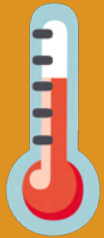# Let's build a Weather Station!

## First of all lets look at what we are going to measure in our weather station: Temperature and Pressure

### TEMPERATURE:

Temperature is the measure of hotness or coldness expressed in terms of any of several scales, including Fahrenheit and Celsius.

### PRESSURE:

Atmospheric pressure, also known as barometric pressure , is the pressure within the atmosphere of Earth.

## What is a weather station?

A weather station is a facility, either on land or sea, with instruments and equipment for measuring atmospheric conditions to provide information for weather forecasts and to study the weather and climate.

The measurements taken include temperature, atmospheric pressure, humidity, wind speed, wind direction, and precipitation amounts.

Wind measurements are taken with as few other obstructions as possible, while temperature and humidity measurements are kept free from direct solar radiation.
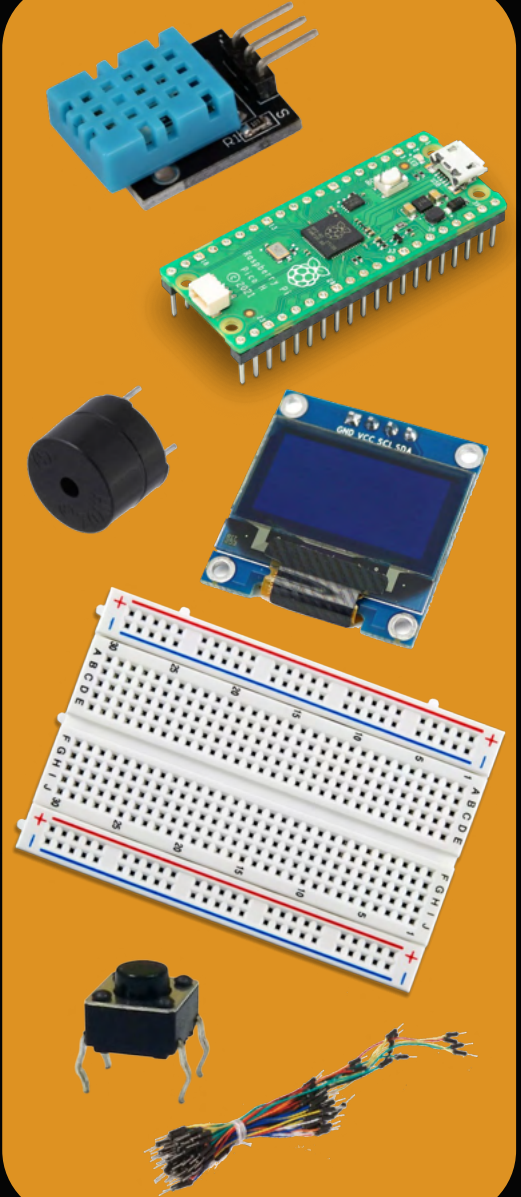
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# Let's build a Weather Station!

## What are we going to need to build our weather station?

## Kit



### KIT LIST

1 * DHT11 Sensor

1 * Pi Pico

1 * Buzzer

1 * Button switch

1 * oled 1306 Display

1 * Breadboard

13 * Jumper wires

    5 Red,  4 Black, 1 Blue

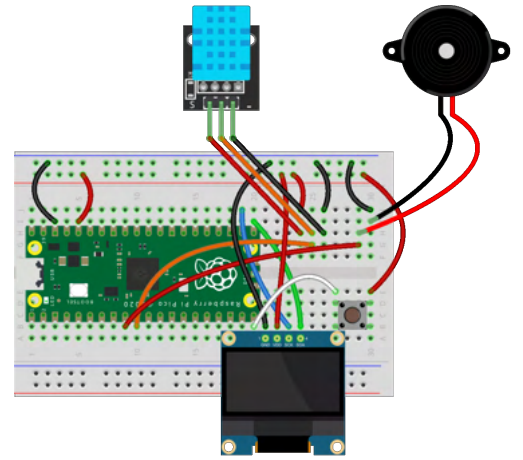    1 Green, 1 White, 1 Orange

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# Let's build a Weather Station!

From design to build what will our weather station end up looking like?

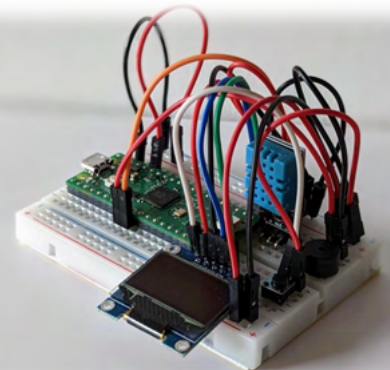## KIT LIST

1 * DHT11 Sensor

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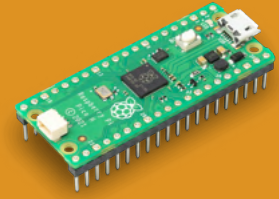
    1 Green, 1 White, 1 Orange

## Design



## Build



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# Let's build a Weather Station!

