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# Hands On Coding Activity:

# Scratch Software



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## INSTRUCTIONS



# Introduction

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Have you ever wondered just what makes those apps and computer games run? Computers, games, and apps are run by programs. Programs are written by computer programmers who have gone to school to learn how to write in code. Code is just a set of instructions that tells the computer what to do. Computers follow those instructions to complete the task. Code can be simple or complicated, depending on what task the computer is going to complete.

There are many different languages that computer programmers use to write code. Programmers need to know how to write using the coding language, and they also need to be careful to write each line of code exactly. One small coding error can prevent the program from running correctly.

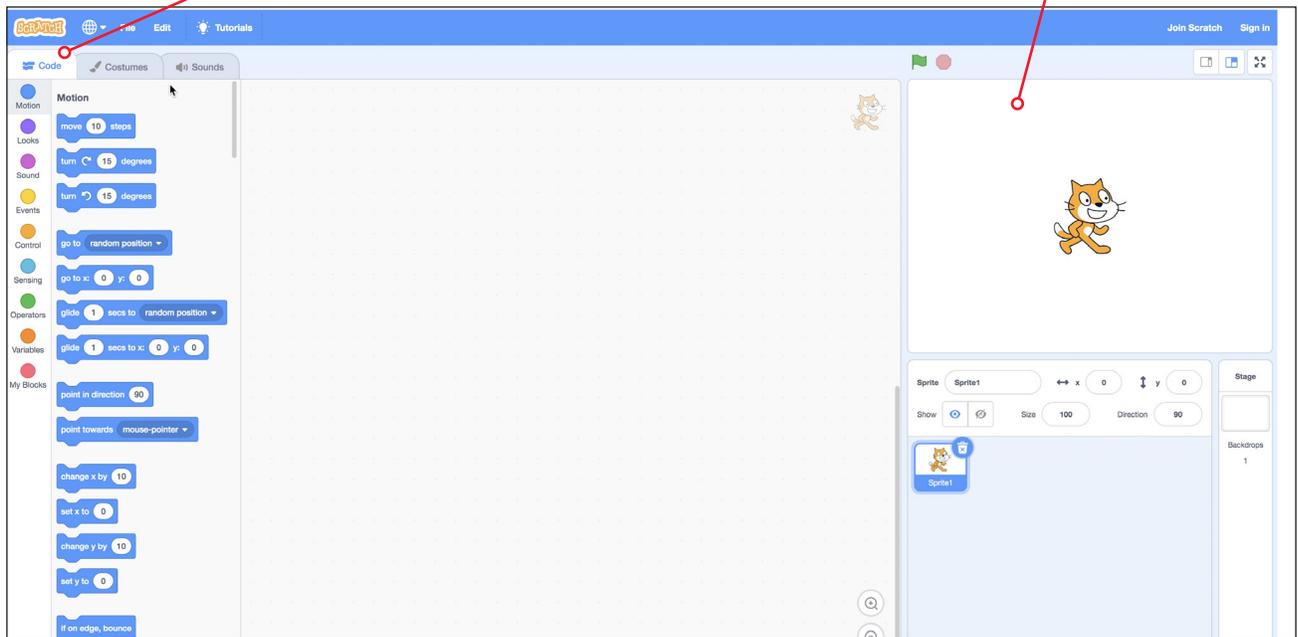
That's why block-based programming is so useful. With block-based programming, the computer programmer strings together blocks of pre-written code to create a program. The programmer can choose the right block to complete the action. Block-based programming is a great way to learn and practice coding because it can prevent new programmers from making mistakes.

## Practice Activity

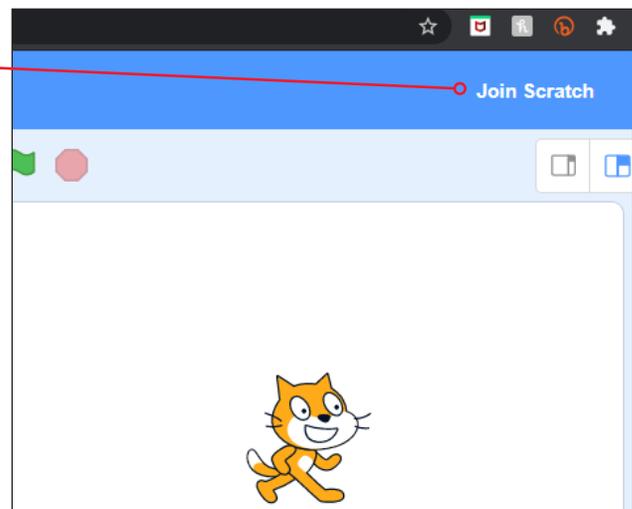
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You can practice a coding activity using Scratch, a free computer program developed by the Massachusetts Institute of Technology (MIT) that uses block-based programming. Follow the steps below to take a tour of Scratch and to create your first program.

