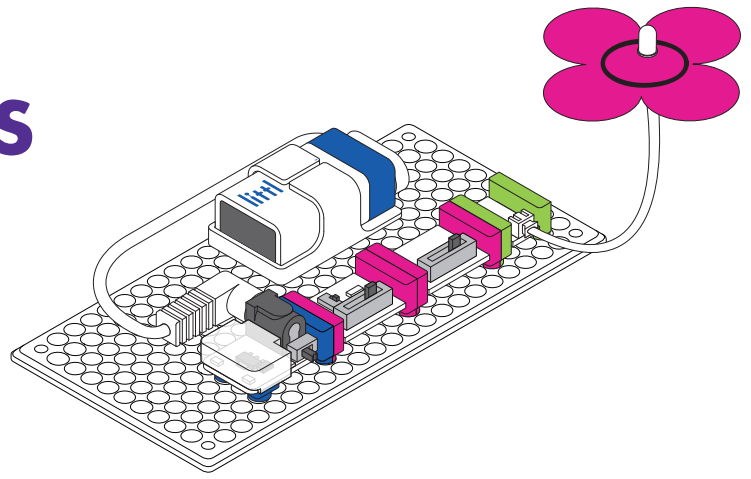


PLANT ADAPTATIONS



GUIDED

DESIGN CHALLENGE

Create a model of a new plant species that has specialized structures to help it survive!



WRITE

EXPLORE

- Complete Writing Box #1 in your guided handout.



CREATE



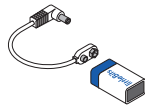
WRITE

CREATE

1. Complete Writing Box #2 and #3 in your guided handout.

Let's build the circuit

2. Gather your invention tools.



a1 battery & cable



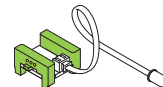
p4 power



i13 light sensor



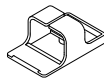
i16 pulse



a2 long LED



a30 mounting board

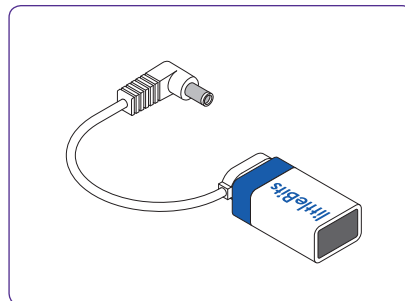
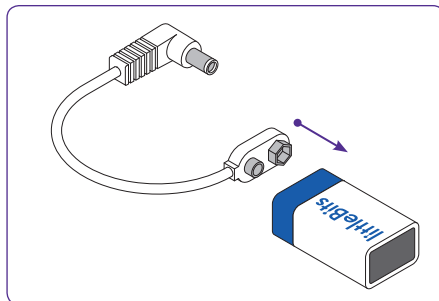


a31 battery clip

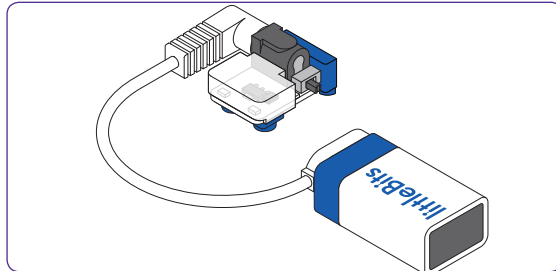
Other materials:

- Construction paper
- Scissors
- Markers
- Light source: From cell phone or flashlight
- If remixing the plant structure, provide assorted materials, like pipe cleaners, tape, paper tubes etc.

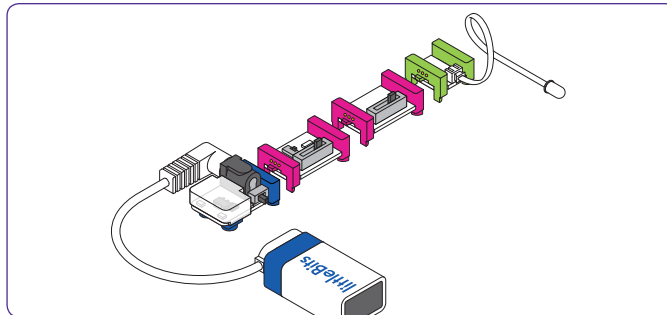
3. Attach the battery cable to the battery.