## Where using a Raspberry Pi Pico as our microprocessor. So what exactly is it?

Raspberry Pi Pico is Raspberry Pi's first microcontroller board, designed especially for physical computing. Microcontrollers are a different type of device than Single Board Computers (like the Raspberry Pi 4 and previous generations of Pi), they don't run an operating system and they are typically programmed to do just one task – though that task can be pretty intricate and exciting! They're perfect for experimenting with hardware and using as the brains of custom devices, machines and inventions.
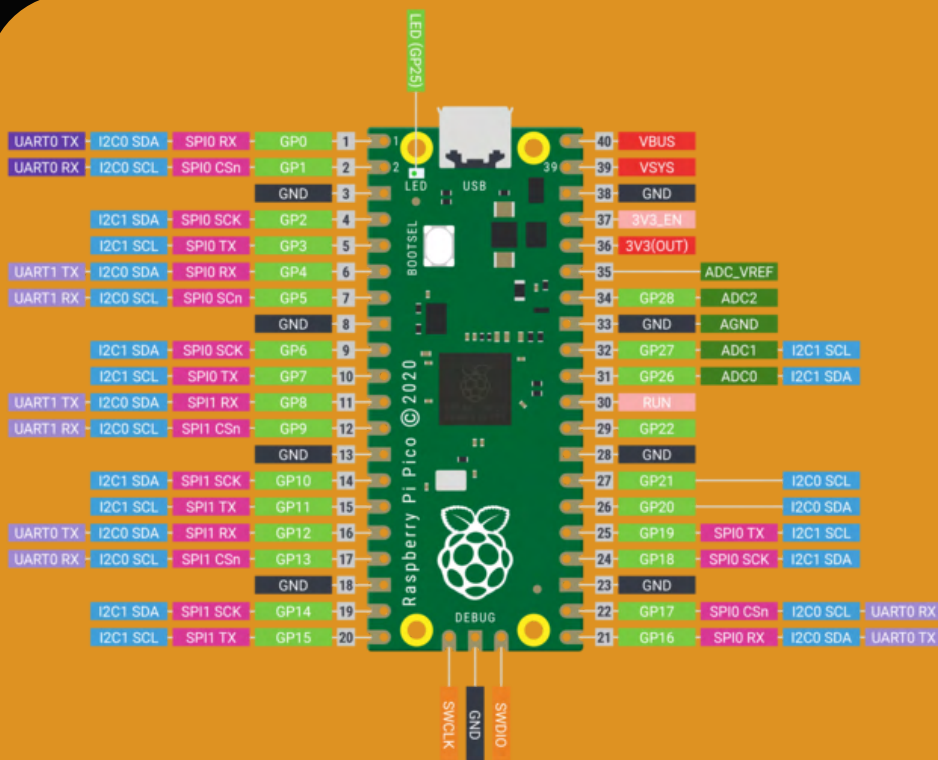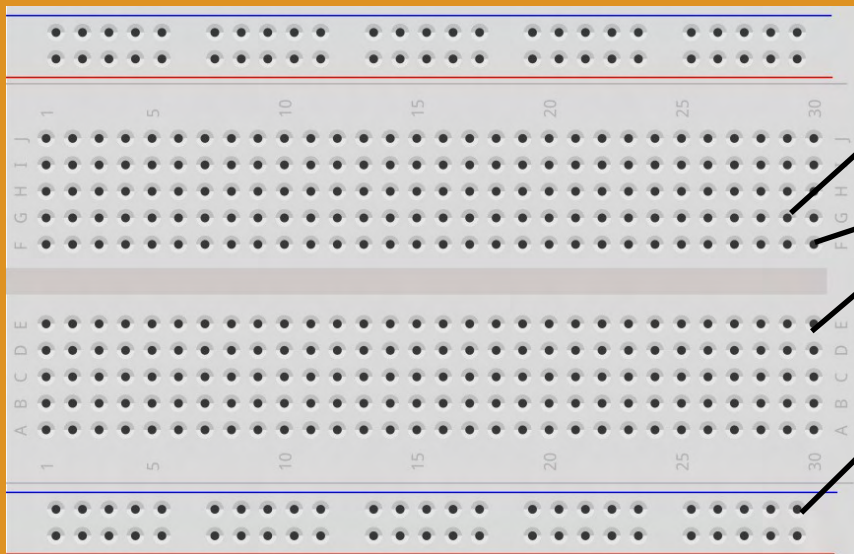


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# Let's build a Weather Station!
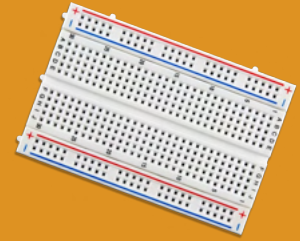
Where building our weather station
as a prototype
using a breadboard.
So what exactly is a breadboard?

