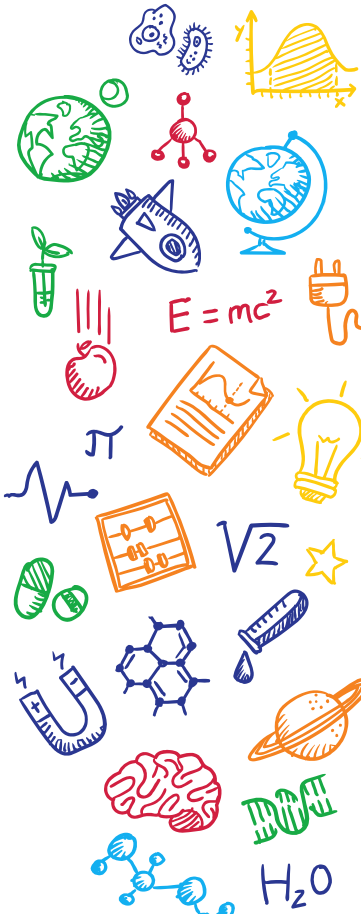
STEMpedia

Internet of Things

Weather Data from Location

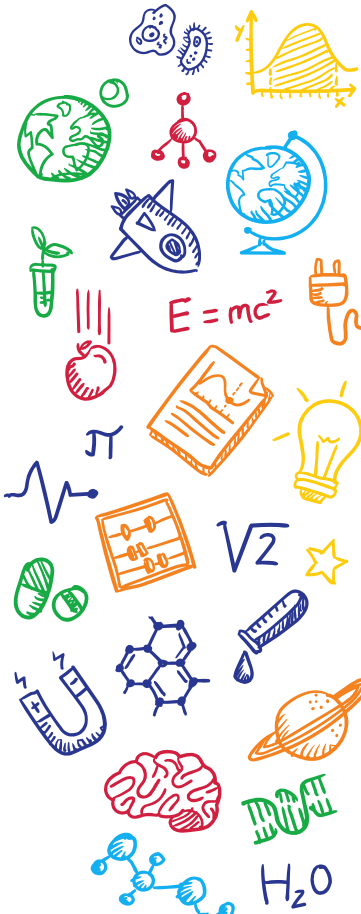
Internet and Internet of Things

- The Internet is one of the greatest creations and gives everyone in the world with Internet access instant access to an endless supply of knowledge and entertainment.
- The Internet of Things means **taking all the things in the world and connecting them to the internet**.
- In the Internet of Things, all the things that are being connected to the internet can be put into three categories:
  1. Things that collect information and then send it.
  2. Things that receive information and then act on it.
  3. Things that do both.



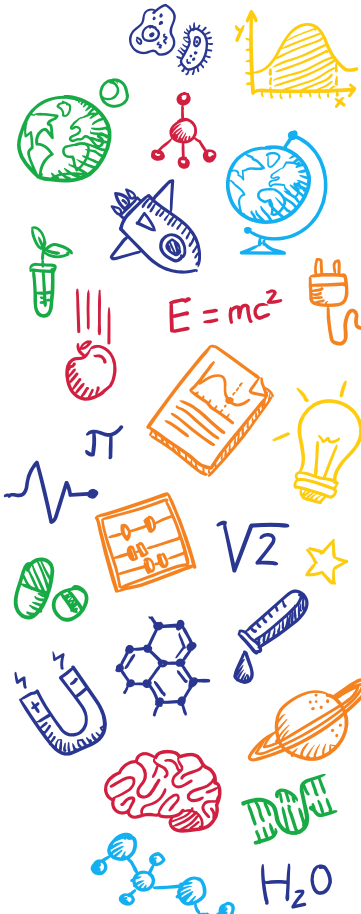
API

- There are many organizations, who gather weather data like temperature, etc. to the cloud and give access to the requested data using API.
- An **application program interface (API)** is code that allows two software programs to communicate with each other.
- The API defines the correct way for a developer to write a program that requests services from an operating system (OS) or could server, which in our case is the weather data.
- In this session we will be using OpenWeatherMap API to get the weather of a particular location.



