Welcome to Mission Mars

Mars Rover 1 Part 1/3

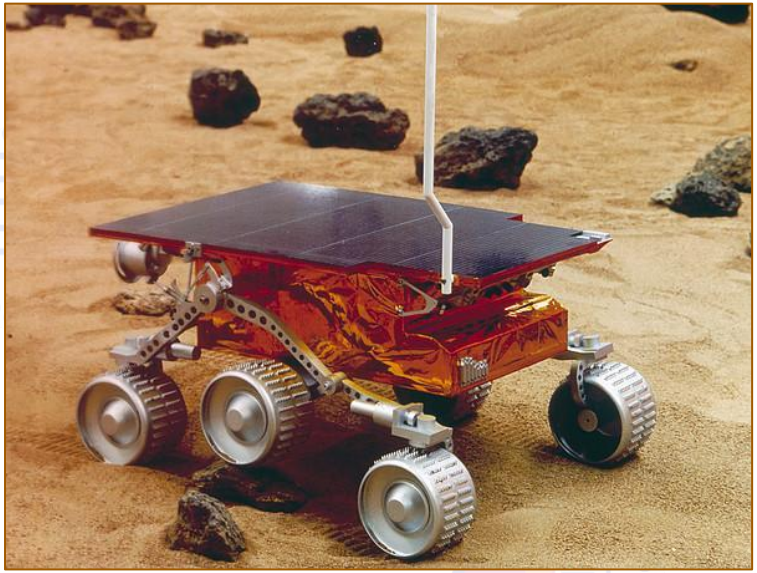
MODULE 6

What is a Mars Rover

It is small vehicle sent from Earth to explore surface of Mars.

The first rover to land on Mars was named Sojourn.

It was launched in 1996 & landed in 97.

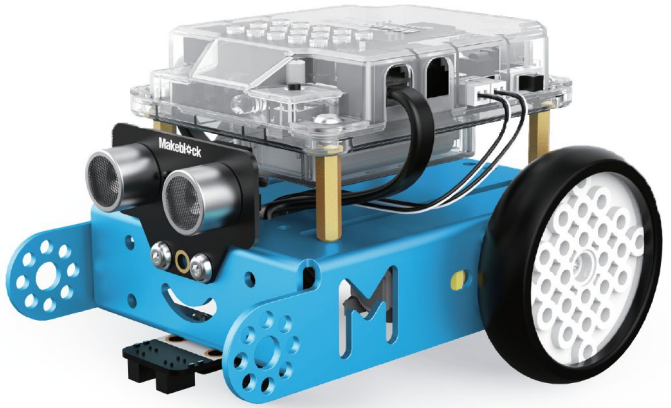


Rovers help scientists in their quest to understand what different parts of the planet are made of.

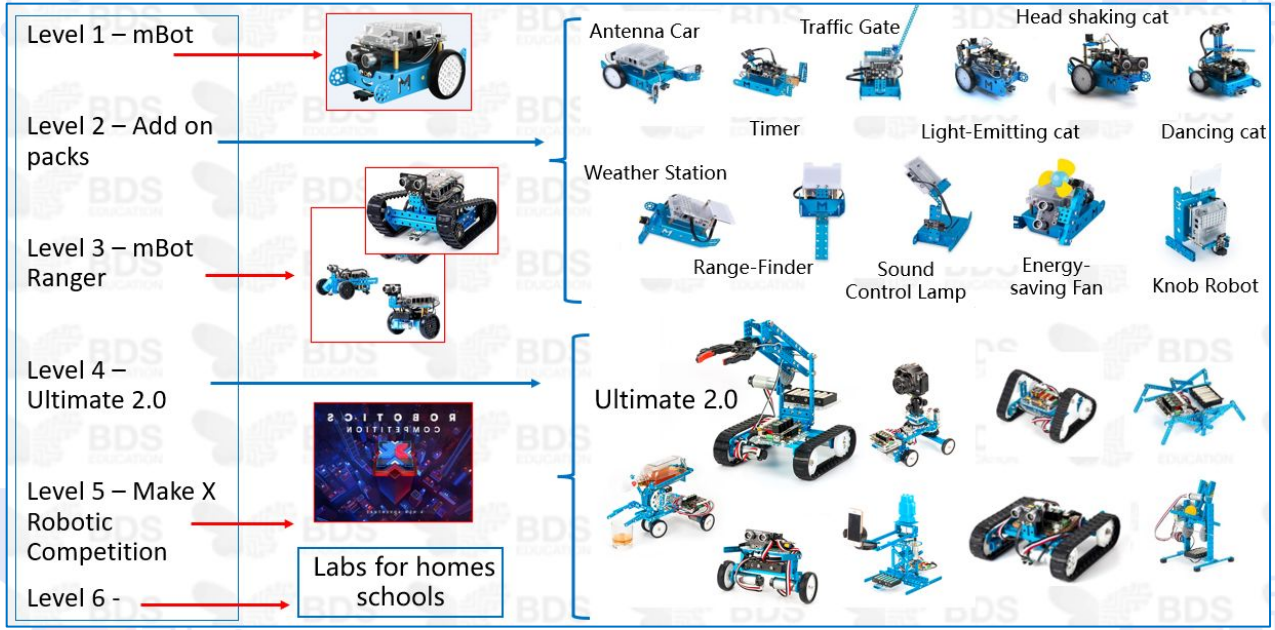
Mars is made up of lots of different types of rocks and each rock is made up of a mixture of chemicals.