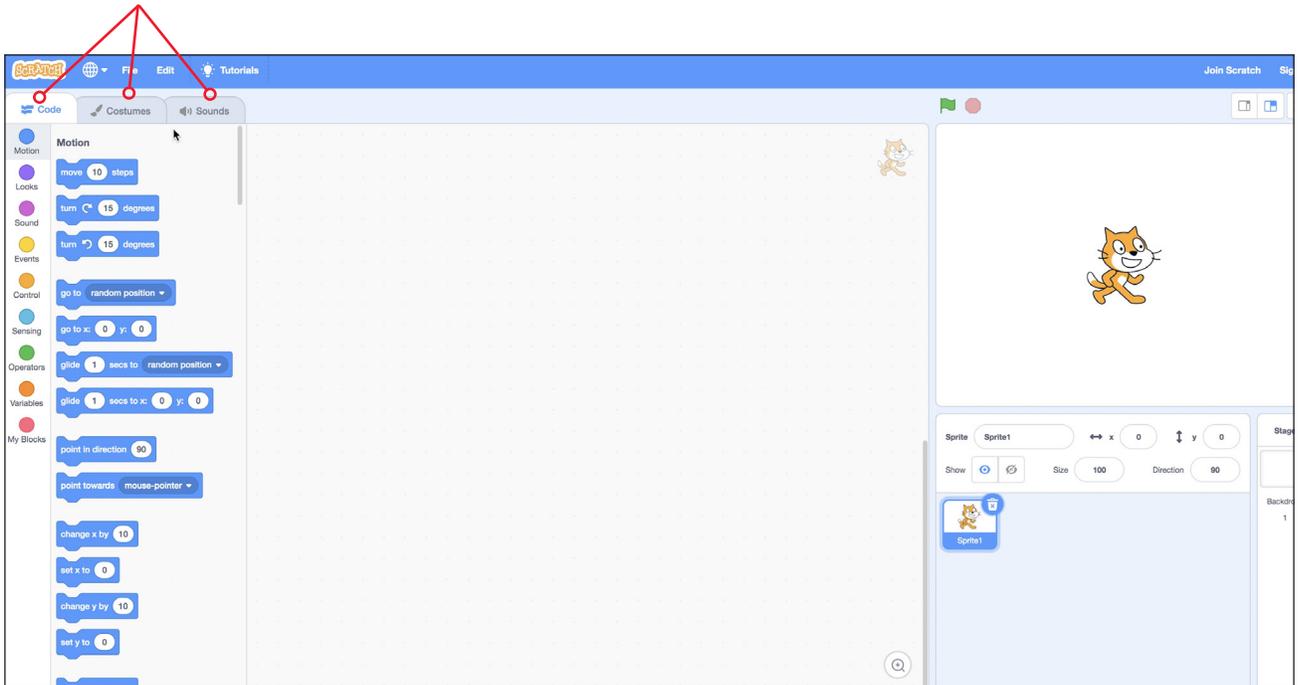
1 Go to <https://scratch.mit.edu/projects/editor/?tutorial=getStarted> to open a new Scratch project.



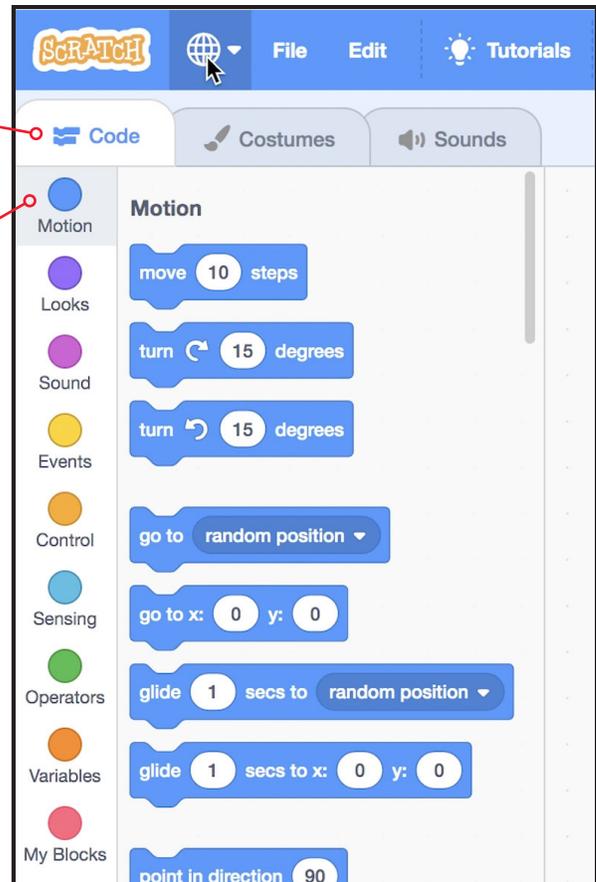
2 Next click on **Join Scratch** to create an account. If you already have an account, log in.