A breadboard is a project platform to test a prototype circuits on. They provide a reusable environment that allows different ideas to be tested.

Breadboards come in different sizes, but they are all have a pattern of holes with holes for jumper wires. The main area have the holes connected vertically and the edges (power rails) have the holes connected horizontally.

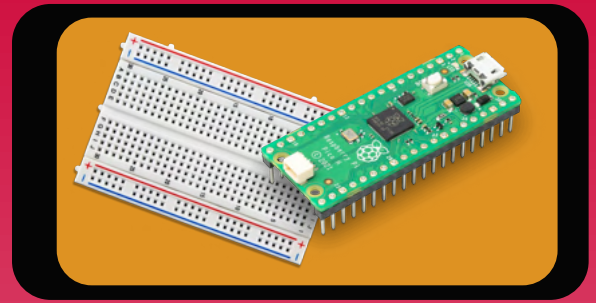Vertically connected holes to allow patching to other ver-

There two areas are separate to allow more devices

Horizontally connected rows to distribute power to devices. RED for positive (+). BLUE for negative (-).
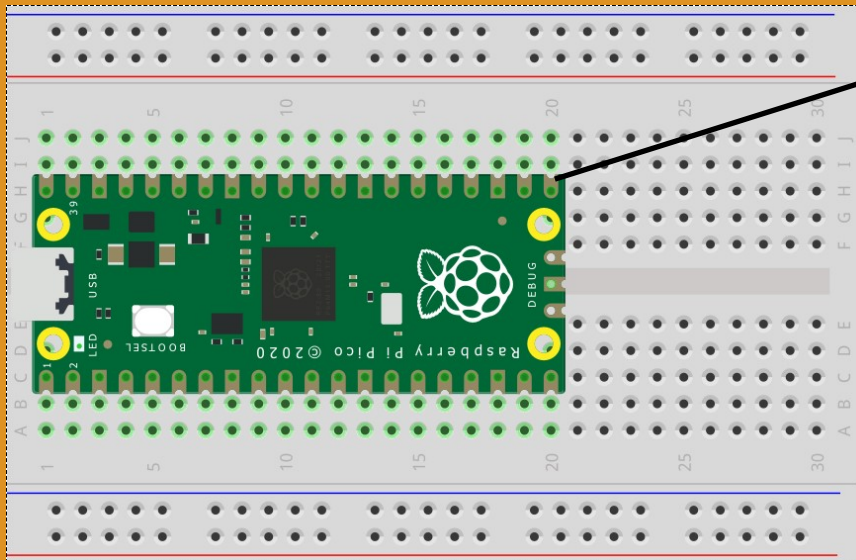
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# Let's build a Weather Station!

It's time to put the microprocessor onto the breadboard which is where we are going to build our weather station. So how do we line them up and fix them together?

The breadboard has 30 columns in two blocks in the centre. The Pico has to be located at the very left hand side with the microprocessor pins in the middle of the two blocks with the pins lined up to the very left hand edge. as shown in the diagram below.

**Be very careful pressing the Pico down. don't force it or it may break.** Press gently at the edges so it sits flush to the breadboard with the Pico pins all the way in so you cannot see them.
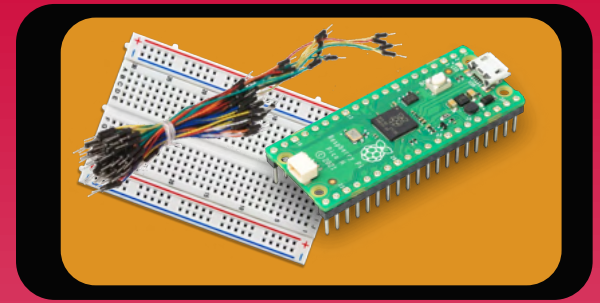
Make sure there are 2 rows above and below the Pico.

