance, you could use video motion or the position of the mouse to play notes.
- You could also make your piano keyboard more accessible by adding visual effects when notes play for those hard of hearing or deaf. By making your musical projects visual as well as audio, more people can experience them, or experience them in different ways.

Alternative Pianos

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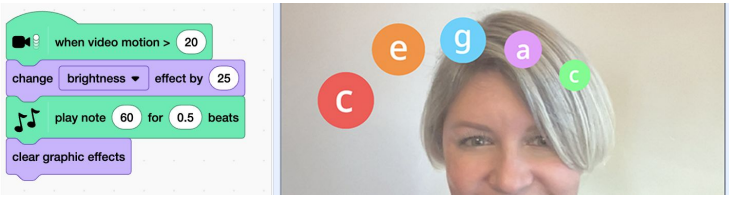
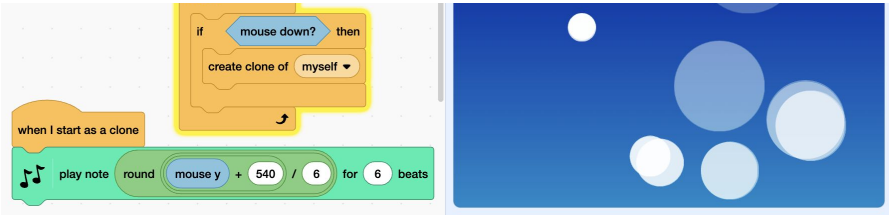
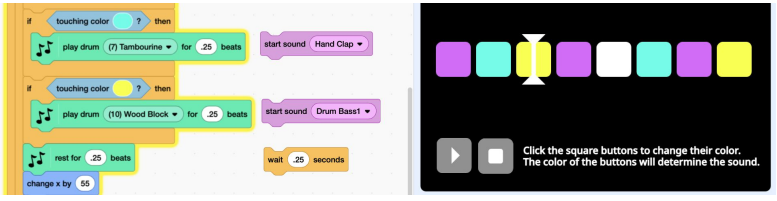
1. Check out our starter project “Musical Buttons using Video” (scratch.mit.edu/projects/1105110383).



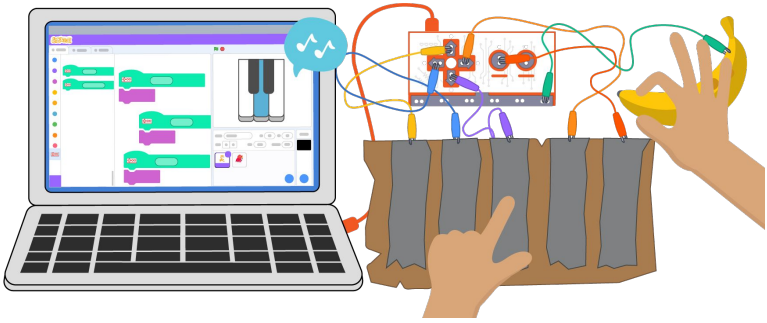
2. Check out our starter project “Musical Droplets” (scratch.mit.edu/projects/1111576868) that uses mouse y-position.



3. Check out our starter project “Drum Sequencer” (scratch.mit.edu/projects/1111562971) where the user creates the beat. The starter project uses sounds from the library, but you could experiment with additional drum sounds by using the “play drum _ for _ beats” block from the music extension.



Makey Makey Foil Piano



You can make a physical piano with some foil and a Makey Makey (see our Makey Makey Coding Cards for more information).

Instructions:

1. Connect one alligator clip to EARTH and various alligator clips to multiple keyboard keys, which will represent various musical notes.
2. Code a project so key presses play different notes.
3. Use foil, bananas, Play-doh, or other conductive materials as external keys.

Makey Makey Foil Piano

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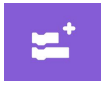
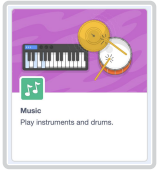
GET READY

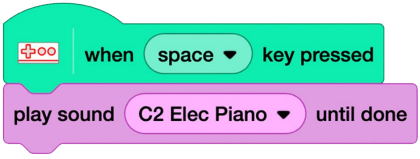
Choose any sprite or draw your own.



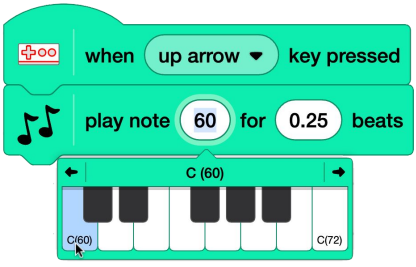
Optional: add the Music Extension.