- 3 This is the Scratch interface. On the left-hand side of your screen, you can see three tabs: **Code**, **Costumes**, and **Sounds**.

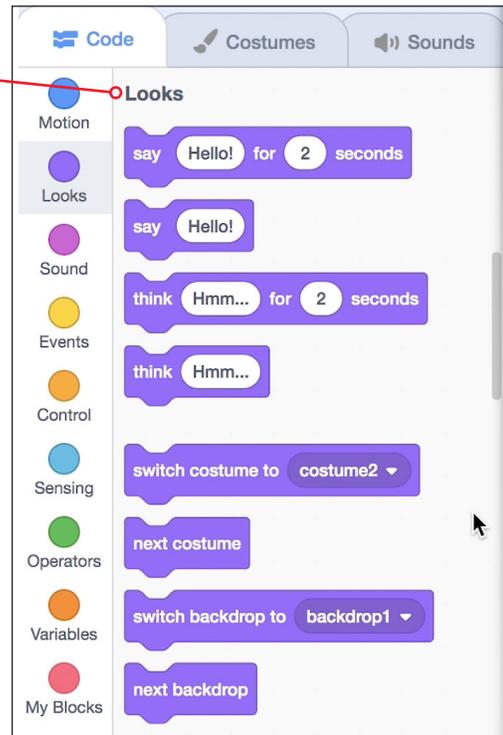


- 4 Click on the **Code** tab. Do you see the column of colored dots? Each of these dots represents a different category of code. What blocks are found in the blue category? That's right. **Motion**. You can use these blocks to program motion.



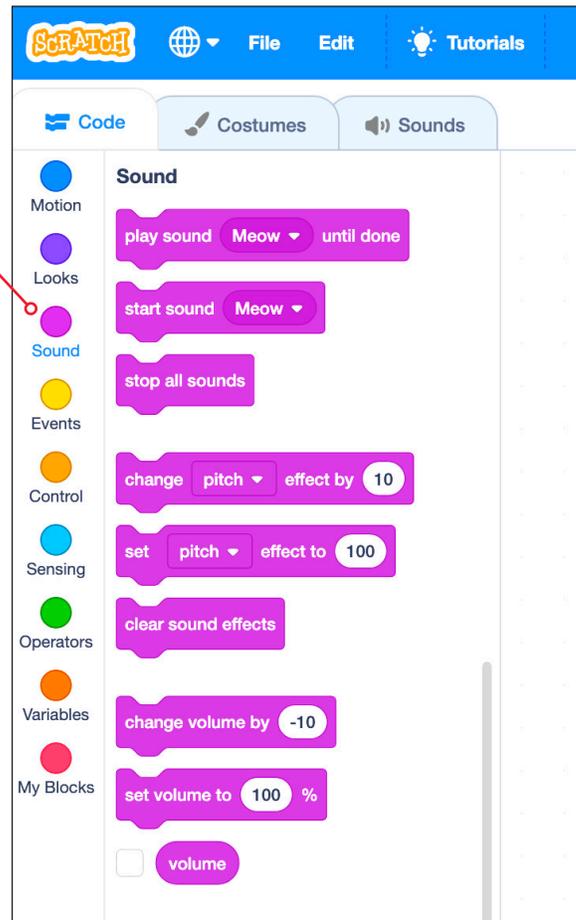
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Now click on the **Looks** category. These blocks program what you see on the screen.