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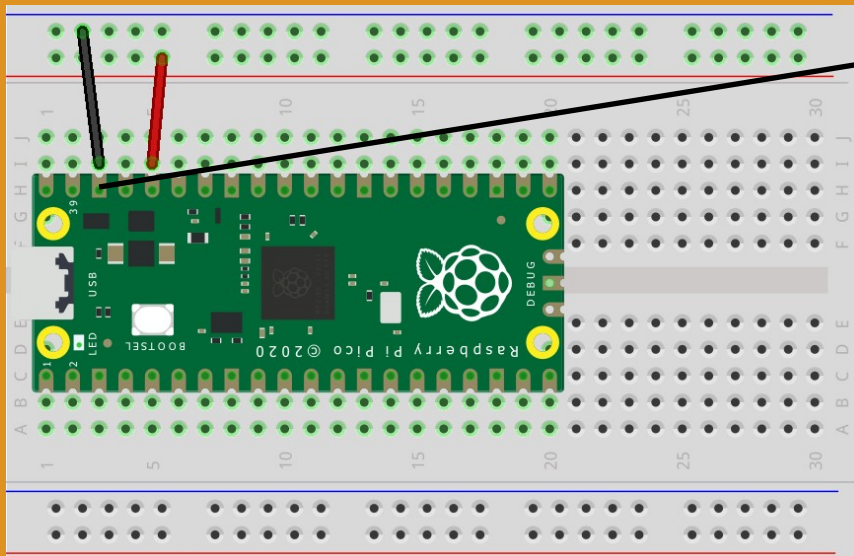
# Let's build a Weather Station!

That's the Pico on the breadboard and we can start adding all the components and wires.
Let's start by adding power to the power rails (rows) at the top of the board.
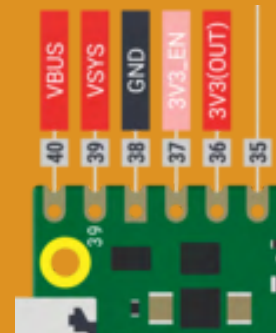
The top row of the breadboard needs to have a 3.3v (+) and ground (GND) added to them.

We can do this by adding a wire from the 3.3v power out on Pico to the RED rail with a RED wire and a GND to the BLUE rail using a BLACK wire.  See the diagram on page 4 for the Pins.
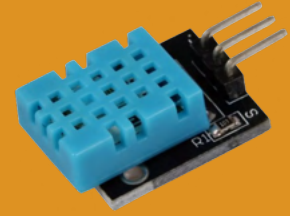
Pin 38 – BLUE rail, Pin 36—RED Rail



You can tell the GND pin as it has a square edges.

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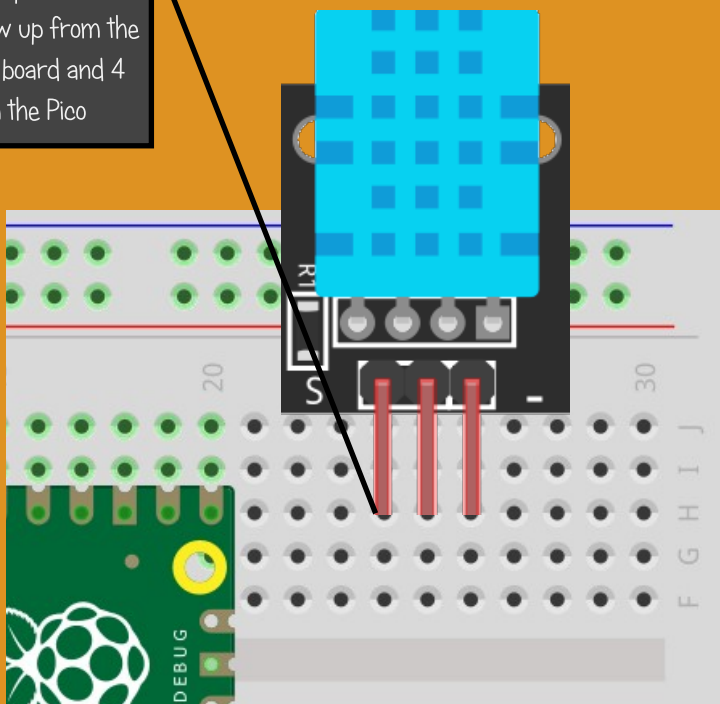
# Let's build a Weather Station!

Now we have the basic prototype setup,
we have the Pi Pico on the breadboard
and the power distribution is ready.
Now we can site the rest of the components.

The first component we can add is the DHT11 sensor.

It has 3 connectors that need to be lined up on the breadboard

The three connectors are 3.3v power,  GND

and a signal pin (in the middle) which send the readings to the Pico.

