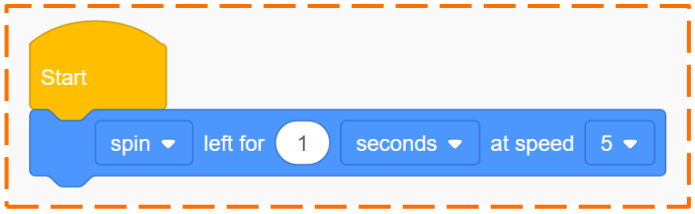
Lesson 11: Let's explore Edison's motors

Edison robots have two motors: one on the left side and one on the right side. Outputs using these motors are one of your Edison robot's three main types of outputs. In EdScratch, the blocks related to motor outputs are in the Drive category.

When you write a program for Edison using blocks from the Drive category in EdScratch, you are telling the motors what to do. Most of the blocks control both of Edison's motors. Does that mean that both the motors do the same thing?

Task 1: Spin that robot

If you wanted to write code to tell your robot to 'spin left' you can make a simple one-block program like this:



The input parameters in that block tell Edison the direction, the distance, the distance units and the speed you want the robot to use in the program.

The direction input parameter that has been selected is spin, which means the whole direction input is spin left. What is that input telling Edison's motors to output?

In EdScratch, write the program using the same input parameters as the one in the picture. Download the program and run it with Edison on the desk or floor.

Now run the program again, but this time hold Edison in your hands. Feel how the wheels are moving. What do you notice?

1. Which direction is the left wheel moving?

   _____

2. Which direction in the right wheel moving?

   _____

Edison's motors don't have to both do the same thing at the same time. Does that mean you could write a program moving just one of the motors? Can you write a program that tells each motor what to do separately?

Open the EdScratch app and look at the Drive category in the block pallet. Look at the different blocks and see if you can discover blocks you could use if you only wanted an output from one of Edison's motors.

3. Which blocks do you think only use one of Edison's motors? Why do you think that?

4. You can use Edison to build and invent lots of different things. Imagine you need to create something using Edison which only uses one of Edison's motors. What could you build? How would your creation use the one motor?

Don't forget

The wheels of your Edison robot can be removed from the powered sockets they sit in. These sockets are what Edison's motors actually move.

Task 2: Direction = forward

To get Edison to work the way you want, you have to make sure you give the robot all the information it needs. If the robot doesn't have all the inputs and instructions it needs, the program probably won't work the way you want. This kind of logical error can be frustrating, especially if you think you have given the robot all the information necessary.

One of the main ways you give information to the robot using EdScratch is through input parameters.

Don't forget

Each input parameter in a block gives a different piece of information to Edison that the robot will need to be able to run that command. Input parameters are sort of like the answers to questions the robot has about what you are asking it to do.

In EdScratch, some blocks get all the information they need from their own input parameters. Other blocks get information from inside their block, but also need information from somewhere else in the program as well.

Let's make a program for Edison to get the robot to move its motors. For this program to work, there are four questions you need to make sure your program answers:

Question 1: What direction do you want the robot to go?

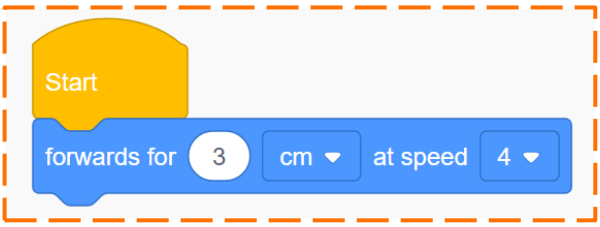
Question 2: How far do you want the robot to go?

Question 3: What units are you using to measure distance?

Question 4: How fast do you want the robot to go?

Your program needs to give the robot an answer to all of those questions.

Look at this program:



If you ran this program in an Edison robot, would the robot have all the information it needed to know what to do? In other words, does this program tell the robot the direction, distance, distance units and speed to move the motors?