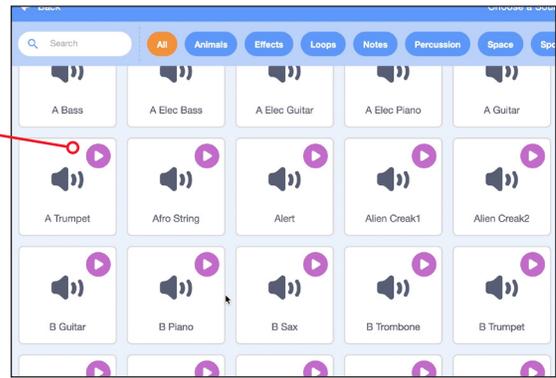


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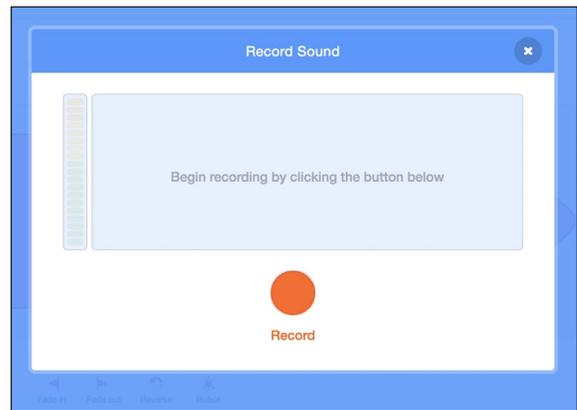
Next look at the pink codes for **Sound**. You have many different choices when it comes to adding sound to your program. You can search the sound library by holding your mouse over **Choose a Sound**.



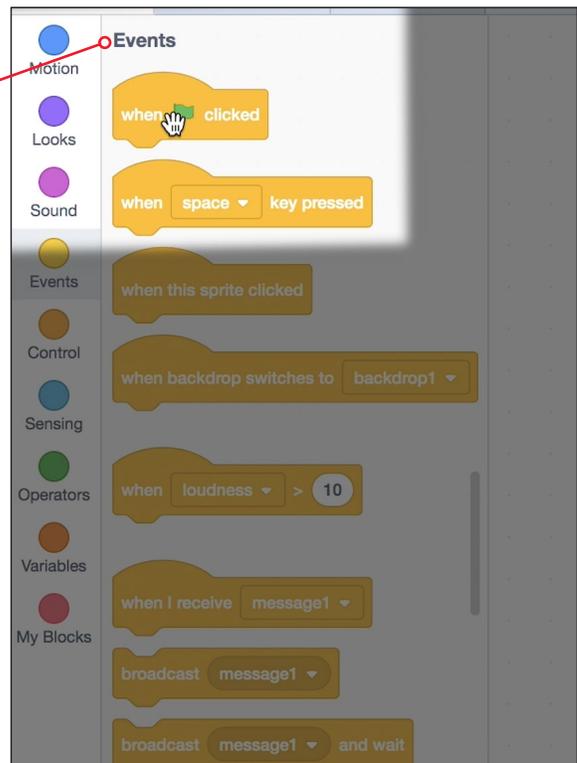
7 Look at all of the options in the sound library. Press the purple arrows to hear the sounds.



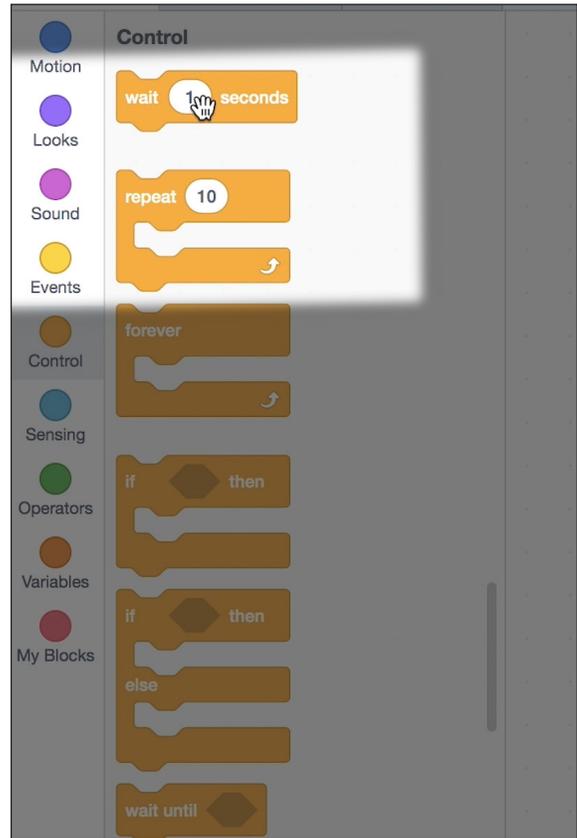
8 You can upload a sound from your computer. You can even record your own sound!



