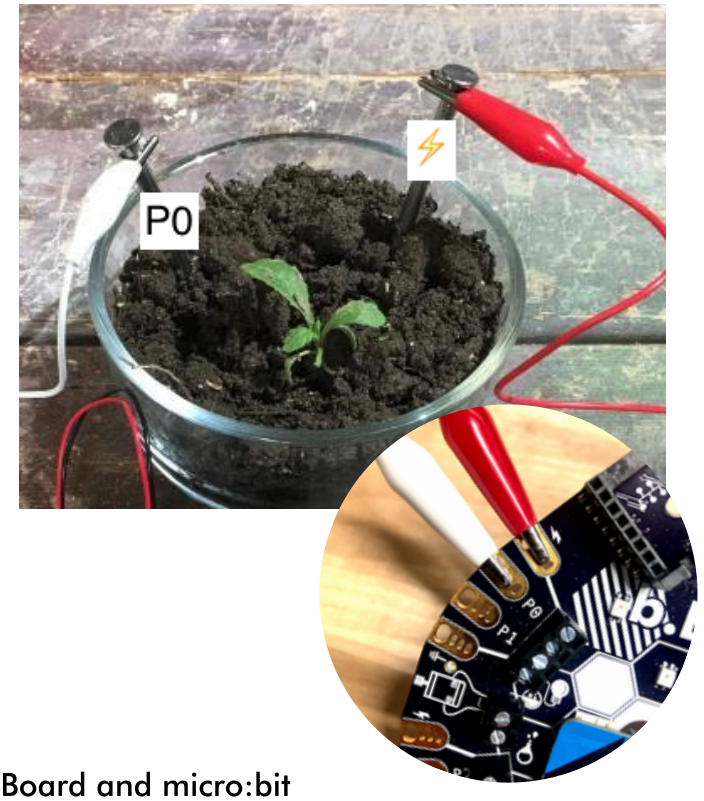
Water on Mars: Is there any water on Mars?

While the earth is covered in around 70% water, the low pressures and temperatures on Mars do not allow for water to exist in stable liquid form. Therefore, water on Mars is usually in the form of ice and vapor in the atmosphere. New research also suggests that there is a lot of water below the surface on Mars. As humans, we require water to live, so finding water on this dusty planet is top priority! Using satellite imagery, we've been able to narrow down a small area of Martian soil that we believe may contain moisture. Your mission will be to detect any signs of water or moisture on Mars.

We know that dry soil doesn't work well for conducting electricity, but wet soil does because water is extremely conductive. Let's use that knowledge to help us find water on Mars and test this Martian dust for how well it can conduct electricity. In the picture below, we've connected the nail with the red gator to power on the bBoard and the nail with the white gator to P0 on the b.Board. If there is moisture in your testing site, the electricity should be conducted between the two nails, which would complete the electrical circuit to turn on a signal.

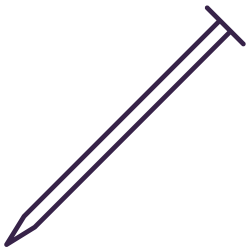


1 0 1 0
0 1 0 1
1 0 1 0

Computers such as the b.Board and micro:bit like their information to be very straightforward (yes or no, on or off, 0 or 1), we call this binary. With binary, a pin-like P8 can either be off or on, that is to say, 0 or 1 to the computer.

Greicius, T. (2021, June 24). Study Looks More Closely at Mars' Underground Water Signals. NASA. https://www.nasa.gov/feature/jpl/study-looks-more-closely-at-mars-underground-water-signals/.

When we are using analog signals, instead of either 0 or 1, it will return a value of 0 all the way up to 1023. This means we can detect if a signal is all the way off (0) or all the way on (1023) or somewhere in between.

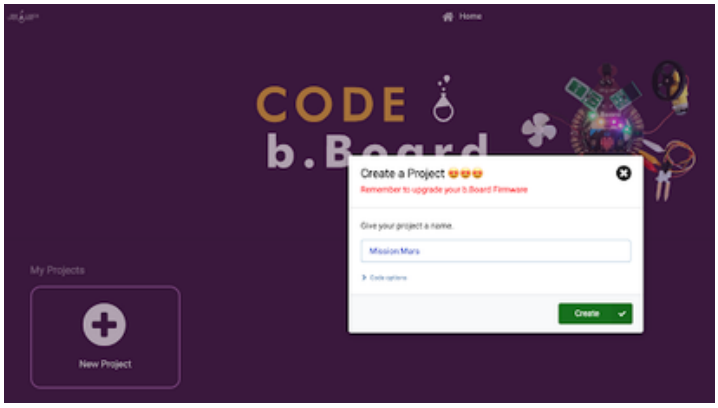


With our nails, if we touch the two nails together, P0 will be connected to power and fully on (1023), but if we stick the nails in the soil, depending on how wet or dry it is, P0 will be closer or further away from 1023.

