**Fast Start with Edison**

**Lesson Plans**

**Description:** Prior to an Edison Robotics and Coding competition students should become familiar with the basics of Edison Robots. The better they understand these basics, the more successful they will be in the competition. There are two lesson plans below along with a getting started worksheet, google slides (with videos) and a troubleshooting guide.

**Materials:**

Edison Robots

Edison Connector Cables

AAA batteries

Internet enabled device with headphone jack: chromebook, ipad, computer, iphone

Blue Painters Tape or Colored Masking Tape

[Getting started with Edison Worksheet](https://drive.google.com/file/d/1hinGvvEhL5yk92iixRNZ0gXATTxQ0-CD/view?usp=sharing) 1 per student

[Edison Fast Start Google Slides](https://docs.google.com/presentation/d/13_EmnGw7Ag6VJhQBTWo5F1LOfXLgtCjNr_iHs0SlD8E/edit?usp=sharing)

**Prepare:**

Teacher make a square on the floor with tape that is 3 feet x 3 feet.

Teacher ensure batteries are in Edison and Edison is working

Decide if students will be coding independently or as a group

**Lesson Plan 1:**

1. What is Edison Robot:

Teacher describe: *Edison is a robot, that does a lot of things to interact with the world around it. It only knows what to do when a human codes information on a computer and then send that program to the Edison.*

1. Pass the robot around to the students and ask them to observe it and state things they notice about it.
2. Demonstrate Edison performing one of the pre-loaded or barcode programs.
3. Hand out [Getting started with Edison Worksheet](https://drive.google.com/file/d/1hinGvvEhL5yk92iixRNZ0gXATTxQ0-CD/view?usp=sharing) (page 1)
4. To create a program:

Students go to [edscratchapp.com](https://www.edscratchapp.com/)

*To tell Edison what to do, drag out puzzle piece like blocks from the side and line them up in the order you want the robot to do them.*

All Ed Scratch programs start with a Start Block.

1. Drive Forward:

Students explore the program and look for blocks that will make Edison move.

Students record what the block that makes Edison move says and what all the options are on their worksheet.

Students drag drive **Forward for** block on to their program.

1. Turn:

Students find blocks that will make Edison turn.

Students describe on their worksheet what each turn block would do.

Students drag one **Spin** block on to their program.

1. Challenge:

Students are then challenged to make a program that will drive Edison in a square that is 3 feet x 3 feet

1. Uploading the program to the Edison robot:

Review the instructions on the flow chart on Page 2 [Getting started with Edison Worksheet](https://drive.google.com/file/d/1hinGvvEhL5yk92iixRNZ0gXATTxQ0-CD/view?usp=sharing)

Students follow the instructions to upload code.

Page 3 of [Getting started with Edison Worksheet](https://drive.google.com/file/d/1hinGvvEhL5yk92iixRNZ0gXATTxQ0-CD/view?usp=sharing) has a Troubleshooting Guide

1. Extra Challenge:
	1. What is the least number of blocks possible to make Edison drive the square?
	2. What other shapes can you make Edison drive?

**Lesson Plan 2:**

1. Senses vs. Sensors Discussion:

Teacher ask: *How do humans interact with the world around them?* = They use their 5 senses of touch, taste, sight, hearing, smell. *When a human touches a hot stove the skin sends a message to the brain through the nerves saying I’m touching something very hot, the brain processes that information thinks wow something very hot, that could hurt me, I need to move my hand away. Then the brain sends a message to the muscles in the arm to flex and pull the hand away from the hot stove.*

Teacher ask: *How do robots and electronics or computer things interact with the world around them?* Robots and electronics or computer things interact with the world around them through sensors.

Teacher ask: *Describe some sensors.* = automatic door in a supermarket, sensors in a car, or the sink or hand dryer in the bathroom.

1. Input vs. Output Discussion:

Teacher ask: *Describe the difference between an input and an output.* = An input puts information into a system i.e. your skin touching a hot stove, or your hand under the hand dryer. An output puts information back out into the world i.e. your muscles contracting to moving your hand or air blowing out of the hand dryer.

1. Explore Edison inputs & outputs:

Teacher ask: *Edison robots have a few ways to interact with the world around it.*

Show Edison anatomy from [Edison Fast Start Google Slides](https://docs.google.com/presentation/d/13_EmnGw7Ag6VJhQBTWo5F1LOfXLgtCjNr_iHs0SlD8E/edit?usp=sharing)

Teacher ask: *What are some of Edison’s outputs? =* Motors, LEDs, Sounds.

Teacher ask: *What are some of Edison’s inputs? =*

* Obstacle sensors - detects things in its path
* Light sensor - detects darkness or brightness, Ed Scratch has a line tracking sensor - it will help Edison say on a dark line
* Sound sensor - detects loud sounds
* And a few others

 Students record inputs and outputs on [Getting started with Edison Worksheet](https://drive.google.com/file/d/1hinGvvEhL5yk92iixRNZ0gXATTxQ0-CD/view?usp=sharing) (page 1)

1. Students log onto [EdScratchApp.](https://www.edscratchapp.com/)
2. Programming Edison to use Obstacle Sensor:

Teacher describe: T*o use the sensors we need some sort of control functions like our brain is our control function for our senses. We are going to use blocks from the sensing panel and the control panel.*

1. Students Challenge: To have Edison detect obstacles and move out of the way of them. *First we need to tell Edison to listen to the Obstacle Sensor* ***turn on obstacle detection beam****. Then we want our Edison to drive without any set time or distance to stop, so we will use* ***set both motors to drive forward****. Then we need to create a condition for the obstacle detection beam to work. So we use* ***if then block****. Inside the IF we put an* ***obstacle sensor block****. Inside the THEN what we want to do when an obstacle is detected. Whether that is to stop or turn. Lastly we want to make this happen forever. So we will put a forever loop around the drive forward and if/then block*
2. Uploading the program to the Edison robot:

Review the instructions on the flow chart on Page 2 [Getting started with Edison Worksheet](https://drive.google.com/file/d/1hinGvvEhL5yk92iixRNZ0gXATTxQ0-CD/view?usp=sharing)

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1. Extra Challenge:
	1. Use other sensors to control Edison.