OpenWeatherMap API

- **OpenWeatherMap** is one of the leading digital weather information providers.
- Using OpenWeatherMap API you can get Current weather data:
  - Access current weather data for any location including over 200,000 cities
  - Current weather is frequently updated based on global models and data from more than 40,000 weather stations
  - Data is available in JSON, XML, or HTML format
  - Available for Free and all other paid accounts



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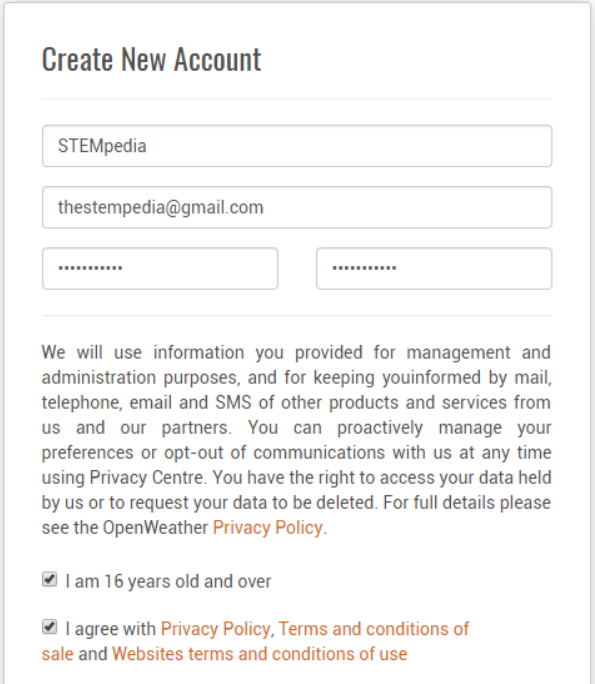
Creating Account on OpenWeatherMaps

