This course is for grades 3-5

2.1.1 Suggested Timeline: 1 55-minute class period

1.2 Standards

<table>
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<th>Common Core Standards</th>
<th>Disciplinary core ideas</th>
<th>Learning objective</th>
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<td>RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS1-6)</td>
<td>PS3.A: Definitions of Energy</td>
<td>Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions</td>
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Objectives:

Build a simulation in MIT’s Scratch program to observe the flow of electrons in a simple circuit

Key terms
current flow

electrons

Potential energy

**Key Concepts**

- The battery is a potential energy source.
- Only until the switch is thrown and the circuit complete does electrons (current) flow from the one side of the battery through the circuit and light the bulb.
- Electrons flow in 1 direction from the positive side of the battery to the negative side.

**You tube link**

https://youtu.be/M8zt14WBRjc

**Start Coding Project Here**

This Scratch Project will animate the electron flow in a simple electric circuit. This will reinforce the concept of current flow.

Students will drag and drop Scratch code blocks for each sprite (character).

1. Open a browser and go to this Scratch URL
   https://scratch.mit.edu/projects/106686714/#editor

The sprites are all pre-placed to save time, and also saves with the artistic efforts.

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1 Scratch is a project of the Lifelong Kindergarten Group at the MIT Media Lab.
Click on the switch to turn it on.
Step 1.
Select the switch sprite

Add this code for the switch sprite
First switch to the **EVENTS** panel by click on **EVENTS** in the center of the *Scripts* tab.
Now drag over the following blocks to the right most pane - the script pane

When Green flag clicked

When this sprite clicked

Broadcast
Change the Scripts panel tool to the **Looks** menu by click on the word **Looks**

And drag over the
Switch costume block
And
Switch costume block again

Change the 2nd block to **Switchoff** by clicking on the inverted triangle in that block to get a pull down selection menu

Select **switchoff** for this part
And
Under the green flag, select **switchon** costume

This will start the switch in the off position and when clicked change to the **switchon** costume
See the **costumes** tab to see the 2 images
Step 2. The bulb sprite

Add this code for that sprite to illuminate it when the switch is on
Select electron 1

Click on the switch to turn it on
Drag the electron to the top right hand side of the output screen. From the Scratch tool bar, select **Motion**

And drag the current **goto xy** block to the script panel

![Click on the switch to turn it on](image)

Move the electron to the bottom right hand side of the output screen

And from the Scratch tool bar, drag the glide 1 sec block to the script panel
Change to the *Events* tool selection bar
And drag over **When green flag clicked** and stack over the *goto xy* block

Drag over the *when I receive* block and stack over the *glide block* as shown

Duplicate the *goto block* and stack below the *glide block*
Now change to the **Control** tool selection

Drag over the *forever* block jaws and wrap the *glide* and *goto* blocks as shown
Now change the tool selection to **LOOKS**
And drag over the **show** block under the **when I receive** block

And drag over the **hide** block under the **when the green flag is clicked** block as shown below
Click the **green flag** at the top of the project
And click on the **switch** to turn it **ON** from **OFF**
And observe electron1 gliding from the top left down the right side of the screen.

**Final Working Solution**

https://scratch.mit.edu/projects/106684221/
Post Coding Questions

1.