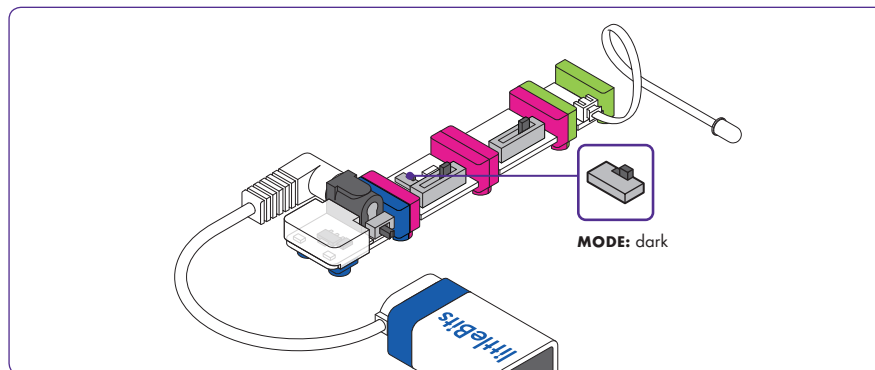
4. Attach the p4 power Bit to the battery cable assembly.



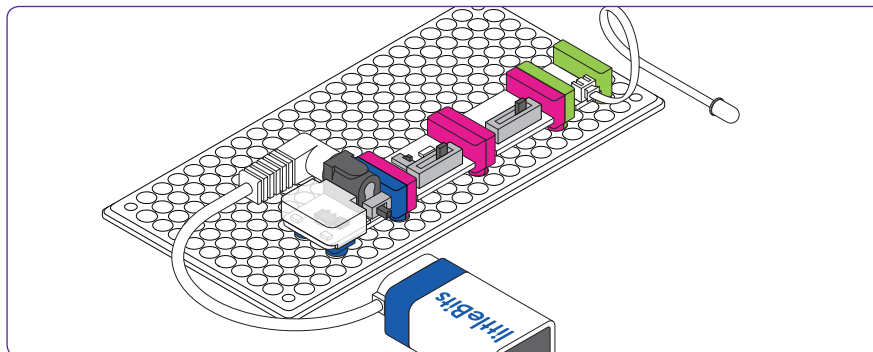
5. Snap this circuit together (power + light sensor + pulse + long LED).



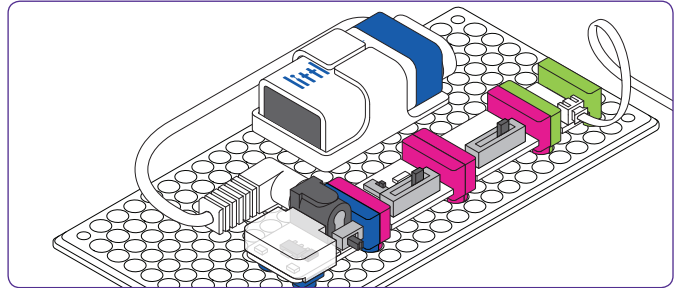
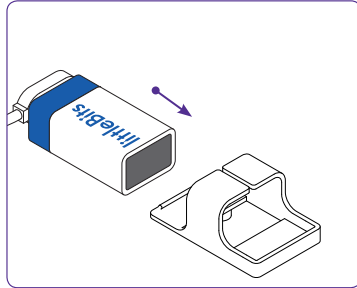
6. Switch your light sensor to "dark" mode.



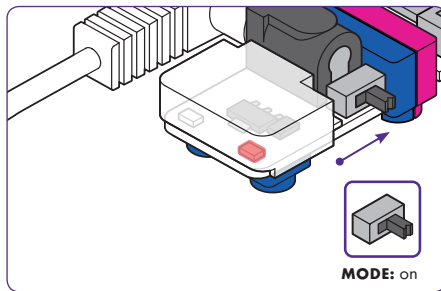
7. Press your circuit onto the mounting board.



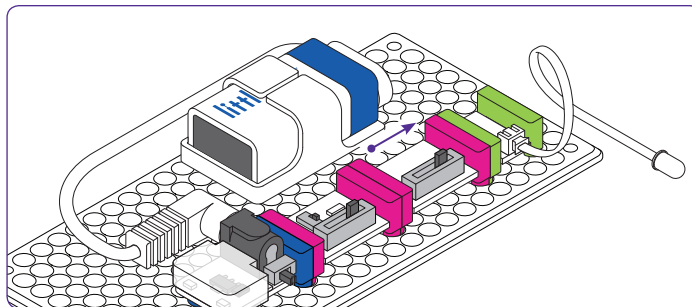
- 8.** Slide your 9-volt battery into the battery clip. Press your battery into the mounting board.



