INTELLIGENT CONNECTED OBJECTS

SUBJECT	IoT sensors
FORMAT	Individual, pairs, or small groups
PREPARATION TIME	1 hour
ACTIVITY LENGTH	1h30
DIFFICULTY LEVEL	Average

PEDAGOGICAL GOALS

- To develop an IoT project
- To work on implementing a sensor application
- To learn to connect electronic systems using the internet

NECESSARY MATERIALS

- Computer room with computers connected to the Internet
- NodeMCU board or similar
- Breadboard
- Jumpers
- Potentiometer

⊙ INTELLIGENT CONNECTED OBJECTS

Conducting the activity:

- If possible, divide the class into small groups. Each group must have access to a computer with Arduino IDE installed, a NodeMCU board or similar and a cable to connect the board to the computer. If this is not possible, try to take turns so that all students have access to the materials, or work in a collective format, projecting your screen.
- Organize the materials and provide a kit with the components for each group.
- Then ask each group to connect their board to their computer and open the Arduino IDE.
- Present the steps to transfer the code below onto the board.

Code

```
// ThingSpeak and ESP8266 Libraries
#include <ThingSpeak.h>
#include <ESP8266WiFi.h>

// Network data: name and password
char ssid[] = "xxxxxxxxx";        //  SSID network name
char pass[] = "xxxxxxxxx";   // Password

int status = WL_IDLE_STATUS;
WiFiClient  client;

int sensorValue; // variable that stores the value read by the sensor

// Information available on ThingSpeak: channel number and writing key
unsigned long canal = xxxx;
const char * WritingKeyAPI = "xxxxxxx";

void setup() {
  WiFi.begin(ssid, pass);
  ThingSpeak.begin(client);
}

void loop() {
  // Reads the input value on the analog pin 0
  sensorValue = analogRead(A0);

  // Writes on ThingSpeak:
  // (channel number, field number, value, write key)
  ThingSpeak.writeField(channel, 1, sensorValue, WritingKeyAPI);

  delay(5000); // ThingSpeak accepts value updates every 5 seconds.
}
```

- As next steps, it is possible to suggest implementing other sensors, such as a light or temperature sensor.

⬢ INTELLIGENT CONNECTED OBJECTS

Conducting the activity:

- Check the project circuit below:
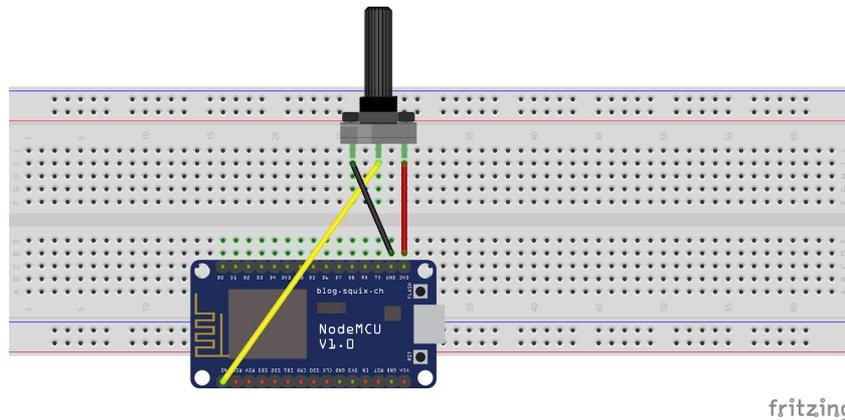
- Once the network parameters, password, write and read keys and channel of Thingspeak have changed, ask them to update the chart data within the Thingspeak platform.
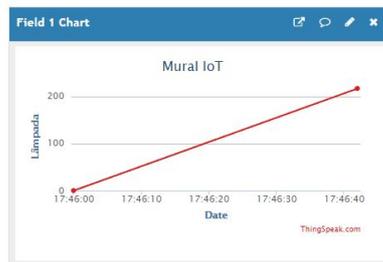
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Discussion:

- After completing the activity, discuss the concepts learned with the class, testing and designing the code, if possible. Some questions that can guide the discussion::
    - What is a computer program? How does this program work?
    - Where in the code does the program read information from the internet?
    - Why is the value updated every 5 seconds?
    - What would happen if the piece of code that is inside the void loop function was passed to void setup?

Credits:

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