A rover can drive around to different areas, studying the different chemicals in each rock

Welcome to mBot – Our Rover for Mission Mars



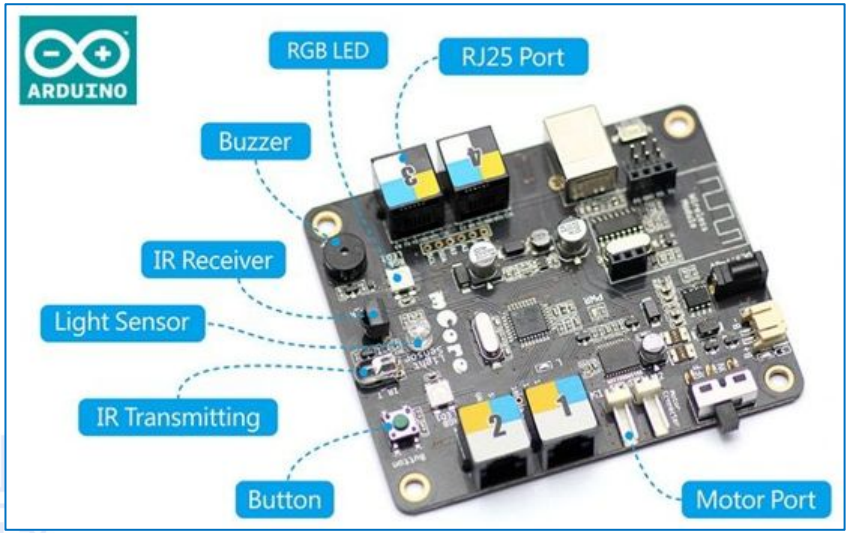
Six Level Family of mBot Robotic Kits.



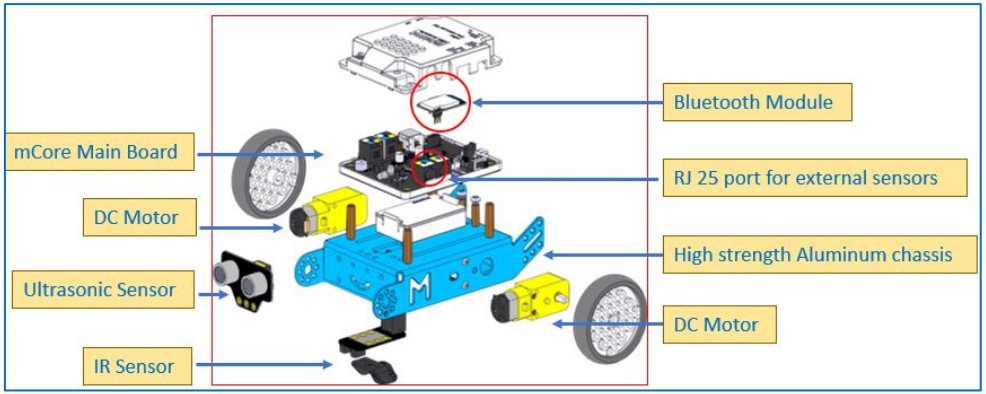
Components of Level 1 Robotic Kit - mBot

