
Illuminated Story

featuring Microsoft MakeCode

Objective

This activity combines art and creative writing with a friendly introduction to programming light-up circuits. It can be used by language arts teachers, world language teachers, or computer science educators. Recommended grades: 3-5.

Overview

Working in teams of two, students creatively complete sentence blanks to describe a scene. They swap their story starters with another team, who turns them into an illustrated story. Each story starter features a description of a light source to set the “mood” of the scene. As part of the illustration, students learn to add a light circuit with copper tape and sticker LEDs. Then they use the programmable Chibi Chip to program the lights and animate their stories.

Recommended Grade Level

- Grades 3-5

Estimated Time

- 15 minutes for story starters, 1 hour for programming, illustration and story writing.

Learning Standards

- ISTE 1.b.i, 2.b.i
- NGSS 4-PS3 Energy
- CCSS.ELA-LITERACY.SL.5.5

Consumable Materials

- The template below
- 1/8” wide copper tape
- 1 LED sticker per team, assorted colors

Reusable Tools

- Chibi Chip mounted on Clip
- Chibi Chip Programming cable
- A web browser (via smartphone or laptop)
- Internet connection
- Drawing supplies such as colored pencils

Questions? Need materials?

Use the educator discount code **EDU20** at checkout for **20% off** your order at <https://chibitronics.com>. Email info@chibitronics.com with any questions, and for special bulk educator discounts.

Lesson: Natalie Freed, Jie Qi, Andrew “bunnie” Huang. Illustrations: K-Fai Steele

Story Starter

Write a story starter for another team.

Who is in the scene?

A _____ (adjective) _____ (identity)

and a _____ (adjective) _____ (identity)

Examples: *a grumpy pirate and a tired toddler. A curious librarian and a tall detective.*

What is in the scene?

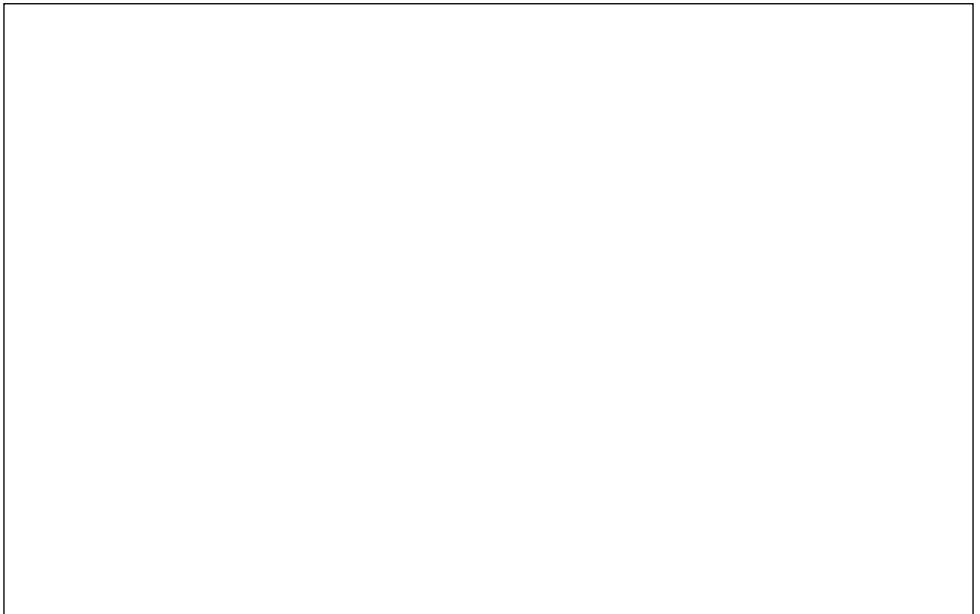
A _____ (adjective) _____ (object)

and a _____ (adjective) _____ (light source)

Examples: *a damp shoe and a flickering neon light. A wobbly shelf and a cloudy moon.*

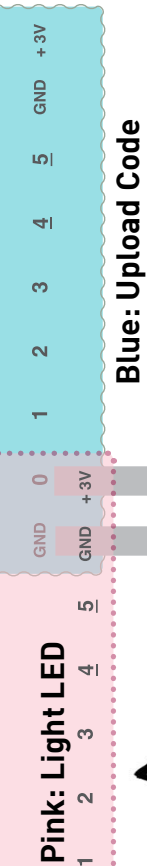
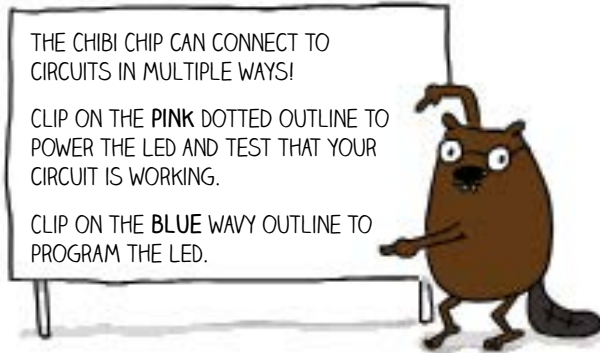
Illustration

Show us the scene! Use drawings and your programmable light to show us what is happening to your characters. Lay this page over your circuit page and illustrate it below:



Light an LED!

First, follow the directions below to build an electronic circuit using copper tape and an LED sticker. To test your circuit, clip the Chibi Chip onto the pink outline below. This will power the LED so you can make sure your circuit is working. Once you see your LED turn on, go to the next page to learn to program it.