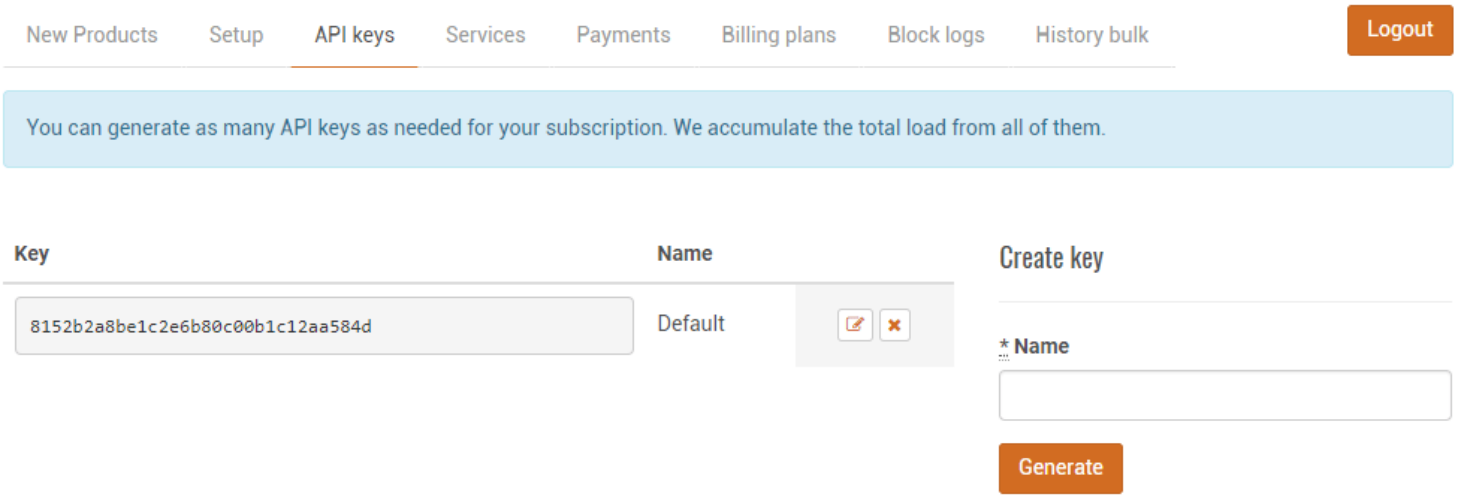
Creating Account

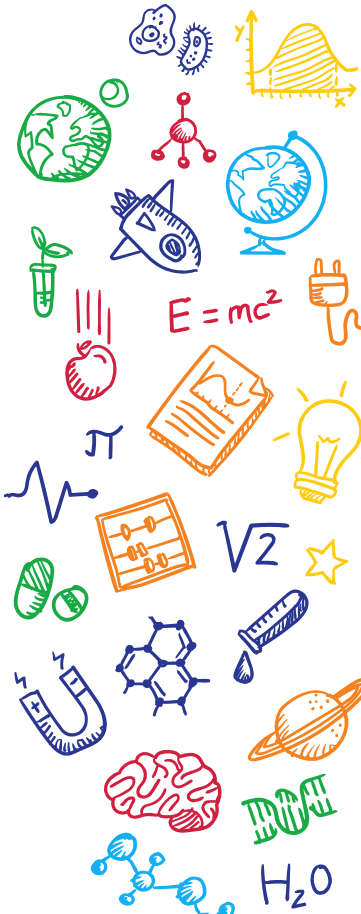
- Go to OpenWeatherMap website: https://openweathermap.org/ and create a free account.



API Key

- Choose the API tab to get the API Key.
- This API Key allows you to request data.

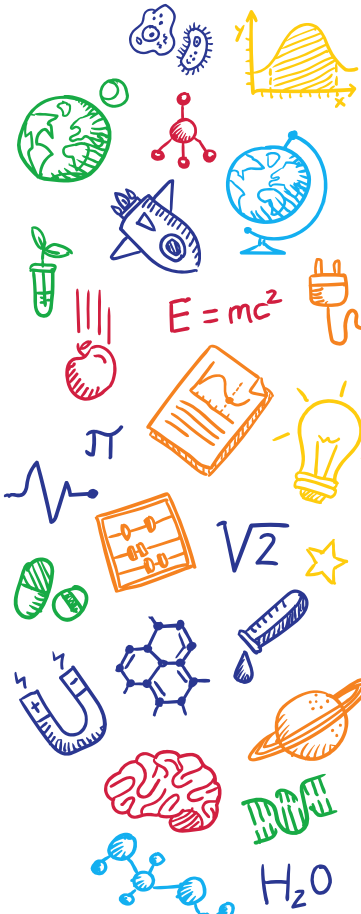




Free Plan

- Free plan has some limitations like only 60 calls per minutes, but it is sufficient for individuals.

	Free
Price Price is fixed, no other hidden costs (VAT is not included)	**Free**
Subscribe	Get API key and Start
Calls per minute (no more than)	60
Current weather API	✓
5 days/3 hour forecast API	✓
16 days/daily forecast API	-
Weather maps 2.0: Current, Forecast, Historical NEW	-
Relief maps NEW	-
Weather maps 1.0	✓
Bulk download	-
UV index	✓
Weather alerts	✓