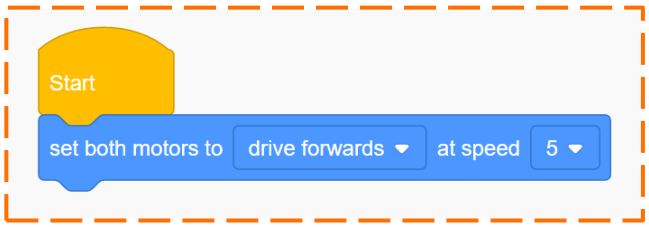
5. Fill in this chart. If the information is in the program, write the value of that input in the 'value' column. For example, the value of 'distance' is the answer to the question, 'how far is this program telling the robot to go?'

Information	In the program?	Value
Direction		
Distance		
Distance units		
Speed		

Write the program in EdScratch, download it and run it in your robot.

6. What did the robot do when you ran the program?

Now look at this next program:



Does this program give the robot all the information it needs?

7. Fill in this chart. If the information is in the program, write the value of that input.

Information	In the program?	Value
Direction		
Distance		
Distance units		
Speed		

Write the program in EdScratch, download it and run it in your robot.

8. What did the robot do when you ran the program? Why did it behave that way?

How can you give the robot the rest of the information it needs so that the robot moves its motors? Experiment in EdScratch to see if you can write a program that uses the set both motors block but no other blocks from the Drive category and gets the robot to move forward.

Hint!

Don't give up! Experimenting, testing and problem solving is how you learn new things in coding.

Feeling stuck? Think about what it is you are trying to do a different way. Look at different blocks in EdScratch and ask yourself, 'if I use this block, will it fix the problem I am trying to solve?'

If you aren't sure, try it and see what happens! Be sure to check the bug box for hints too!

9. What did you try? Did it work? Write what you did, what worked, what didn't work and how experimenting made you feel.

BONUS Challenge: Spinning garden

Edison's two motors each control a powered socket, one on the right side of the robot and one on the left. When you want the robot to drive, you attach wheels to the powered sockets using the wheels' axles. The motors turn the axles, which turns the wheels and allows Edison to drive.

How else can the powered sockets be used?

If you turn an Edison robot on its side, you won't be able to drive it like a car. Instead, you can use the robot to be the powered base for an invention!

What could you attach into the powered socket instead of a wheel? What will happen when the motor is turned on?

Don't forget

The wheels of your Edison robot can be removed from the powered sockets they sit in. These sockets are what Edison's motors actually move.

What to do

In this project, you need to use your Edison robots to help create a spinning garden. Work in a group to design a garden that uses Edison robots as the bases for plants, flowers, bees, birds or whatever else you would like to have in your spinning garden.

You can take the wheels off of the robots and use a different axle inside the powered socket or build using a wheel as a base. Each robot needs to have something created and attached to it which can spin in the garden.

Each robot will need to be programmed using EdScratch. Write and test your programs for each robot. You may need to make adjustments to your program depending on the type of object you are using and how you attach that object to the powered sockets of each robot.

Hint!

The set right motor and set left motor blocks are very helpful if you only want one motor to move. Don't forget you need another block, like a wait block, in the program to set the duration for the set motor blocks.

BONUS Challenge: Spinning solar system

Edison's two motors each control a powered socket, one on the right side of the robot and one on the left. When you want the robot to drive, you attach wheels to the powered sockets using the wheels' axles. The motors turn the axles, which turns the wheels and allows Edison to drive.

How else can the powered sockets be used?

If you turn an Edison robot on its side, you won't be able to drive it like a car. Instead, you can use the robot to be the powered base for an invention!

What could you attach into the powered socket instead of a wheel? What will happen when the motor is turned on?

Don't forget

The wheels of your Edison robot can be removed from the powered sockets they sit in. These sockets are what Edison's motors actually move.

What to do

In this project, you need to use your Edison robots to help create a model of the solar system where the planets can spin. Work in a group to build your model. Decide how you will build the planets, if you will include moons, how big each solar object will be and how fast each one will spin. How accurate to the real solar system can you make your model?

You can take the wheels off of the robots and use a different axle inside the powered socket or build using a wheel as a base.

Each robot will need to be programmed using EdScratch. Write and test your programs for each robot. You may need to make adjustments to your program depending on the size of each object and how you attach that object to the powered sockets of each robot.

Hint!

The set right motor and set left motor blocks are very helpful if you only want one motor to move. Don't forget you need another block, like a wait block, in the program to set the duration for the set motor blocks.