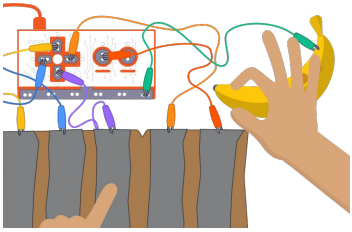
ADD CODE AND TEST



Select note sounds in the Sound library to play when different keyboard keys are pressed. (You can use the Makey Makey extension hat block or the Event hat block.)



Or add the Music Extension and select notes to play when different keyboard keys are pressed. Notes can be customized for beat count and instrument.



Close the circuit to register each keyboard press by touching EARTH and a keyboard input.

Make or Re-Create a Song

- Think about the structure of a piece of music. Typically there are verses and choruses that are repeated throughout the song.
- You can use the music or sound blocks to compose your own original composition or recreate a song!
- Are you creating a song with a simple melody, or are you creating chords and layering sounds? There are different approaches you can try using sound blocks and instrument sounds from the library or music blocks. Experiment!

Make or Re-Create a Song

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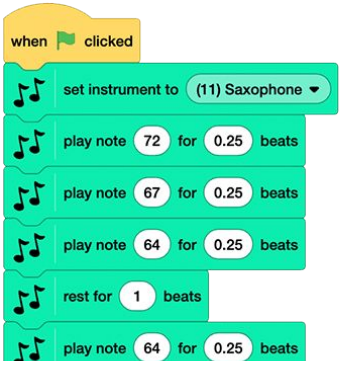
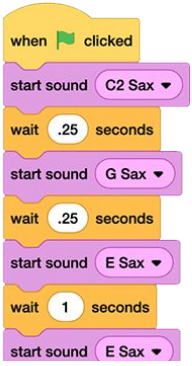
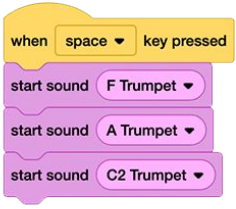
Here is an example of two different ways to create a melody. How to choose? Explore which instruments are available in the sound library vs the music blocks. Think about how much control you need over the beat.

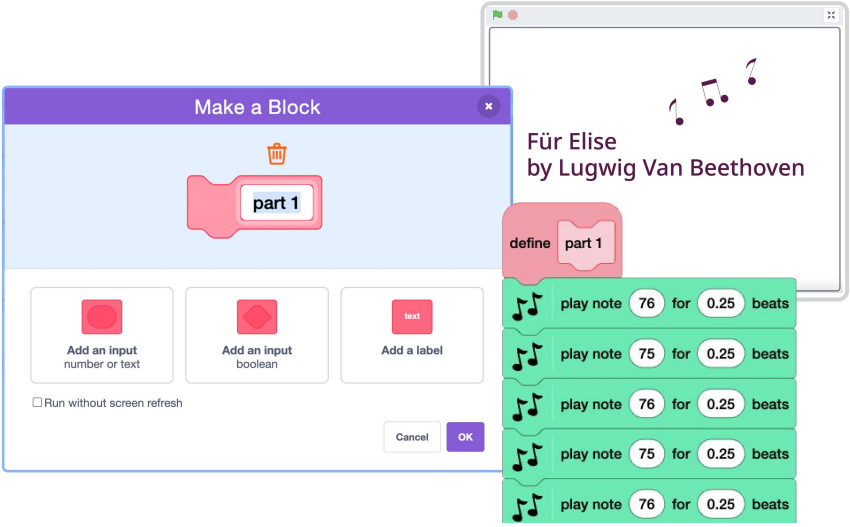




Are you creating chords/layering sounds or notes to play at the same time? Here is an example of two different ways.



My Block: Music



- You can use music blocks from the Music extension to create a song in Scratch.
- Rather than write the same sequence of notes over and over when they repeat in your song, you can place those notes in a My Block and simply call that block each time you need it, for instance each time a chorus is called.

My Block: Music

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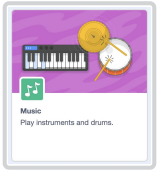
GET READY

Choose any sprite.

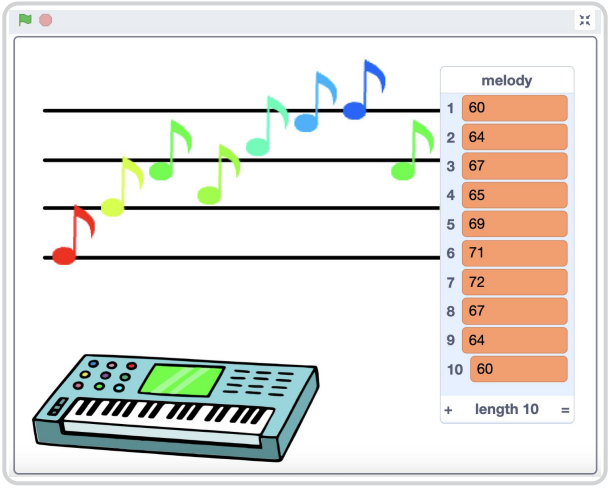
Add Music extension.