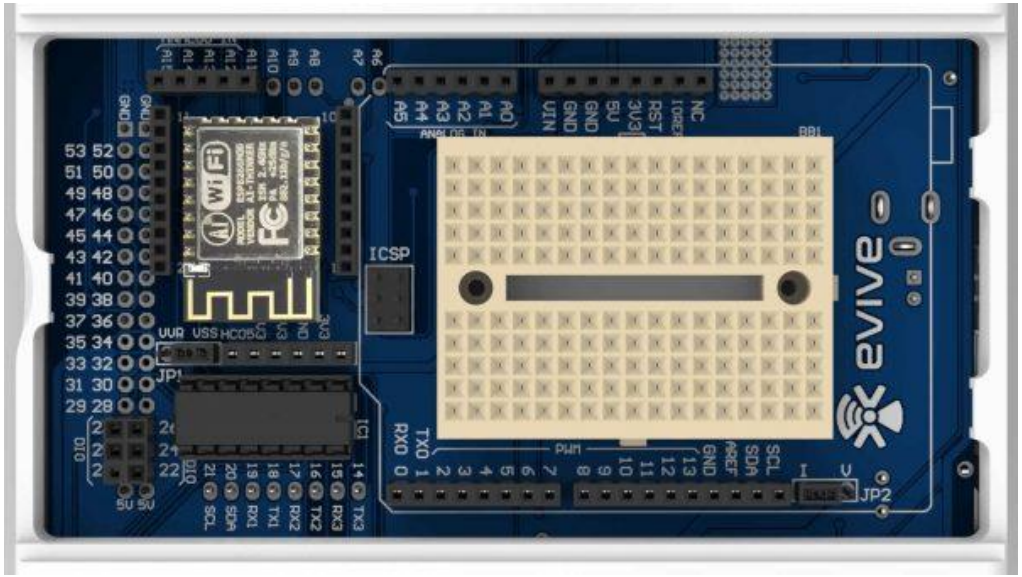


Activity

Getting Temperature Data of a Location

Connecting evive to Internet

- To connect evive with the internet we will use the ESP8266 module.
- Connect ESP8266 Module to its header on evive:



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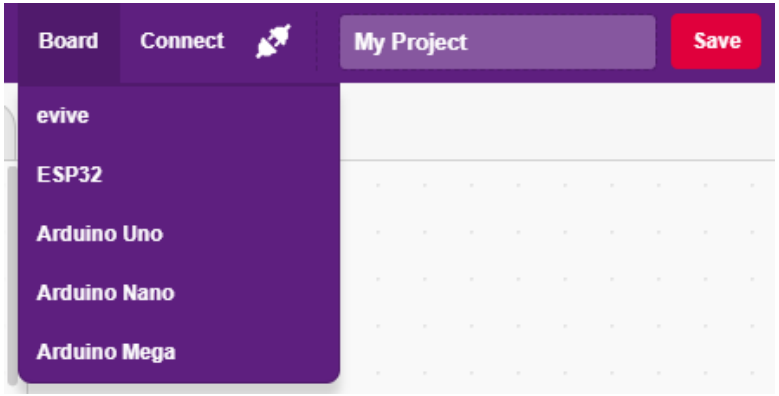
Programming the evive