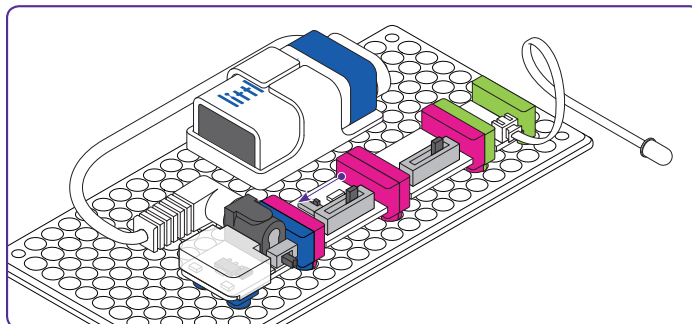
- 9.** Let's test that your circuit works! Power on your circuit.



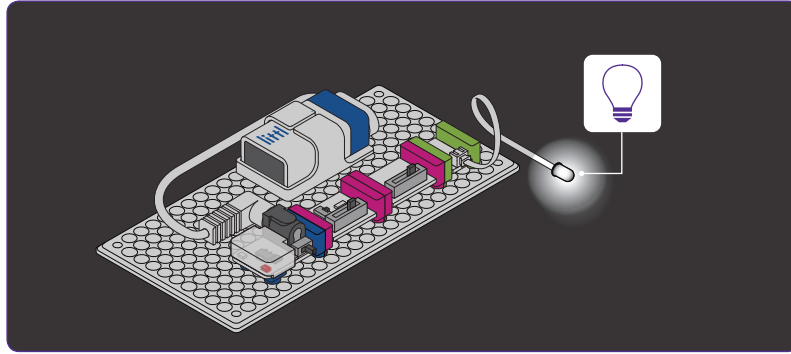
- 10.** Adjust the speed of the pulse Bit to the highest setting by moving the slider to the right. Your long LED should blink very quickly now.



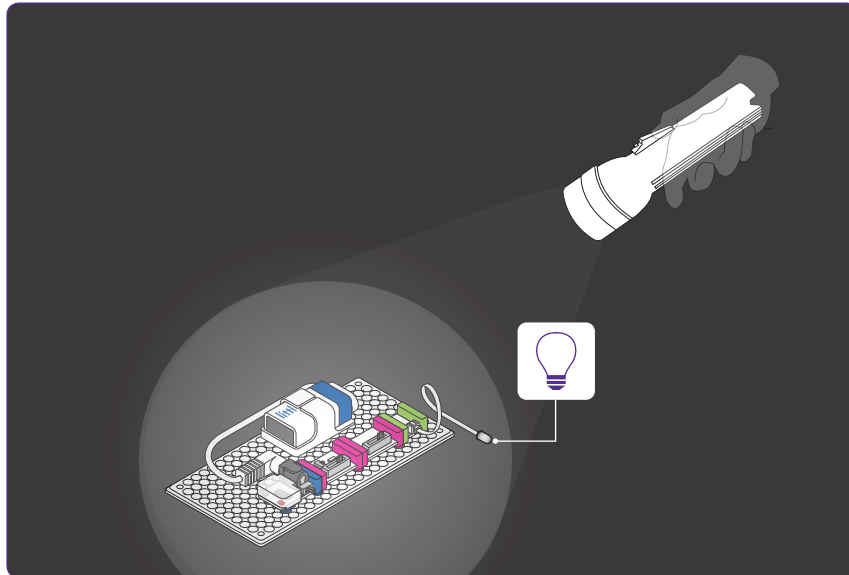
- 11.** Adjust the sensitivity of the light sensor to the lowest setting by moving the slider to the left.



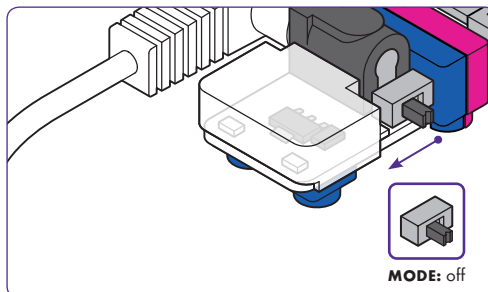
- 12.** Let's test that your light sensor works. Move to a darker location and bring a flashlight. The long LED should blink when the light sensor is in darkness. You can fine-tune the blinking light by adjusting the speed on the pulse Bit.



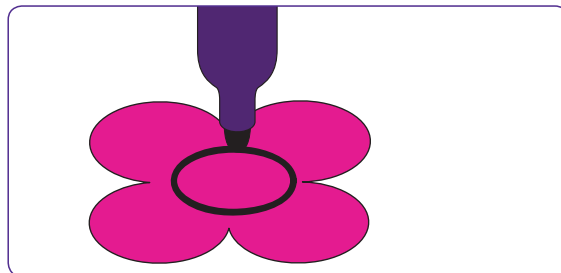
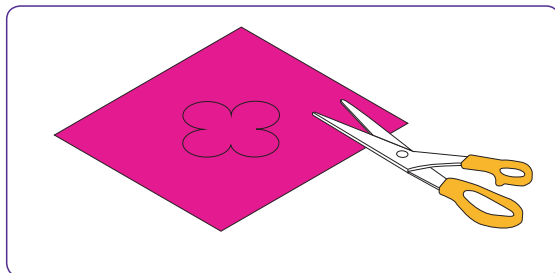
- 13.** Now, shine a flashlight on the light sensor. The long LED should stop blinking and remain off until the light is turned off. This is modeling how your plant behaves during the day.



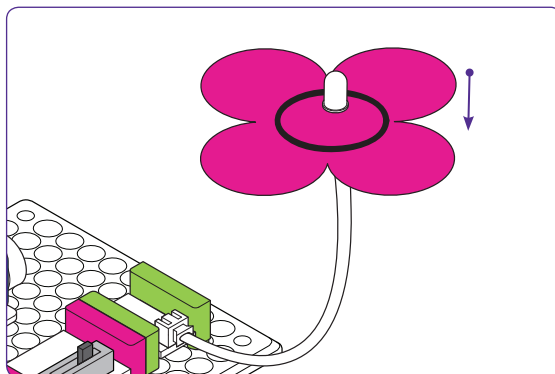
- 14.** Power off your circuit.



- 15.** Let's get creative and add some details to make this look more like a plant. Draw and cut a flower shape out of construction paper.

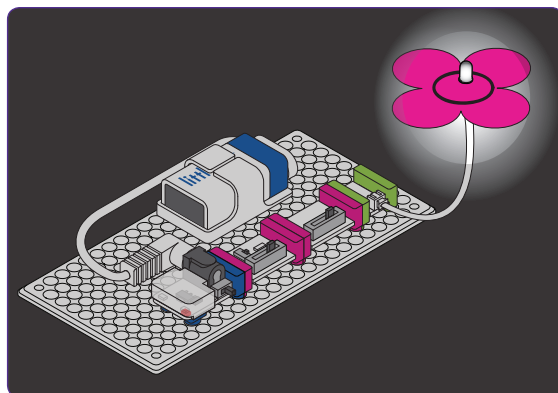
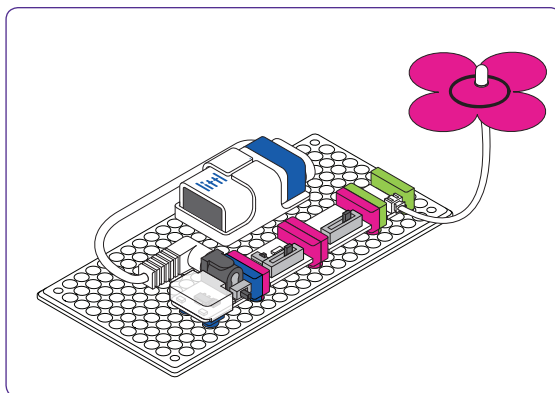


- 16.** Take your cutout and push the center of the paper onto the tip of the long LED. Your Bit should now look like a flower.



PLAY

- 17.** Let's see how well your plant protects itself against insects at night! Turn on your circuit, place your invention in a dark area and shine your flashlight at the light sensor. Turn off the flashlight for a few seconds, and turn it on again. How does your plant respond?



**REMIX****WRITE**

REMIX

- If time, use additional materials to embellish and customize your plant structures.
- Complete Writing Box #4 in your guided handout.

**CLEAN**

CLEAN UP

- **Until next time, littleBits!** Place the Bits gently back in the box according to the diagram on the back of the Bit Index; return classroom materials to their proper place and check the area around your workstation.

littleBits

PLANT ADAPTATIONS

Name:

CHALLENGE OVERVIEW

Let’s create a model of a new plant species!

GUIDING QUESTIONS TO REACH LEARNING OBJECTIVES

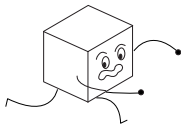
How do specialized plant structures help a plant survive?



1. Explore the list of specialized plant structures below. What are some challenges that the plant may have encountered that led to each of these specialized plant structures? Write your descriptions in the chart below.

SPECIALIZED PLANT STRUCTURE	WHY MIGHT THEY HAVE THIS?
Thick leaves that swell to store water	
Stems that wrap around objects	
Petals that close up at night	
Thorns and prickles	
Long roots that grow deep into the ground	





2. Explain the challenge that your plant needs to overcome.

3. What structure of the plant could you specialize to help the plants survive against leaf-eating insects? Sketch your ideas.



4. How might you improve your design? What changes would you make to better protect the plant?

