

Edison's musical talents

Teacher's notes



The *Edison's musical talents* lesson set by Emma Grace, Kat Kennewell and [Jin Peng](#) is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#).

Contents

About this lesson and guide	3
Lesson overview	4
Before you start	6
Part 1: What is an Edison robot?.....	8
Part 2: How do you use EdScratch with Edison?	8
Part 3: Play a tune	9
Part 4: Move to the music	10
Part 5: Dance along	11
Part 6: Challenge: You are the conductor	11

About this lesson and guide

This guide offers teachers and instructors overview information, facilitation recommendations and other supporting information for the *Edison's musical talents* lesson available at [Edison's musical talents](#).

Do you need to read this whole guide to run the lesson? **Absolutely not!**

Once the robots and programming devices are set up, you can start learning along with your students! The student sheets for this lesson have been designed to allow students to work through the different parts of the lesson independently, learning about the Edison robot, how to use the EdScratch programming environment, and the key computer science learning objectives of the lesson. This guide simply offers further information for teachers and instructors to help make using this lesson easy and fun.

Each part of the lesson is included in this guide along with any relevant supporting information for that part. Supporting information is divided into the following sections:

Overview

General information about the section and key learning objectives covered.

Delivery recommendations

Suggestions for how you can cover the lesson section if you want to run the lesson in a more facilitator-led capacity.

Tips and tricks

Helpful hints and ways to overcome common issues students may encounter.

Creative Commons licence attribution details

The *Edison's musical talents* lesson set is comprised of the student sheets and this guide. This set is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#).

Developed and written by: Kat Kennewell and Emma Grace

Illustrations by: Jin Peng and Emma Grace

The *Edison's musical talents* lesson set was developed using resources from the [EdScratch Lesson Plans Set](#).

Lesson overview

Simple musical tunes are a great example of sequence in action. Using Edison and the [Scratch-based programming language EdScratch](#), students can create music and tie together sequence and inputs-outputs into enjoyable programs.

This activity is designed to mix the familiar with the unknown. By having students experiment using new blocks without explicit instructions or detailed explanations, they apply computational thinking practices and develop problem-solving mindsets.

The final task in this activity includes a semi open-ended programming challenge. This is a great opportunity for students to experience the creative side of coding.

Grade levels	Difficulty	Duration
Year 5+	Advanced	60 minutes

Prerequisite knowledge

To be successful with this activity, it is recommended that students:

- Have used block-based coding applications
- Understand sequence and sequential programming
- Understand definite loops ('for' loops)
- Have an understanding of basic music knowledge

Computer science and computational thinking topics covered

- Sequence
- Code tracing
- Inputs-outputs

Tie-ins to other subjects

- Music

Supplies you need

- Full set of Edison robots¹ and EdComm programming cables
- Full set of prepared programming devices (computers or tablets) (Please see [‘Setting up your programming devices for EdScratch’](#) in this guide.)
- 4x AAA batteries per robot, regular disposable-alkaline or NiMH rechargeable batteries are recommended (For more information on batteries, please see [‘Get Edison ready’](#) in this guide).
- Print-outs or digital copies of the student sheets

¹This activity assumes Version 2.0 Edison robots. If you have Version 1 Edison robots, you will need to adjust the activity to have the robot turn using seconds as the input parameter rather than degrees. Learn more at <https://meetiedison.com/meet-edscratch-edison-robots-scratch-language/#V1-EdScratch>

Some great advice from the Hour of Code team

It's okay not to know! Respond to student questions and struggles with phrases like:

- "I don't know. Let's figure this out together."
- "Technology doesn't always work out the way we want."
- "Learning to program is like learning a new language; you won't be fluent right away."

And don't forget to have fun! (^_^)

Before you start

Before using Edison with your students, you will need to set up the programming devices, (i.e. the computers or tablets) you will be using with the EdScratch app and get the Edison robots ready.