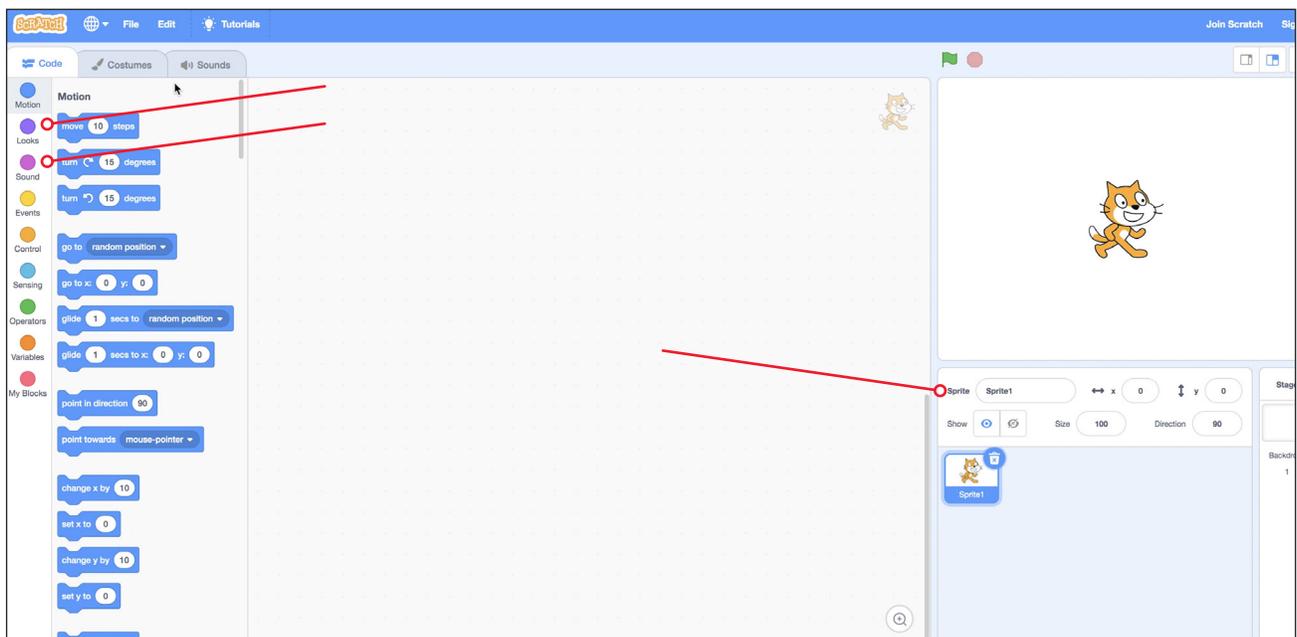
9 Every computer program has to start somewhere. You will start your program by coding with one of the **Events** blocks. Can you find the block that tells the computer to perform an event when the green flag is clicked?



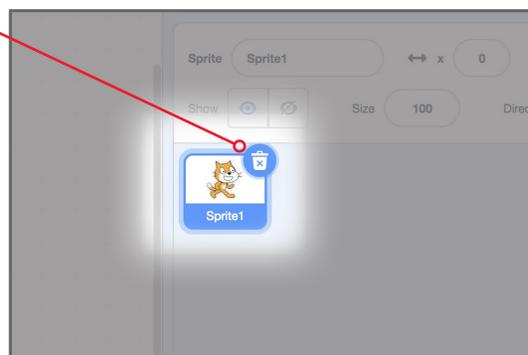
10 Let's check out the orange **Control** codes. You can use these blocks to write your code. You can add a pause or make an action repeat.



