

Coding, Covid, and Life Support

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About me...



Middle School Science Teacher, 13 years

SEEC Crew Member, Unity

JPL Solar System Ambassador

Space Foundation Teacher Liaison

Husband, Father, Pastor, USAF Reserve Chaplain



BLUF

That's an Air Force acronym for "Bottom Line, Up Front"

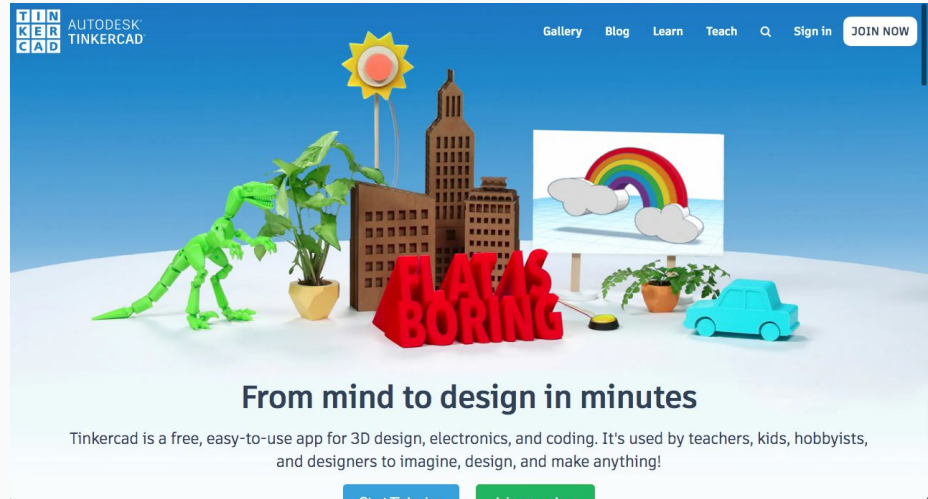
- We want to teach our students about coding.
- Materials are **expensive**.
- New Covid regulations involving sanitizing supplies and distancing makes sharing in the classroom difficult.
- Today, we will learn about **FREE online resources** to help you teach your students about the practical value of coding and microelectronics.
- Then, we can make connections to the life support sensors used in spacecraft and on the ISS.