Additional details can be found in the free *Getting started with Edison guide* available at <https://meet Edison.com/content/Get-started-with-Edison-guide-English.pdf>

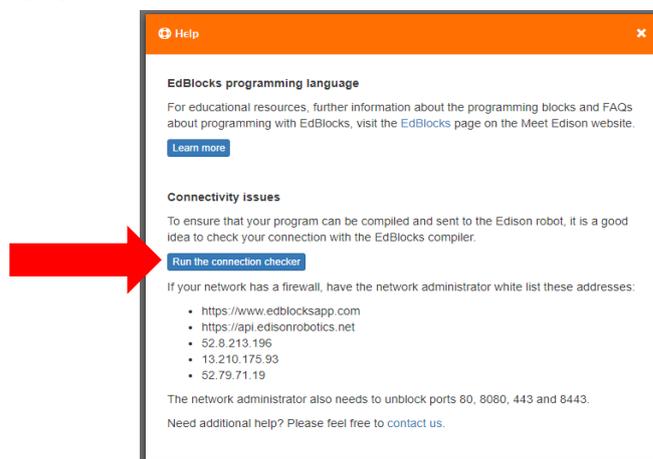
Setting up your programming devices for EdScratch

Depending on the type of programming devices you are using, there are a few things you will need to do to prepare them to be able to work with the EdScratch app.

If you are using computers running Windows operating systems, you will need to disable sound enhancements. Please go to <https://meet Edison.com/edison-robot-support/trouble-shooting/#soundenhancements> to find step-by-step video guides showing you how to disable sound enhancements for standard Windows sound enhancements as well as the most common third-party software programs.

To be able to program Edison, most devices will need the volume turned up to maximum or 100%. As many devices have built-in safety settings that reduce the volume when an audio device is connected using the headphone jack, it is also important to double check that your volume is turned all the way up after plugging in the EdComm programming cable to your device.

You also need to check that the EdScratch app can access the compiler (which is what converts the EdScratch programs into a format that can be sent to the Edison robot) on the devices you will be using. Inside the EdScratch app at www.edscratchapp.com, open 'Menu' in the upper left-hand corner and select 'Help'. This will open a pop-up which includes a button to 'run the connection checker':



Click this button to check your connection and follow the steps provided.

Additional details specific to different types of devices (Windows, Macs and tablets) can be found in the free *Getting started with Edison guide* available at <https://meet Edison.com/content/Get-started-with-Edison-guide-English.pdf>

Get Edison ready

To get Edison ready for use, you need to:

1. Open the battery compartment at the back of Edison and remove the EdComm programming cable.
2. Insert 4 'AAA' batteries. Please refer to the picture to ensure that the batteries are inserted correctly. Be sure to reclose the battery case by clipping the battery cover back on.

Please note: Low or flat batteries can cause a range of issues with Edison. For this reason, please be sure always to use fresh, fully charged batteries in your robots.

Choosing batteries: If using disposable batteries with Edison, only ever use alkaline batteries.

(These are the most common standard AAA batteries you will find in just about any shop.) If you are using rechargeable batteries with Edison, only use nickel metal hydride (NiMH) rechargeable batteries. Never use lithium rechargeable, heavy-duty disposable, super heavy-duty disposable or carbon zinc batteries.

3. To turn Edison on, flip the robot over. Slide the power switch to the 'on' position, as shown in the picture. This will turn Edison on, and the red LED lights will start flashing.



Ensure the batteries are in the right way.



Push the switch towards the 'on' symbol.

Please note: While Edison will turn off automatically if not used after five minutes, we recommend you turn the robots off manually when not in use.

Part 1: What is an Edison robot?

Overview

New to Edison robots? Spend just a few minutes to ‘meet’ the Edison robot and learn about the robot’s key features.

Delivery recommendations

- Recommended time: 5 minutes
- *Already familiar with Edison and EdScratch? Have students start at part 3 instead!*

Tips and tricks

- Have the time to do more than just 1 hour of coding? Using Edison’s various sensors in programs can really bring robotics to life. Choose one of Edison’s sensors and run another lesson using that sensor from the free [EdScratch Lesson Plans Set](#).

Part 2: How do you use EdScratch with Edison?

Overview

This part of the lesson draws attention to the hardware-software connection that exists in all computer systems, then introduces the online application EdScratch to students, including the names of the main areas inside the programming environment. Students will practice downloading a program from EdScratch to their Edison in the next section, so it is important that they are familiar with the user interface in this section.