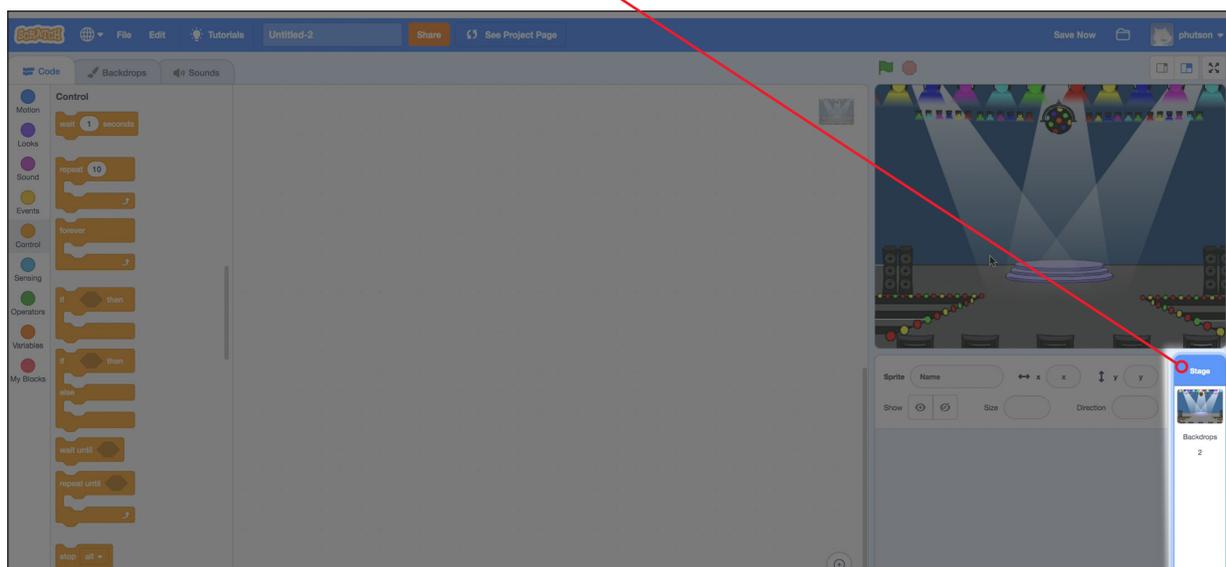
11 Let's practice as you take a look around the Scratch Project Dashboard.



12 This is where you can choose your Sprite, or your character. The first thing we want to do is delete the cat. There's no cat in our musical program. To delete the cat, just click on the X on the top right of the Sprite. .



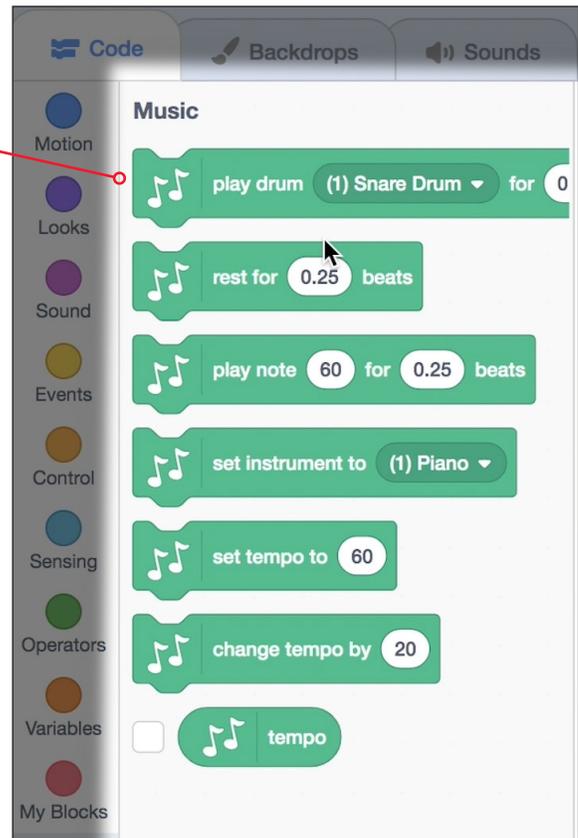
13 This is where you can choose your different backgrounds. Let's get ready to make music by choosing our background, or stage. Click on this box...



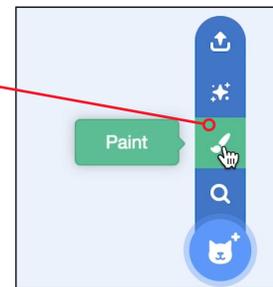
14 Since you want to write the code to make music, you've got to add the Music extension. This will give you a special musical extension, so you can program a song. To add the extension, click on this button from the **Code** tab and click on **Music**.



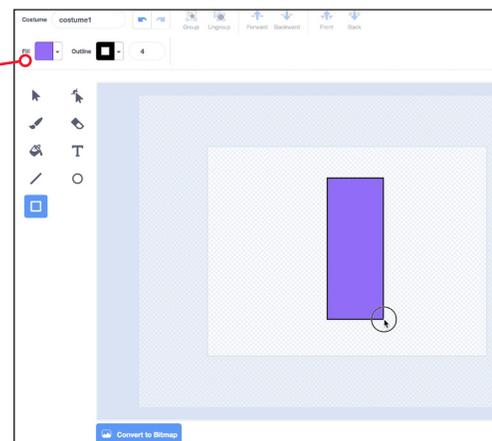
15 These blocks will help you with your musical program.



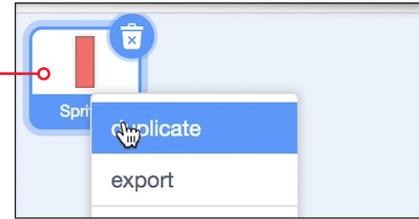
16 Click the button to add a **Sprite** and choose **Paint**.