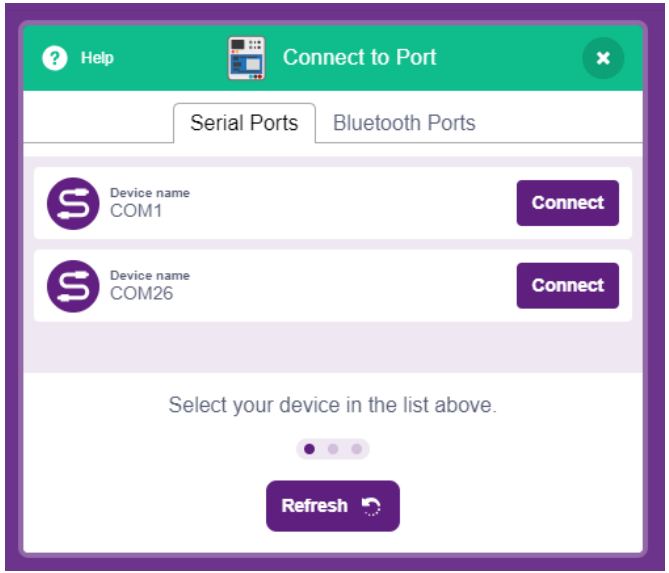
Interfacing evive with PictoBlox

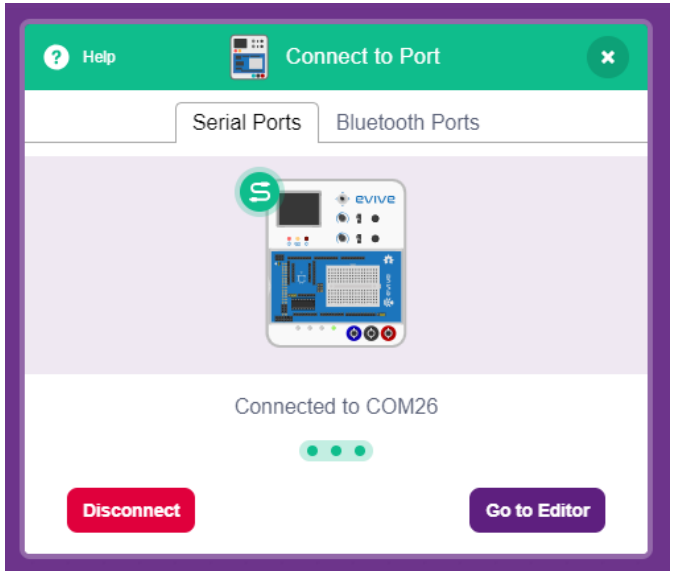
- Connect evive to your laptop/PC and open PictoBlox.
- In PictoBlox, go to the menu and click on the Boards Select the evive.



Interfacing evive with PictoBlox

- Once you've selected the board, click on the Connect tab and connect the board.





PictoBlox Program

- Add Internet of Things extension in PictoBlox by clicking on the add extension button on the bottom left corner.

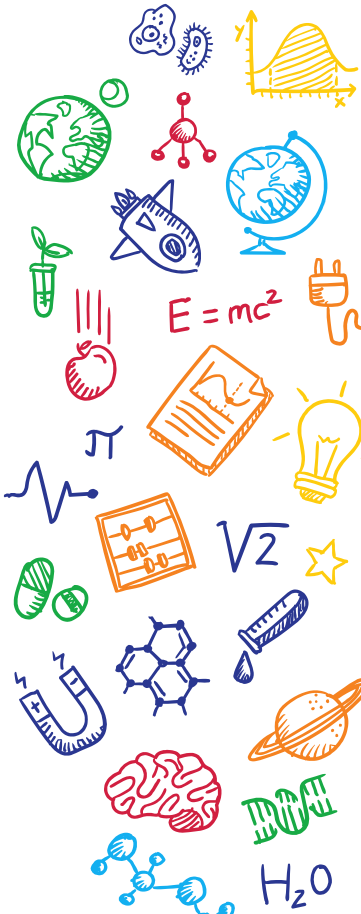
Internet of Things Extension

- **Connect to Wi-Fi () with password ()** block connects ESP8266 module connected to evive to the Wi-Fi. The user has to specify the Wi-Fi name and password in the block.

- **get weather data for latitude () & longitude () with API ()** block gets the weather data of the specified location (**using latitude and longitude**) and stores in the internal variables.

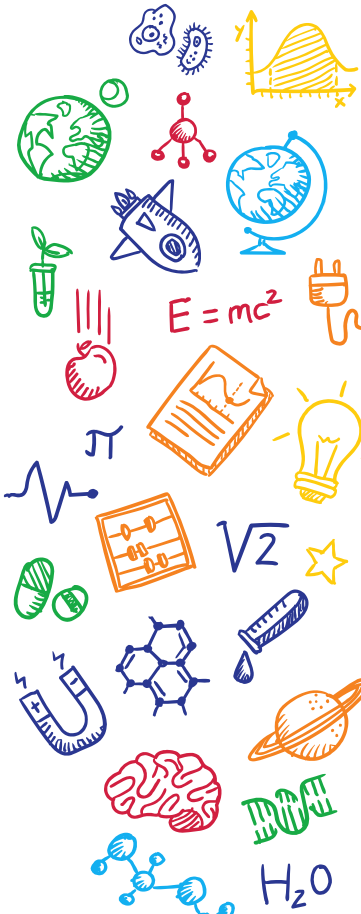
Internet of Things Extension

- **get (float) data**: The block reports the weather data specified in the input:
  - latitude,
  - longitude,
  - the temperature in C,
  - the temperature in F,
  - humidity,
  - visibility,
  - wind speed,
  - wind direction, and
  - clouds.