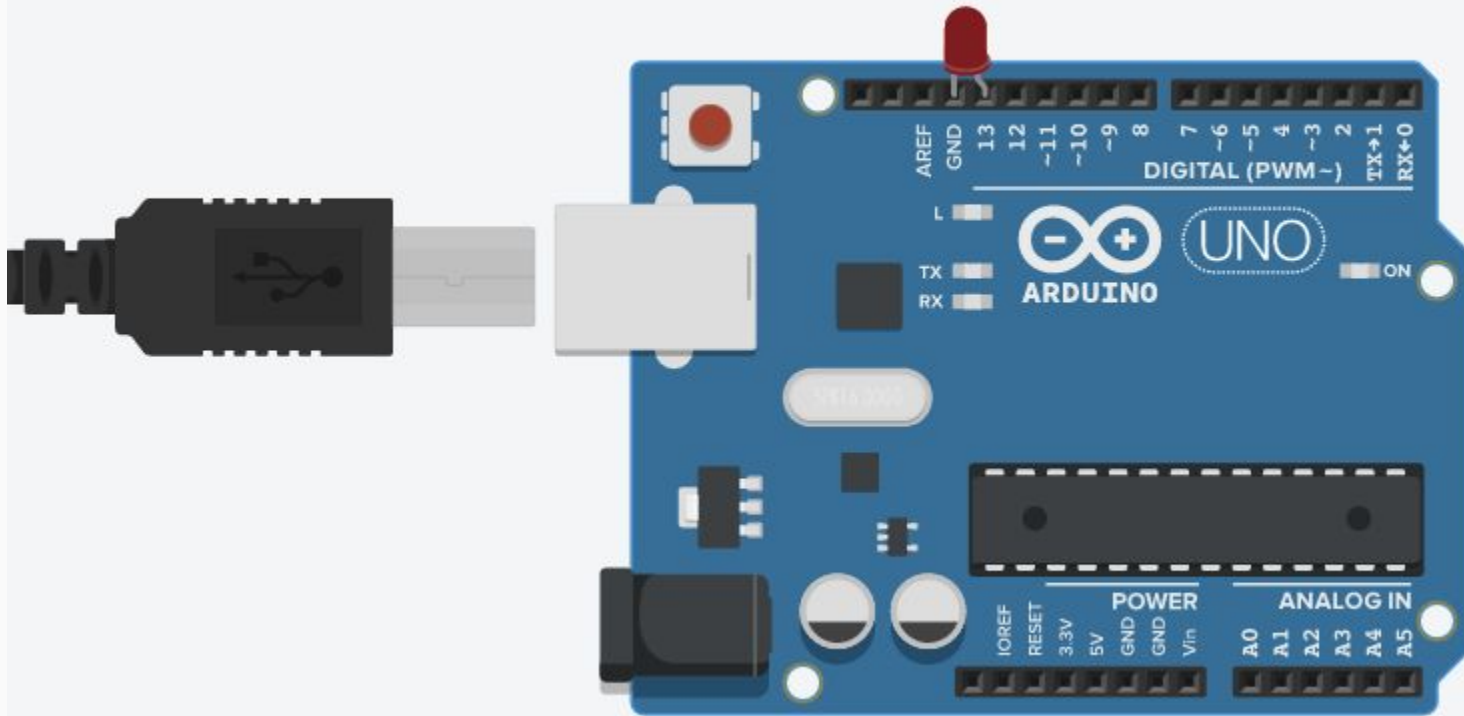
Coding and Microelectronics

[Tinkercad.com](https://www.tinkercad.com)

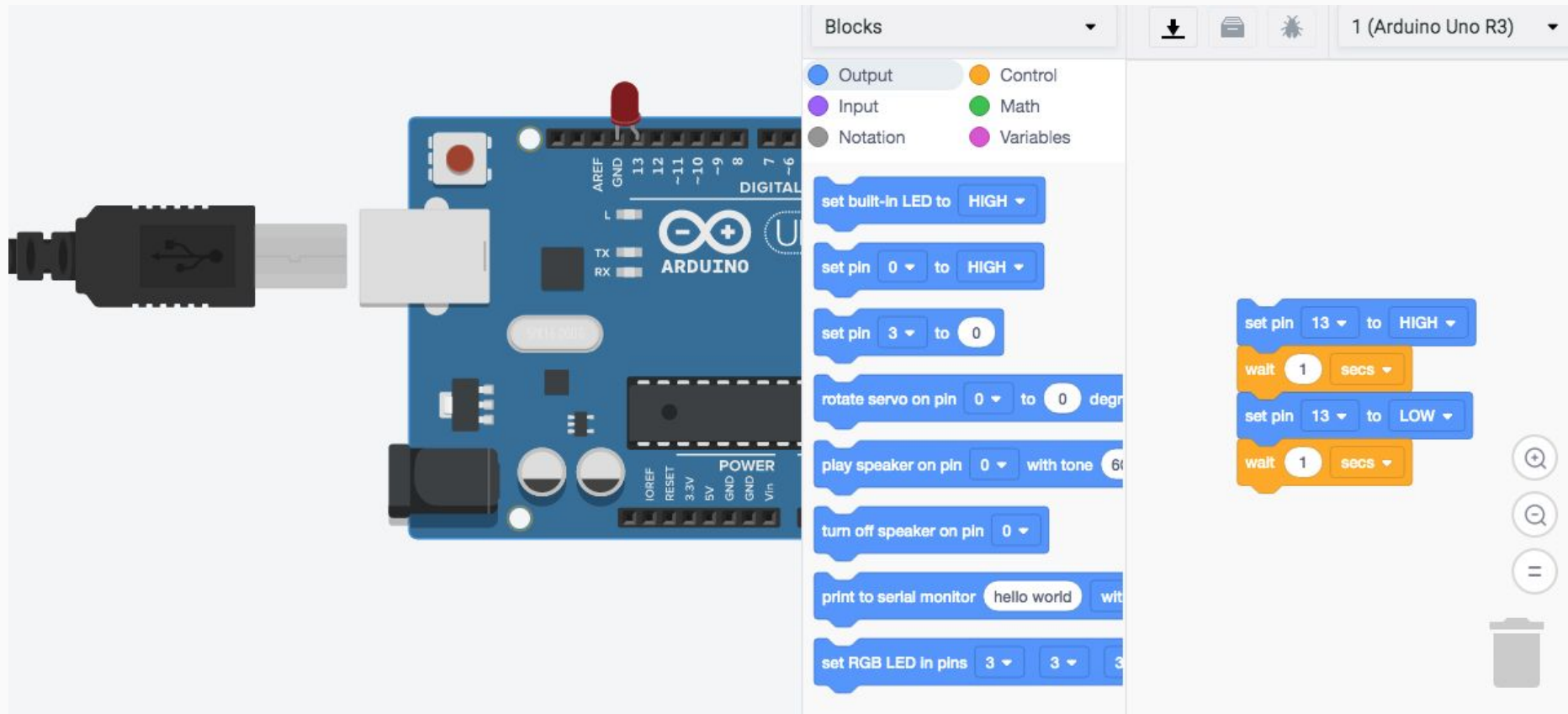
Login with Google credentials.