1. Plug the Chibi Chip into a **power source**, so that the green PWR light comes on.



2. Stick **copper tape** over each of these gray lines.



3. Stick an **LED sticker** over the triangle footprint.



4. Align and **clip the Chibi Chip** to the page over this **pink dotted outline**. Make sure the metal pads of the clip touch your circuit.

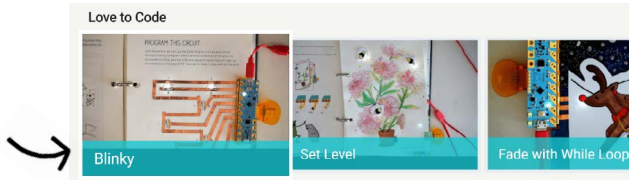
5. Bask in the soft glow of the LED!

Upload Some Code!

In this exercise, you will learn how to upload code to the Chibi Chip. Once the code is uploaded, you will clip the Chip onto the blue outline and see your LED blink!

1. Make sure you have an Internet connection. Open a web browser and go to: <https://makecode.chibitronics.com/>

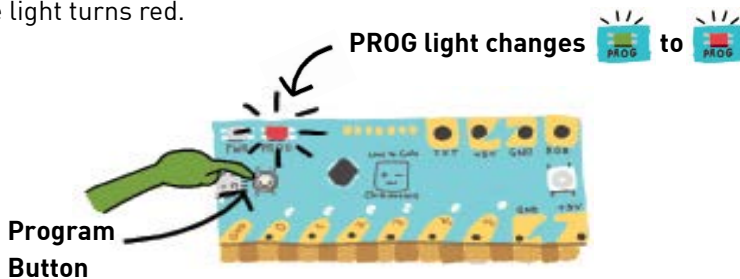
2. Begin by opening **Love to Code → Blinky**



3. Plug the Chibi Chip into a **power source**, and **plug the audio end of the red cable into the audio jack** of your web browsing device.

4. **Turn the volume up to the max** on the web browsing device and make sure it's not muted.

5. **Press and hold the program button on the Chibi Chip until the PROG light stays red.** This lets the Chibi Chip know to listen for new code. Let go of the button after the light turns red.



6. Click the **Upload** button.



The upload will finish in a few seconds, and you should see the PROG light turn green as the indicator light above the "0" pin starts blinking.

7. Clip the Chibi Chip over the **blue, wavy outline** on the left hand side of this page, so that the copper traces on the page are touching "GND" and "0". You should see the LED on the page blink along with the indicator light on the Chibi Chip.

Write Your Own Light Code

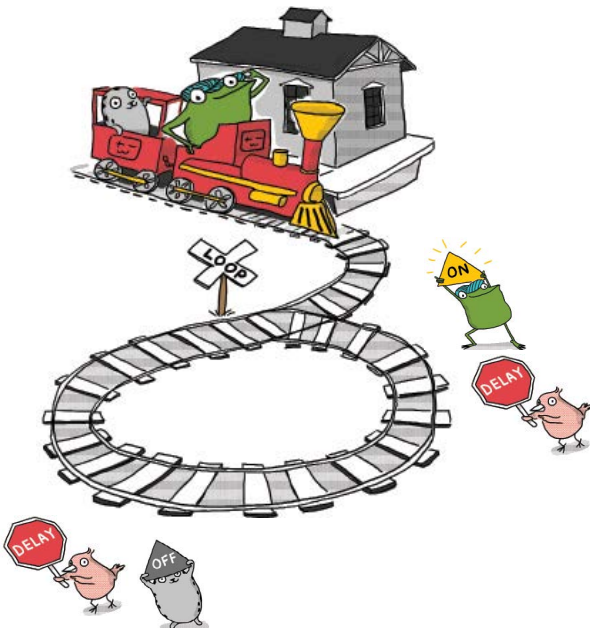
How does the Chibi Chip blink the LED? It's actually following a set of instructions generated from the code! Let's take a look:

```
forever
  turn D0 ON
  pause 1000 ms
  turn D0 OFF
  pause 1000 ms
```

In this program, four instruction blocks are enclosed inside a "forever" loop. This means "repeat these four instructions over and over."

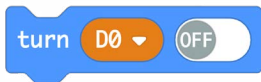
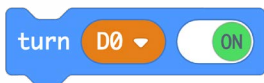
The four instruction blocks turn the LED on, wait for a second, turn it off, and then wait for a second. Repeating these instructions makes the LED blink.

The program runs like a train on a track. When the Chibi Clip is powered on, it starts out on the track, following the instructions in your program one after the other. A "forever" block makes the track into a loop, so the train will come back around and repeat the sequence of instructions.



```
forever
  [ ]
```

You can make your light match your story by creating your own repeating sequence of the instruction blocks below:



The turn on/off blocks let you turn the light either ON (maximum brightness) or OFF (all the way off).

The set level block allows you to set the light to a brightness between 0 and 100. Try it out! Type in the box to change the brightness setting.

The pause block tells the Chibi Chip to wait and not do anything. Change the number to change the length of the pause. Good to know: 1000 milliseconds (ms) is 1 second. You can choose numbers from the dropdown or type them in.

These are the basic building blocks for creating your own light patterns! Experiment with your own sequence until it matches the light you imagined for your story. Here are some examples to get you started:

