

Using LED Lights with the Microbit

Introduction:

These instructions will help you create a circuit using the Micro:bit to make an LED light blink. From here you should have students experiment to see what else they can do with the lights.

Previous Knowledge:

Students should already know how to write basic code for the Micro:bit and load it onto the micro:bit.

Standards:

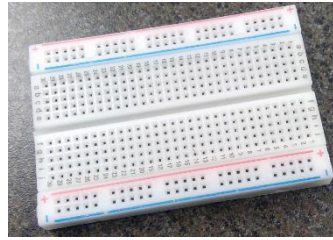
These are just examples of some of the standards covered with this lesson.

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| <p>ADST Grade 6-7</p> <p>This also covers ADST standards for most grades if students experiment with the lights and attempt to create a project.</p> | <p>Big Ideas:</p> <ul style="list-style-type: none">• Design can be responsive to identified needs.• Complex tasks require the acquisition of additional skills.• Complex tasks may require multiple tools and technologies. <p>Standards:</p> <ul style="list-style-type: none">• simple algorithms that reflect computational thinking• visual programming• function of input and output devices, including 3D printing and adaptive technologies for those with special needs <p>Competencies:</p> <ul style="list-style-type: none">• Generate potential ideas and add to others' ideas• Screen ideas against criteria and constraints• Choose an idea to pursue• Explore and test a variety of materials for effective use• Test the first version of the product or the prototype• Make changes, troubleshoot, and test again• Demonstrate an awareness of precautionary and emergency safety procedures in both physical and digital environments• Select, and as needed learn about, appropriate tools and technologies to extend their capability to complete a task |
| <p>Science Grade 9</p> | <p>Big ideas:</p> <ul style="list-style-type: none">• Electric current is the flow of electric charge. <p>Standards:</p> <ul style="list-style-type: none">• circuits — must be complete for electrons to flow• voltage, current, and resistance <p>Competencies:</p> <ul style="list-style-type: none">• Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled• Transfer and apply learning to new situations• Contribute to finding solutions to problems at a local and/or global level through inquiry |

Materials you will be using:



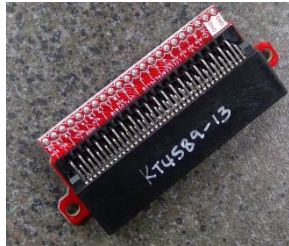
Micro:bit



Breadboard - A thin plastic board used to hold electronic components (transistors, resistors, chips, etc.) that are wired together.



Resistor - Too much current will quickly burn out the LED light so we are going to use a resistor to limit the amount of current going into the LED .



Micro:bit Breakout Board – This helps you connect the Micro:bit to the breadboard so you can easily use all the pins available on the micro:bit.



LED- Light Emitting Diode – An electrical current will flow through this causing the light to light up.

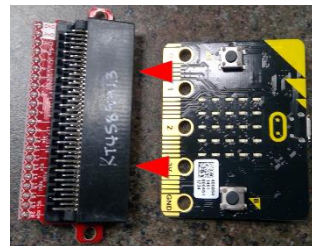


Jumper wire

Step 1 – Hook up your electronics

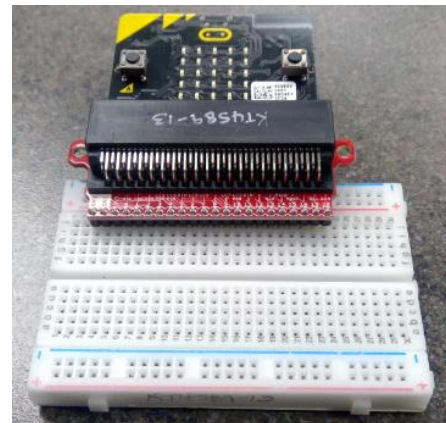
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Hook the breakout board up to the micro:bit.



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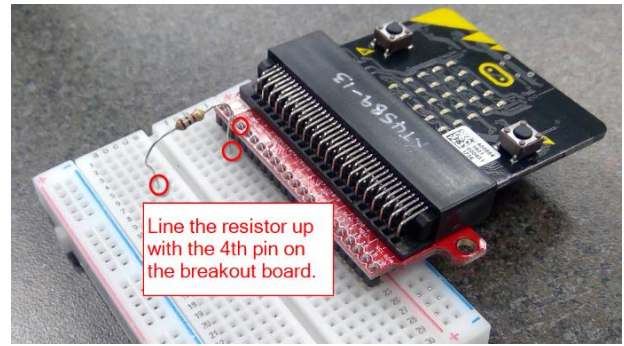
Hook the micro:bit and breakout board up to the breadboard.



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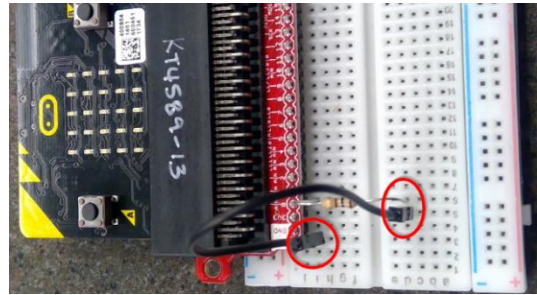
Place the (100 ¼ W) resistor so that it will limit the amount of power that will reach the LED. You will need to bend the wire. You should put the resistor with the 4th pin on the breakout board. The first two pins are for grounding and the 3rd is 3.3V (power).

NOTE: Please straighten the wires again before putting them away in the kit.



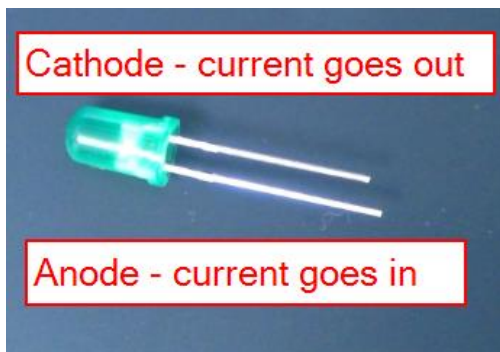
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Place a grounding wire on the breadboard. Place one end in the hole beside the GND on the breakout board and the other in the hole beside the left end of the resistor.

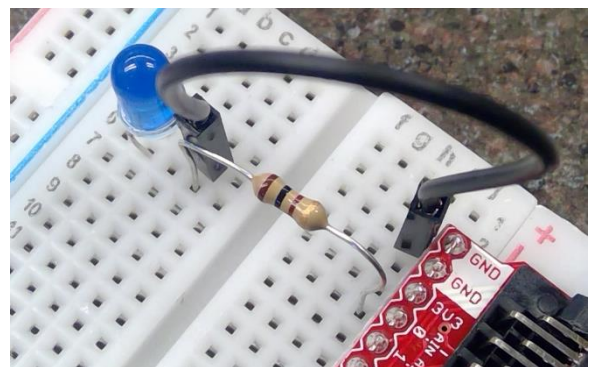
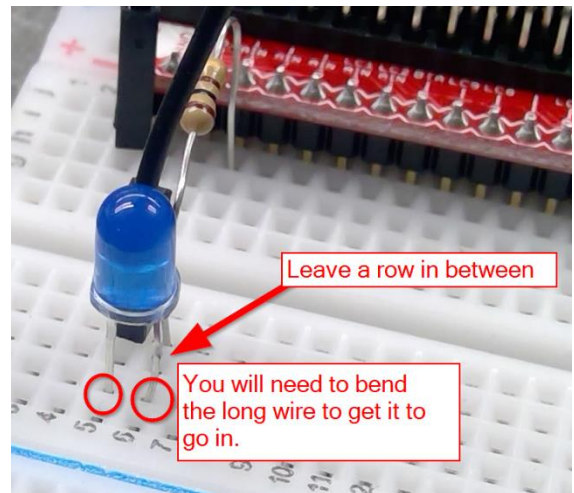