Select “Circuits.”





Add an Arduino Uno to the workspace and place an Led into the ports as shown (GND/13).



The image shows the Arduino IDE interface with a sketch loaded for an Arduino Uno R3. The sketch includes a USB cable connected to the board, a red LED on pin 13, and a block of code that sets pin 13 to HIGH, waits 1 second, sets it to LOW, waits 1 second, and prints "hello world" to the serial monitor.

Blocks

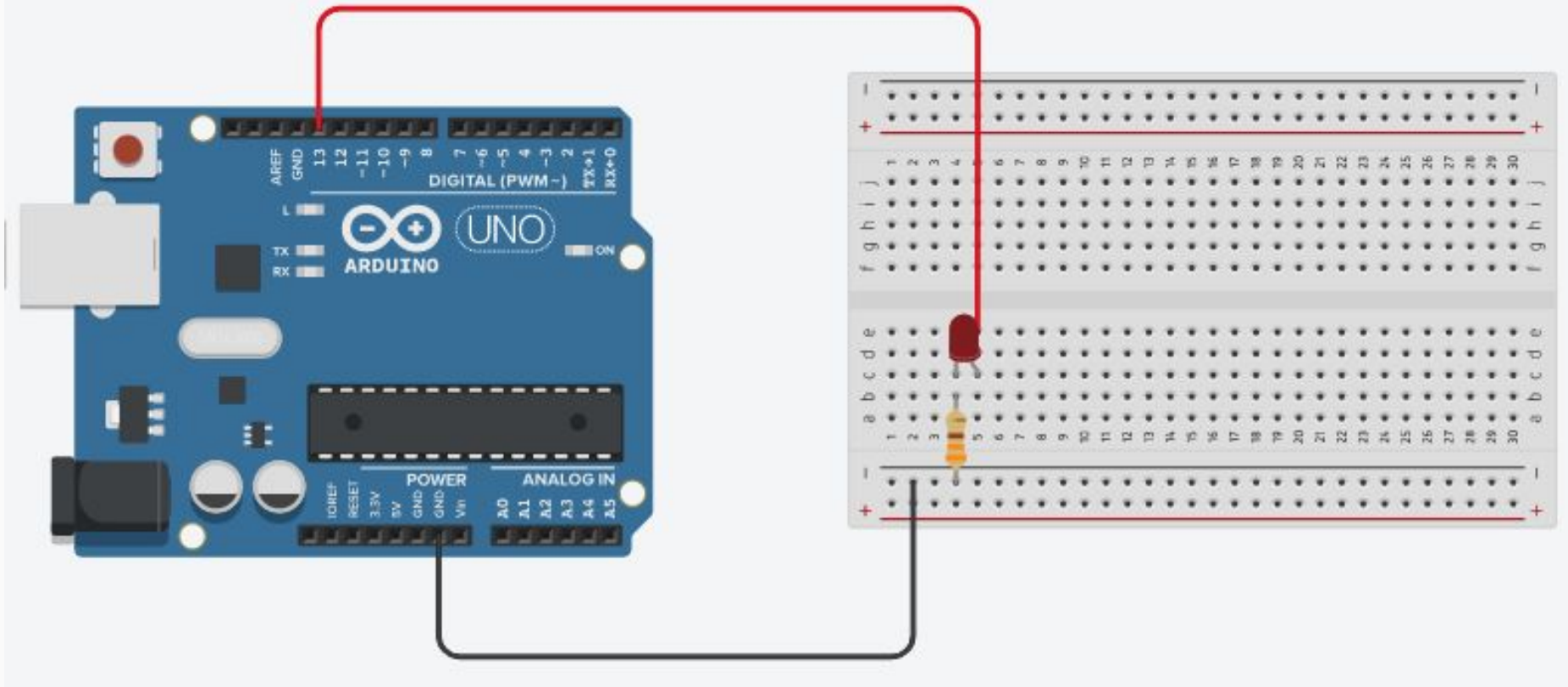
- Output
- Input
- Notation
- Control
- Math
- Variables