Locate the 3.3v pin (+) on the second row up from the middle of the  board and 4 hole way from the Pico

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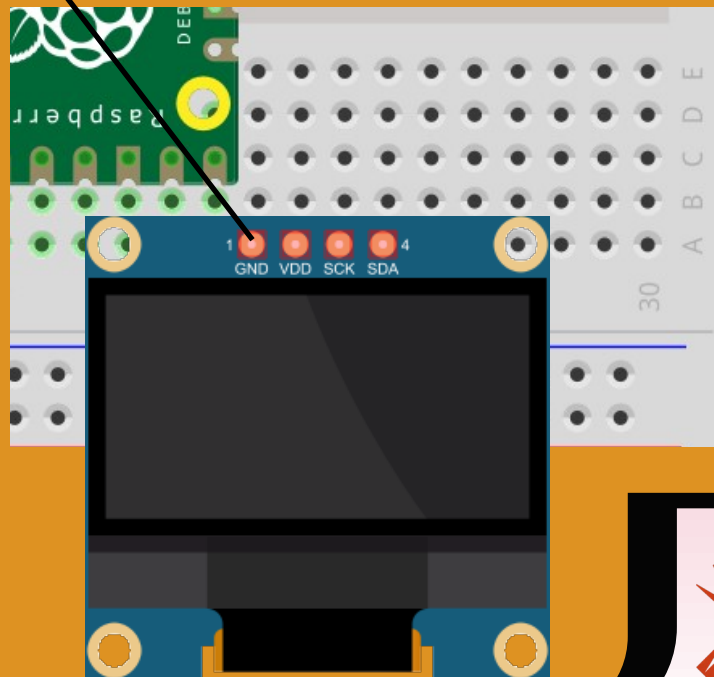
# Let's build a Weather Station!

Now we have the basic prototype setup,
we have the Pi Pico on the breadboard
and the power distribution is ready.
Now we can site the rest of the components.

The next component we can add is the OLED screen.

It has 4 connectors that need to be lined up on the breadboard

The four connectors are 3.3v power (VCC),  GND,

and the clock (SCL/SCK) and data signal (SDA) pins which send the readings to the Pico.

Locate the VCC pin (+) on the bottom row from the middle of the and 1 hole way from the Pico

**BEWARE!**

Check the connections carefully some OLED have a different layout!

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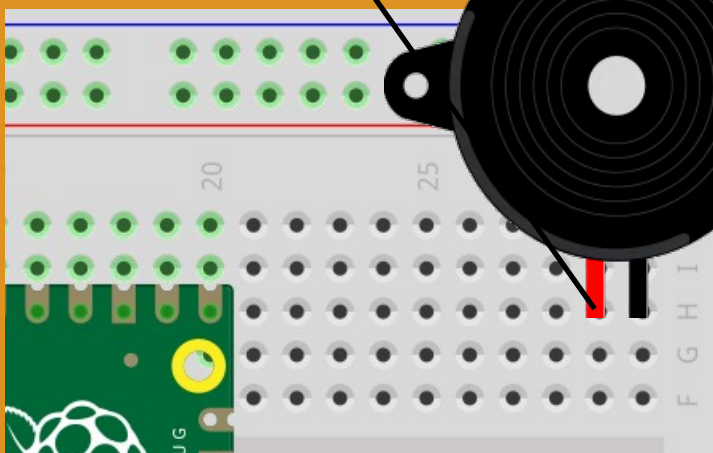# Let's build a Weather Station!

Now we have the basic prototype setup,
we have the Pi Pico on the breadboard
and the power distribution is ready.
Now we can site the rest of the components.

The next component we can add is the OLED screen.

It has 4 connectors that need to be lined up on the breadboard

The four connectors are 3.3v power (VCC), GND,

and the clock (SCL/SCK) and data signal (SDA) pins which send the readings to the Pico.

Locate the VCC pin (+) on the second row up from the middle of the board and 1 hole in from the edge.

BEWARE!

Check the connections carefully. The VCC (+) pin needs to be on the inside of the board.

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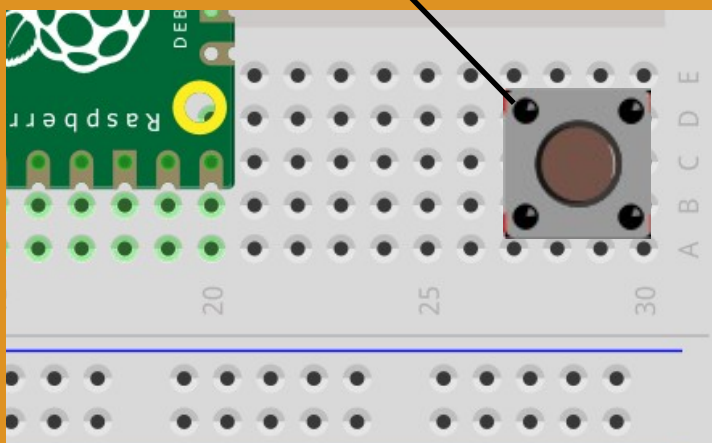# Let's build a Weather Station!

Now we have the basic prototype setup,
we have the Pi Pico on the breadboard
and the power distribution is ready.
Now we can site the rest of the components.