Comes with a step by step DIY Assembly Guide

Heart of mBot – mCore Arduino Board

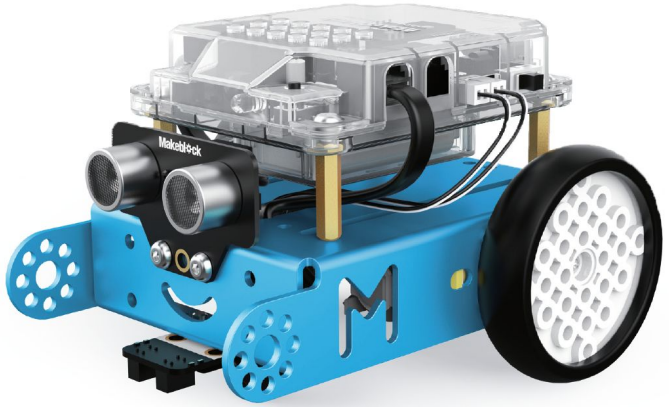


Layout of Major Components



Follow the illustrated manual to assemble the mBot

Assembly & Testing of mBot



mBot Assembly Tool

Note:
Screw heads
& Direction of tightening

Let children follow the User Manual & assemble their mBot

Powering Options of mBot

mBot voltage range – 3.7 V to 6.0 V DC

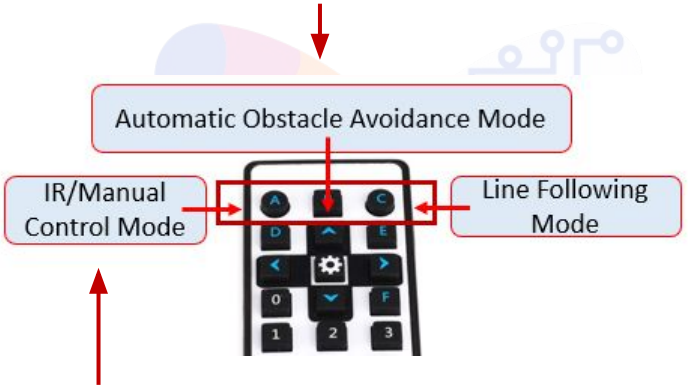
Powering option 1 – 4 x AA batteries in a battery holder with a 2.5mm Barrel plug that connects to mBot.

Powering option 2 – 3.7 V Lithium battery with standard 2.0 interface that connects to mBot.
It supports on board USB charging.

Powering option 3 – mBot can also be powered from a PC/laptop using a standard USB cable.

Operating Modes of mBot.

The three mode are shown below:

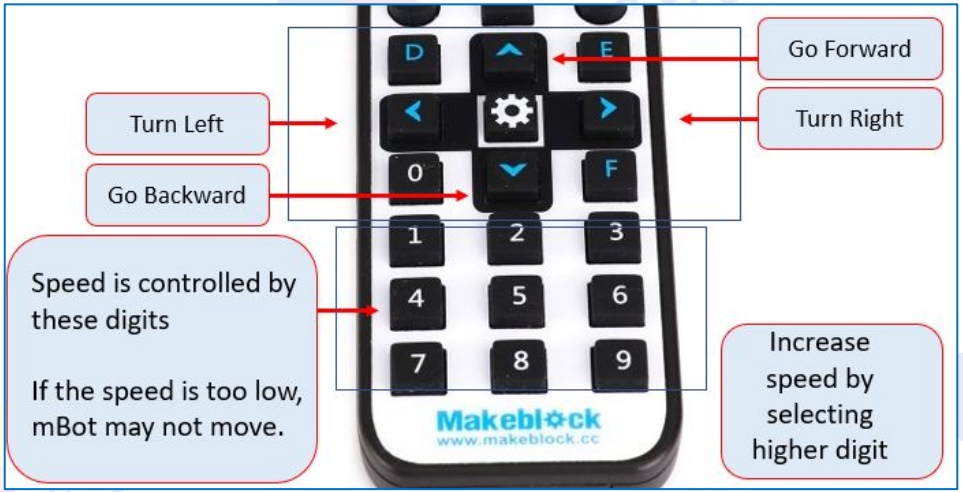


Note: IR/Manual mode, in turn has two modes:

- **Manual mode. This is to operate mBot manually without coding. It is a good idea to use this before you start learning to code.**
- **IR control mode. This involves coding. This is what we shall learn.**

Manual Control of mBot

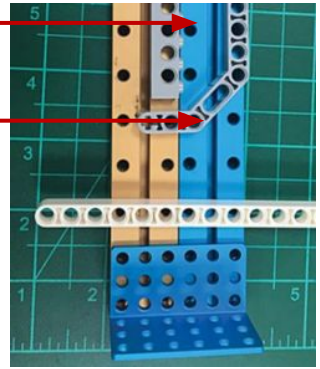
Button Functions are shown below:



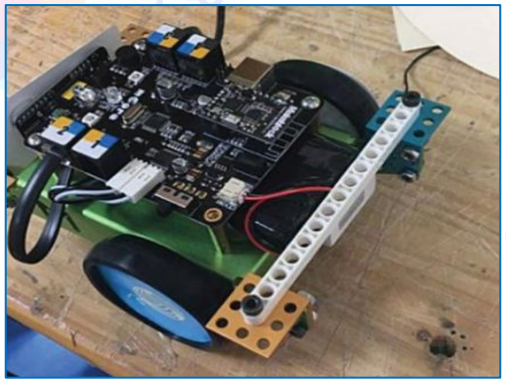
Compatibility with Lego

Here blue & golden are mBot structural parts

Grey & white blocks are of Lego.



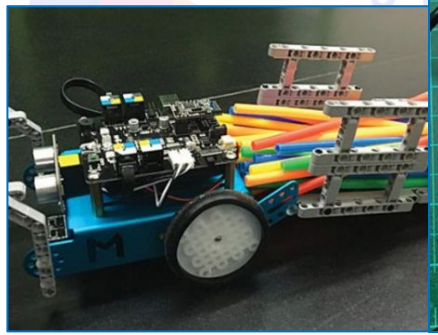
Both are compatible. Use these & similar blocks to expand the mBot structure.

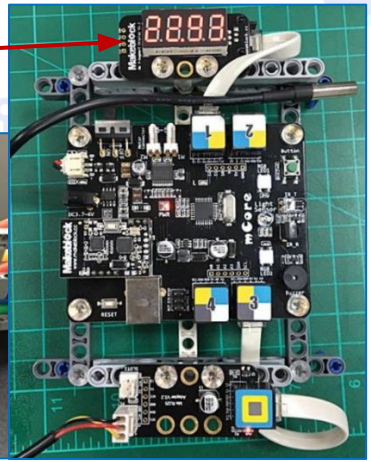


Use the expanded structure to:

1. Mount external sensors & components.
2. Free imagination.
3. Explore possibilities.
4. Create more robots.

& learn more.





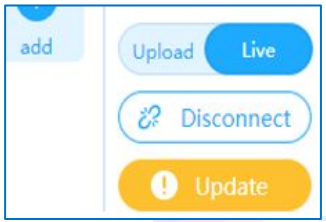
Let us now Learn how to use the mBot

Need for Firmware Update

A firmware update may be required on two occasions:

- When connecting for the first time.
- In case not used for some time.

To update, connect mBot to PC.
Select live mode. This screen appears.



If there is no update, it does not appear.

Connecting PC/Laptop to upload the Code

Coding is done on a PC or laptop
Once the code has been written, it must be uploaded to the mBot to play.
Options are:

- **Use USB cable.**

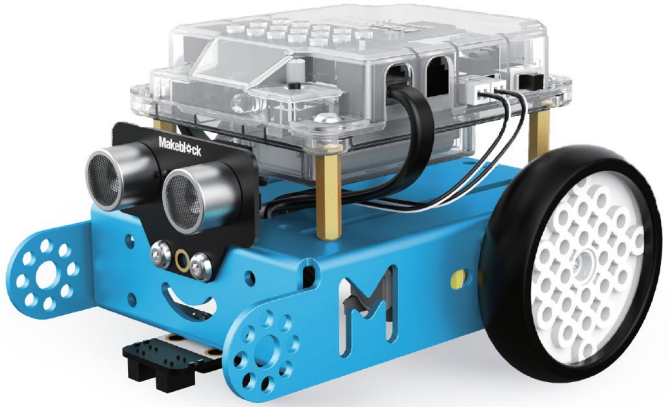
- **Use Wireless dongle.**

Wireless in turn has two options:

- **Option 1 – Use in-built Bluetooth.**
  Its version on PC must be 4.0.