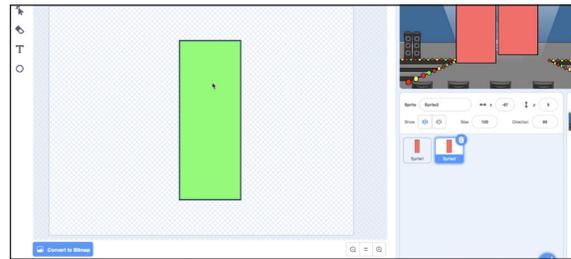
17 Draw a piano key by making a rectangle. Use the **Fill** button to decide what color you want to make your key.



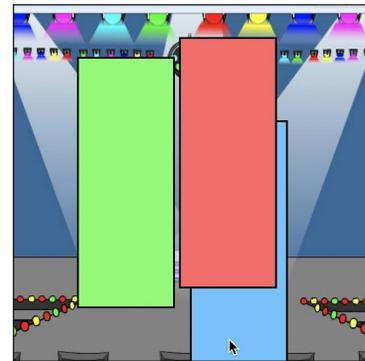
- 18 Make two more keys for your piano by right-clicking your mouse over the first **Sprite** and highlighting duplicate.



- 19 Then open your new **Sprite** and change the color. Follow those steps one more time to create your third key, and you are ready to code your keys.



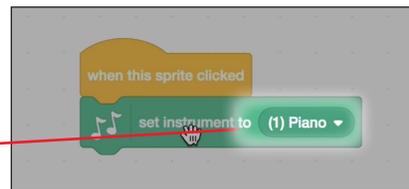
- 20 Don't worry if your keys aren't in the right place yet. You may need to click on them and drag them to where you want them on your stage.



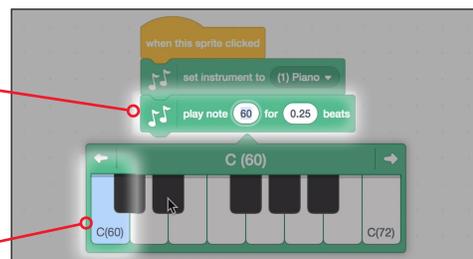
- 20 Click on your first **Sprite**. Under your **Code** tab, click on **Events**. Choose the **When This Sprite Clicked** block and just drag it over into the center of your dashboard.



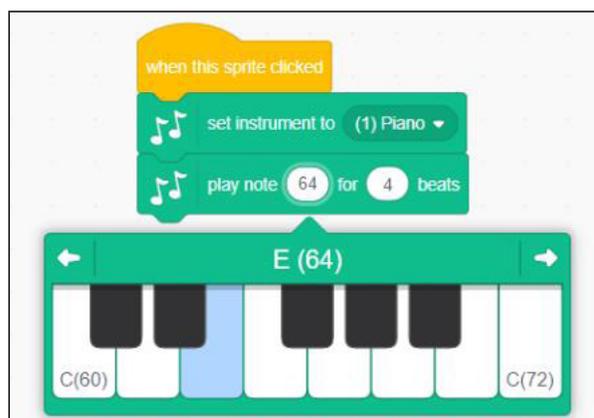
**21** Now go back to your **Code** tab and click on **Music**. Drag the **Set Instrument To** block and connect it to your **Event** block. Use the drop down menu to select **Piano**.



**22** Find the **play note** block and drag that beneath your other two blocks. You want to make each of your keys a different note. When you click in the box for the numbers, a keyboard opens up. Chose a note. I'm choosing 60, which is middle "C" on the piano.



**23** Click the **Sprite** and listen for the sound. Next, click on **Sprite 2** and follow the same steps. Starting with your **Event** block, add your instrument and your note blocks. You will use the same code blocks to write the same program for each **Sprite**.

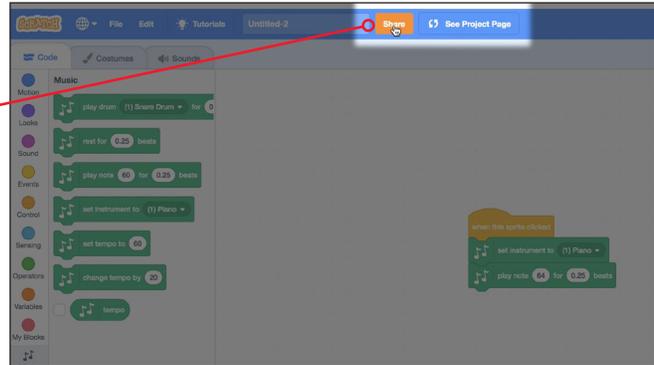


**24** Once you have written code for each **Sprite**, click on each of the keys to hear your music. Can you play a tune?