The next component we can add is the Button. It has 2 connectors that need to be lined up on the breadboard

The 2 connectors work in either direction so as long as the button is in the right location it will work

The button should be in the bottom area in the middle or the left hand side

with the pins in the last, and fourth from last row.

There isn't a VCC pin (+) or a GND (−) pin on a basic button.

**NOTE!**

The connections work in either direction. If the button has 2 pins they need to be on the left and right side. If it has 4 pins they need to be on the left and right side too.
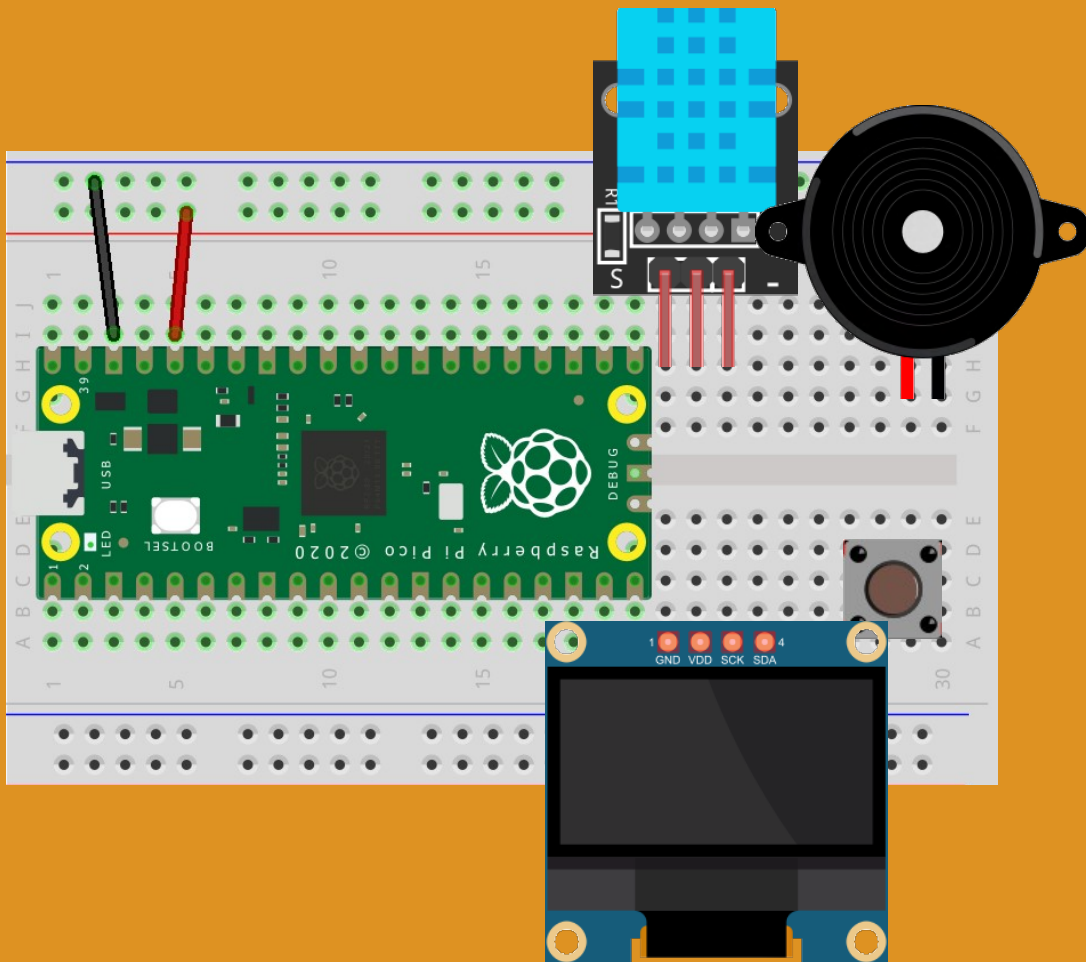
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# Let's build a Weather Station!