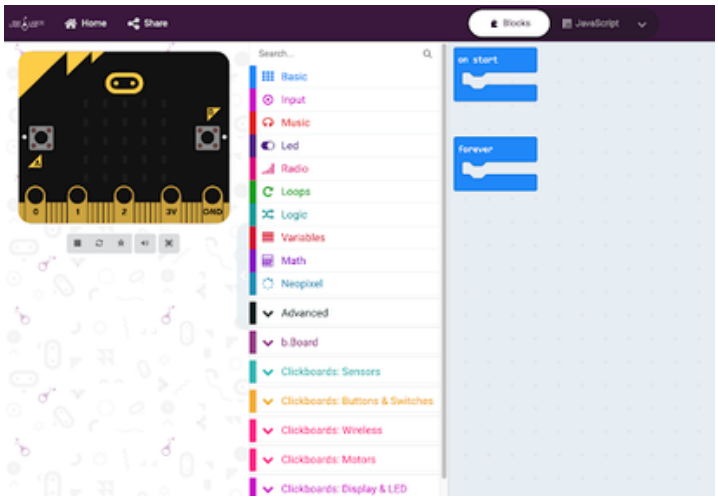
The b.Board and micro:bit have built-in ability to read analog signals. If you don't know much about the b.Board, or how to power it or plug anything in, take a minute to go through our great getting started guide before you go any further! There's even a section with an example of how to use the microphone.

Getting Started Guide

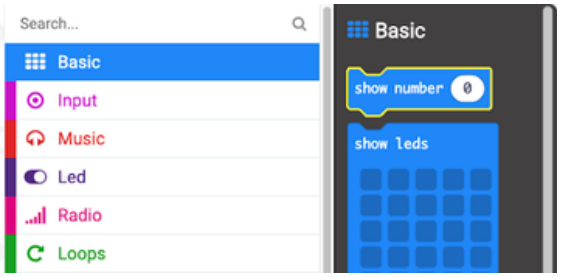
Once you're ready to go, head on over to code.brilliantlabs.ca and start testing it out! Create a new project or open one that you've already created. In my case, I selected the new project + icon and gave it the name Mission:Mars.



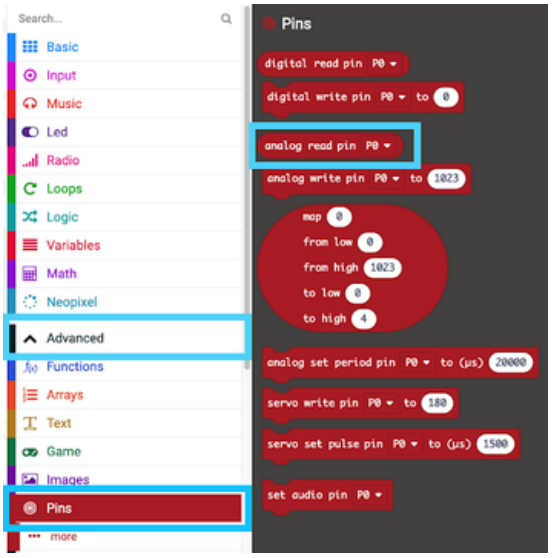
As soon as you select "create", your new project will open. You should see something like this:



On the left hand side of the screen you can see the toolbox. This is where we keep all of the blocks of code you need to control your micro:bit and b.Board. Let's experiment with reading the soil moisture by displaying the analog value on the micro:bit LED screen. To do that, grab the 'show number' block in the basic toolbox as shown here:



Now drop it in your forever loop and grab the 'analog read pin' block as shown here:



Finally, drop it into your 'show number' block inside your 'forever loop'.

Download your code to your micro:bit and observe how the value changes as you change the moisture level.

What next?

Head on over to our WiFi guide to learn how you can connect your rover to our Brilliant Labs Cloud (cloud.brilliantlabs.ca) and get your rover ready to send this analog data from "Mars" back to "Earth". :)

Join the Mission: Mars Challenge!

Are you on track to complete your Mission: Mars Rover by early May? If so, Brilliant Labs welcomes you to visit or mail your rover to 1 of 5 in-person Provincial School Maker Faires or the Atlantic Virtual Mission: Mars Challenge (June 2nd). This is your chance to showcase your work and participate in up to 10 mission challenges. Each challenge, when completed successfully, will earn points and badges. The Mission: Mars student engineers with the most points will win the Mission: Mars Challenge Showcase!

Download, Register & Book Today!

Get the Mission: Mars Challenge Guide to learn more about what to expect and how the points will be awarded. Plus, don't forget to register and book your Mission Challenge(s) at Brilliantlabs.ca/innovation-challenge/missionmars (winners will be announced at the June 9th Atlantic Virtual School Maker Faire). Join the challenge and explore Maker Mars!