Delivery recommendations

- Recommended time: 5 minutes
- *Already familiar with Edison and EdScratch? Have students start at part 3 instead!*

Tips and tricks

- Some devices, especially tablets, automatically lower the volume when they detect that an audio device, such as headphones, has been connected to the audio jack. The programming device may read the EdComm cable as ‘headphones’. Make sure the volume on the computer or tablet is still turned all the way up after the EdComm cable is plugged in.
- While a program is downloading to Edison, Edison makes a whirring sound, similar to an old dial-up modem. Once the program downloads successfully, Edison will make a chirping beep. If the program fails while downloading,

Edison will make a 'fail sound'. You can hear what the success and fail noises sound like at <https://meetedison.com/edison-robot-support/trouble-shooting>

- Make sure students do not unplug the EdComm cable until after they hear the 'success' sound.
- When many students are downloading programs at the same time, you may experience slower internet speeds, causing the program to take longer to create the 'Program Edison' button in the pop-up box and for the program to download to Edison. Remind students to listen for the success sound before unplugging the EdComm cable to ensure they wait until the program fully downloads.

Part 3: Play a tune

Overview

Students are introduced to the EdScratch **Sound** category and replicate a written program to download to their Edison robot.

Delivery recommendations

- Recommended delivery time: 10 minutes

Tips and tricks

- The song used in part 3 is *Mary Had a Little Lamb*. Use this share-code to access a program with more of the song:
<https://www.edscratchapp.com?share=Eb12x3Dm>
- The third input parameter in the 'music note' block has three choices: (-), sharp, flat. The default (-) input means to play a normal note, not a sharp or flat.
- The 'tempo' block sets the tempo to be played. Only blocks which come after a 'tempo' block will be affected.
- Edison's default tempo is 'medium'. If no 'set music tempo to' block is used, the robot will play notes at the default tempo.

Answer key

Question	Type	Answer/Sample answer	Marking notes
1	SE	<i>Very fast</i>	
2	SE	<i>It made the song play a lot quicker compared to the original with the 'medium' input parameter.</i>	
3	SE	<i>The 'set tempo' block sets the speed or tempo of the music.</i>	Students should identify that the block

			sets the tempo of the music.
4	EA	<i>If the 'set tempo' block is at the end, it won't do anything. This is because Edison looks at the blocks one by one and does them in the order. If there are no music blocks after the tempo block, then the tempo block has no effect.</i>	Ideally, students will identify that sequential programming means things only go into effect in order. Consider having students try using the tempo blocks in different places in the program to test and reinforce this concept.

Part 4: Move to the music

Overview

Students replicate a written program to download to their Edison robot which incorporates 'dance' in the form of Edison moving forwards and backwards.

Delivery recommendations

- Recommended delivery time: 20 minutes

Tips and tricks

- Use this share-code to access a program with more of *The Hokey-Pokey* song: <https://www.edscratchapp.com?share=v0wMx5D5>
NB: This version of the song uses loops.
 - You may want to wait to use this program until after students have studied repeating loops.
 - Repeat loops cannot be used inside 'play music in background' blocks. To use the longer version of the song in the background, duplicate the blocks inside the loop and add them into the program in sequential order instead.

Answer key

Question	Type	Answer/Sample answer	Marking notes
1	EA	<i>No, it played the music and then moved. I think this is because the blocks are in order with all the music first and then the drive blocks.</i>	Student answers should note that the robot doesn't move until after the music plays and identify sequence as the reason.

Part 5: Dance along

Overview

Students expand on the previous dance program by adding more lines of code to get their robot to 'dance' along to the music.

Delivery recommendations

- Recommended delivery time: 10 minutes

Answer key

Students should describe blocks that would have the robot move (Drive forwards, drive backwards, turn left, turn right, etc).

Part 6: Challenge: You are the conductor

Overview

This free-form activity asks students to bring their favourite tune to life by programming it in EdScratch for Edison to play. Music is a great way for kids to express themselves and their interests, and this activity lets them marry that enthusiasm with programming, helping showcase the arts in STEAM (science, technology, engineering, arts and maths).

Delivery recommendations

- Recommended delivery time: 20 minutes

Tips and tricks

- Having students search online for their favourite music opens up opportunities to discuss safe search habits, copyright and attribution, and many other digital citizenship topics.
- Students with musical talent can choose to write their own original song to program instead of using an existing song.