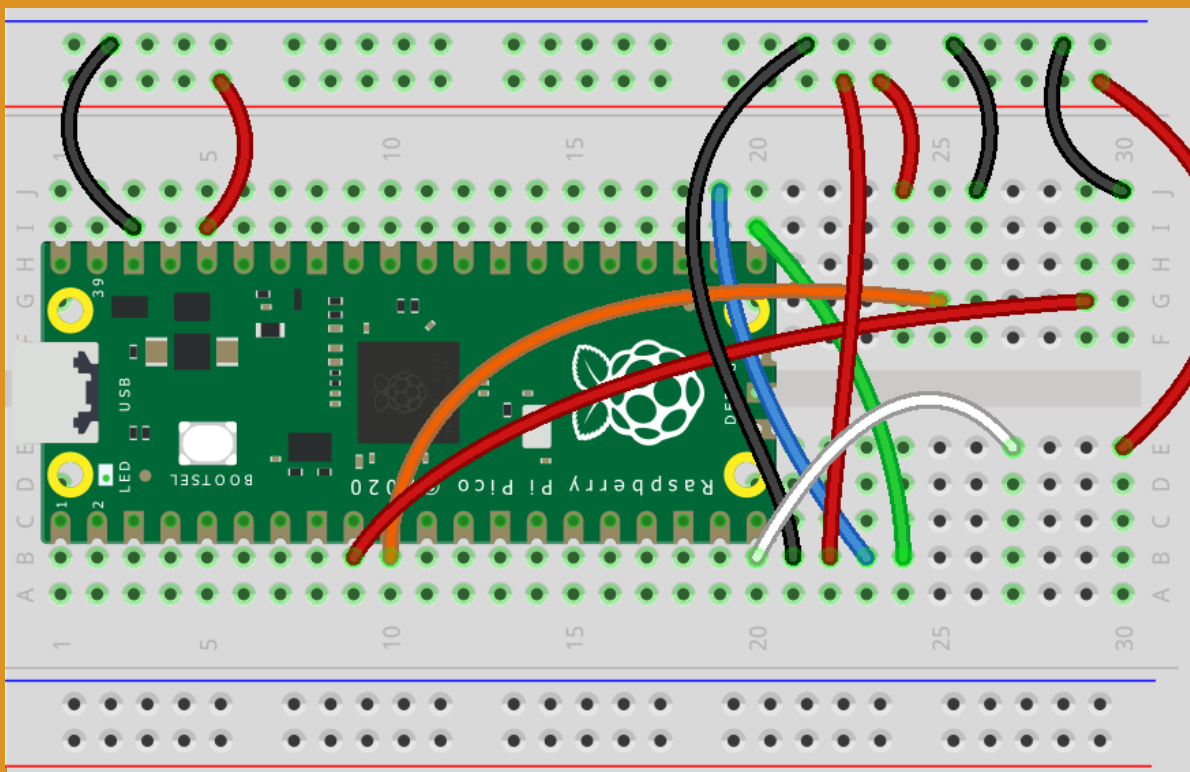Now we have all the components on the board we can start to wire them together!

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# Let's build a Weather Station!



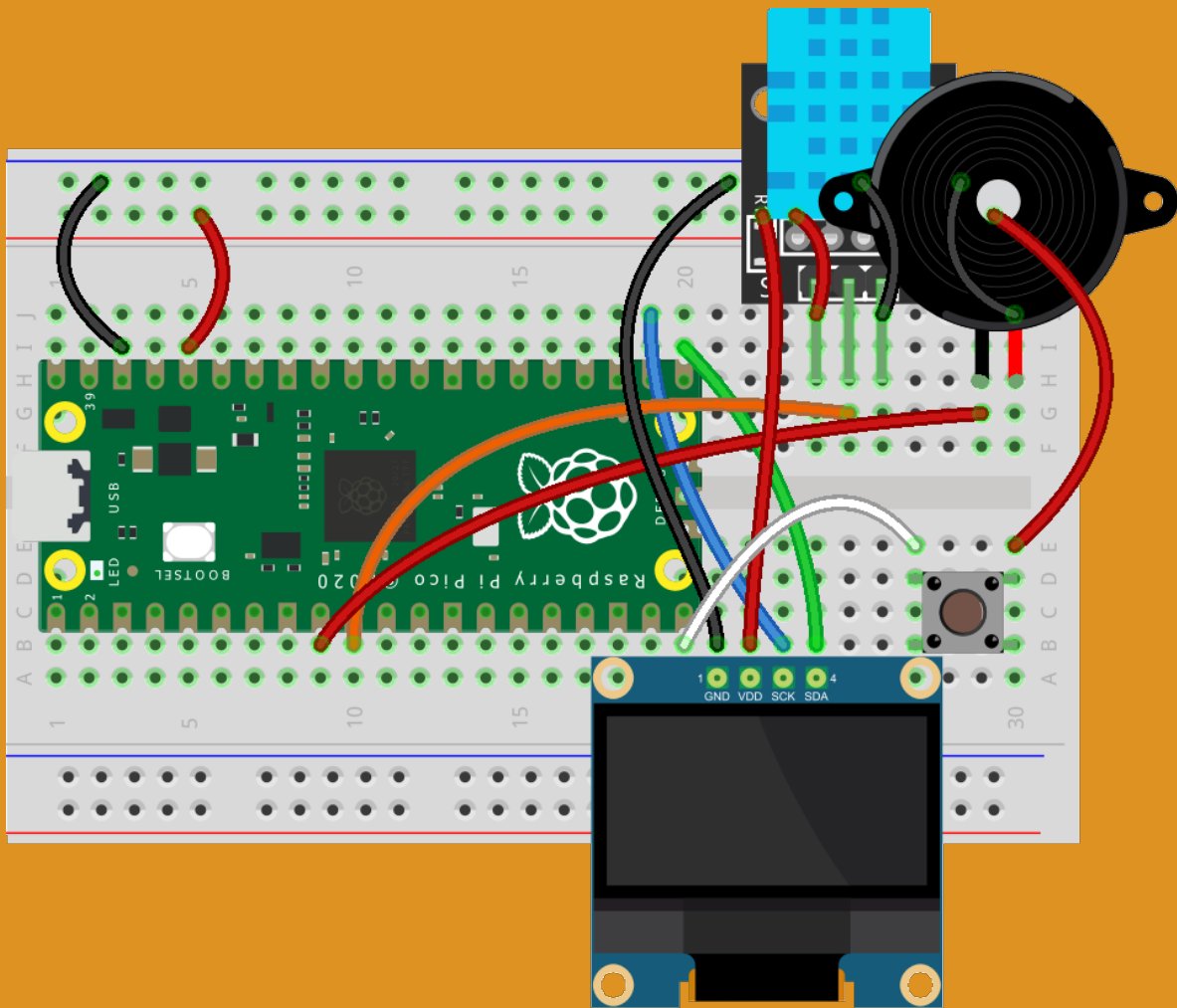Now we have all the components on the board we can start to wire them together!