ADD CODE

1. Compose the sections of your song. Create multiple My Blocks for different parts (such as verse and chorus).
2. My Blocks can also be placed within other My Blocks to further simplify the code.
3. Use My Blocks in the main program, along with repeat blocks (if applicable) to compose a whole song. Set the instrument and the tempo.

Musical List



- You can use a predefined list to determine animation.
- Try creating a melody project, storing song notes in a list that creates a musical score that can be played.
- As a bonus, you can use the Pen extension to stamp notes on a scale and produce a visual representation of your musical score.

Musical List

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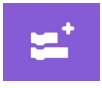
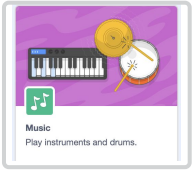
GET READY



Add the Music extension.

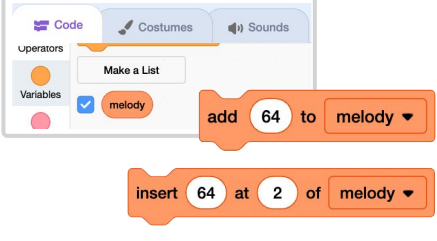


Choose any sprite.

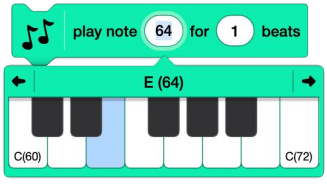
Keyboard

ADD CODE

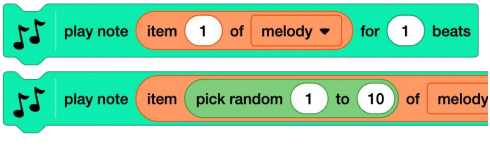
1. Create a list. Add song notes to the list via the stage monitor (add rows manually and type note numbers in) or by using the “add to [list]” block.



   You can find note numbers by clicking on the input of the “play note” music block.

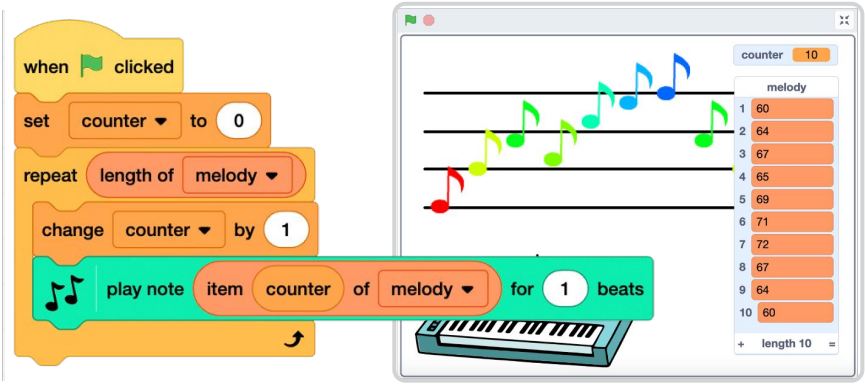


2. Write a script to play each note on the list by item number, or let the program pick the note to play randomly.



See the next card to learn how to create a “counter” variable to automate moving/repeating through the list in order.

Generate a Melody: Repeat through a List



- While there is no “next item of list” block, you can create a script that loops through the items of a list in order.

  The ability to automate moving or repeating through a list can speed up your coding process and make editing scripts quicker.

- This can be useful if you want to add items of a list together, speak or say items in a list, etc.

Generate a Melody

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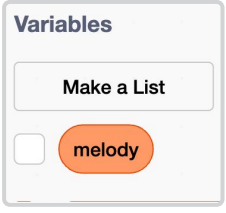
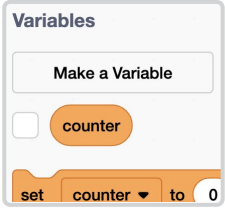
GET READY

Create a list.



Create a variable.