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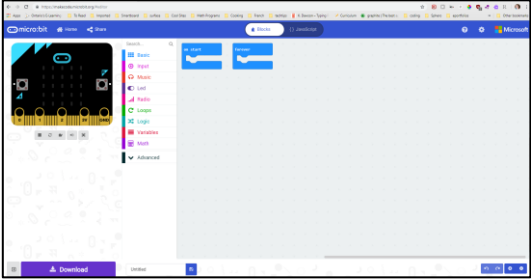

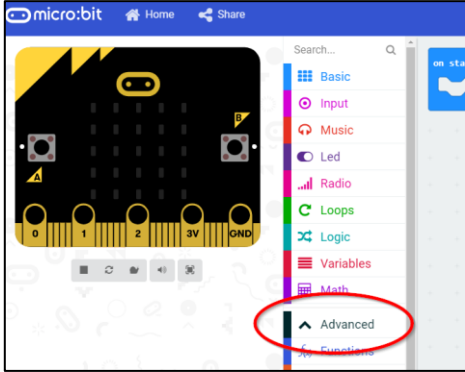
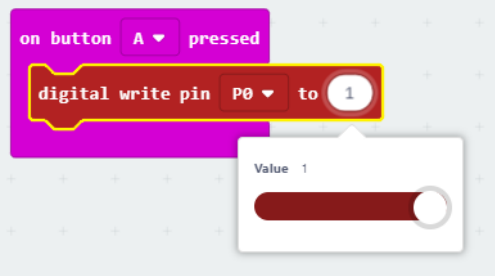
Look at the LED. One side is longer than the other. The longer end is where the current goes in (anode) and the shorter end is where the current goes out (cathode).



We are going to connect the long end beside the resistor and the short end beside the ground wire.



Step 2 – Coding the Micro:bit

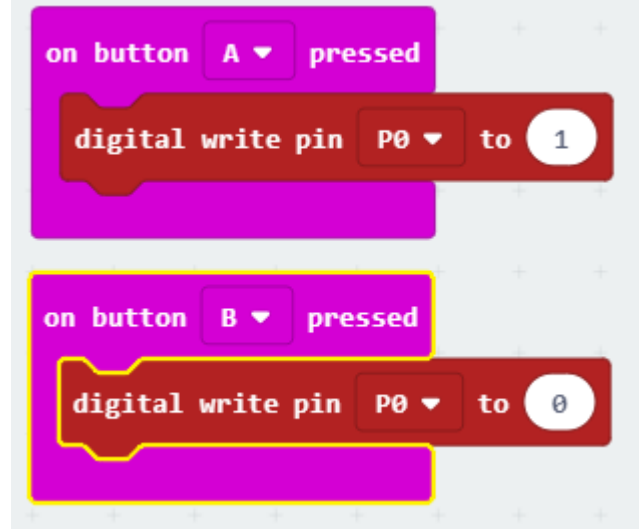
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| 1 | Open the Micro:bit Make Code site in your internet browser and start a new project. |  |
| 2 | Choose the input that you would like to use to make light go on. Ex. On button A pressed. |  |
| 3 | Click on Advanced to show more options. |  |
| 4 | Click on Pins . These are the controls that tell the Micro:bit to use the pins. When you have the Breakout Board attached you have 21 different pins to use (you start counting at 0). | |
| 5 | Put the digital write pin in the input block. Change the 0 to a 1 (0 if off and 1 is on). P0 is the first pin. |  |
| 6 | Now download the code onto your microbit. | |

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Challenge students to figure out how to turn it off.

Ask them where you see this in the real world?

Ask students what else they could use this for?



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Some ideas for further exploration:

- Have students attempt to make the LED blink
- Ask students to add a string of lights
- Challenge students to create a string of lights that blink to music
- Challenge students to create a system with lights that would help people (this would be a great opportunity to use the design thinking model)