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# Let's build a Weather Station!

Now we have the all the components on the board and the wiring so what next?

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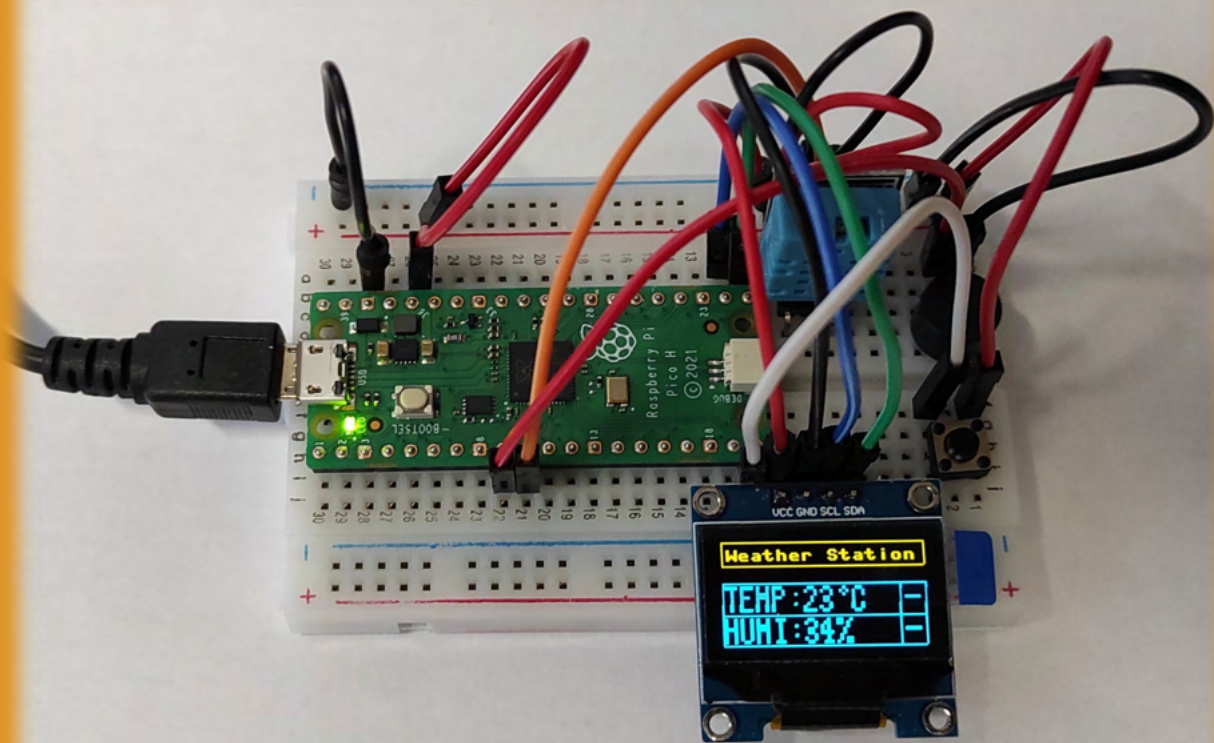
# Let's build a Weather Station!

## We plug it in and see what we get!



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