- **Option 2 - In case it is not 4.0**
  use supplied 2.4 Ghz USB Dongle.

Procedure for Coding Devices



The basic procedure for coding Devices is like those for coding Sprites.
The main features are:

- Devices have a library like sprite library.
- Devices have no background library because they perform in the real world & not on a stage.
- Devices are coded on the PC in the same ways as a sprite.
- Once coded, the code needs to be uploaded to the brain of the device.

Accessing the Device Library

Coding with devices starts from the Device library.

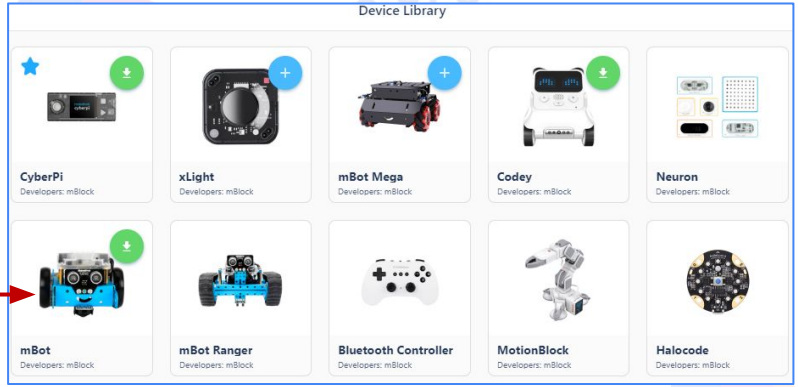
To access the device library, in SIA, Select devices.

Default device Cyber Pi is highlighted.

Device Library offers dozens of options

These including use of third party devices like Arduino & Raspberry Pi.

In Mission Mars We shall learn mBot only.



Scroll & see the device options of mBlock. Possibilities are limitless.

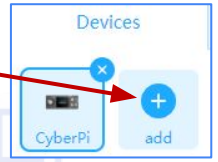
Default Device

Cyber Pi is the default device.
It is used for Learning Python.

However, it can be coded in Scratch as well.
We shall use it in some on our advance projects on planet Mars.

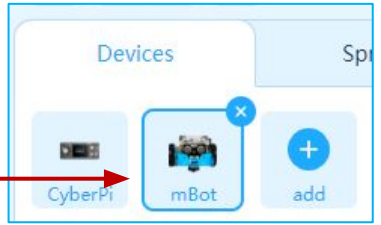
Accessing the Library for Other Devices

To add other devices, Click add.



Device library opens.
In device library:

- Select device (mBot) & click ok.
- mBot gets added & blocks & block statements for mBot can be seen & used.

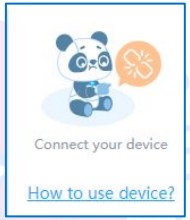


- In addition, are the blocks & block statements of mBots block extension library.

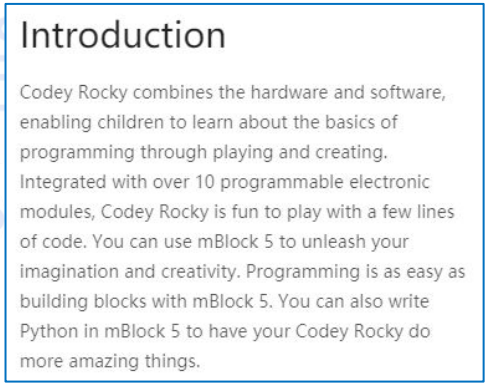
- Kindly go over them for information of possibilities.

In-built Device Tutorials

When the device gets added, you will see this useful link on the screen.



On clicking it a short tutorial on the device appears.



See it on your own.

Block Extension of Selected Device

Every device has its extension library as well.
These are similar to Sprites & are used in same way.

They contain addl block statements
to do more coding projects
with the selected device.

To use click on add.

Blocks related to that extension appear.

Code Karega India Badhega