1 (Arduino Uno R3)

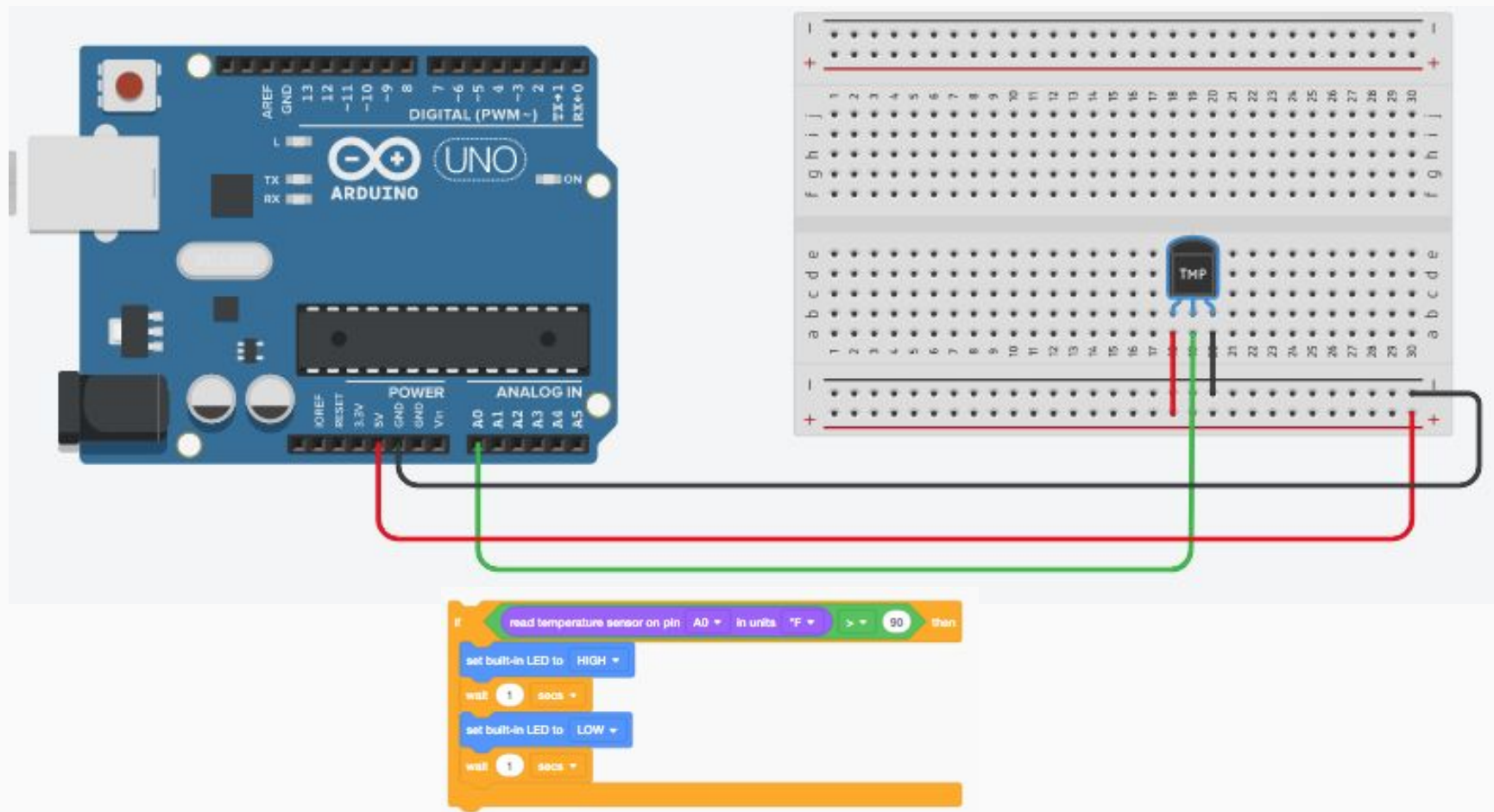
```
set built-in LED to HIGH
set pin 0 to HIGH
set pin 3 to 0
rotate servo on pin 0 to 0 degrees
play speaker on pin 0 with tone 600
turn off speaker on pin 0
print to serial monitor hello world with
set RGB LED in pins 3 3 3
```