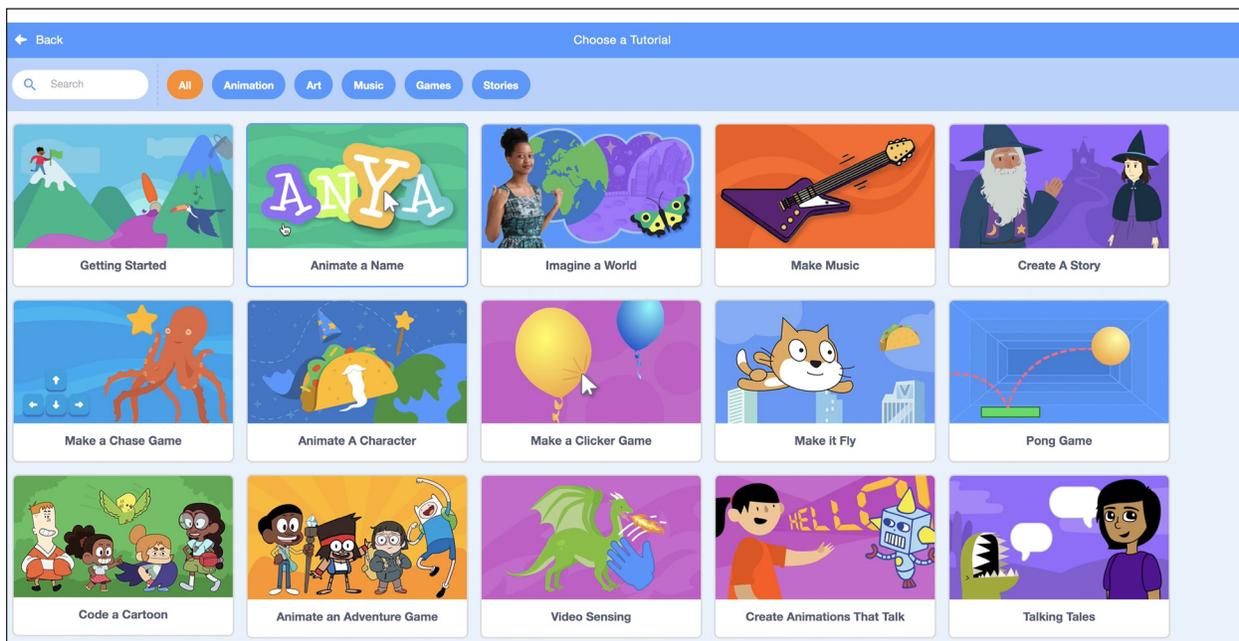


## Way to go, Coder! You've got the hang of this now!

25 But wait...there's one more thing! If you want to share your piano with other kids, you can! Just click the **Share** button. Other coders can remix your piano and make their own creations. If you do share, be sure to use the name GTD Piano. Do not use your real first and last names.



26 Now that you've gotten started, what else can you code with Scratch? If you need help, the **Tutorials** section is where you can find lots of helpful hints and tips just in case you get stuck.



# Practice Activity

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For more practice coding with Scratch, try these ideas.

- Use the **Move** blocks to animate your name.
- Add more keys to your piano and write a song.
- Design and create your own avatar, and record a new sound.
- Click Explore and choose someone else's project to remix. How can you build on another Scratcher's ideas?
- Create a three-scene story. Add dialogue between two or more Sprites.

## Parent Tips

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Your child is learning how to use block-based programming to create her own computer program in Scratch, a computer program developed by the Massachusetts Institute of Technology (MIT) to help students learn valuable programming skills. Block-based programming is a great way for new coders to get started learning how to write simple programs. It's especially important to encourage girls to open their eyes to the possibilities of computer programming; one day all careers will require some programming skills! Support your child by asking her to share her project with you, and try one or more of the ideas below:

- Practice programming by asking your child to write simple instructions for you to follow. For example, ask her to "code" how to make a bed or set the table. Then switch roles. Did your computer program run well?
- Research careers that require knowledge of coding. What types of jobs or careers can you explore together? Ask your child to identify how computer programming plays a role in many different career fields.
- Talk about how we all rely on computer programs. What are some ways that we use programs without even thinking about it?
- Explore Scratch with your child. What types of programs can you create together?