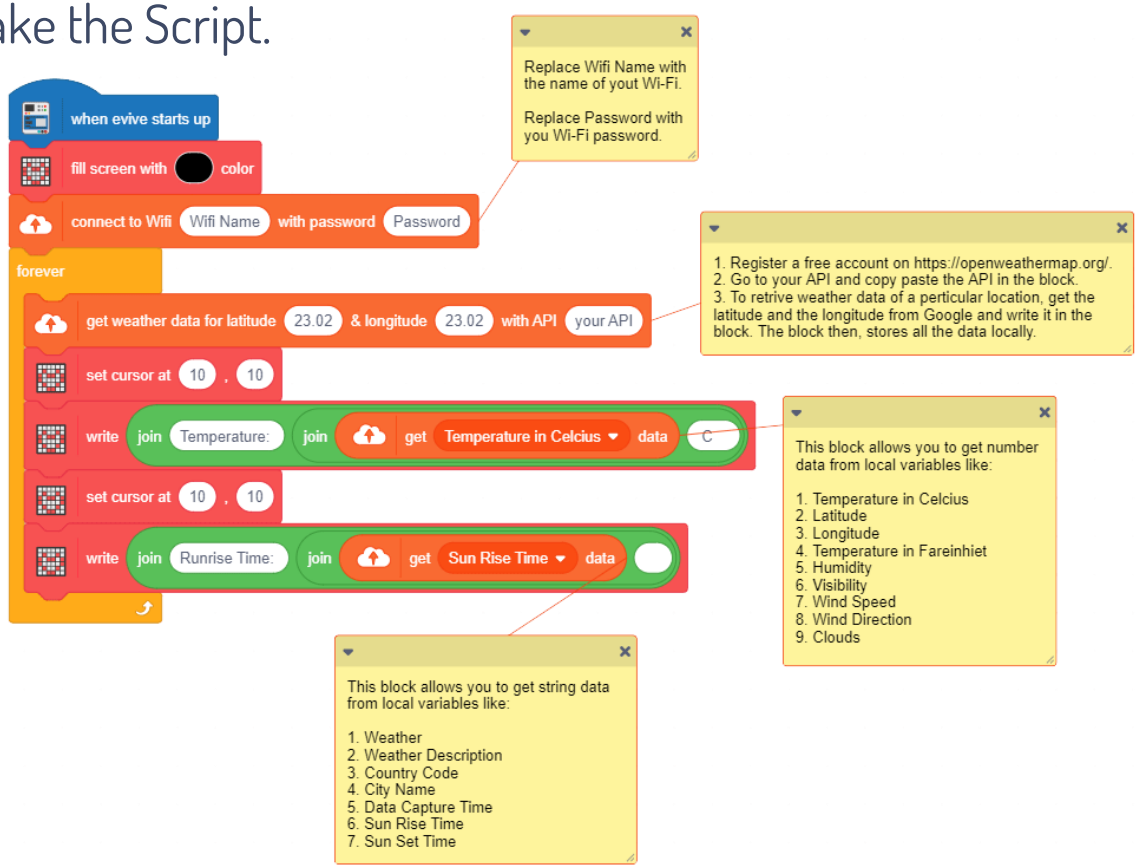
Internet of Things Extension

- **get (string) data**: The block reports the weather data specified in the input:
  - weather,
  - weather description,
  - country code,
  - city name,
  - time of captured data,
  - sunrise time and
  - sunset time.