set pin 13 to HIGH
wait 1 secs
set pin 13 to LOW
wait 1 secs

The built-in LED will be coded automatically. You can change the code to read "pin 13".



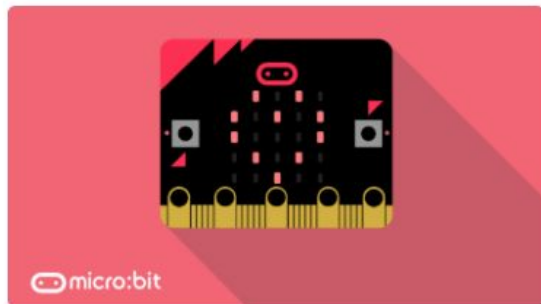
Then, you can add a breadboard, resistor, and wires to expand your design. You can use any of the digital ports, as long as you amend the code.



We can also add a temperature sensor and make an LED blink...like an alarm for high temperatures in a spacecraft.

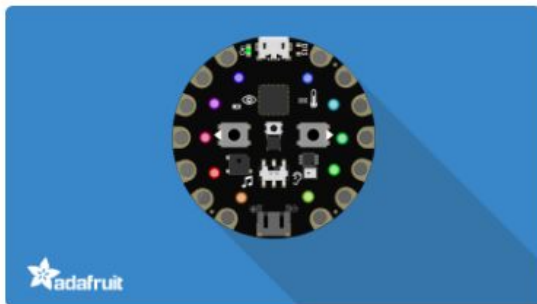
Hands on computing education

Microsoft MakeCode brings computer science to life for all students with fun projects, immediate results, and both block and text editors for learners at different levels.



micro:bit

[Learn more with micro:bit >](#)



Circuit Playground Express

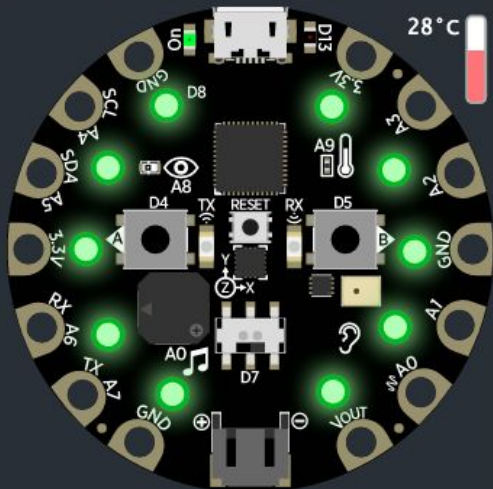
[Use Circuit Playground Express >](#)



Minecraft

[Learn more with Minecraft >](#)

Adafruit and Microsoft's Makecode have an online simulator for the Circuit Playground Express as well!



28°C

Search...

 LIGHT☐ INPUT MUSIC

 NETWORK

LOOPS

 LOGIC

VARIABLES

 MATH

▼ ADVANCED

forever

```
if temperature in °C > 35 then
```

set all pixels to 

```
else if (temperature in °C < 15) then
```

set all pixels to 

```
else
```

set all pixels to 

The possibilities are endless!

Links/Resources

[Tinkercad.com](https://www.tinkercad.com)

[Makecode](https://makecode.com)

[Student Inventor's Kit by SparkFun v3.2](#) and [v4.0](#)

[Circuit Playground Express](#)

[Arduino Uno](#)

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