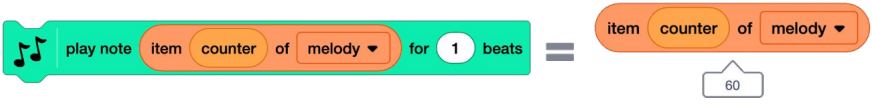


ADD CODE

Step through the code on the card front to see what it does:

1. Changes the “counter” variable (that stores a number to represent an item number on the list) by one.

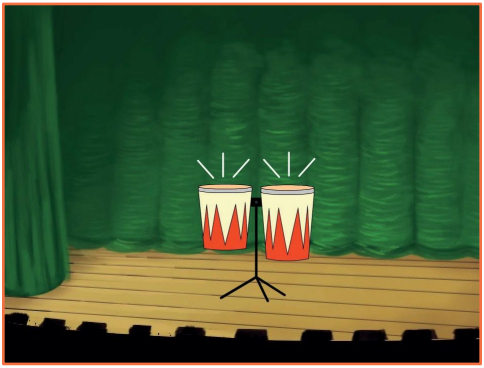
2. Plays the note number associated with that item number (the number entered on that line of the list). Note: This is why it is important to first set “counter” to zero first each time the program runs.



3. Repeat as many times as there are rows in the list/for the length of the list.

Animate a Drum

Switch between costumes to animate.



Animate a Drum

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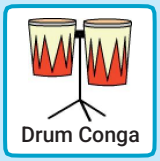
GET READY

Choose a drum.

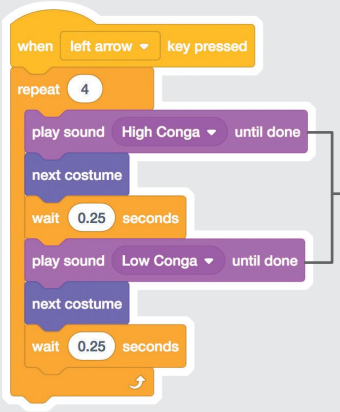


Costumes

Click the **Costumes** tab to see the costumes.
You can use the paint tools to change colors.

ADD THIS CODE

Code Click the **Code** tab.



Choose a sound from the menu.

TRY IT

Press the **left arrow** key on your keyboard.

Surprise Song

Play a random sound from a list of sounds.

Surprise Song

scratch.mit.edu

GET READY

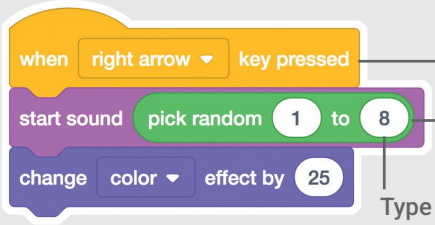
Choose and instrument, like Guitar.

Sounds

Click the **sounds** tab to see how many sounds are in your instrument.

ADD THIS CODE

Code Click the **Code** tab.



Choose **right arrow** .

Insert a **pick random** block.

Type the number of sounds in your instrument.

TRY IT

Press the **right arrow** key.

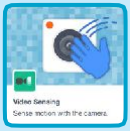
Play the Drums

Interact with sprites that play sounds.

Play the Drums

scratch.mit.edu

GET READY

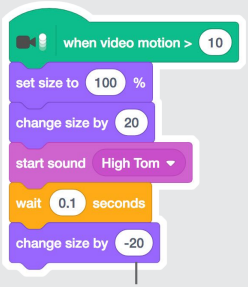


Click the **Extensions** button, then choose **Video Sensing** .

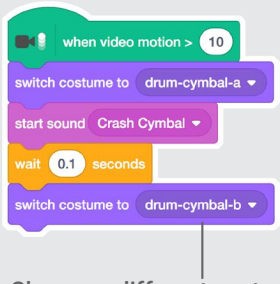
Choose two sprites, like Drum and Drum-cymbal.

ADD THIS CODE

Click on a drum to select it, then add its code.



Type a minus sign to get smaller.



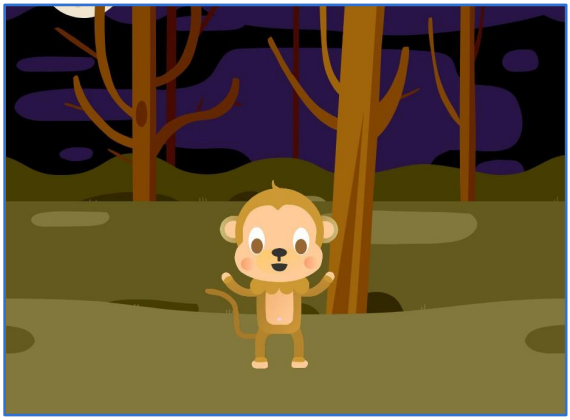
Choose a different costume.

TRY IT

Use your hands to play the drums!

Squeak

Make a sound when you shake the micro:bit.



Squeak

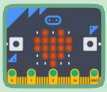
scratch.mit.edu/microbit

GET READY

Choose a sprite, like Monkey.

ADD THIS CODE

TRY IT



Shake the micro:bit to start.

Click the stop sign to reset the pitch.

TIP

You can click the **Sounds** tab to view your character's sounds.

Click this button to add a sound from the Sound library.