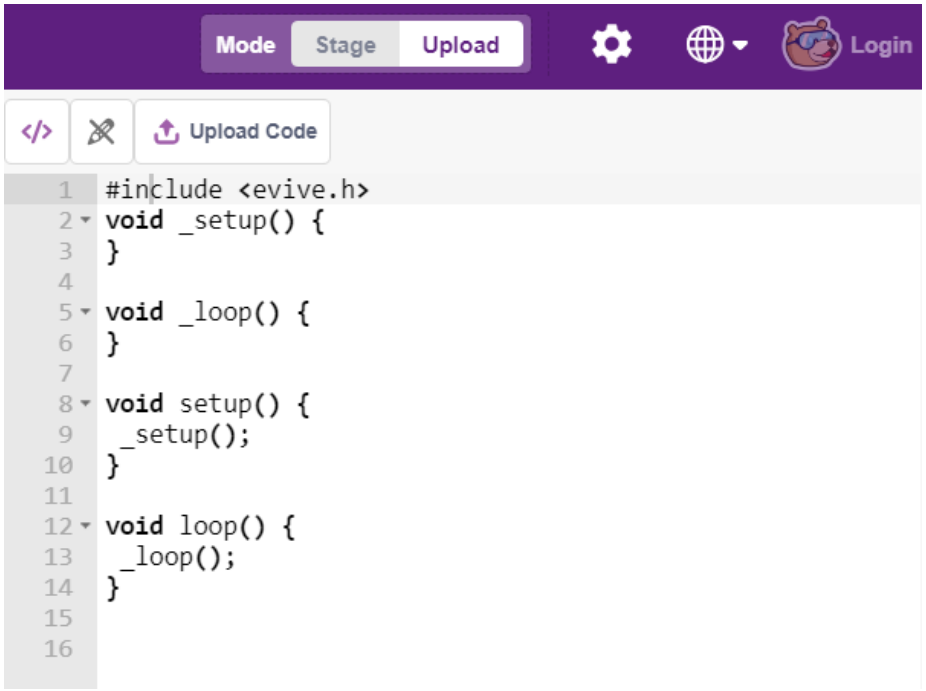
PictoBlox Script

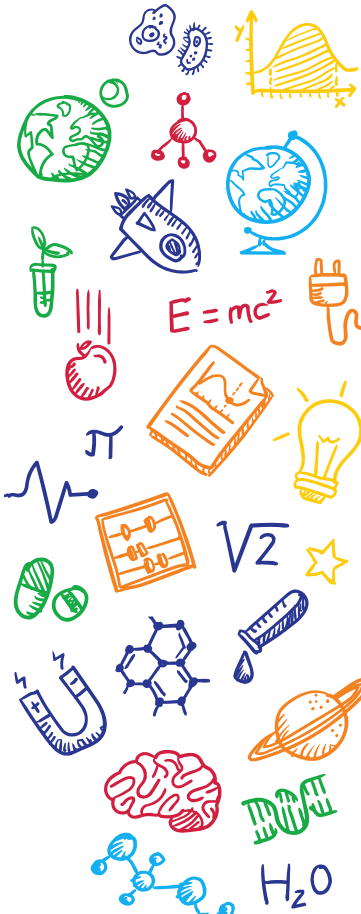
- Make the Script.



PictoBlox Script

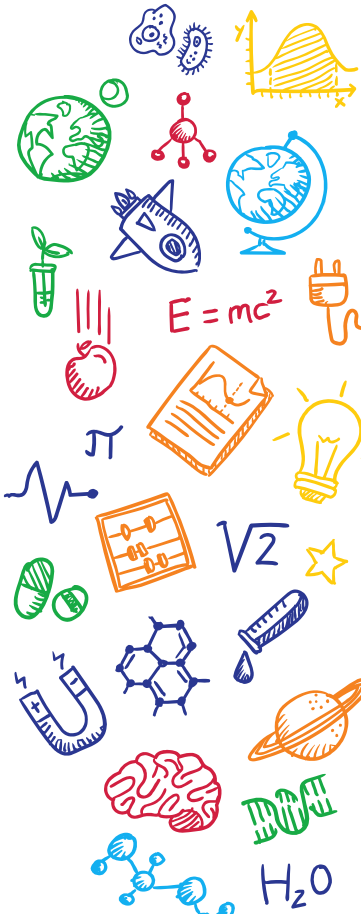
- Upload the code onto evive by clicking on the Upload Code Button:





Receiving Data

- When you start your evive, you will see two things happening:
- M1 LED glowing:
  - Yellow: Connected to Wi-Fi.
  - Red: Not connected to Wi-Fi. Check if your Wi-Fi name and password are correct.
- M2 LED glowing:
  - Yellow: Connected to ThingSpeak.
  - Red: Not connected to ThingSpeak.
- Once both the LEDs are Yellow, you will see the requested data on the evive Screen.



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